Chapter 22

Emergency Medical Care for   
Fire Department First Responders

Lesson Goal

After completing this lesson, the student shall be able to describe the role of the fire service in emergency medical care , laws regarding patient confidentiality, infection control practices, patient assessment, CPR, bleeding control, and shock management.

Objectives

Upon successful completion of this lesson, the student shall be able to:

1. Describe the roles the fire service may take in providing emergency medical care. *[NFPA® 1001, 4.3]*

2. Summarize patient confidentiality requirements. *[NFPA® 1001, 4.3]*

3. Distinguish among commonly encountered communicable diseases. *[NFPA® 1001, 4.3]*

4. Summarize immunization considerations for first responders. *[NFPA® 1001, 4.3]*

5. Explain the importance of body substance isolation (BSI). *[NFPA® 1001, 4.3]*

6. Explain actions taken for basic patient assessment. *[NFPA® 1001, 4.3]*

7. Compare and contrast CPR techniques for adults, children, and infants. *[NFPA® 1001, 4.3]*

8. Explain when to administer and when to discontinue CPR. *[NFPA® 1001, 4.3]*

9. Describe basic types of external bleeding. *[NFPA® 1001, 4.3]*

10. Explain the use of direct pressure and elevation to control external bleeding. *[NFPA® 1001, 4.3]*

11. Describe the signs and symptoms of internal bleeding. *[NFPA® 1001, 4.3]*

12. Describe the role that recognizing the types, signs, and symptoms of shock plays in shock management. *[NFPA® 1001, 4.3]*

Instructor Information

This is the lesson covering emergency medical care for fire department first responders. This lesson describes the role of the fire service in providing emergency care and laws regarding patient confidentiality. The lesson also covers infection control, patient assessment, CPR, bleeding, and shock.

Important instructor information is provided in shaded boxes throughout the lesson plan. Carefully review the instructor information before presenting the lesson.

The information contained in this lesson covers topics that are related to the entrance requirements for firefighter training required by NFPA® 1001. However, it is not meant to substitute for formal training as an emergency medical care provider.

Methodology

This lesson uses lecture and discussion. The level of learning is comprehension.

Outline Contents

| Section | Outline Pages | Text Pages |
| --- | --- | --- |
| [Section I: Fire Service-Based Emergency Medical Care](#_fire_service_based) | 6 | 1272 |
| [Section II: Patient Confidentiality](#_patient_confidentiality) | 9 | 1272 |
| [Section III: Infection Control](#_infection_control) | 12 | 1273 |
| [Section IV: Patient Assessment](#_patient_assessment) | 29 | 1280 |
| [Section V: Cardiac Arrest and Cardiopulmonary Resuscitation (CPR)](#_cardiac_arrest_and) | 33 | 1282 |
| [Section VI: Bleeding Control](#_bleeding_control) | 47 | 1288 |
| [Section VII: Shock Management](#_shock_management) | 55 | 1292 |
| [Section VIII: Summary and Review](#_SUMMARY_AND_REVIEW) | 59 | 1294 |

Audiovisuals

* Visuals 22.1 to 22.63 (PowerPoint® Presentation)

Evaluation

* Chapter 22 Quiz
* Chapter 22 Test

Presentation Tools

**Interactive Objects** allow instructors to present information a piece at a time by clicking on hot spots in a larger image.

Each object is labeled in the Lesson Outline and indicated in the PowerPoint® presentation by a RED arrow in the top left corner of the image. This lets instructors know to use the mouse to explore all of the information on the slide.



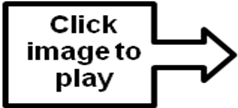
After all of the information is displayed a reset arrow will appear in the bottom right corner of the image. Instructors can use this to remove the text and quiz students on content just covered or simply move on to the next slide.



To move to the slide after an interactive object, select the Click for next slide arrow on the left side of the slide.

**Videos** are used as discussion starters or to illustrate a concept or process discussed in the chapter.

These are labeled in the Lesson Outline and indicated in the PowerPoint® presentation by the **Click image to play** arrow on the left side of the slide.

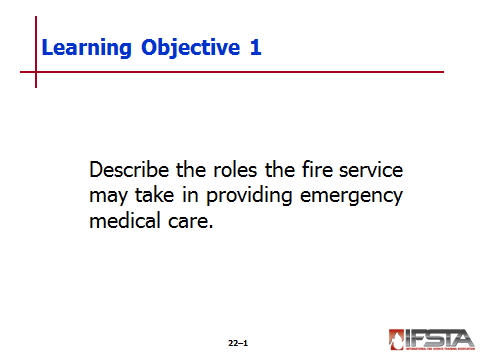


Section I: Fire Service-Based Emergency Medical Care

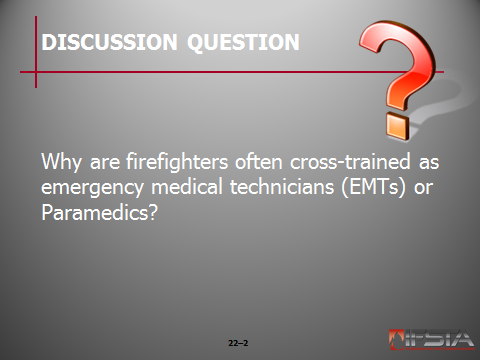
# fire service-based emergency medical care

p. 1272 Objective 1 — Describe the roles the fire service may take in providing emergency medical care.

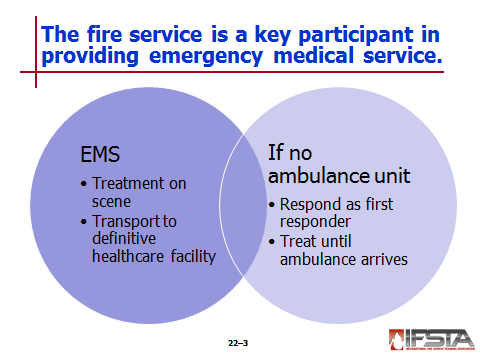
**Ask Students:** Why are firefighters often cross-trained as emergency medical technicians (EMTs) or Paramedics?



Briefly discuss answers with students. Students may respond that firefighters may be responsible for emergency medical care either as part of an ambulance service or as first responders to the scene of a medical emergency.



## Fire Service-Based Emergency Medical Care



### Emergency medical service (EMS) –Treatment on scene and transport of victims who are ill or injured to definitive healthcare facility

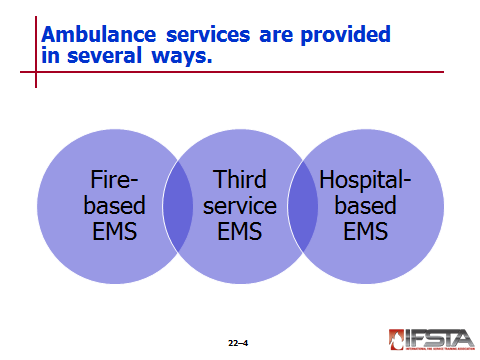
#### Only had formal recognition since 1960s

#### Fire service is key participant

##### Provide EMS in a number of different ways

##### If organization does not operate ambulance units, personnel often respond as medical first responders to begin treatment until an ambulance arrives

### Ambulance services provided in several ways



#### Fire-based EMS – Service provided as a function of fire department

##### Staffing by firefighters who cross-trained as emergency medical technicians (EMTs) or Paramedics

##### In some instances - Staffing provided by EMTs and Paramedics with no fire fighting responsibilities

#### Third-service EMS – Service provided by organization separate from fire and police services

##### Has own administration and personnel

##### In most instances, organization is function of municipal, county, provincial, or regional government

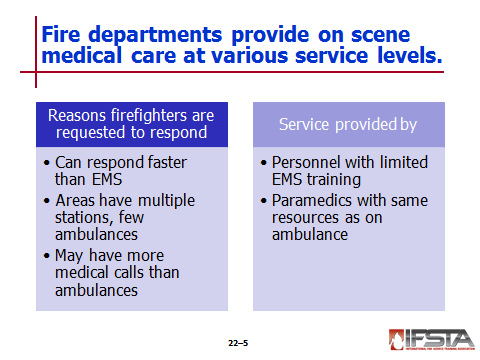
##### May also be provided by for-profit or not-for-profit organization under contract

#### Hospital**-**based EMS – Service is contracted to hospital by local government

##### Personnel are employees of hospital

##### Patients are typically transported to contracted hospital for treatment

### Reasons fire departments are often requested to respond to scene and begin care until EMS personnel arrive



#### Fire department personnel often able to respond faster than EMS in many jurisdictions

#### Most areas have multiple fire stations and apparatus but only few ambulances

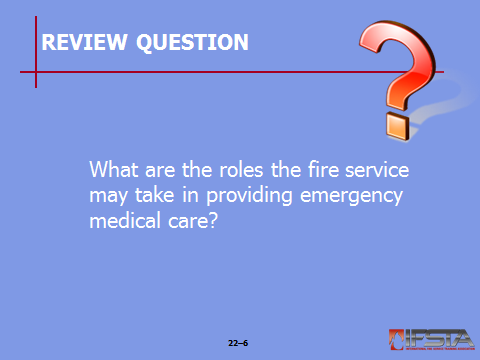
#### Areas may have more medical calls than ambulances available

### Service level – May be provided

#### By personnel with limited EMS training

#### By paramedics who carry most of same equipment and medications on fire apparatus as are on ambulance

Review Question: What are the roles the fire service may take in providing emergency medical care?  
*See p. 1272 of the manual for answers.*

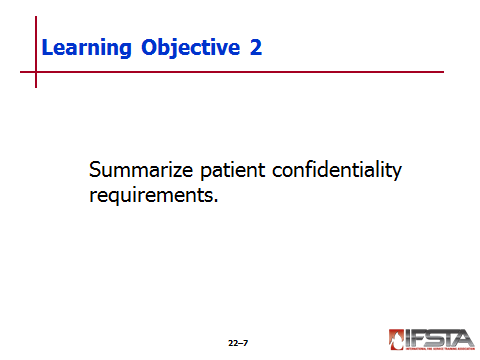


Section II: Patient Confidentiality

# patient confidentiality

pp. 1272-1273 Objective 2 — Summarize patient confidentiality requirements.

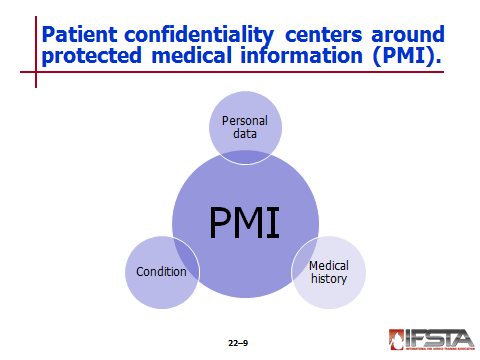
**Ask Students:** What information is included in the protected medical information (PMI) of a patient?



In the discussion students should understand that the information includes: personal data (name, birth date, social security number, address), medical history, and condition. Also emphasize why it is important for this information to be kept confidential.



## Patient Confidentiality



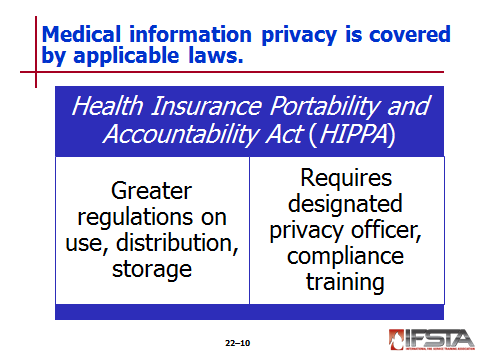
### Healthcare providers must safeguard protected medical information (PMI)

#### Personal data (name, birth date, social security number, address)

#### Medical history

#### Condition

### Actions governed by applicable laws



#### *Health Insurance Portability and Accountability Act* (HIPAA) (1996) – Instituted greater regulations on use, distribution, storage of PMI

##### Establishes civil and criminal penalties for noncompliance

##### Fire departments typically required to follow regulations – If providing medical care and bill electronically for services

##### Regulations dictate

###### How and to whom PMI can be shared

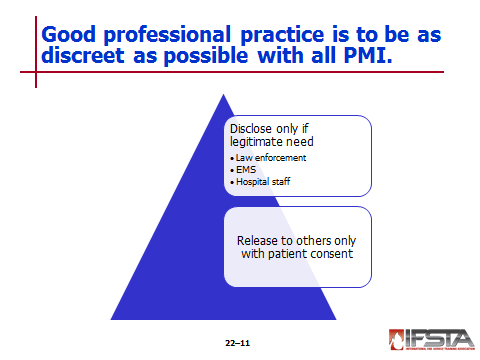
###### How information is protected from unauthorized disclosure

#### Departments bound by HIPAA regulations are required to

##### Have designated privacy officer

##### Provide compliance training

### Regardless of department’s obligations – Good professional practice is to be discreet as possible with PMI



#### PMI should only be disclosed to those who have a legitimate need

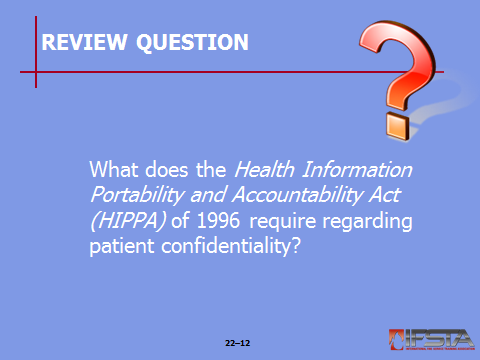
##### Law enforcement personnel

##### EMS personnel

##### Hospital staff

#### Release to other individuals can only be done with consent of patient

Review Question: What does the *Health Information Portability and Accountability Act (HIPPA)* of 1996 require regarding patient confidentiality?  
*See p. 1272 of the manual for answers.*

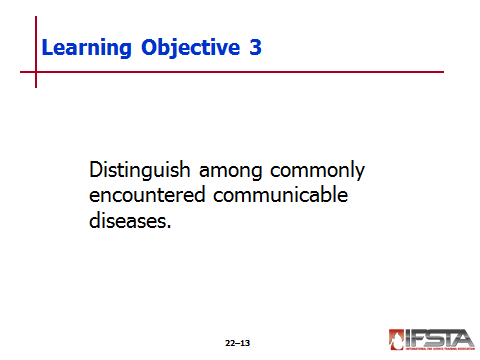
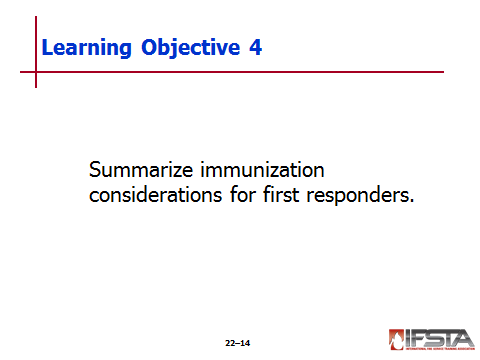


**Section III:** Infection Control

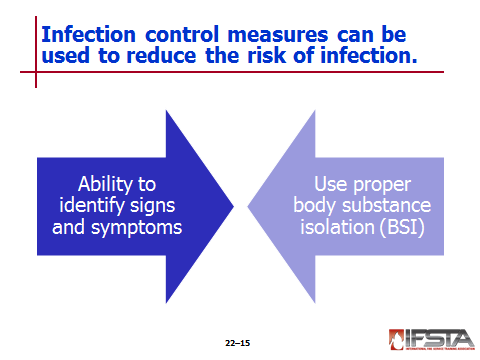
# infection control

pp. 1273-1280 Objective 3 — Distinguish among commonly encountered communicable diseases.

Objective 4 — Summarize immunization considerations for first responders.



## Infection Control



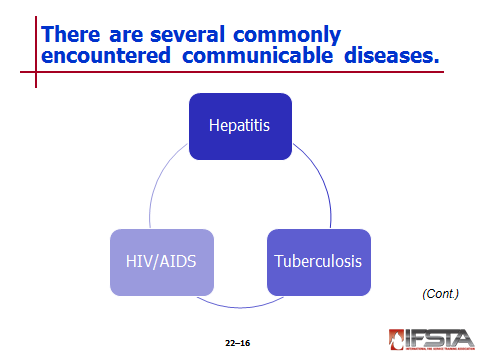
### Communicable diseases not always obvious

### Reduce risk of infection

#### Ability to identify signs and symptoms of common communicable diseases

#### Use proper body substance isolation (BSI)

## Commonly Encountered Communicable Diseases



### Hepatitis – Inflammation of the liver

#### Kinds encountered

##### Viral most common

##### Can be caused by drugs, alcohol, hazardous chemicals, heredity

#### Symptoms include

##### Viral-like illness

##### Yellowish discoloration of eyes and skin

### Types of viral hepatitis

#### Hepatitis A – Typically caused by consuming food or water that has been contaminated, particularly by fecal matter

##### Signs and symptoms

###### Fatigue

###### Abdominal pain

###### Fever

###### Dark urine

###### Marked yellowing of the skin and/or eyes

##### Generally short-term; typically no long-term consequences

##### Least serious form of viral hepatitis

#### Hepatitis B – Typically transmitted through blood and other body fluids

##### Can be short-term or long-term

##### Can potentially cause serious scarring and injury to liver

##### Can eventually progress to liver failure

##### Signs and symptoms of Hepatitis B similar to those of Hepatitis A

##### Serious and potentially life-long infection

#### Hepatitis C – Typically transmitted through blood and other bodily fluids

##### Differs from other types

###### Those infected can go for years without exhibiting symptoms

###### Virus has more than likely done serious liver damage even while individual is symptom free

##### Damage can be long-term or permanent

##### Liver failure can occur

#### Hepatitis D (Delta) – Uncommon rare strain of hepatitis

##### Only occurs when also infected by Hepatitis B

##### Makes effects of Hepatitis B much worse

### Vaccines

#### Available for Hepatitis A and B; those for Hepatitis C still in development stage

#### Important to be immunized against hepatitis and other infectious diseases

### Best way to combat

#### Thoroughly wash hands

#### Maintain proper BSI procedures

### Tuberculosis (TB) – Bacterial infection that primarily affects respiratory system

#### Contagious, spread through droplets in air produced by breathing and coughing of infected person

#### Bystanders have chance of becoming infected when droplets inhaled

#### Because transmitted by airborne droplets – Incidences more prevalent in high-density living areas

#### Considered active when exhibiting signs and symptoms

##### Fever

##### Fatigue

##### Chills

##### Weight loss

##### Painful breathing

##### Productive cough (often with traces of blood)

##### Coughing that lasts several weeks

#### Because signs and symptoms often similar to other illnesses – Take BSI precautions, use a N-95 mask, even if patient is not known to be infected

#### No widely used vaccine to protect against

#### Healthcare providers typically skin tested to check for occupational exposure annually

### HIV/AIDS – Result of prolonged exposure to human immunodeficiency virus (HIV)

#### Weakens immune system to point where body is unable to fight off diseases

#### Symptoms

##### Early– Similar to other viral illnesses

##### More advanced – Lead to severe muscle wasting, increased likelihood of contracting other infections

#### Because of weakened immune defense – Also likely to be infected by diseases such as hepatitis and TB

#### Spread through contact with infected blood and body fluids

#### Pose less risk than hepatitis and TB

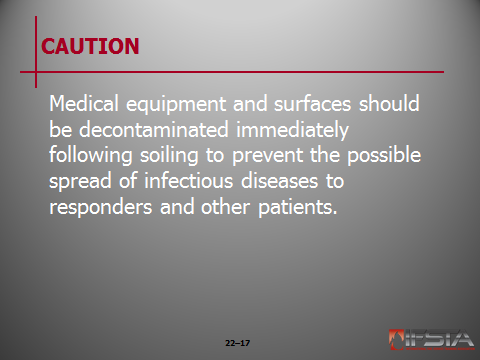
##### Due to short amount of time HIV can survive outside of body

##### Still important to

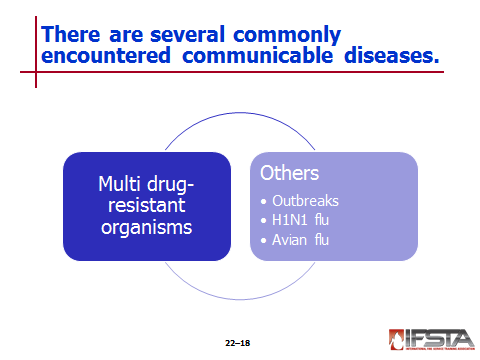
###### Practice proper BSI procedures

###### Adequately decontaminate any medical equipment before used on another patient

Caution: Medical equipment and surfaces should be decontaminated immediately following soiling to prevent the possible spread of infectious diseases to responders and other patients.



### Multi Drug-Resistant Organisms (MDRO)



#### Increasing concern in healthcare settings

##### Difficult to control

##### Do not typically respond to normal antibiotic treatment

#### Methicillin resistant staphylococcus aureus (MRSA) – Drug-resistant staph infection that is commonly encountered type of MDRO

##### Typically occur in healthcare settings, have been more recent outbreaks in communities

##### Can develop in numerous ways but are usually initially seen as abscesses in skin commonly mistaken for spider bites

##### Are easily spread – Important that proper BSI precautions be taken

##### All reusable medical equipment must be sanitized after each use to prevent from spreading

### Other diseases

#### Outbreaks of infectious disease occur from time to time

#### Recent outbreaks in North America include

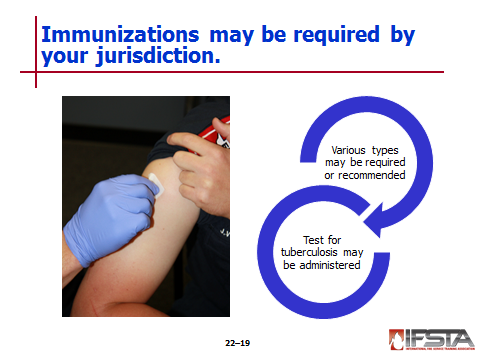
##### H1N1 influenza (“swine flu”)

##### Avian influenza (“bird flu”)

##### Others

#### Keep yourself and patients safe – Use proper sanitation and BSI procedures

## Immunizations



### May be required by jurisdictions

### Types that may be required or recommended

#### Hepatitis B

#### Measles, mumps, and rubella (MMR)

#### Varicella (chickenpox)

#### Tetanus/diphtheria

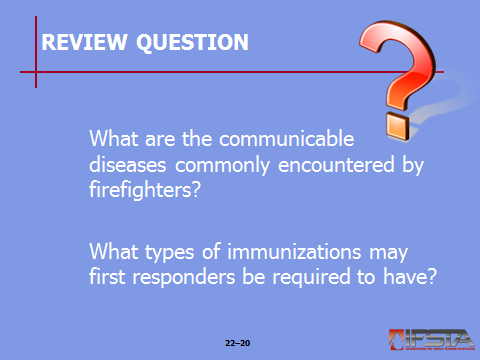
#### Influenza

### Annual purified protein derivative (PPD) test may be administered to determine tuberculosis exposure

#### Performed by injecting inactive bacterium under skin

#### Reaction to test may indicate tuberculosis exposure

Review Questions:

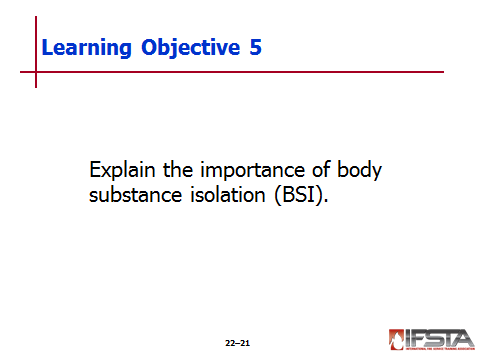
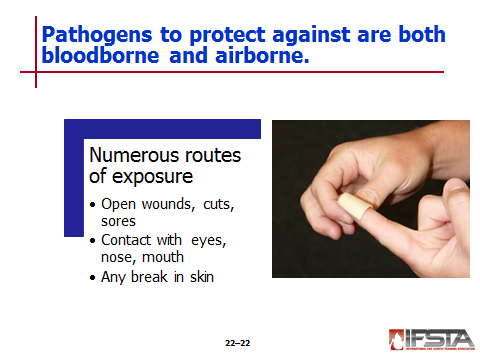


What are the communicable diseases commonly encountered by firefighters?  
*See p. 1274 of the manual for answers.*

What types of immunizations may first responders be required to have?  
*See p. 1277 of the manual for answers.*

pp. 1277-1280 Objective 5 — Explain the importance of body substance isolation (BSI).

## Body Substance Isolation (BSI)



### Pathogens – Organisms that carry disease and can cause infection

#### Exist in body fluids of infected persons

#### Can be transmitted from one person to another through contact with these fluids

##### Any type of body fluid can carry pathogens

##### Bloodborne pathogens are most commonly encountered

#### Main types

##### Bloodborne most commonly encountered – Though any type of fluid can carry

##### Airborne – Spread by tiny droplets when infected individual coughs or breathes

#### Exposure occurs when body fluid of infected individual comes in contact with exposed area of another person

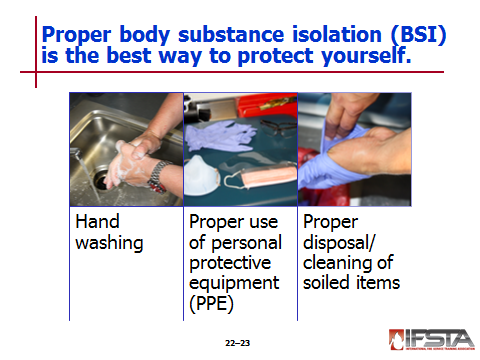
#### Numerous routes where emergency responders are susceptible to exposure

##### Open wounds, cuts, and sores on body

##### Contact with eyes, nose, or mouth

##### Any break in skin is potential route of exposure

### Critical that firefighters take all precautions necessary to protect from exposure – Best way is by maintaining proper BSI procedures



#### Hand washing

#### Proper use of personal protective equipment

#### Proper disposal and/or cleaning of soiled items

#### Sources of information for establishing BSI procedures

##### United States Centers for Disease Control and Prevention (CDC)

##### Canadian provincial health authorities

### Hand washing must be performed regularly



#### Proper hand washing has been shown to greatly reduce transmission of disease

#### Should be done frequently; especially before and after coming in contact with a patient

#### Hands should be washed in methodical manner with warm water and soap

##### Special attention paid to areas on hands that are soiled, areas between fingers, fingernails

##### Good practice to wash wrists and forearms

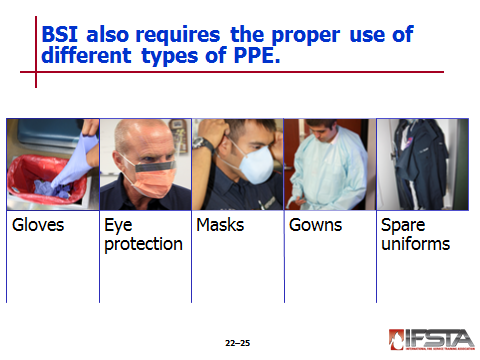
##### Hands should be washed for no less than 30 seconds

#### Hand washing is often not an option when responding to emergency calls

##### Alcohol-based hand cleaning solution should be used

##### Especially after providing patient care

### Personal Protective Equipment (PPE) – Use to prevent transmission of infectious diseases



#### When selecting – Better to wear too much than not enough

#### Refer to department SOPs regarding use on emergency medical responses

### Types of PPE

#### Gloves – Should always be worn during patient contact

##### In the past, medical gloves were typically made of latex

##### Some patients and healthcare providers have allergic reaction to this material

##### Many jurisdictions supply emergency responders with gloves made of vinyl or other materials

##### If jurisdiction uses latex gloves, ask patient if he or she has a latex allergy; nonlatex gloves should be available

##### The same gloves should never be used when treating multiple patients

##### To remove soiled gloves, place two clean fingers on inside of glove and peel off

##### Gloves soiled with blood or other body fluids should be disposed of in sealed container

###### Specifically used for disposal of biohazards

###### Typically red in color and have a red liner

#### Eye protection – Especially necessary when there is chance for blood or other body fluids to be splashed, sprayed, or spattered

##### Safety glasses are a common type used

###### Designed to keep fluids away from eyes

###### Usually provide some type of impact resistance

###### Accessories are available for those who wear prescription glasses

##### Combination mask and eye shield available and widely used

##### Helmet shields and Bourke eye shieldsdo not provide suitable eye protection for emergency medical use

#### Masks – Protect against respiratory hazards, airborne pathogens, body fluids

##### Surgical-style masks typically suffice in situations where contact with blood or other body fluids are concern

##### Use mask that provides greater level of protection if you suspect patient has communicable respiratory disease

###### Placing mask on patient can also prevent transmission of disease to others

###### N-95 respirators may be provided for use when treating patients where TB suspected

###### Termed N-95 because are tested and shown to block at least 95 percent of airborne particles

#### Gowns – Protect exposed skin and uniform from spray and spatter of body fluids

#### Spare uniforms – Departments may require extra uniform ensemble available at station or on apparatus

##### Soiled uniform looks unprofessional, can potentially allow for spread of disease

##### Follow departmental guidelines with regard to cleaning

##### In instances of extreme contamination, immediately shower and notify infection control officer

### Cleaning and disposing of contaminated items



#### Medical equipment and non-disposable PPE that comes into contact with any patient must be considered contaminated

#### Must follow requirements of NFPA® 1581 and department’s infection control protocol

#### General steps for decontaminating equipment and PPE

##### Wear disposable gloves, mask, eye protection to place contaminated items in biohazard bag or container

##### Transport contaminated items to designated disinfecting area of fire station or other facility

##### Don appropriate splash-resistive eyewear, cleaning gloves, and fluid-resistant clothing designated for decontaminating equipment

##### Use solution of bleach and water or disinfectant in accordance with equipment or PPE manufacturer’s instructions

##### Do not decontaminate equipment or PPE in kitchen, bathroom, or other living areas of fire station

##### Contaminated station uniforms or structural PPE must not be taken home or cleaned in normal laundry facilities

##### Decontaminate sink and cleaning area, remove PPE worn during cleaning, and dispose of in accordance with fire department protocol

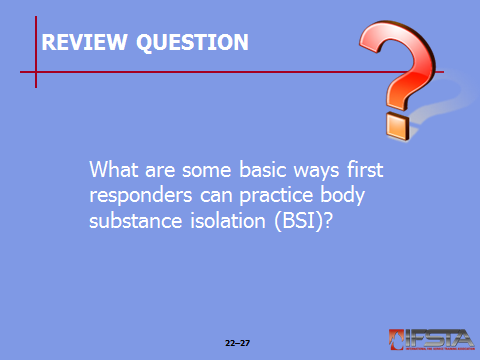
#### Contaminated disposable equipment and PPE must be placed in medical waste containers and disposed of in accordance with local protocol

#### Needles and blades, must be placed in sharps containers designated for such items

##### Containers must be closable, puncture-proof, leak-proof

##### Labeled according to federal, state, or local regulations

Review Question: What are some basic ways first responders can practice body substance isolation (BSI)?  
*See pp. 1278-1280 of the manual for answers.*

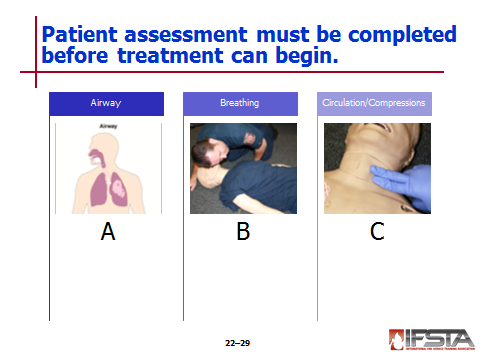


**Section IV:** Patient Assessment

# patient assessment

pp. 1280-1282 Objective 6 — Explain actions taken for basic patient assessment.

## Patient Assessment



### Patient condition must be assessed before medical treatement can begin

### Most basic assessment – determine if critical functions of body are working properly

### If patient is responsive, assessment involves evaluation of airway, breathing, and circulation

#### Known as the ABCs

#### Majority of patients will be responsive and assessed in this manner

### In patients that are unresponsive and not breathing, or breathing with irregular gasping breaths, assessment sequence should be rearranged

#### Circulation,Airway, then Breathing (CAB)

#### Change is based on research that shows that *any* delay in delivery of high quality chest compressions reduces likelihood of successful resuscitation from cardiac arrest

### If pulse present – Assess airway and follow normal ABC sequence

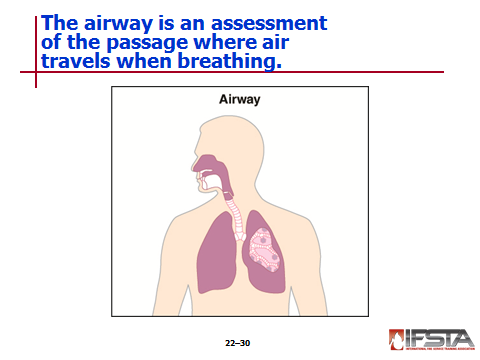
### If no pulse found

#### Immediately begin cycle of chest compressions

#### Then open airway and ventilate patient – Cardiac arrest CAB sequence

Instructor Note: Discuss with students the fact that formal CPR training will provide more definitive information on the performance of assessment techniques.

## Airway



### Airway – Passage between lungs and nose and mouth where air travels during breathing

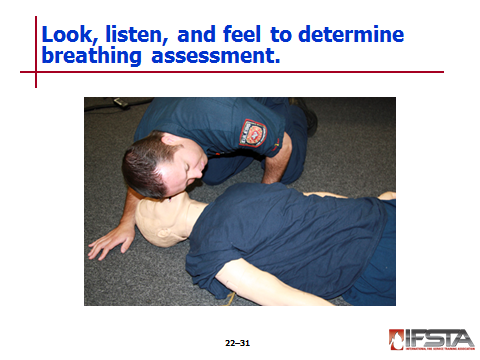
### If obstructed by tongue, a foreign object, or fluid, air cannot travel freely

### If patient is able to talk and appears to be breathing without difficulty, can be assumed that airway is clear

### If the patient is unresponsive, you may need to perform a technique to open airway

Instructor Note: Discuss with students the fact that techniques for opening the airway are introduced during formal CPR training.

## Breathing



### After determining airway is open, necessary to determine if patient is breathing

### Best way to determine is to look, listen, and feel for breathing by placing ear near patient’s nose and mouth and looking at chest

#### Should see patient’s chest rise and fall with each breath

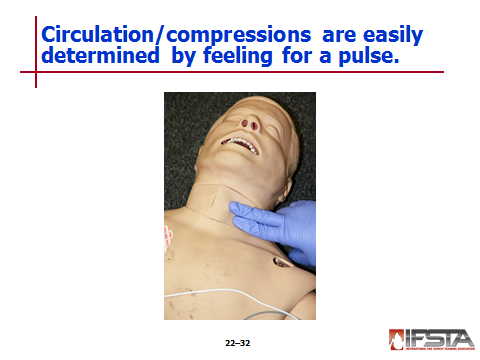
#### When listening, should be able to hear patient breathing through mouth or nose

#### When feeling, should be able to feel exhaled air

### If patient is not breathing or no air is being moved during breathing, you will need to provide assistance

Instructor Note: Discuss with students the fact that techniques for rescue breathing are introduced during formal CPR training.

## Circulation/Compressions



### Circulation – Flow of blood through body

### Easiest way to determine by feeling for pulse

### Most pulses assessed at radial and carotid arteries

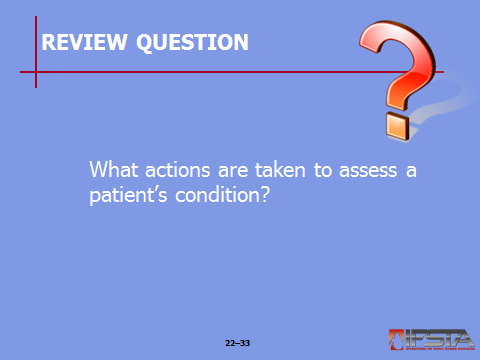
#### Because of distance of radial artery from heart, it typically takes stronger blood flow for pulse to be felt in this area than at carotid artery

##### Just because pulse cannot be found at radial artery does not mean that patient is pulseless

##### In these instances, you should attempt to find pulse at carotid artery as well

#### If pulse cannot be found, chest compressions should be initiated immediately

Review Question: What actions are taken to assess a patient’s condition?  
*See pp. 1280-1282 of the manual for answers.*

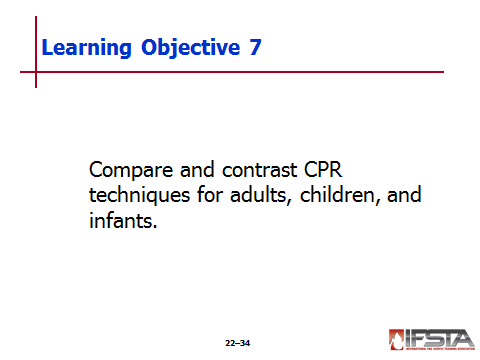
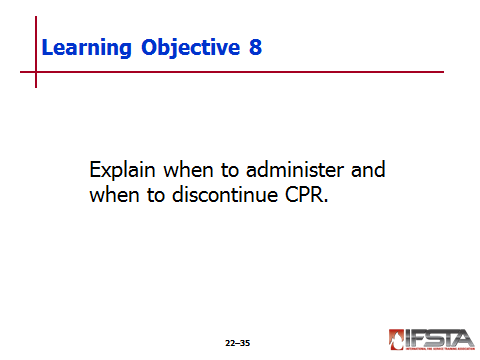


**Section V:** Cardiac Arrest and Cardiopulmonary Resuscitation   
 (CPR)

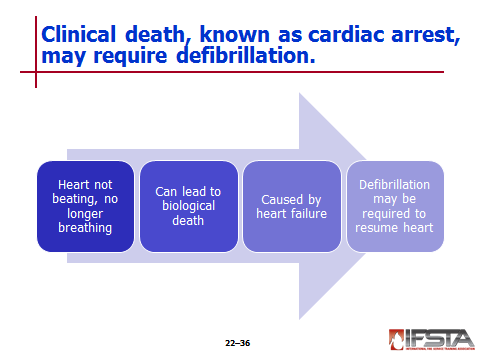
# cardiac arrest and cardiopulmonary resuscitation (CPR)

pp. 1282-1288 Objective 7 — Compare and contrast CPR techniques for adults, children, and infants.

Objective 8 — Explain when to administer and when to discontinue CPR.



## Cardiac Arrest and Cardiopulmonary Resuscitation (CPR)



### Clinical death – When patient’s heart stops beating and they are no longer breathing

#### Condition known as cardiac arrest

##### Heart fails to circulate blood through body

##### Cells not able to receive oxygen and nutrients needed to survive – Begin to die in span of few minutes

#### If allowed to continue

##### Cell death will progress to point where organs (brain, heart, lungs) irreversibly damaged and cannot be revived

##### Leads to biological death – No medical intervention can revive patient at this point

### Electrical impulses in heart – Cause it to contract and force blood throughout body

### Heart failure that causes clinical death often result of problem with heart’s ability to produce, transmit impulses

#### Condition often persists unless outside electrical stimulus applied

#### Outside stimulus commonly known as defibrillation

#### Heart will often not resume operation without defibrillation – Critically important that it be done as soon as possible

##### Advanced-level EMS providers trained to

###### Recognize electrical issues with heart

###### Manually administer defibrillation and medications that treat these issues

##### May take several minutes for these personnel to arrive on scene

##### During this time, patient may have already transitioned from clinical death to biological death

#### Automated external defibrillators (AEDs) available for layperson use in public facilities – Device will

##### Instruct layperson on how to use

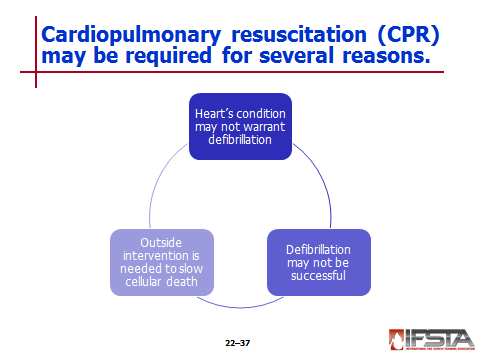
##### Automatically determine if defibrillation is needed

##### Notify user to push button that delivers shock

#### Also common to find AEDs on fire apparatus that do not carry Paramedics and their equipment

Instructor Note: Discuss with students that the use of AEDs is beyond the scope of this chapter; however, the students’ department will provide further training if they are expected to use AEDs during medical responses.

### Cardiopulmonary resuscitation (CPR) – Act of physically forcing blood through a patient’s body and providing artificial respiration



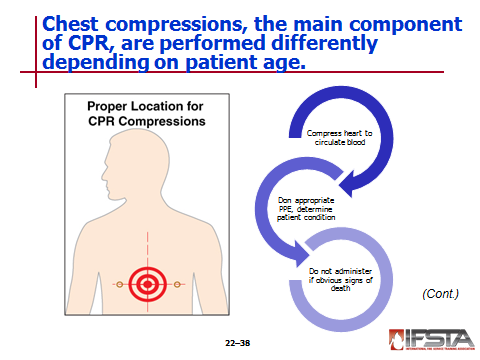
#### In some instances, heart’s condition may not warrant defibrillation

#### In others, defibrillation may not be successful in resuming function of heart

#### Outside intervention is needed in order to circulate blood through body and slow rate of cellular death

Instructor Note: Discuss with students that the information presented highlights how to perform *layperson* CPR on adults, infants, and children. Emphasize that layperson CPR is performed in a different manner than CPR for healthcare providers. In particular, a higher priority is placed on chest compressions than patient assessment. Remind students that it is imperative that they participate and are certified in a CPR course administered by their department and/or the American Heart Association if they are to provide this type of care.

## Chest Compressions



### Chest compressions

#### Main component of CPR

#### Act of forcefully compressing heart in order to circulate blood throughout body

#### When performed properly, chest compressions

##### Compress heart between patient’s sternum and spine in rapid succession

##### Alter pressure within chest, forcing blood from heart

#### Chest compressions performed in different ways and at different rates and depths, depending on age of patient

### Administering chest compressions

#### First priority after donning appropriate PPE – Determine condition of patient

#### While CPR is lifesaving intervention, it should not be administered to those who have obvious signs of irreversible death – These include

##### Rigor mortis

##### Obvious wounds that are not compatible with life (such as decapitation)

##### Decomposition

##### Line of lividity

Instructor Note: Discuss with students that the techniques identified in this chapter are for *layperson* CPR. As such, there is a greater emphasis on providing chest compressions than providing ventilation. Therefore, rescue breathing will not be addressed in this chapter. Full CPR incorporates both chest compressions and rescue breathing. Most emergency responders are certified in CPR to the Basic Life Support (BLS) for Healthcare Providers-Level. Emphasize that it is critical to attend and obtain certification from a formal CPR training course.

### Chest compressions for adults



#### Upon arrival for suspected cardiac arrest – Identify patient and determine status

#### First determination – If patient is conscious or unconscious

##### Can be performed by gently shaking or tapping patient and asking them if they are OK

##### If no physical or verbal response, determine if patient has pulse

#### If no pulse can be found at radial or carotid arteries, chest compressions should be started

#### Communications center should be notified of condition and any additional resources that are needed

#### When performing chest compressions on adult – Must first be lying on their back on hard surface such as floor or backboard

##### If patient lying in bed, should be moved to floor

##### Performing chest compressions on someone lying on soft surface is typically ineffective

#### Next, find correct location to administer compressions – Center of patient’s chest between nipples

#### To perform compressions, place one hand on top of other and complete following steps

##### Step 1 – Straighten arms and lock elbows; elbows should remain locked while performing compressions

##### Step 2 – Align shoulders directly over hands; ensures that compressions are delivered straight down

##### Step 3 – Press straight down on chest hard enough to depress sternum at least 2 inches (50mm)

##### Step 4 – Release compression by lifting up; keep elbows locked at all times and do not remove hands from compression location

#### Compressions should be administered by quickly and firmly depressing chest at rate of at least 100 compressions per minute

#### Responders should rotate performance of chest compressions as needed to prevent exhaustion

#### Compressions should be continued until

##### Patient moves or regains consciousness

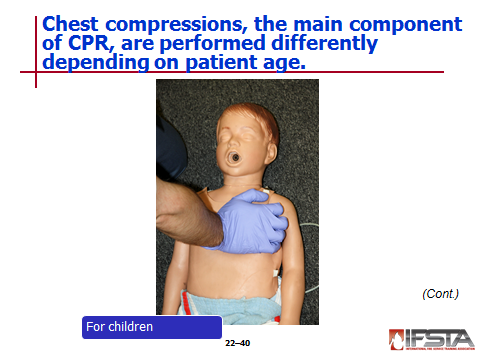
##### Responders with greater training arrive

#### Chest compressions should be performed in a rhythmic manner; should never feel as though you are jabbing at the patient

#### Possible that some type of cracking of sternum or ribs may be heard or felt during compressions – This is normal

NOTE: While performing chest compressions, it is often common to hear or feel a patient's ribs break due to the pressure. While this sensation is not pleasant, it is a sign of good quality compressions and should not discourage you from continuing.

### Chest compressions for children



#### When arriving on scene for cardiac arrest involving child, first determine patient’s status

##### Gently shake or tap child to determine if they are conscious

##### Speak to child and see if they respond

#### If patient is unresponsive, check for pulse; if no pulse can be found, begin chest compressions

#### Move patient to floor or place them on backboard if not lying on solid surface

#### Update dispatch with condition, request any additional resources

#### Chest compressions are performed for children ages 1-8 in slightly different manner than those for adults

##### Instead of performing compressions with 2 hands, rescuers should only use one hand

##### Hand should be placed in center of chest in-line with patient’s nipples

##### When performing compressions, patient’s chest should be compressed about 1/3 depth between chest and back or about 2 inches (50 mm)

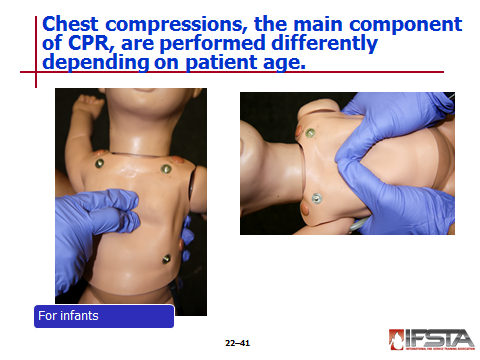
##### Compressions should be administered firmly and quickly at rate of at least 100 compressions per minute

#### Continue administering compressions until

##### Child begins to move, regains consciousness

##### Rescuers with greater training arrive

### Chest compressions for infants



#### When responding to cardiac arrest in infant patient (less than one year old), first determine patient’s status

#### Most incidences of cardiac arrest in infants are due to airway obstructions

#### If obstruction can be seen in mouth, remove it

#### If not, continue in determining patient’s status by speaking to and stroking infant and looking for any type of movement or other response

#### If there is no response, check for pulse

#### If no pulse can be found, begin chest compressions

#### Have another responder update dispatch on patient’s status, request any additional resources

#### Chest compressions for infants are performed with index and middle fingers of one hand – Allows chest to be better compressed than with heel of hand

#### As with adults and children, compressions should be delivered in center of chest in-line with patient’s nipples

#### Compressions should be delivered at rate of at least 100 compressions per minute; infant’s chest should be compressed to 1/3 depth of torso – About 1.5 inches (38 mm)

#### Periodically check patient’s mouth to see if any foreign bodies are present

##### If so, remove from mouth and reassess

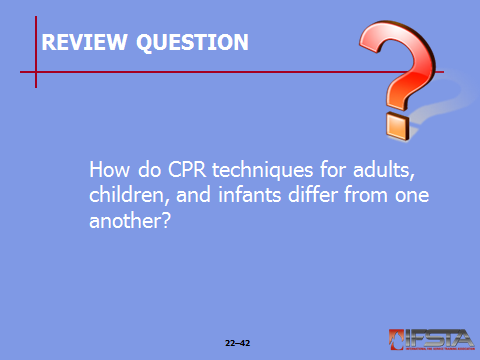
##### If not, continue performing compressions until infant begins to move, regains consciousness, or until responders with greater training arrive

#### Can also be performed in “around the chest” manner

##### Where thumbs are used to perform compressions

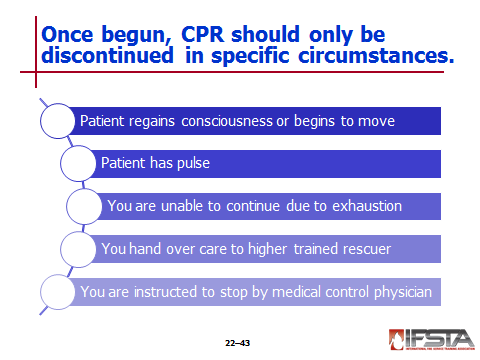
##### Same compression rate and depth as traditional method still applies

Review Question: How do CPR techniques for adults, children, and infants differ from one another?  
*See pp. 1285-1287 of the manual for answers.*



## Discontinuing CPR

### Periodically reassess patient during CPR to determine if working



#### Main way – Patient regains consciousness or begins to move

#### Another way – Reassessing periodically for pulse

### Discontinue CPR if patient regains consciousness, begins to move, or has pulse – Patient should be transported to definitive care facility

### Once CPR is initiated, it should continue until one of following events occurs

#### Patient begins to move and/or regains consciousness

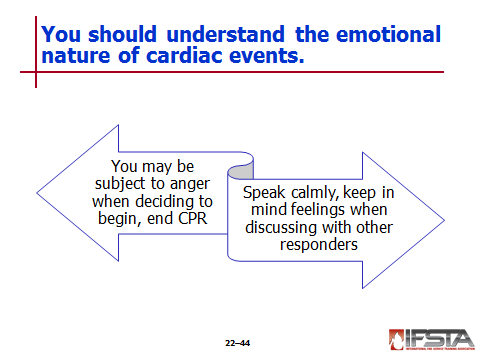
#### Patient has pulse

#### You are unable to continue due to exhaustion

#### You hand over care to rescuer with higher training

#### You are instructed to stop CPR by medical control physician

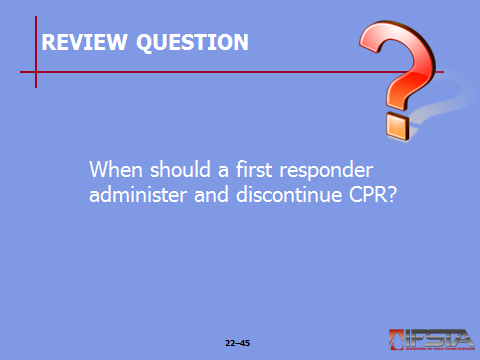
### Understand emotional nature of cardiac arrest events



#### May be subject to anger or emotional response when deciding not to begin or to discontinue CPR without patient response

#### Speak calmly, keep in mind feelings when discussing patient with other responders

Review Question: When should a first responder administer and discontinue CPR?  
*See p. 1288 of the manual for answers.*

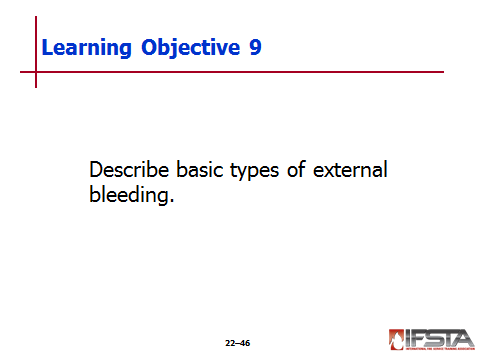
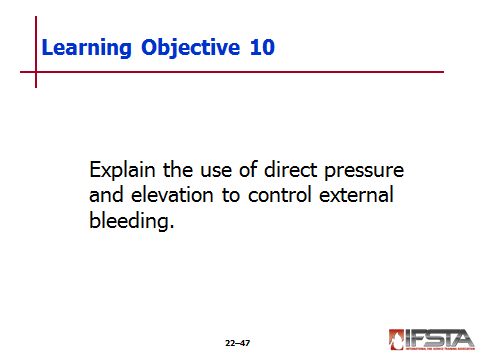


**Section VI:** Bleeding Control

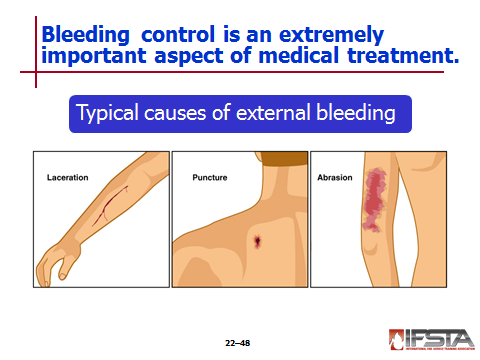
# bleeding control

pp. 1288-1291 Objective 9 — Describe basic types of external bleeding.

Objective 10 — Explain the use of direct pressure and elevation to control external bleeding.



## Bleeding Control



### Blood in body is critical to transport oxygen and nutrients to cells

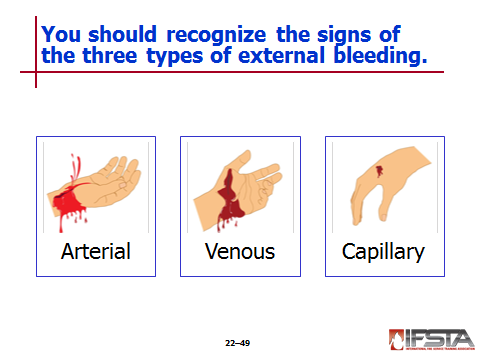
### Maintaining blood flow and volume is extremely important; emergency responders should be prepared to control bleeding

### Two types of bleeding

#### External

#### Internal

## Types of External Bleeding



### External bleeding – Occurs outside body; typically caused by

#### Lacerations

#### Punctures

#### Other openings in skin

### Three types of external bleeding

#### Arterial

#### Venous

#### Capillary

### Arterial bleeding – Occurs when wall of artery has been ruptured

#### Blood is transported away from heart through vessels called arteries

##### Under high pressure

##### Bright red in color due to large amount of oxygen it contains

#### Arterial bleeding can be identified when blood is

##### Bright red

##### Spurting or pulsing

#### Spurting bleeding coincides with each contraction of heart

#### As significant quantities of blood are lost, force of blood decreases

#### Often difficult to control due to substantial force of the blood; is a true medical emergency

#### Patients with arterial bleeding have potential to lose substantial amount of blood in short period of time

#### Sometimes not possible to stop arterial bleeding without surgical intervention – Should be no delay in transporting patients with arterial bleeding to hospital by ambulance

### Venous bleeding

#### Veins – Responsible for returning blood that has been used by cells back to heart

##### Blood movement through veins occurs at slow and steady flow

##### Venous bleeding is typically easier to control than arterial bleeding

#### Patients with venous bleeding will have steady flow of blood

#### Blood will be much darker than arterial blood because oxygen has been removed by cells; carbon dioxide and waste have been added

### Capillary bleeding – Majority of injuries to capillaries come in form of scrapes or superficial lacerations

#### Capillaries – Areas between arteries and veins where oxygen and nutrients in blood are delivered to cells

#### Carbon dioxide and waste are removed by blood through capillaries

#### Because of this exchange, blood moves relatively slowly in capillaries

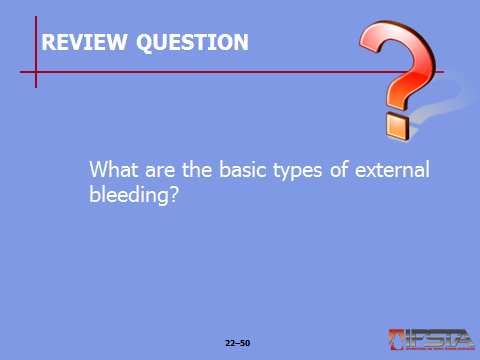
#### “Oozes” from injuries to capillaries and is typically of limited quantity

#### Not quite as dark as venous blood, but darker than arterial blood

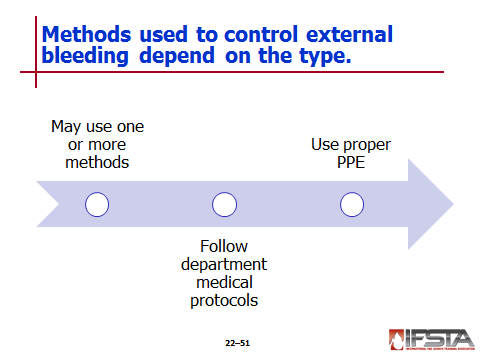
#### Some capillary bleeding can stop on its own without outside intervention

#### Injuries provide an opportunity for infection and should be properly cleaned and bandaged

Review Question: What are the basic types of external bleeding?  
*See p. 1288 of the manual for answers.*



## Controlling External Bleeding



### Methods for controlling bleeding

Instructor Note: Discuss with students the fact that tourniquets are also used to control bleeding by medical providers who are trained in their use. However, the use of tourniquets is beyond the scope of this chapter.

#### Depending on type of bleeding, one or more method may need to be used simultaneously

#### Always follow departmental medical protocols and recommended standards of patient care

#### Proper PPE must be used when treating patients with uncontrolled bleeding

### Direct pressure – Pressure is applied directly to wound



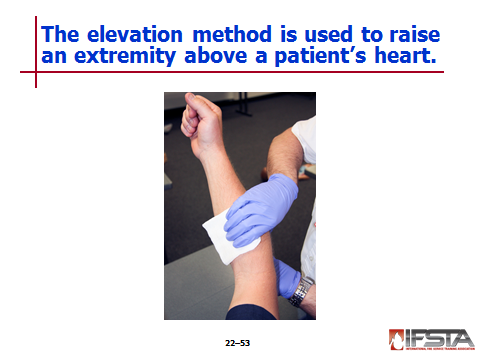
#### First and most commonly used method to control bleeding

#### Can be applied with gloved hand, dressing, or with dressing and some type of bandage

#### With minor bleeding, application of dressing to wound may be all that is necessary to stop bleeding

#### In more severe instances of bleeding, especially arterial bleeding, direct pressure should be applied with gloved hand immediately

### Elevation – Act of raising extremity above level of patient’s heart

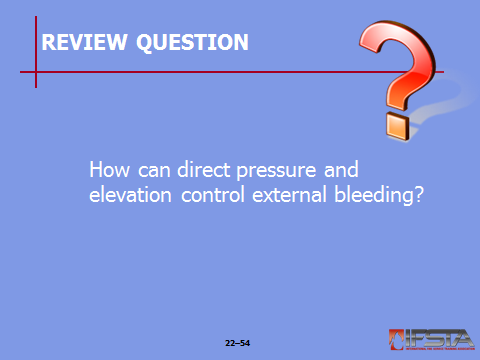


#### When injuries occur to extremities, elevation can be used in conjunction with direct pressure

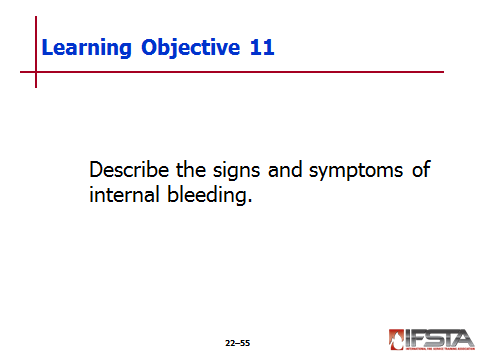
#### Effect of gravity helps slow amount of blood traveling through extremity, in turn slowing bleeding

#### May not be possible in some instances, such as with fractures and injuries where spinal immobilization is needed

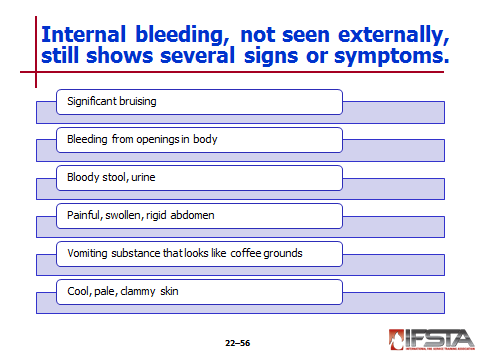
Review Question: How can direct pressure and elevation control external bleeding?  
*See pp. 1290-1291 of the manual for answers.*



pp. 1291-1292 Objective 11 — Describe the signs and symptoms of internal bleeding.



## Internal Bleeding



### May occur when blood vessels rupture inside body

### Dangerous because spaces within body can hold considerable amount of blood before there is evidence of problem

### While not seen externally – Signs and symptoms that may show

#### Significant bruising or other indications of injury, especially involving patient’s torso

#### Bleeding from openings in body such as mouth, nose, or rectum

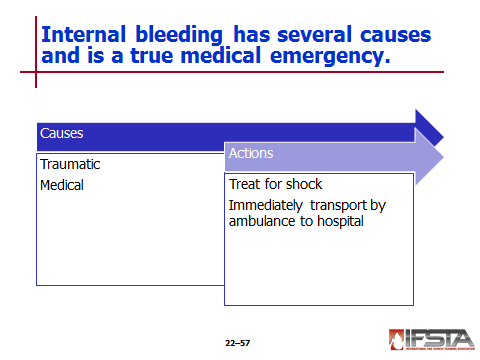
#### Bloody stool or urine

#### Painful, swollen, or rigid abdomen

#### Vomiting of substance that looks like coffee grounds

#### Cool, pale, and clammy skin

### Caused by both trauma and medical issues



#### Traumatic causes

##### Penetrating gunshot or stab wound

##### Motor vehicle accident

##### Fall

#### Medical causes – Include ruptured blood vessels or organs

### Uncontrolled internal bleeding is true medical emergency

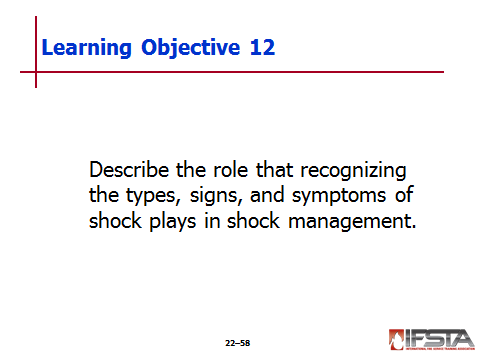
#### Patients with internal bleeding should be treated for shock

#### Patients who show signs and symptoms of internal bleeding should be immediately transported by ambulance to hospital for treatment

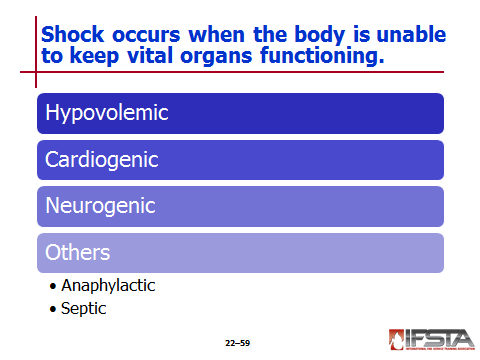
**Section VII:** Shock Management

# shock management

pp. 1292-1293 Objective 12 — Describe the role that recognizing the types, signs, and symptoms of shock plays in shock management.



## Shock Management



### Shock – Condition that occurs when body is unable to regulate itself and maintain normal function

### Body in shock is unable to supply enough blood to vital organs to keep them functioning

## Types of Shock

### Hypovolemic shock – Caused by loss of blood

#### Body is unable to supply blood to tissue

#### Result of internal and/or external bleeding

#### “Volume” issue – Amount of blood in body substantially reduced

#### Majority of instances of shock

### Cardiogenic shock – Caused by poor cardiac output

#### Occurs when heart is unable to force enough blood to tissue for it to continue functioning

#### “Pump” issue – Heart is unable to pump enough blood

#### Myocardial infarction (MI), also known as a heart attack – Main cause of heart impairment and can cause body to go into cardiogenic shock

### Neurogenic shock – Caused by overexpansion of blood vessels due to damage to brain, spinal cord, or other nerves

#### Prevents body from controlling expansion and contraction of blood vessels

#### “Container” issue – Typically result of overexpansion of blood vessels; as vessels expand, pressure of blood decreases due to increased capacity

#### Common causes are spinal trauma and head injuries

### Other types of shock

#### Anaphylactic shock – Caused by severe allergic reaction

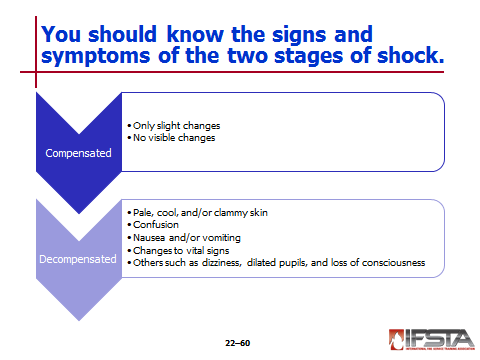
##### Food allergies

##### Environmental allergies

##### Insect bites or stings

#### Septic shock – Caused by severe infection in body

## Signs and Symptoms of Shock



### Two stages of shock

#### Compensated – When body is affected by negative condition and is adjusting functions in order to maintain normal levels

#### Decompensated – When body is no longer able to adjust to maintain these levels

### Compensated shock can often be difficult to identify because patient

#### May exhibit only slight changes (such as an increased pulse rate)

#### May exhibit no visible changes at all

### When a patient is in decompensated shock, body will produce signs and symptoms that are readily identifiable – Signs and symptoms include one or more

#### Pale, cool, and/or clammy skin

#### Confusion

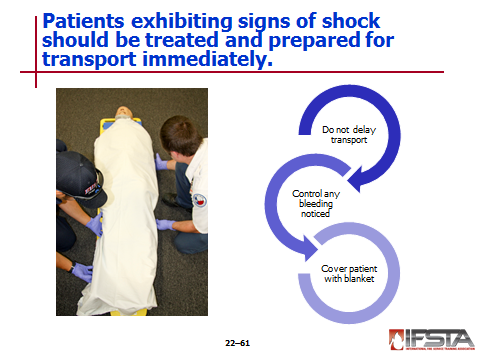
#### Nausea and/or vomiting

#### Changes to vital signs

#### Others such as dizziness, dilated pupils, and loss of consciousness

### Whenever shock is suspected, patient should be quickly treated and prepared for transport by ambulance to hospital

## Shock Treatment



### Shock is life-threatening condition, patients exhibiting signs and symptoms should be

#### Treated immediately

#### Prepared for transport

### Advanced life support treatments by paramedics are extremely important, but they should not delay transport to hospital

### Transport to hospital can be viewed as treatment

#### In most cases it is best treatment that can be provided

#### Transport of any patient exhibiting symptoms of shock should never be delayed

### Any bleeding that is noticed should be controlled immediately

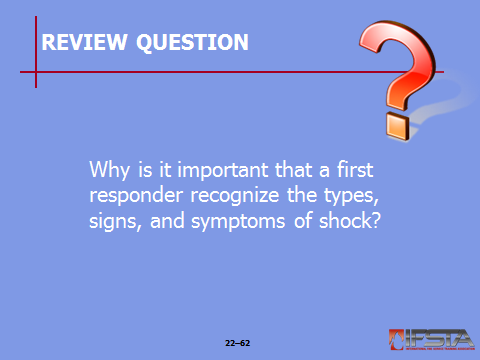
### Blanket should be used to cover patient in order to

#### Maintain body temperature

#### Prevent hypothermia

### EMT Intermediates and Paramedics are able to provide other advanced treatments for shock in these instances

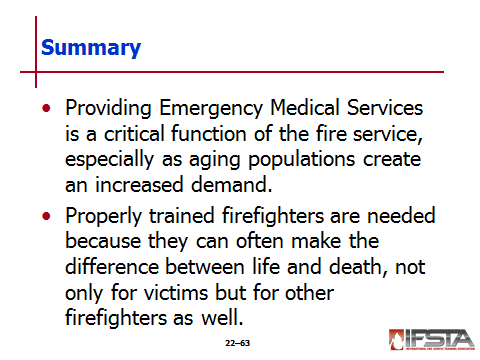
Review Question: Why is it important that a first responder recognize the types, signs, and symptoms of shock?  
*See p. 1293 of the manual for answers.*



Section VIII: Summary and Review

# **SUMMARY AND REVIEW**

## Chapter Summary



### Providing Emergency Medical Services is a critical function of the fire service; especially as aging populations create an increased demand.

### Properly trained firefighters are needed because they can often make the difference between life and death, not only for victims but for other firefighters as well.

## Review Questions

### What are the roles the fire service may take in providing emergency medical care? *(1272)*

### What does the *Health Information Portability and Accountablity Act (HIPPA)* of 1996 require regarding patient confidentiality? *(1272-1273)*

### What are the communicable diseases commonly encountered by firefighters? *(1274)*

### What types of immunizations may first responders be required to have? *(1277)*

### What are some basic ways first responders can practice body substance isolation (BSI)? *(1278-1280)*

### What actions are taken to assess a patient’s condition? *(1280-1282)*

### How do CPR techniques for adults, children, and infants differ from one another? *(1285-1287)*

### When should a first responder administer and discontinue CPR? *(1288)*

### What are the basic types of external bleeding? *(1288)*

### How can direct pressure and elevation control external bleeding? *(1290-1291)*

### What are the signs and symptoms of internal bleeding? *(1291)*

### Why is it important that a first responder recognize the types, signs, and symptoms of shock? *(1293)*