



# **COVID-19 and Bloodborne Pathogens**

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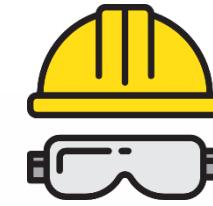
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**Naryn, Kyrgyzstan, 4 pm, February 28, 2023**



# Lessons learnt last time

- Emergency Action Plan
- Fire Protection Plan
- Conditions requiring evacuation
- Conditions requiring shelter-in-place
- Emergency escape routes
- Extinguishing fires
- Maintenance of extinguisher
- Fire alarm system based on Arduino Mega and Ethernet boards, LED, DHT11 temperature and humidity sensor



# What we gonna discuss today?

- Pandemic flu
- COVID-19
- Impact of COVID-19 on Cyber Security
- Bloodborne pathogens
- Workers who are at risk of exposure to bloodborne pathogens
- Key aspects of a Bloodborne Pathogen Exposure Control Plan
- Methods for controlling exposure to bloodborne pathogens
- Steps to take when exposed to a bloodborne pathogen



# Question



**Do you think COVID-19 is over?**

# An idea on how to answer the question ...

CNBC, Feb 17, 2023

Amazon, Google and Microsoft laid off thousands of tech workers ...



**Another question ...**



**or ChatGPT did it ...**



# Pandemic flu

- Epidemic flu: disproportionately large number of individuals within a population, community, or region at the same time
- Pandemic flu: occurring over a wide geographic area and affecting an exceptionally high proportion of the population



# Pandemic flu

<https://www.youtube.com/watch?v=ZxxT6W-bIUY>

- What's the Impact of COVID-19 on Cyber Security?

# Pandemic flu

## ● Fast Facts



- 30,000 people die every year from influenza or complications of influenza
- Some viruses and bacteria can live from 20 minutes up to 2 hours or more on fomites
- Addressing the spread of germs in schools and colleges is essential

# Pandemic flu



- Modes of Transmission

- Droplets
- Airborne particles
- Fomites

Vaccination  
Culture

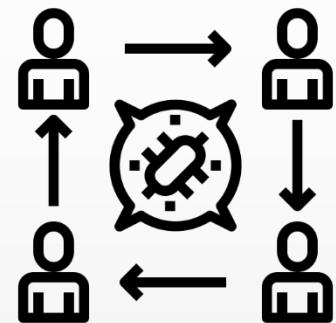
Fewer than 50% get  
vaccinated now

Who was vaccinated - ?

# Pandemic flu

- Pandemic Impact – Business and Government (research was done over ten years ago)

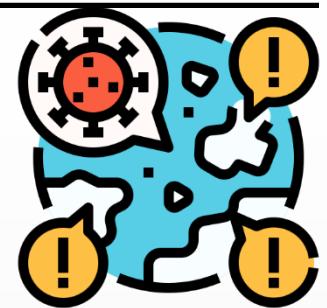
- High absenteeism
- Significant threat to continuity of government
- Challenges getting to / from worksite
- Psychological impacts on workforce will be extreme
- Economic losses will be long term
- Schools and colleges will be closed



# Pandemic flu

- Pandemic Impact – Health Care System **(research was done over ten years ago)**

- Extreme staffing shortages
- Shortage of beds, facility space, supplies
- Hospital morgues, Medical Examiner and mortuary services overwhelmed



- Pandemic Impact – Infrastructure **(research was done over ten years ago)**

- Significant disruption of transportation, public works, commerce, utilities, energy, communications, and emergency response

# Pandemic flu



- Major modern influenza pandemics

Name	Date	World pop.	Subtype	Reproduction number	Infected (est.)	Deaths worldwide	Case fatality rate	Pandemic severity
1889–90 flu pandemic	1889–90	1.53 billion	Likely H3N8 or H2N2	2.10 (IQR, 1.9–2.4)	20–60% (300–900 million)	1 million	0.10–0.28%	2
1918 flu	1918–20	1.80 billion	H1N1	1.80 (IQR, 1.47–2.27)	33% (500 million) or >56% (>1 billion)	17 – 100 million	2–3%, or ~4%, or ~10%	5
Asian flu	1957–58	2.90 billion	H2N2	1.65 (IQR, 1.53–1.70)	>17% (>500 million)	1–4 million	<0.2%	2
Hong Kong flu	1968–69	3.53 billion	H3N2	1.80 (IQR, 1.56–1.85)	>14% (>500 million)	1–4 million	<0.1%	2
2009 flu pandemic	2009–10	6.85 billion	H1N1/09	1.46 (IQR, 1.30–1.70)	11–21% (0.7–1.4 billion)	151,700–575,400	0.01%	1
Typical seasonal flu	Every year	7.75 billion	A/H3N2, A/H1N1, B, ...	1.28 (IQR, 1.19–1.37)	5–15% (340 million – 1 billion) 3–11% or 5–20% (240 million – 1.6 billion)	290,000–650,000/year	<0.1%	1

# Pandemic flu

- Major modern influenza pandemics



**1918: “Spanish Flu”**

A(H1N1)

17 - 100 M deaths

>1 M US deaths



**1957: “Asian Flu”**

A(H2N2)

1-4 M deaths

~70,000 US deaths



**1968: “Hong Kong Flu”**

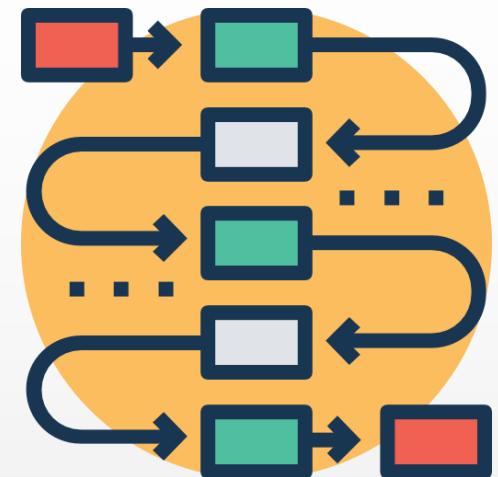
A(H3N2)

1-4 M deaths

~34,000 US deaths

# Pandemic flu

- Elements of School Pandemic Plan
  - Procedures for communicating:
    - with public health officials
    - with parents, staff on school closures
  - Procedure for sending ill individuals home
  - Education and training



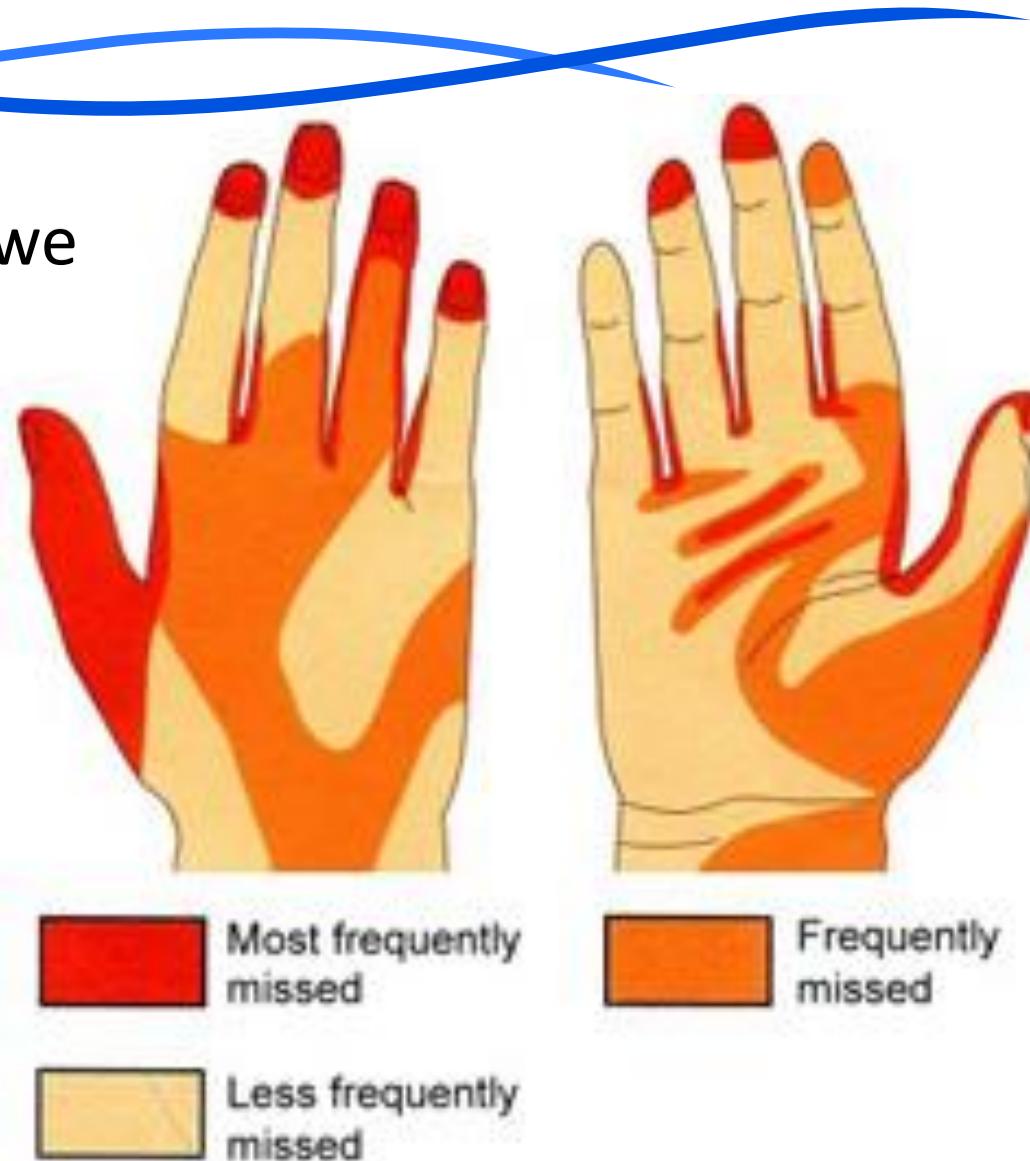
# Pandemic flu



- OSHA recommends that employers encourage staff to:
  - Stay at home when sick
  - Wash their hands frequently with soap and water or with hand sanitizer if there is no soap or water available
  - Avoid touching their noses, mouths, and eyes
  - Cover their coughs and sneezes with a tissue, or to cough and sneeze into their upper sleeves if tissues are not available
  - Practice social distancing by maintaining a separation of at least 1.5-2 m from other staff, students and the public

# Pandemic flu

This is how we wash our hands ...

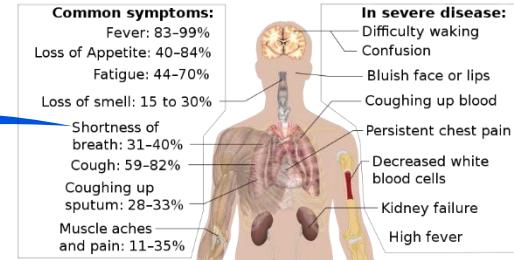


# COVID-19



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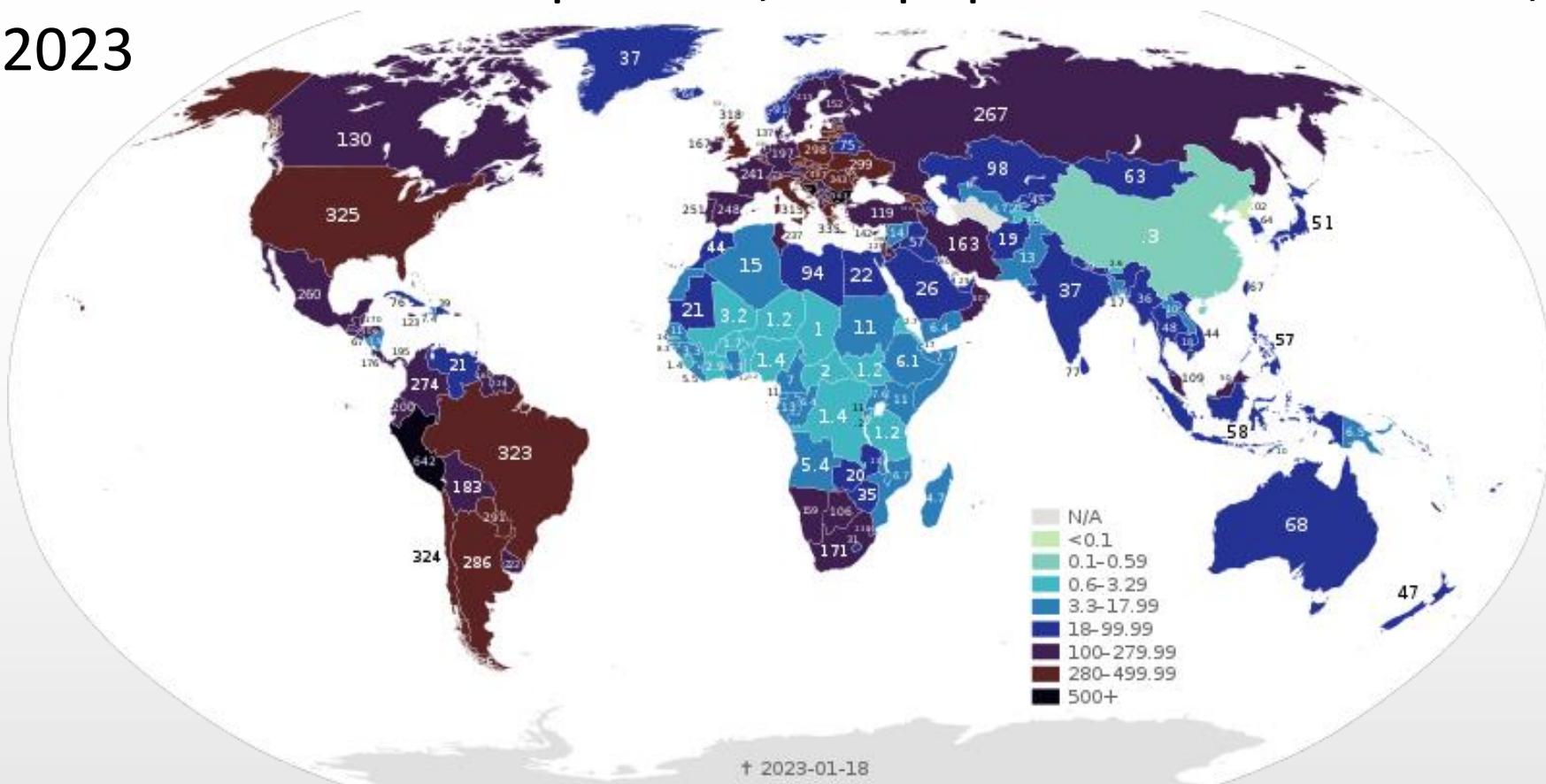
# COVID-19



- The COVID-19 pandemic, also known as the coronavirus pandemic, is an ongoing pandemic of coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).
  - The disease was first identified in December 2019 in Wuhan, China. The World Health Organization declared the outbreak a Public Health Emergency of International Concern on 30 January 2020 and a pandemic on 11 March.
  - **As of 3 March 2023, more than 6.87 million deaths had been attributed to COVID-19, making it one of the deadliest pandemics in history.**

# COVID-19

- Confirmed deaths per 100,000 population as of Jan 18, 2023



# Bloodborne pathogens

1981

**1 in 8** people with **HIV** don't know **THEY** have it.



**Get the facts. Get tested. Get involved.**

Find out more about HIV, including where to get tested, at [gettested.cdc.gov](http://gettested.cdc.gov)

2014

## Facts *about* Ebola in the U.S.

You CAN'T get Ebola through AIR



You CAN'T get Ebola through WATER



You CAN'T get Ebola through FOOD grown or legally purchased in the U.S.



### You can only get Ebola from

- The body fluids of a person who is sick with or has died from Ebola.
- Objects contaminated with body fluids of a person sick with Ebola or who has died of Ebola.
- Infected fruit bats and primates (apes and monkeys).
- And, possibly from contact with semen from a man who has recovered from Ebola (for example, by having oral, vaginal, or anal sex).



2016

## TOP 5 THINGS EVERYONE NEEDS TO KNOW ABOUT ZIKA

**1** Zika primarily spreads through infected mosquitoes. You can also get Zika through sex.

Many areas in the United States have the type of mosquitoes that can spread Zika virus. These mosquitoes are most active daytime, but can also bite at night. Also, Zika can be passed through sex from a person who has Zika to his or her sex partners.

**2** The best way to prevent Zika is to prevent mosquito bites.

- Use insect repellent. It works!
- Wear long-sleeved shirts and long pants.
- Stay in places with air conditioning or window and door screens.
- Remove standing water around your home.

**3** Zika is linked to birth defects.

Zika infection during pregnancy can cause a serious birth defect called microcephaly that is a sign of incomplete brain development. If you have a partner who lives in or has traveled to an area with Zika, do not have sex, or use condoms every time you have sex during your pregnancy.

**4** Pregnant women should not travel to areas with Zika.

If you must travel to one of these areas, talk to your healthcare provider first and strictly follow steps to prevent mosquito bites during your trip.

**5** Returning travelers infected with Zika can spread the virus through mosquito bites.

If you get infected with Zika and a mosquito bites you, you can pass the virus to the mosquito. The infected mosquito bites other people, who get infected. Returning travelers should use condoms or not have sex if they are concerned about passing it to their partners through sex.

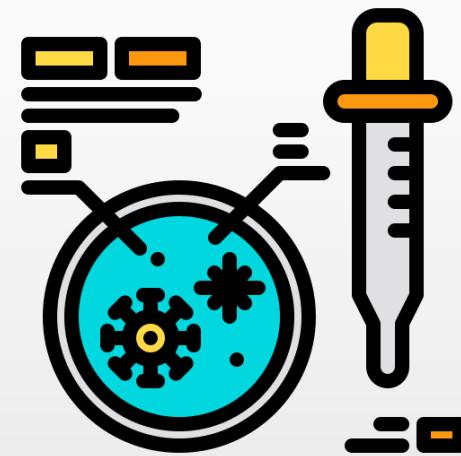
[WWW.CDC.GOV/ZIKA](http://WWW.CDC.GOV/ZIKA)



# Bloodborne pathogens

- What are bloodborne pathogens?

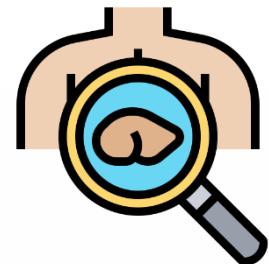
- Pathogenic microorganisms present in human blood that can lead to diseases
- Examples of primary concern
  - Hepatitis B (HBV)
  - Hepatitis C (HCV)
  - Human Immunodeficiency Virus (HIV)



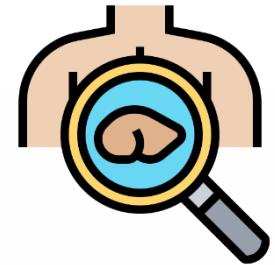
# Bloodborne pathogens

- Hepatitis B (HBV)

- Over 12 million Americans are infected (1 in 20)
- Silent infection; symptoms include jaundice, fatigue, abdominal pain, loss of appetite, intermittent nausea, vomiting; may lead to chronic liver disease, liver cancer, and death
- HBV can survive for at least one week in dried blood
- Up to 40,000 people in the U.S. become newly infected each year



# Bloodborne pathogens



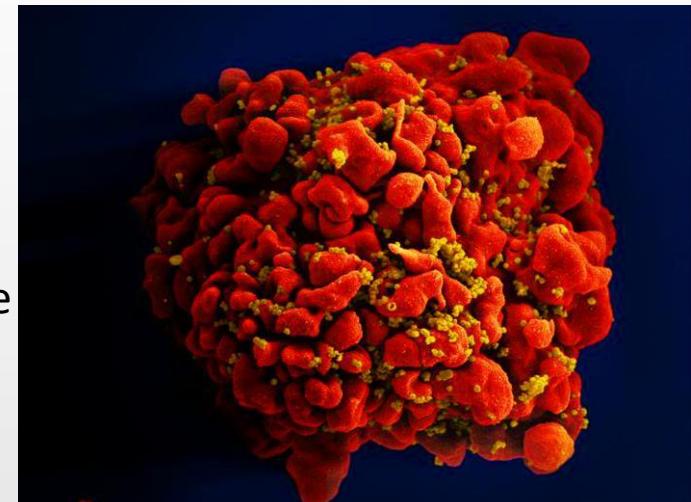
- Hepatitis C (HCV)
  - Hepatitis C is the most common chronic bloodborne infection in the U.S.
  - Symptoms include jaundice, fatigue, abdominal pain, loss of appetite, intermittent nausea, vomiting
  - May lead to chronic liver disease and death

# Bloodborne pathogens

- Human Immunodeficiency Virus (HIV)

- HIV is the virus that leads to AIDS
- HIV affects the body's immune system
- HIV does not survive well outside the body
- Estimated >1.1 million people living with HIV in U.S.
- Infected for life

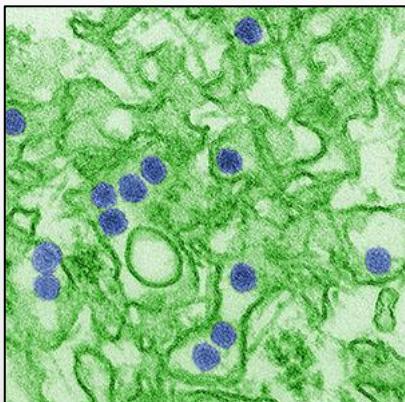
Single, red-colored H9-T cell infected by numerous mustard-colored HIV particles which are attached to the cell's surface membrane. Source: National Institute of Allergy and Infectious Diseases



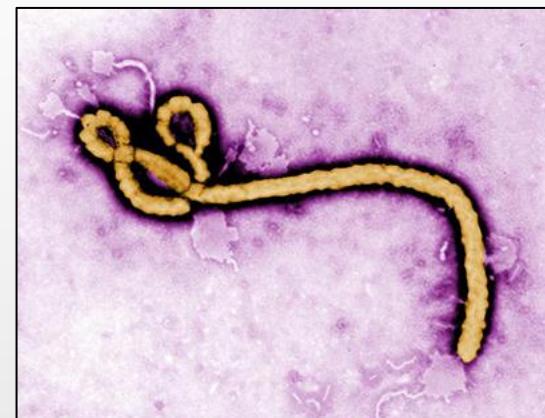
# Bloodborne pathogens



- Other bloodborne diseases
  - Caused by viruses or bacteria
  - Circulate in blood at some phase; capable of being transmitted
  - Most are rare in the U.S. and around the world



Zika Virus (left) and Ebola Virus (right) can be spread to workers through contaminated blood or infectious body fluids



# Risk of exposure

- Contamination sources

- Human blood
- Other potentially infectious materials (OPIM)
  - Human body fluids
  - Any unfixed tissue or organ from human
  - Cultures, culture mediums, or other solutions
  - Experimental animal blood, tissues, or organs infected with HIV or HBV



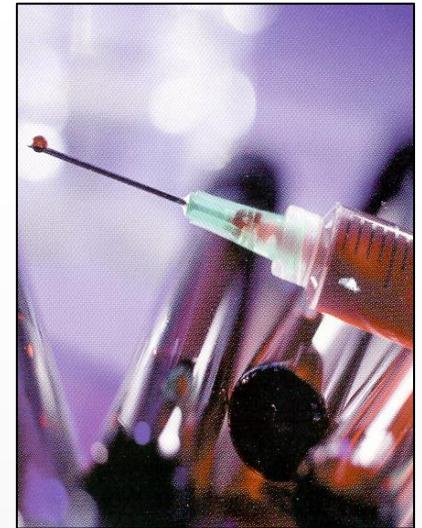
# Risk of exposure

- Spread of bloodborne pathogens occurs through
  - Direct contact
  - Indirect contact
  - Respiratory transmission
  - Vector-borne transmission



# Risk of exposure

- How exposure occurs
  - Needlesticks
  - Cuts from other contaminated sharps
  - Contact of mucous membrane or broken skin with contaminated blood or other potentially infectious materials



# Risk of exposure

- Occupational exposures

- Occupations at risk
  - First responders
  - Housekeeping personnel in some industries
  - Nurses and other healthcare personnel
- U.S. Centers for Disease Control and Prevention estimates 5.6 million workers in healthcare and related occupations are at risk in the U.S.
- All occupational exposure to blood or other potentially infectious materials places workers at risk



# Exposure Control Plan (ECP)

- Establish an Exposure Control Plan

- Written plan
- Review and update plan



# Exposure Control Plan (ECP)

- Required elements of Exposure Control plan include
  - Exposure determination
  - Schedule and method of implementation
  - Procedure for evaluation of exposure incidents



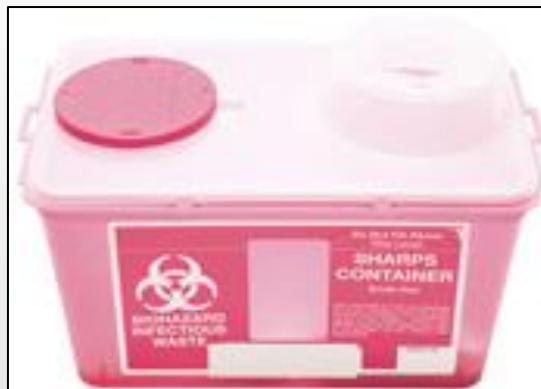
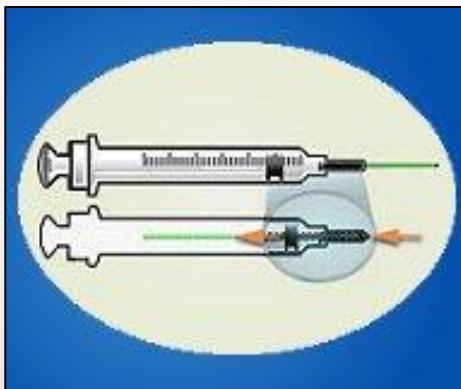
# Exposure Control Plan (ECP)

- Accessible to employees
- Review and update
  - Annually
  - When new or modified tasks/procedures are implemented



# Controlling exposures

- Engineering and work practice controls
  - Safer medical devices
  - Sharps disposal containers
  - Hand hygiene



# Controlling exposures

- PPE examples:
  - Gloves
  - Masks
  - Aprons/Smocks/Gowns
  - Face shields
  - Mouthpieces
  - Safety glasses
  - CPR pocket masks



# Controlling exposures

- Employer's responsibilities
  - Perform hazard assessment
  - Identify and provide appropriate PPE to employee at no cost
  - Train employees on use and care
  - Maintain/replace PPE
  - Review, update, evaluate PPE program



# Controlling exposures

- PPE selection
  - Safe design and construction
  - Fit comfortably
- Required PPE training
  - When it is necessary
  - What kind is necessary
  - Proper donning, adjusting, wearing, doffing
  - Limitations
  - Proper care, maintenance, useful life, disposal



# Controlling exposures

- Training

- Who

- All employees with occupational exposure to blood or other potentially infectious material

- Employees who are trained in first aid and CPR

- No cost; during working hours

- When

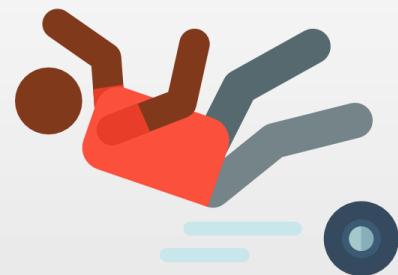
- Initial assignment

- Annually; or with new/modified tasks



# When exposure occurs

- Report exposure immediately
- Direct employee to healthcare professional for treatment
- First aid if possible



# When exposure occurs

- Confidential medical evaluation and follow-up
  - Route(s) of exposure and circumstances
  - Source individual
  - Collect/test blood for HBV and HIV serological status
  - Post exposure prophylaxis (when medically indicated)
  - Counseling
  - Evaluation



Do you have any  
questions or  
comments?





Thank you  
for your attention !



In this presentation:

- Some icons were downloaded from flaticon.com and iconscout.com