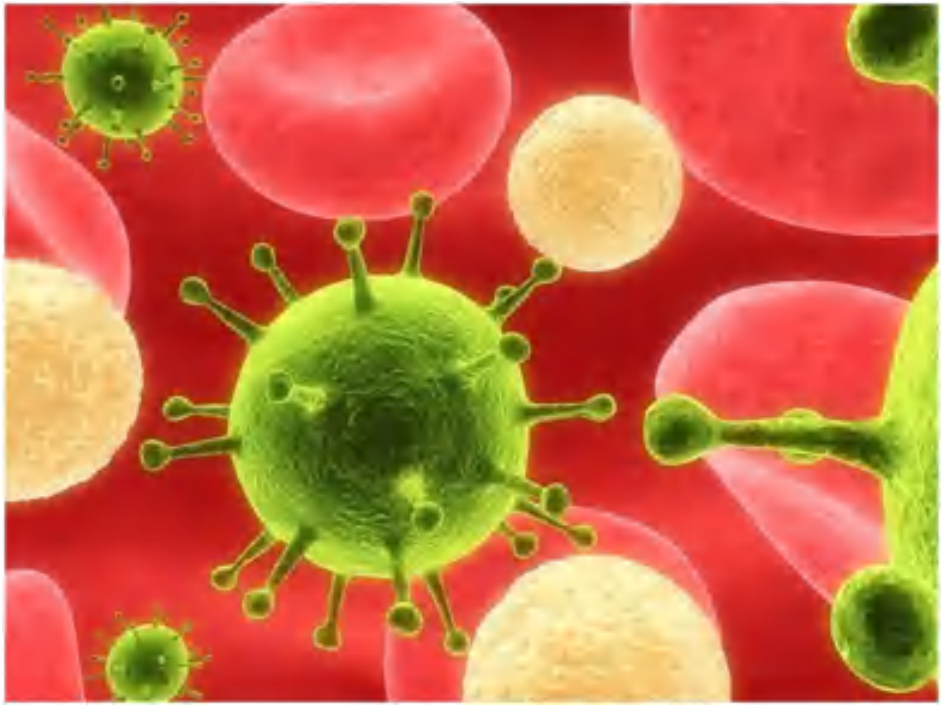
Basic Bloodborne Pathogens Course

Blood Borne Diseases

- Diseases that are commonly transmitted by exposure to blood

Most common are:

- Hepatitis B and C
- HIV



OSHA Bloodborne Pathogens Standard 29 CFR 1910.1030

- applies to all persons who may reasonably anticipate contact with blood or other potentially infectious materials in the course of their employment

Bloodborne pathogens

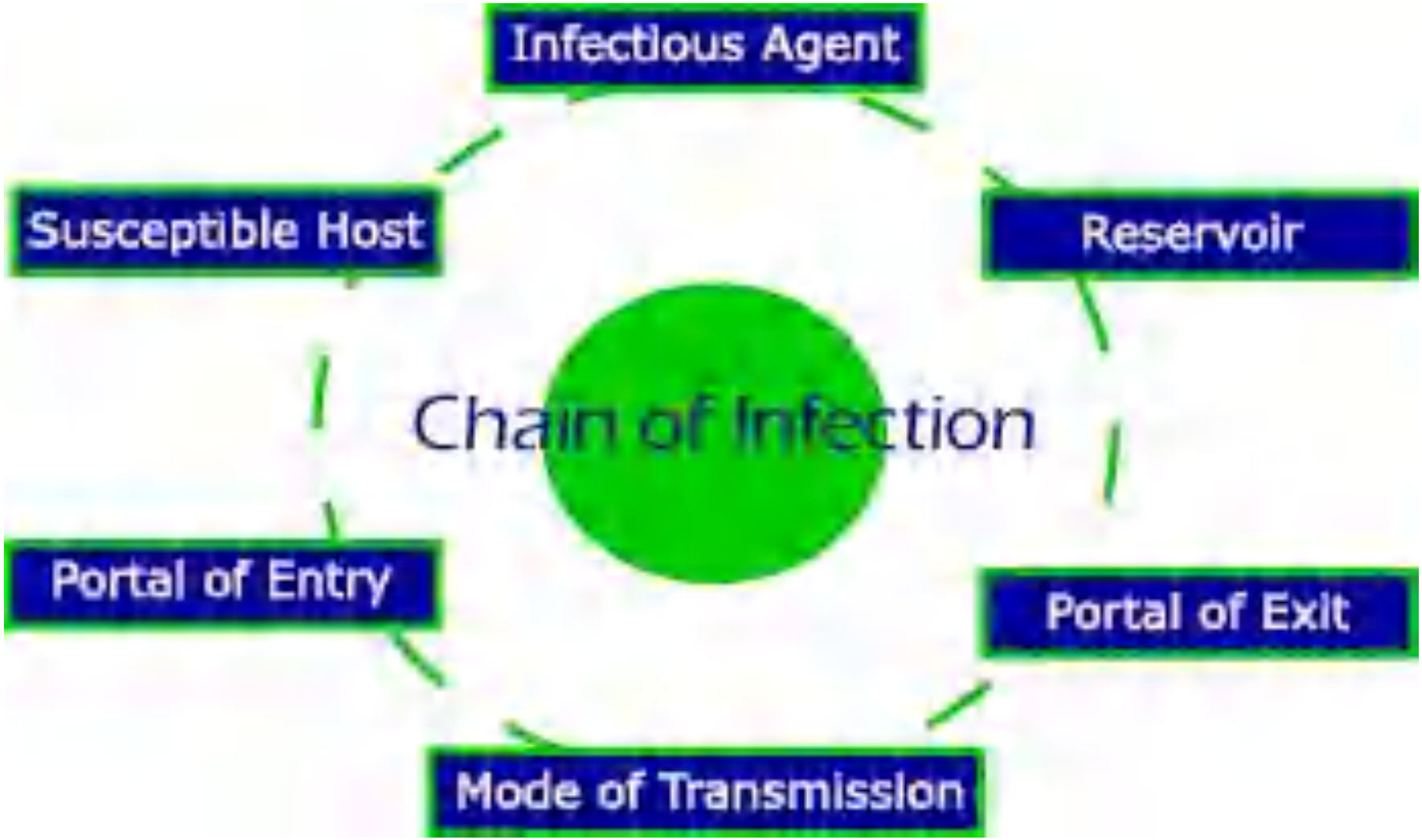
- pathogenic microorganisms that are present in human blood and can cause disease in humans.
- Include among others hepatitis B virus (HBV), which causes hepatitis B; human immunodeficiency virus (HIV), which causes AIDS; hepatitis C virus and other pathogens, such as those that cause malaria.

Potentially Infectious Materials

- Human body fluids
- Blood
- Any unfixed tissue or organ (other than intact skin) from a human (living or dead)

Understanding How Infection Occurs

Chain of Infection



Bloodborne Pathogens

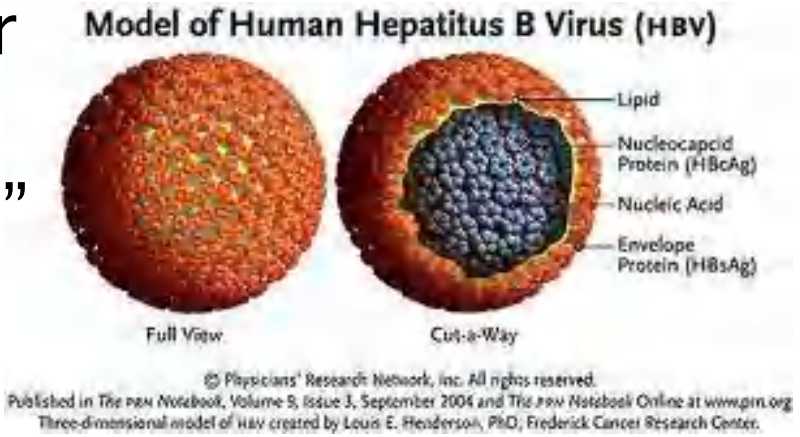
- Transmitted through cuts and breaks in skin and contact with mucous membranes

Hazards in Accident Investigation

Common BloodBorne Pathogens

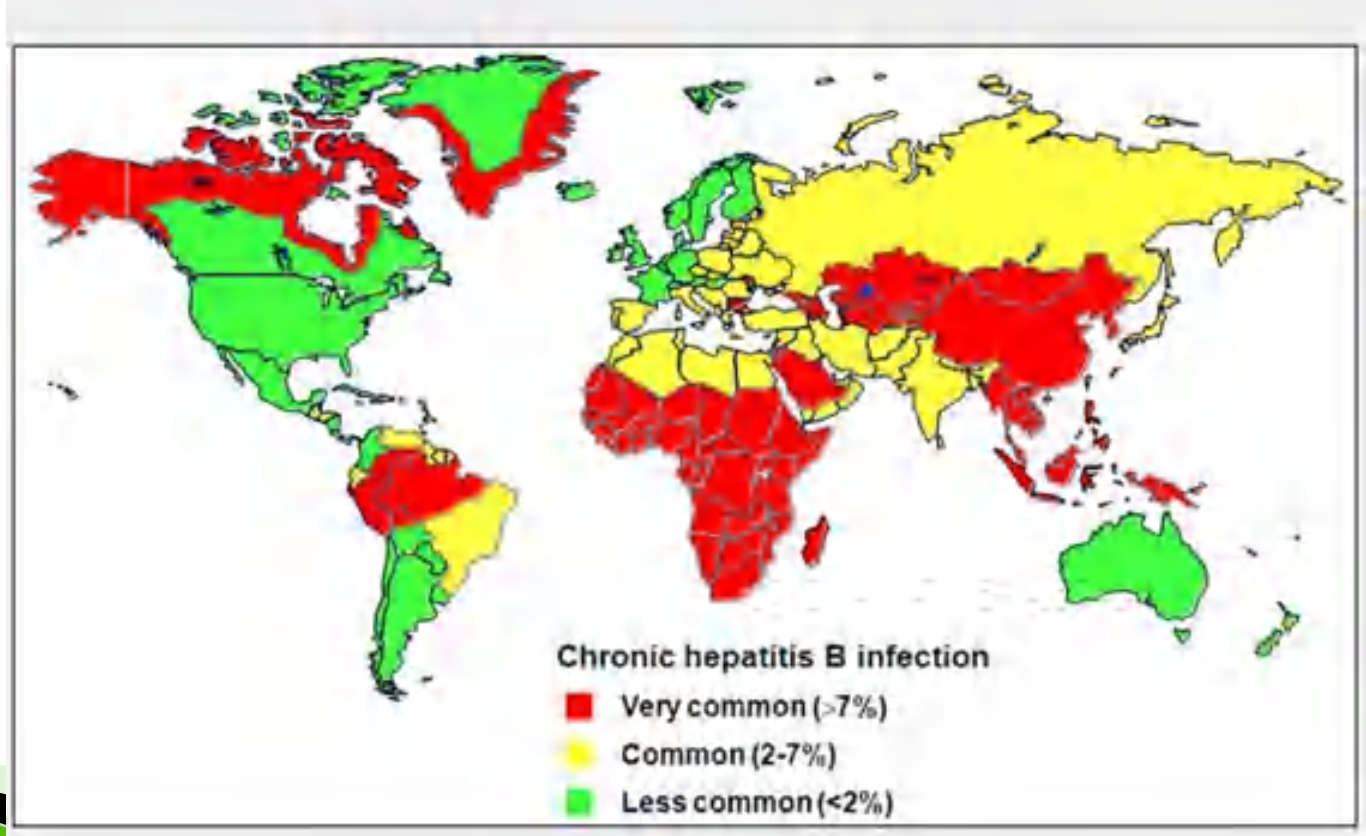
Hepatitis B

- A virus that cause infection and inflammation of the liver
- Transmitted primarily through "blood to blood" contact
- can lead to serious conditions such as cirrhosis & liver cancer
- can survive in dried blood for up to seven days



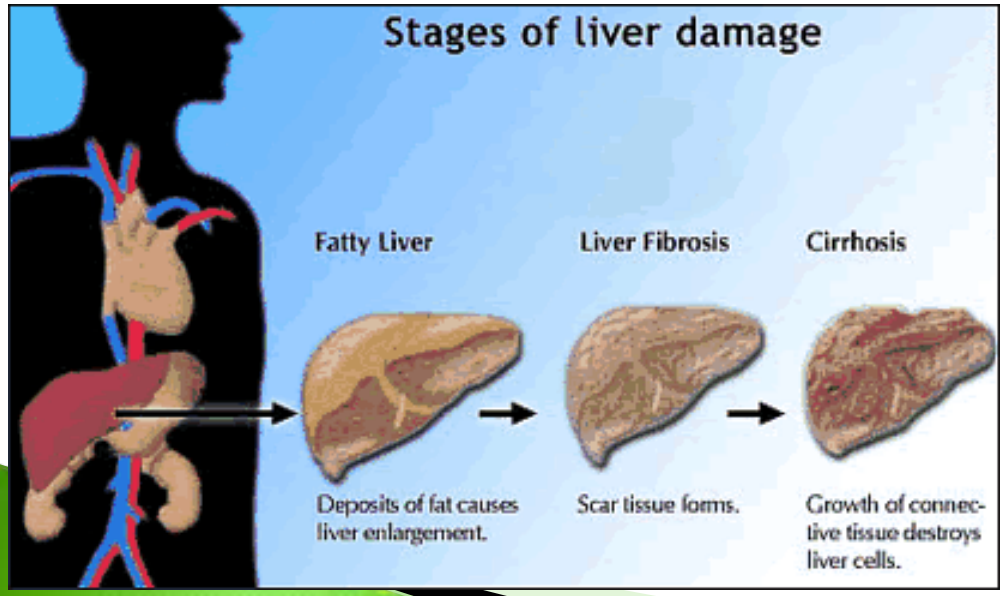
Hepatitis B

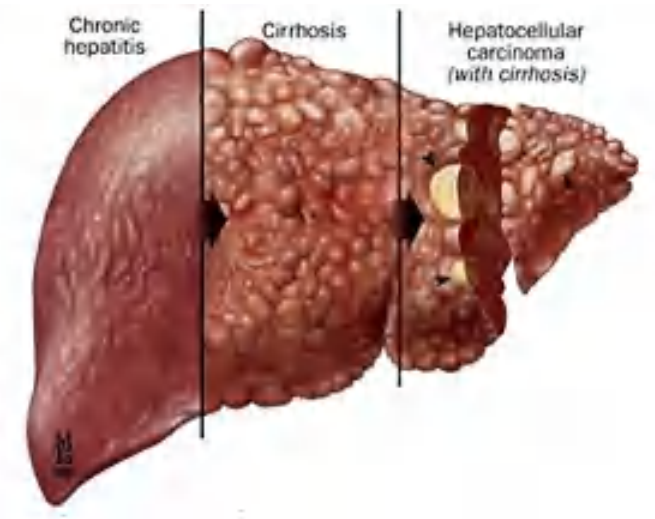
- 5% prevalence in general population
- 20 People in a 400 seat 777 will be carriers of the virus



No Cure for HBV

- There is no "cure" or specific treatment for HBV
- Many people develop antibodies to fight the disease which may prevent future infection
- Virus remains in the liver





Hepatitis B Symptoms

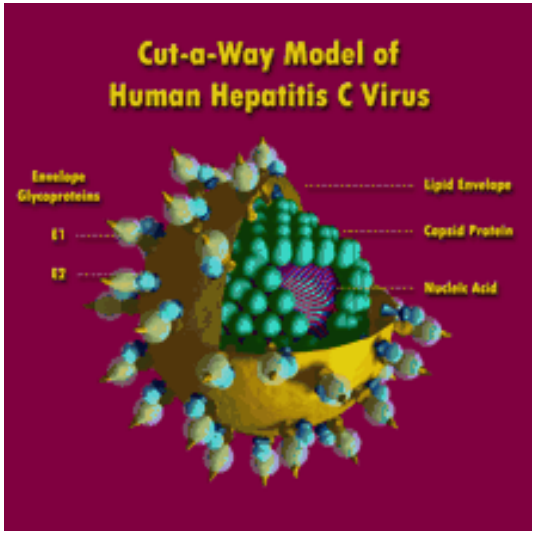
- Mild flu -like symptoms
- Fatigue
- Possible stomach pain
- Loss of appetite
- Nausea
- Jaundice
- Darkened urine

Hepatitis B Vaccine

- OSHA requirement
- Employees who may possibly be exposed to blood borne pathogens should be offered the Hepatitis B vaccine series at no cost
- Series of three shots.
- Second shot is given one month after the first
- Third shot follows five months after the second.
- This series gradually builds up the body's immunity to the Hepatitis B virus.

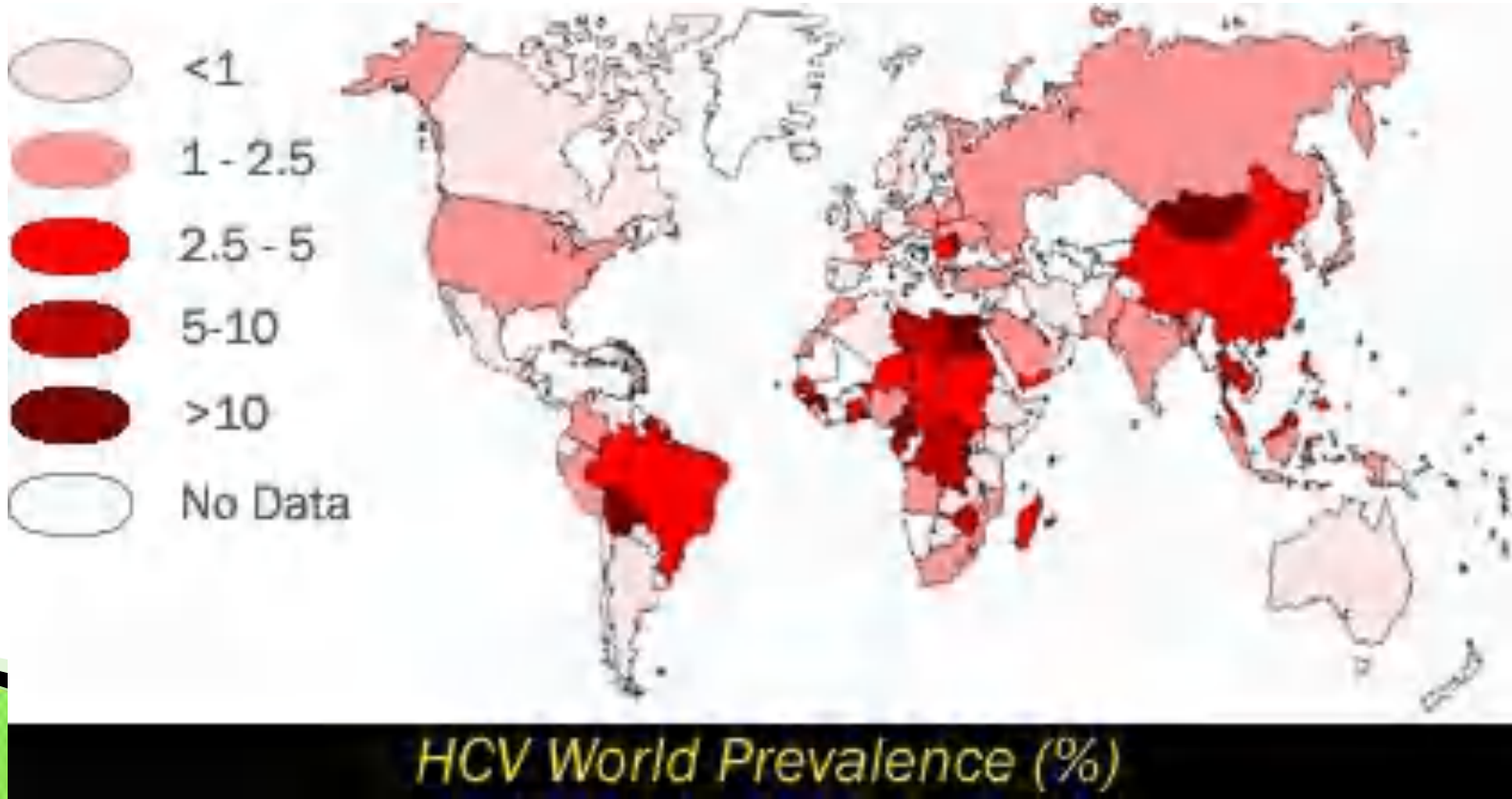
Hepatitis C

- An infectious disease affecting primarily the liver, caused by the hepatitis C virus
- often asymptomatic, but chronic infection can lead to scarring of the liver and ultimately to cirrhosis
- Spread by blood to blood contact



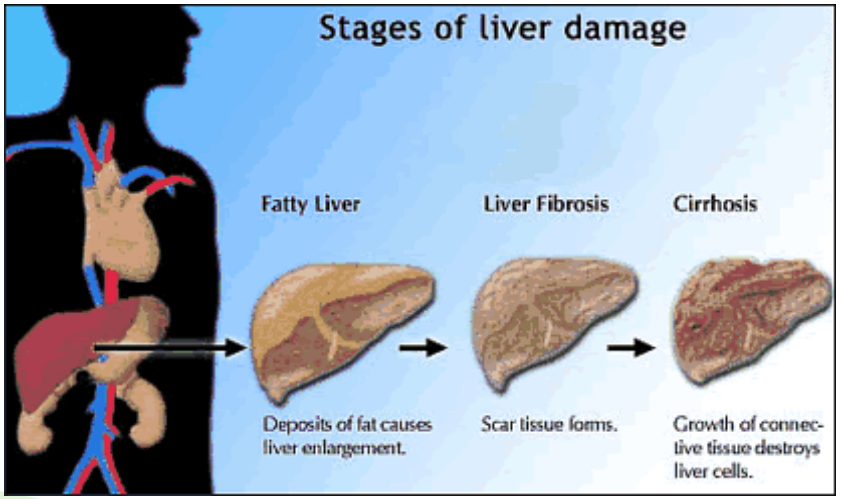
Hepatitis C

- .5 to 2% prevalence in europe
- 20% in certain countries
- Between 2 to 80 people in a 400 person flight will carry the virus depending on flight origin



Hepatitis C Chronic Infection

- Main risk in Hepatitis C infection is the development of a recurring chronic infection
- HCV induces chronic infection in 50–80% of infected persons
- Approximately 40–80% of these clear with treatment
- Leads to liver cirrhosis, cancer and death

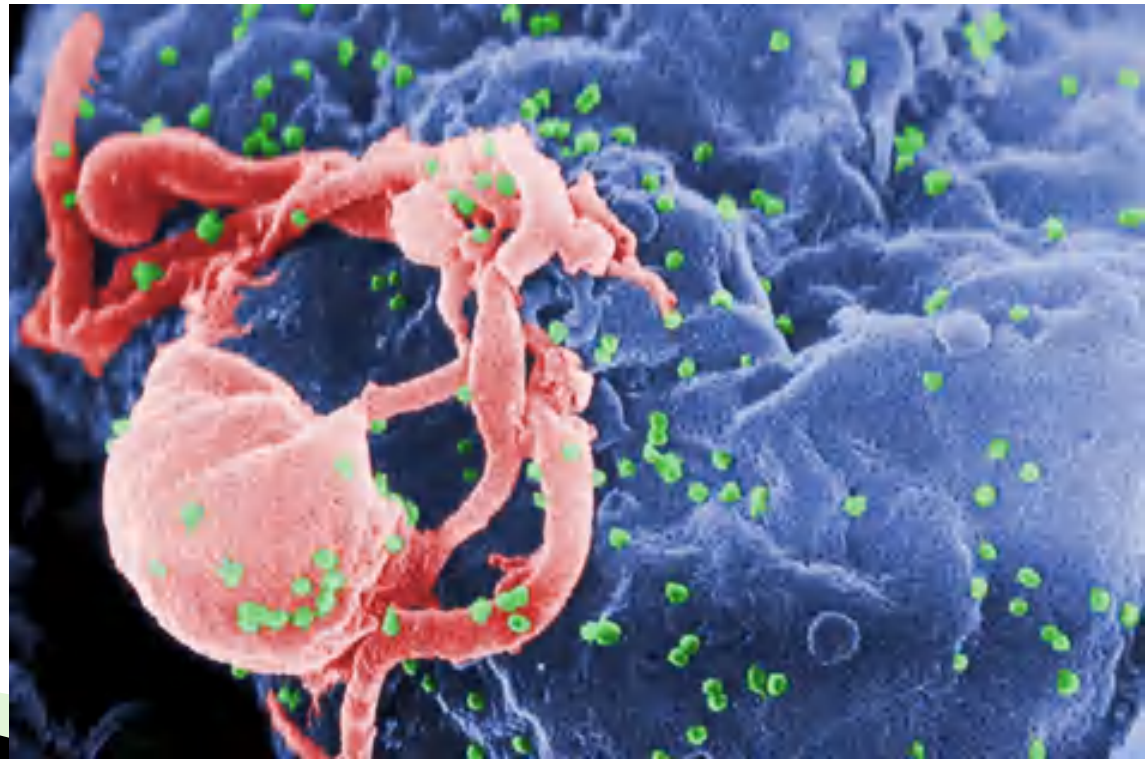


Hepatitis C Symptoms

- decreased appetite
- Fatigue
- Nausea
- muscle or joint pains
- weight loss

Human Immunodeficiency Virus (HIV)

- AIDS, or acquired immune deficiency syndrome, is caused by a virus called the human immunodeficiency virus, or HIV.
- It may be many years before AIDS actually develops.

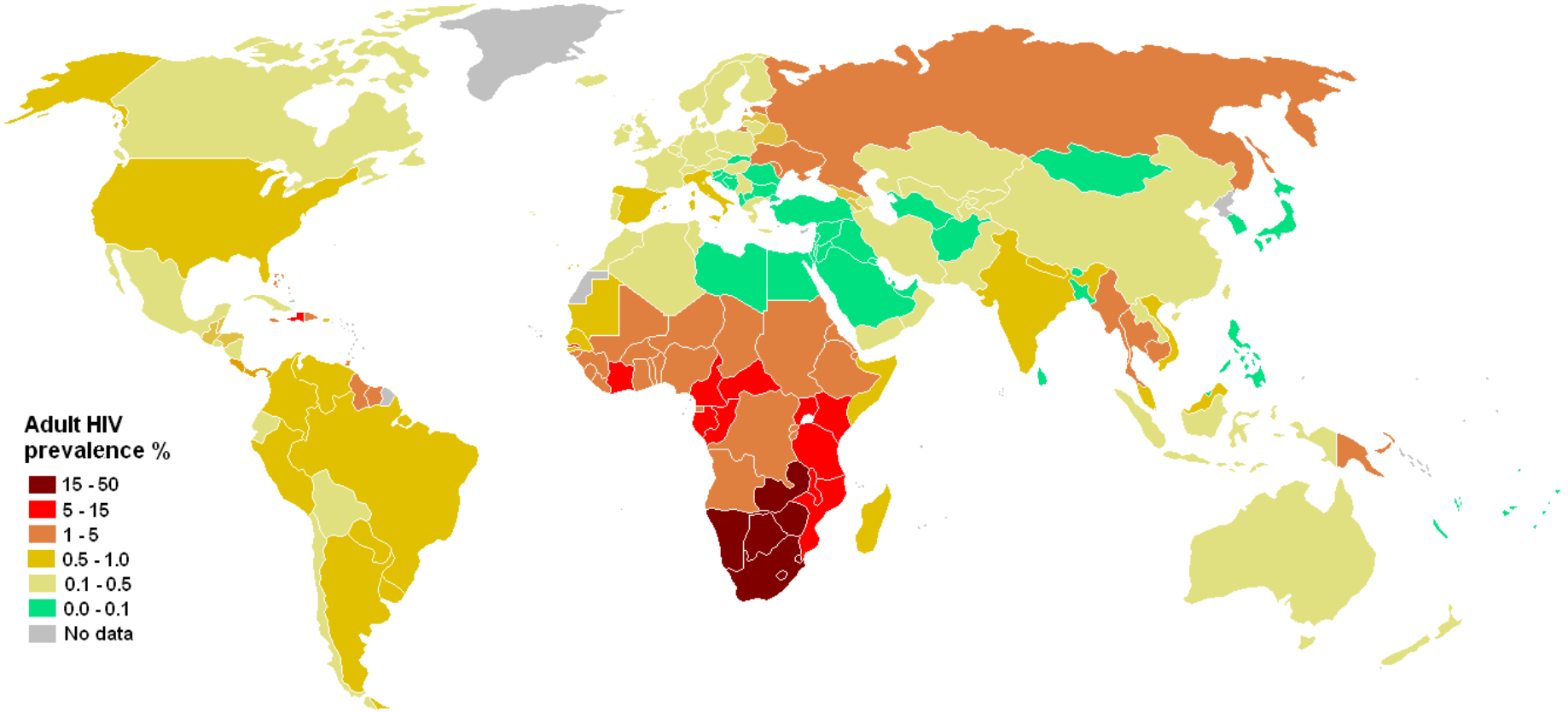


HIV

- HIV attacks the body's immune system, weakening it so that it cannot fight other deadly diseases.
- AIDS is a fatal disease, and while treatment for it is improving, there is no known cure.

HIV Prevalence

- Prevalence of 4.9% in sub saharan africa to .2% in developed countries
- Between 1 to 20 people in a 400 person flight depending on origin



HIV and Direct Contact

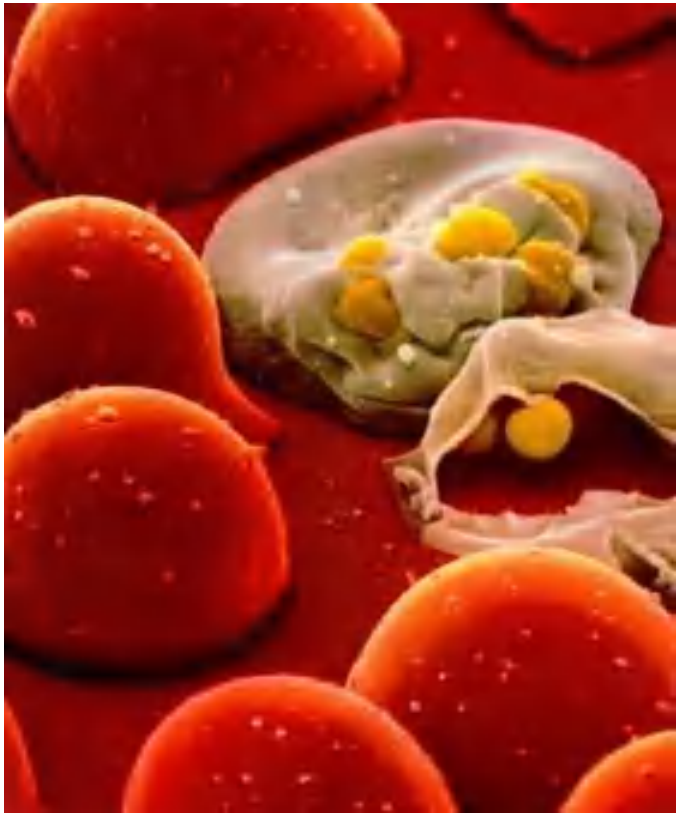
- The HIV virus is very fragile and will not survive very long outside of the human body.

- It is primarily of concern to employees providing first aid or medical care in situations involving fresh blood or other potentially infectious materials.

HIV Symptoms

- Symptoms of HIV infection can vary, but often include:

- Weakness
- Fever
- Sore throat
- Nausea
- Headaches
- Diarrhea
- White coating on the tongue
- Weight loss
- Swollen lymph glands



ONCE YOU HAVE BEEN INFECTED WITH HIV

YOU WILL ALWAYS CARRY IT IN YOUR BODY

THERE IS NO CURE FOR HIV

Ebola

- Ebola virus disease (EVD), formerly known as Ebola haemorrhagic fever, is a severe, often fatal illness in humans.
- The virus is transmitted to people from wild animals and spreads in the human population through human-to-human transmission.

Transmission

- Ebola spreads through human-to-human transmission via direct contact (through broken skin or mucous membranes) with the blood, secretions, organs or other bodily fluids of infected people, and with surfaces and materials (e.g. bedding, clothing) contaminated with these fluids.

Symptoms

- The incubation period is 2 to 21 days. Humans are not infectious until they develop symptoms.
- First symptoms are the sudden onset of fever fatigue, muscle pain, headache and sore throat.
- Followed by vomiting, diarrhoea, rash, symptoms of impaired kidney and liver function, and in some cases, both internal and external bleeding

Ebola Fatality

- The average EVD case fatality rate is around 50%. Case fatality rates have varied from 25% to 90% in past outbreaks
- No definitive treatment and no vaccine

Prevention is better than cure

- Training and Administrative Controls
- Engineering Controls
- Work Controls
- PPE
- Vaccinations
- Common Sense

Engineering and Practice Controls

- Measures put in place to decrease risk of exposure
- If engineering and practice controls are not enough, PPE must be used.

Engineering Controls

- Reduce employee exposure by either removing the hazard or isolating the worker

Work Practice Controls

- Reduce likelihood of exposure by changing how task is performed
- Example:
  - No eating and drinking at site
  - Hand hygiene protocols
  - Proper steps for infil and exfil from site

Hand Hygiene

- Hand hygiene is important in every setting.
- It is considered one of the most effective infection control measurement.
- It is important to prevent the spread of microorganisms:

Hand Hygiene

- World Health Organization (WHO) recommends hand washing under a stream of water for at least 20 seconds using plain granule soap, soap-filled sheets, or liquid soap when:
- hands are visibly soiled.
- after using the restroom.
- after removing gloves.
- After contact with equipment and potentially contaminated objects

Universal precautions (UP)

- are techniques to be used at all times to decrease the risk of acquiring unidentified pathogens.
- These obstruct the spread of bloodborne pathogens, namely hepatitis B and C viruses and HIV.
- The CDC did not recommend that universal precautions replace disease-specific or category-specific precautions, but that they be used in conjunction with them.

Basic Idea of Universal Precautions

- All objects are considered infectious unless Cleaned / Disinfected

BioHazard Response

- Personnel should always be alert to the possibility that they may be dealing with a contaminated scene
- Although an injury at a hazardous material incident need not invariably involve exposure (it could have resulted from a purely physical occurrence, such as slipping off a ladder), as a routine precaution, the involvement of hazardous materials should be considered a possibility in such situations.

Site Control

- Hazardous materials incidents can and often do attract large numbers of people and equipment, complicating the imposition of adequate controls to minimize risks of human injury or death, property damage, and environmental degradation.

Site Control

- An Incident Command System (ICS) allows for the coordination and management of facilities, equipment, personnel, and communications during a hazardous materials incident.
- Incident Commander (IC) is responsible for the control of the scene, which includes delineating work zones, establishing levels of protection, and implementing activities.

Site Control

- inactive individuals and equipment should be kept at a safe distance from the area of possible contamination
- public access from all directions must be restricted as soon as possible
- media access should be limited to the staging area, and any closer approach should involve escort by a designated public Information Officer.

Timeline of an incident

- Incident occurs
- Fire crews put out fire
- Police cordon off the area
- Chief Investigator is assigned
- C.I. assigns Site Safety Officer

Investigator in Charge

- Cordon off site
- Identify zones
- Designate site safety officer
- Identifies team members that go into the hazard zone
- Coordinates with authorities

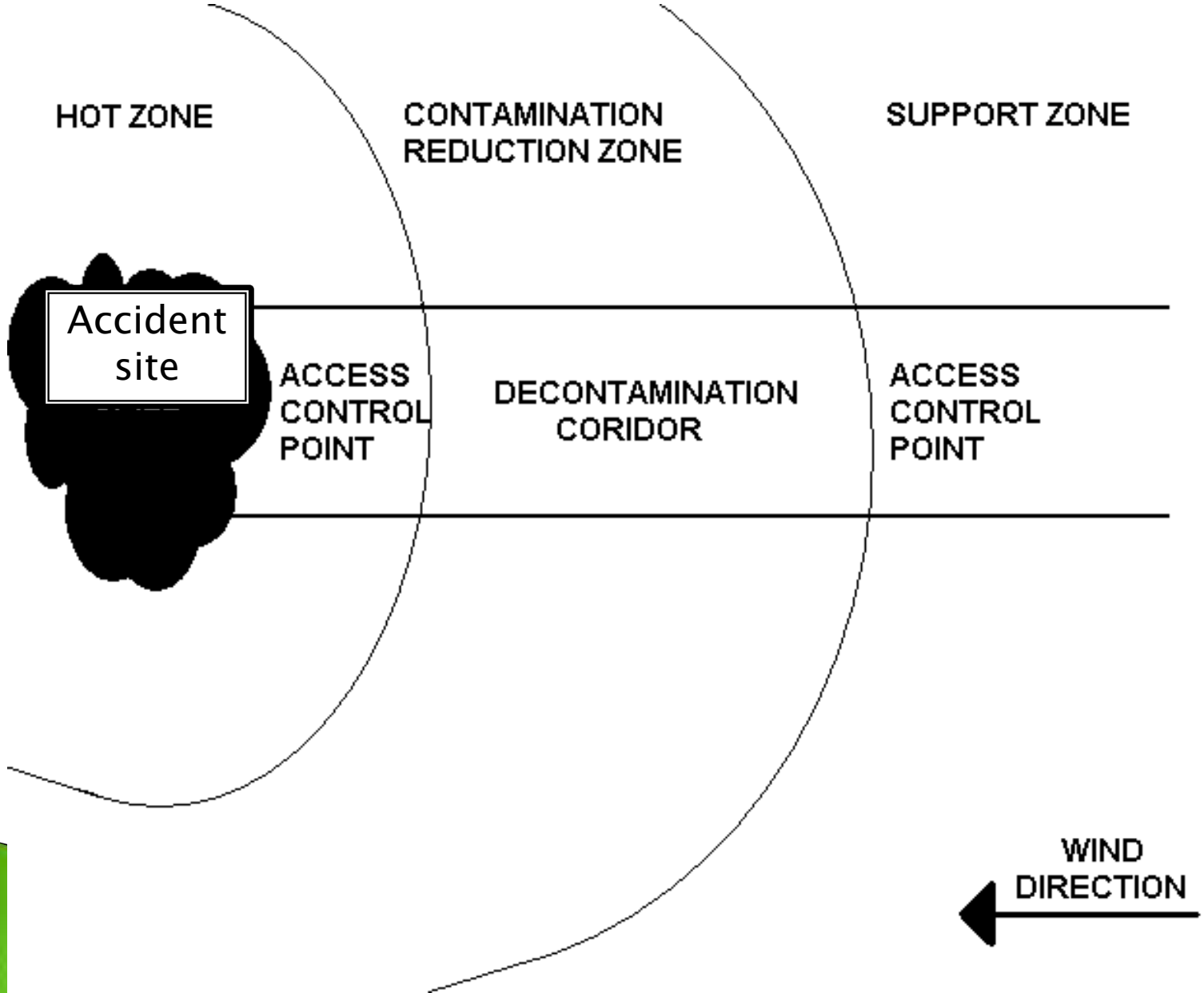
Site Safety Officer

- Labels the site as a BIOHAZARD Site after conducting initial survey of area
- Ensures safety of all people on site
- Ensures proper PPE is worn and correct procedures followed

Site Safety Officer

- Keeps detailed log of people entering the hazard zone and ensuring time limits are followed
- Ensures proper controls are used and prohibitions are enforced in order to minimize risk
- Ensures buddy system is followed
- Ensures staff entering biohazard area are trained and have complete vaccinations

Site Control



Vaccinations

- Important as it gives your body resistance to infection
- Done by giving your body a harmless dose of the disease causing organism inducing antibody production

Vaccines Received by GCAA staff

- Hepatitis B
- Rabies
- Yellow Fever
- Varecilla
- Typhoid
- Tetanus
- Diptheria
- Meningitis
- Polio MMR Hepatitis A

Occupational Exposure

- means reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials that may result from the performance of an employee's duties.

How does exposure occur?

- Cuts
- Contact of mucous membranes with blood and bodily fluids

Exposure Incident

- means a specific eye, mouth, other mucous membrane, non-intact skin, or parenteral contact with blood or other potentially infectious materials that results from the performance of an employee's duties.

If Exposure occurs:

- Wash exposed area
- Flush nose, mouth
- Irrigate eyes
- Report to supervisor
- Start treatment within 24 hours ideally.

Non Exposure Incident

- Suit torn but skin intact; **no exposure to bodily fluids or tissue**
- Defined as a Close call

If you are exposed

- Wash the exposed area thoroughly with soap and running water.
- Use non-abrasive, antibacterial soap
- Flush mouth, nose, eyes for 15 minutes if blood is splashed in mucous membranes

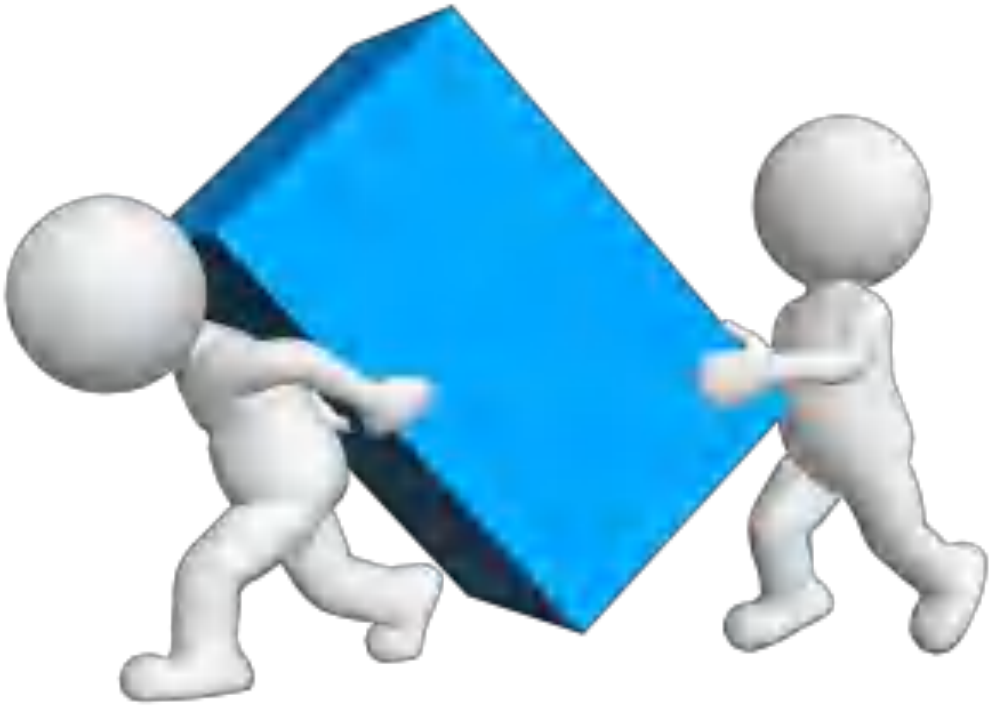
Administrative Actions after Exposure

- Report the exposure to your site safety officer
- Fill out an exposure report form
- Request blood testing & Prophylactic Treatment; Treatment should be within 24 hours

Things to include in exposure report

- Date and time of exposure.
- Where and how the exposure occurred
- Type and amount of fluid or material and the severity of the exposure.
- Details about the exposure source
- Details about the exposed person like vaccination status
- Details about counseling, post-exposure management, and follow-up.

What if I want to bring a contaminated item back from the site?



Cleaning and Disinfection (STERILIZING)

- Contaminated items must be properly cleaned and disinfected following STRICT guidelines.
- Unless an item has been thoroughly cleaned, disinfection cannot occur.
- Workers responsible for cleaning and disinfecting items must be trained in these procedures.

Cleaning

- **The following steps should be followed when cleaning an object:**
  - Rinse article with cold water to remove organic material.
  - Wash the article in hot water and soap.
  - Use brush to clean grooves
  - Rinse article with warm water.
  - Dry the article.
  - Clean the brush, gloves and sink.

Disinfection (STERILIZING)

- is the process that destroys all M.O including spore and virus.

- **Before choose the method for disinfecting or sterilization its important to consider:-**
  - The type and number of infection agent.
  - The concentration of disinfectant and duration of contact.
  - The temp. Of environment.
  - The presence of soap.
  - The presence of organic material (e.g. blood)
  - The surface areas to be treated.

Common Used Methods of Sterilization

- **Moist heat:** - steam under pressure or as free steam → it attain temp. Higher than boiling point e.g. auto clave supply steam under pressure.
- **Gas:** - ethylene oxide gas destroys M.O. by interfering with their metabolic process.
- **Boiling water:** - most practical and inexpensive method for sterilizing in the home, boiling for minute is advised for disinfection or articles in the home.
- **Radiation:**- ionizing and no ionizing radiation can be used to disinfection and sterilization e.g. Ultraviolet Light.

Biological Waste

- Biological waste must be placed in red clearly marked biohazard bags

PPE

- Specialist clothing worn by employee for protection against exposure
- Must be removed before leaving the contaminated area

Personal Protective Equipment

- The best protection against exposure is to ensure you are wearing the appropriate personal protective equipment (PPE)
- To protect yourself, it is essential to have a barrier between you and the potentially infectious material.

Rules to follow:

- Treat all blood or potentially infectious body fluids as if they are contaminated.
- Always wear personal protective equipment in exposure situations.
- Replace PPE that is torn or punctured.
- Carefully remove PPE as per procedure before leaving the site.
- Properly disinfect or dispose of used PPE
- Wash hands immediately after removing PPE

Key points about PPE

- For respirator : fit test, fit check
- Keep gloved hands away from face
- Avoid touching or adjusting other PPE
- Remove gloves if they become torn; perform hand hygiene before wearing new gloves

Key Points in PPE Use

- All of the PPEs supplied are disposable and are designed for one time use only.
- Do not reuse PPEs

Field Operations Utilizing PPE

- A designated area for putting on PPEs should be identified and all personnel should use this area to put on their PPEs.

- A designated area for removal of PPEs should be identified and all personnel should use this area to remove their PPEs.

Right PPE Level (ABCD) for right job

Field Operations Utilizing PPE

- Use of PPEs can sometimes make the job more difficult to accomplish because they can be cumbersome, hot, or uncomfortable. However, PPEs are necessary to prevent from becoming infected or from spreading the virus.

- Incident Commander should take note of the time each member spends in the field and rotate accordingly

Donning PPE – Step 1

- Put on fluid-resistant coveralls

Coveralls: Put on coveralls first. Step into the "feet" of the coveralls first, and pull them up. Zip up the front of the coveralls.

Donning PPE – Step 2

- Shoe cover: Put on shoe covers second. They should fit over your coverall feet, giving you another layer of protection to protect your shoes from contamination

Donning PPE – Step 3

- Put on disposable particulate respirator/mask
- Perform user seal check of particulate respirator:

Donning PPE – Step 4

- Use face shield or goggles:

Donning PPE – Step 5

- Put on gloves (make sure gloves cover cuffs of gown sleeves)

Removing PPE – Step 1

- It doesn't end when you exit site – proper doffing is essential
- Remove gloves and discard in biomedical waste bin/bio-hazard plastic bag
- Perform hand hygiene, preferably with an alcohol-based hand rub or soap and water

Removing PPE – Step 2

- Remove protective eyewear and discard in biomedical waste bin

Removing PPE – Step 3

- Overall:Unzip and roll down your coverall until it is inside-out, and then step out of it.
- Place the used coveralls into the biohazard bag.

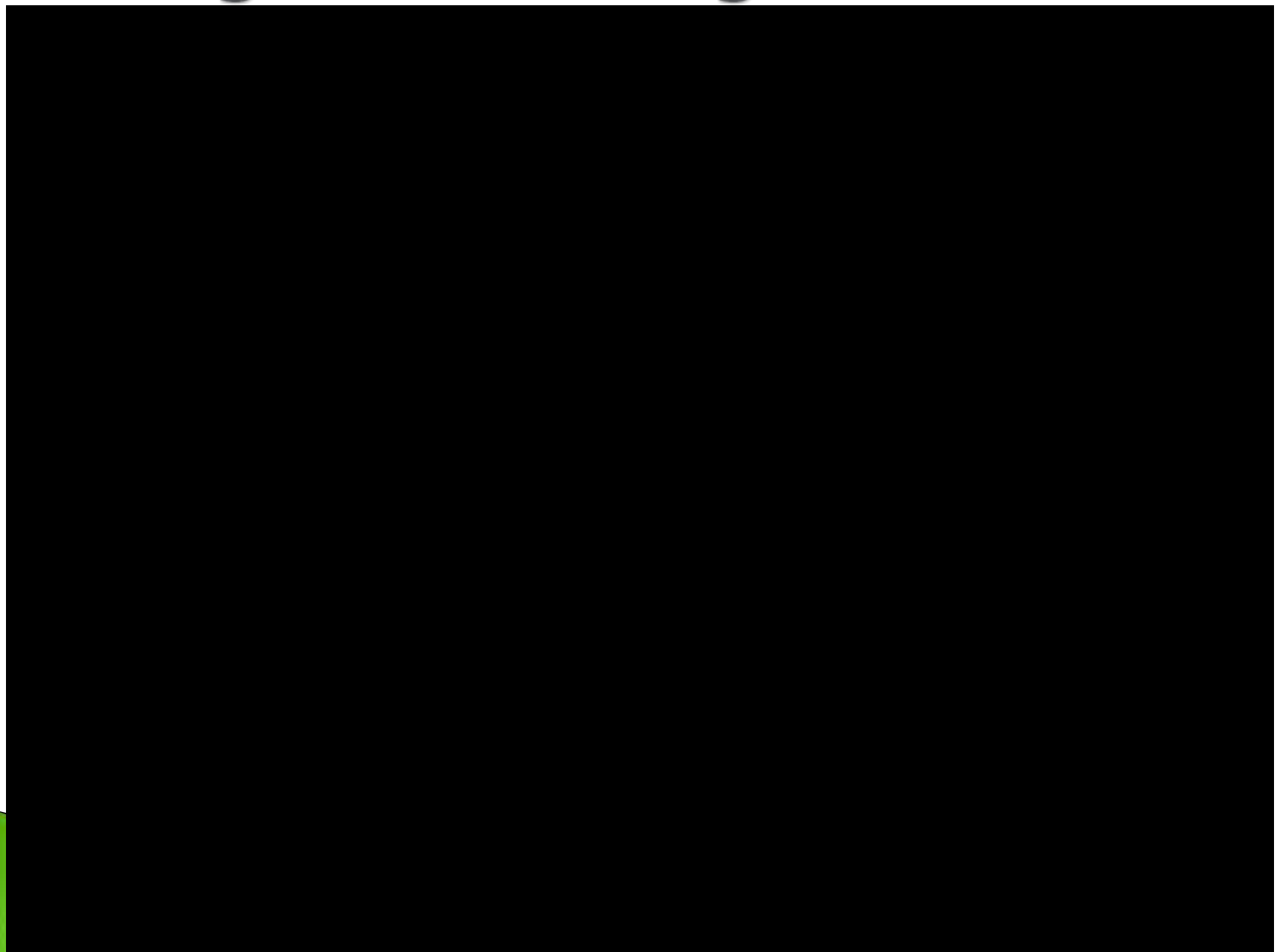
Removing PPE – Step 4

- Remove and discard the boot cover. Do hand hygiene with the alcohol rub

Removing PPE – Step 5

- Remove medical mask or particulate respirator by grasping elastic band.
- Do not touch front of particulate respirator

Donning and Doffing PPE



Now Let's Practice!