Bloodborne Pathogen Training

Environmental Health & Safety

UMass Chan MEDICAL SCHOOL | UMass Memorial Health

Topics to be Covered

- Overview of Standard
- What are Bloodborne Pathogens?
- Exposures
- Safe Work Practices
- Decontamination
- Biological Releases
- Engineering/Work Practice Controls

Occupational Safety and Health Administration (OSHA) Bloodborne Pathogens Standard

The Occupational Safety and Health Administration (OSHA) Bloodborne Pathogens (BBP) Standard [29 Code of Federal Regulations (CFR) 1910.1030] was promulgated to protect workers from the health hazards associated with occupational exposure to blood and other potentially infectious materials or OPIM.

Who is Covered by The Standard?

Any employee who has an **occupational exposure** to human blood or other potentially infectious materials (OPIM) within the scope of the OSHA BBP standard is covered.

Occupational Exposure: reasonably anticipated skin, eye mucous membrane or parenteral (through skin) contact with blood or OPIM that may result from the performance of an employee's duties.

Exposure Control Plan

A BBP Exposure Control Plan is required by the employer according to the OSHA BBP Standard. It is intended to protect employees against exposure to human blood and OPIM.

The Exposure Control Plan sets forth Standard Operating Procedures (SOP's) and precautionary practices for preventing the spread of BBP infections in the workplace.

The Plan requires that employees and students treat all human blood, tissue, and OPIM, including used, contaminated, materials/products as potentially infectious.

This Plan applies to all employees and subcontracted employees whose work duties include potential exposures to BBP.

Employer Requirements

- Prepare a written Exposure Control Plan and review and update it annually
- Evaluate the Exposure Control Plan effectiveness
- Identify all potentially exposed employees
- Provide appropriate controls and personal protective equipment (PPE) and enforce use
- Investigate/document new methods and equipment for reducing needlestick injuries
- Include employee input for new equipment and techniques to reduce needlestick injuries
- Offer hepatitis B virus vaccination to potentially exposed employees
- Provide signs and labels

Manager and/or Principal Investigator Responsibilities

- Supervisors/Managers are responsible for ensuring that all employees and subcontracted employees follow the procedures outlined in the Exposure Control Plan.

Environmental Health & Safety (EH&S) Responsibilities

- Identifying jobs with potential exposures to bloodborne pathogens
- Identifying employees who require training
- Providing support and technical advice to operating units
- Ensure that exposures are appropriately controlled with standard precautions, engineering and work practice controls, PPE, and housekeeping, as appropriate
- Responding to incidents and exposures and documenting reports
- Maintaining training records
- Annually reviewing the effectiveness of the Exposure Control Plan and revising, as necessary
- Include employee input when selecting new equipment and techniques to reduce needlestick injuries

Subcontractor Responsibilities

- Some subcontracted employees may have potential exposures to bloodborne pathogens.
- All subcontractors must comply with OSHA regulations, including the Bloodborne Pathogen Standard.
- The contracting department must inform the subcontractor of any potential BBP hazards they may encounter.

What are Bloodborne Pathogens?

Bloodborne Pathogens

- Bloodborne pathogens are defined as pathogenic microorganisms present in human or Non-Human Primate (NHP) blood, body fluids, tissues, or other potentially infectious material (OPIM) that can cause disease in humans.

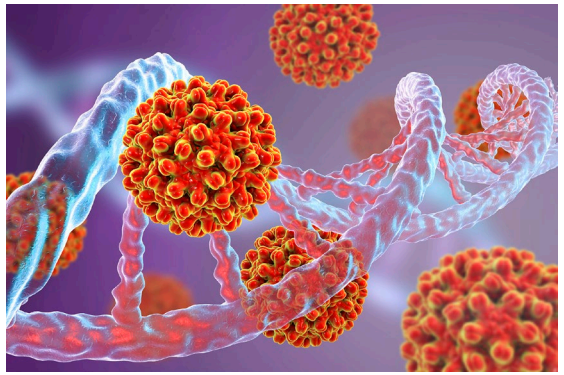
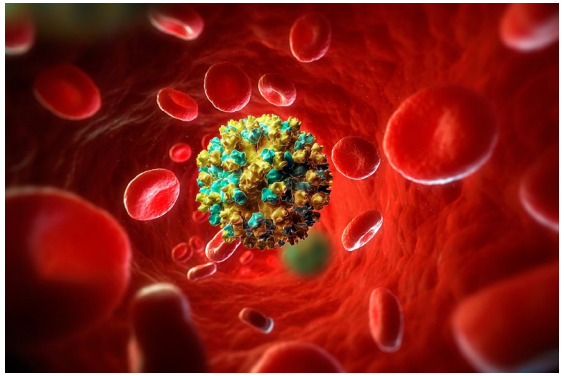
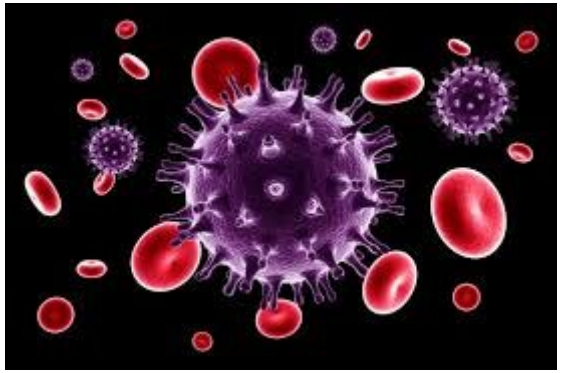
Other Potentially Infectious Materials (OPIM)

- Any body fluid visibly contaminated with blood
- All cultures and culture fluids of human bloodborne pathogens
- Unfixed human or NHP tissue or organs
- Human and NHP derived cell lines

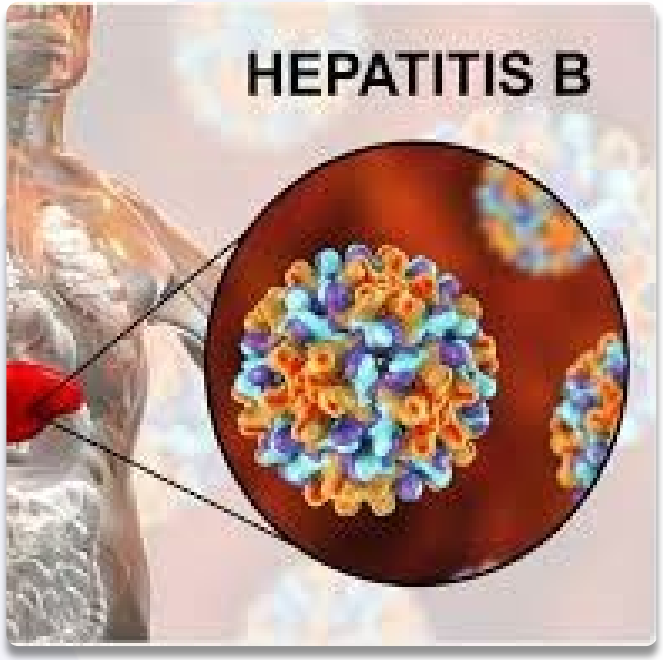
Potential Routes of Exposure

- Accidental puncture with needle, glass, scalpel or other contaminated sharps
- Contact between broken or damaged skin and potentially infected materials
- Contact between mucous membrane (eyes, nose, mouth) and potentially infected materials

Most Common Bloodborne Pathogens

Hepatitis B Virus (HBV)	Hepatitis C Virus (HCV)	Human Immunodeficiency Virus (HIV)
		

Hepatitis B Virus (HBV)



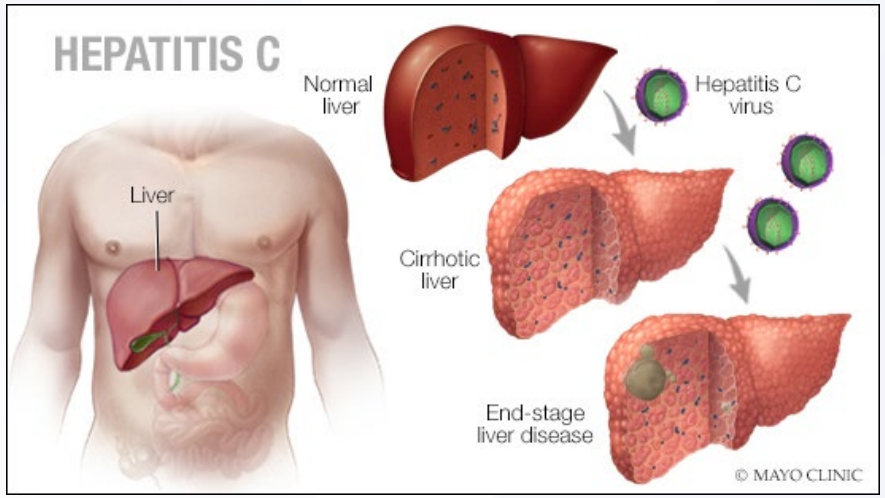
- Hepatitis B is the most common serious liver infection in the world. It is caused by hepatitis B virus (HBV).
- Hepatitis B spreads through contact with blood and body fluids of an infected person.
- Hepatitis B is not spread through food or water or by casual contact.
- For an unvaccinated person, the risk from a *single needlestick or a cut exposure to HBV-infected blood ranges from 6-30%.*
- In some cases, HBV exposure can lead to a long-term, chronic infection that can lead to serious, even life-threatening health issues like cirrhosis or liver cancer.
- While most individuals infected with hepatitis B will not become ill, up to 5% can be seriously ill; and all are at risk of clinical reactivation.

Hepatitis B Vaccination

- Hepatitis B vaccine is the best protection against HBV.
- Three doses are commonly needed for complete protection.
- The vaccine is offered at no cost to employees who have potential for exposure to human or non-human primate (NHP) blood, body fluids, tissues, cell lines and/or OPIM.
- If an individual chooses not to receive the vaccine, it is an OSHA requirement to sign a declination statement.
- For more information or to schedule a vaccination, contact your supervisor or call Employee Health Services at (508) 793-6400.
- For MBL, contact the Clinical Affairs Department at (617) 474-3259.

Hepatitis C Virus (HCV)

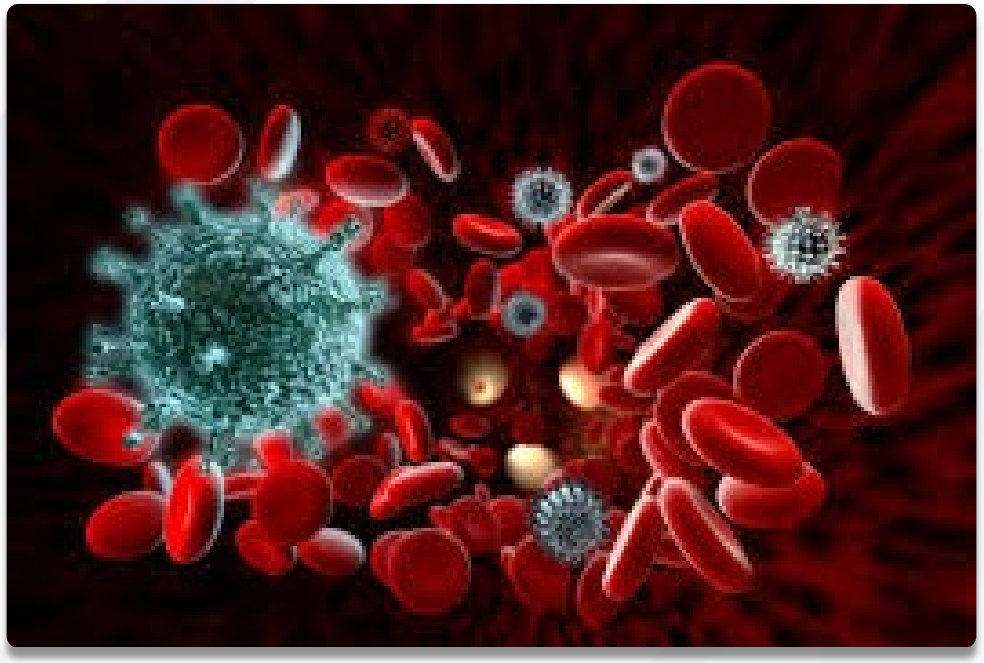
- Hepatitis C is a liver disease caused by the hepatitis C virus (HCV), which is found in the blood of persons who have this disease.
- HCV is spread by contact with the blood of an infected person. It is not spread by casual contact, and there is approximately 1 in 200 risk of infection after a needlestick or sharps injury.
- There is no effective post-exposure prophylaxis, but infection can be cured with treatment in over 95% of infected individuals.



Human Immunodeficiency Virus (HIV)

- HIV is the causative agent of Acquired Immunodeficiency Syndrome (AIDS):
  - Is transmitted through direct BBP exposure and/or sexual contact
  - May not show symptoms for up to 10 years or longer
  - Approximately 40,000 Americans are infected each year
  - Approximately 1 in 300 people will be infected following a needlestick/sharps injury exposure
  - Nearly 25% of HIV positive people also have HCV
- HIV is a Chronic, Incurable, Infection
  - There is no vaccine for HIV
  - An exposure event should be followed up with treatment and counseling by the Employee Health Services Department
  - A course of antiretrovirals (Post-Exposure Prophylaxis - PEP), may be indicated, which can help prevent the establishment of infection (https://www.cdc.gov/hiv/basics/pep.html).

Less common, but still potentially present are the biological agents that cause



- Syphilis
- Malaria
- Babesiosis
- Creutzfeldt-Jacob disease
- Brucellosis
- Leptospirosis
- Arboviral infections
- Relapsing fever

Exposures

Exposure vs. Non-Exposure

- Exposure or Direct Contact with BBP
  - Eye, mouth, non-intact skin, or parenteral contact with blood or OPIM resulting from the performance of an employee's duties
- Non-Exposure
  - When a biohazardous agent contacts intact skin, it is considered a non-exposure; however, it is recommended that it be reported to EHS

Steps to Follow After BBP Exposure

Needlestick/Skin Exposure

Immediately wash site with soap and water

Eye Exposure

Immediately flush at eyewash station for 15 minutes

Medical School Campus: Call Employee Health Triage Number (774-450-5222)
MassBiologics: Call Internal Emergency Number (511)

See next slide for after hours reporting

Receive medical evaluation, which may include:

Evaluate exposure	Exams, testing (serum banking, source blood testing)	Notify results of testing (confidential between physician and exposed person)	Provide counseling	Follow-up

Medical Contacts

UMass Chan Medical School Campus	**Employee Health Services** **Location:** Hahnemann Campus, 291 Lincoln Street **Schedule appointment**: 508-793-6400 Hours: 7:00am – 7:00pm (Mon – Sat) **Speak directly to triage nurse**: 774-450-5222 Hours: 7:00 am - 7:00 pm (Everyday) **Hospital Operator**: 508-334-1000 Hours: 7:00pm – 12:00am (Everyday) Contact the hospital operator after normal work hours, request to have BUGS paged, and enter your 10-digit phone number following the beeping sound to receive call back from a nurse.	**Emergency Department** **Location**: University Campus Level 1 Lakeside of the Hospital **Hours**: 24/7
MassBiologics	**Internal Emergency Number:** Call **511** for all emergencies 24/7	**Emergencies After Hours:** Call **911** for all emergencies 24/7

Safe Work Practices

Precautions for Work With BBP

- Always wear gloves while handling blood, body fluids, or OPIM.
  - **Always wash hands with soap and water after removing gloves.**
- If direct contact is made with blood or bodily fluids, wash the affected area thoroughly with soap and water and rinse under a stream of water.
- Before starting work, employees with cuts or other open wounds should take extra precautions to ensure that wounds are bandaged and protected from exposure.
- Eating, drinking, smoking, applying cosmetics or lip balm, and handling contact lenses are prohibited in all laboratories.

Universal Precautions

- Primary means of protection against BBP exposure
  - Treat all blood, OPIM, and equipment where these materials have been handled, as potentially infectious
  - Wear appropriate PPE
  - Wash hands frequently
  - Handle and dispose of waste properly
  - Dispose of sharps immediately after use in approved sharps containers

Personal Protective Equipment (PPE)

Personal Protective Equipment Guidelines	
Protective Equipment	**When to Use**
Exam or Nitrile Gloves	Any potential contact of the hands with blood or other body fluids or with materials contaminated with blood or body fluids
Utility Gloves	Same as above except when more durable material is required (e.g., maintenance work, housekeeping)
Face and eye protection (goggles, glasses with side shields, and a face shield)	Any potential for contact with eyes or face, (e.g., potential splashes, sprays, splatter, or droplets of infectious materials) and/or when using enhanced practices
Lab coats or Uniform	Any potential for contact with BBP

Personal Protective Equipment (PPE)

- Gloves
  - Before putting on gloves, check for tiny punctures, discoloration, and other physical defects.
  - Dispose of gloves after use.
  - Under NO circumstances should disposable latex or vinyl gloves be washed or disinfected for reuse.
  - When wearing potentially contaminated gloves or other PPE, employees should not touch non-contaminated surfaces, such as doorknobs and telephones.
  - Do not touch the face or mouth with gloves or other PPE.

Personal Protective Equipment (PPE)

- Eye/Face Protection
  - Protective eyewear or face shields should be worn during procedures where contact with the face or eyes with blood, body fluids, or OPIM is possible.
  - Any procedures where this is a concern should be reviewed by your supervisor.

Personal Protective Equipment (PPE)

- Disposal
  - PPE contaminated with BBP should be immediately removed and placed in a biohazard waste container for disposal and/or decontamination.

Personal Protective Equipment (PPE)

Glove removal

Sharps

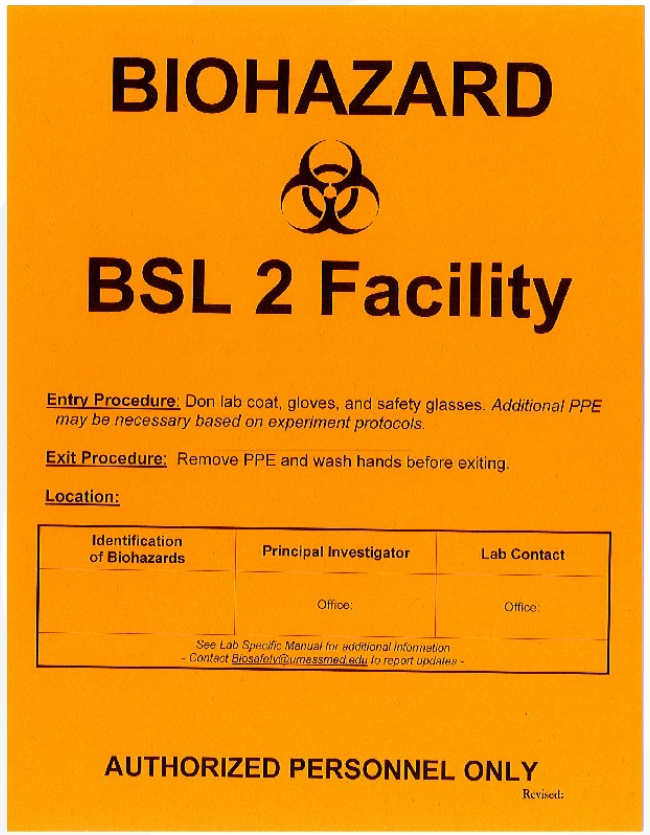
- Sharps used in research and animal work may cause punctures, lacerations, or cuts. Examples of sharps are:
  - Hypodermic needles and syringes
  - Pasteur pipettes
  - Serological pipettes *(must be disposed of as sharps)*
  - Scalpel blades
  - Disposable razors
  - Suture needles
  - Sharp edges on metal animal caging

- Sharps are required to be immediately disposed of within designated, covered, sharps containers. Once the container is three-fourths full, it must be sealed and appropriately discarded.

Labels and Signage

- OSHA requires that warning labels be placed on:
  - Biohazardous waste
  - Refrigerators, freezers, and other equipment where blood and or OPIM are used or stored
  - Containers used to store, transport, or ship blood or OPIM

Labels and Signage



- Employer shall post signs at the entrance to work areas. Signs must include:
  - Biohazard Symbol
  - Name of the Infectious Agent
  - Special requirements for entering the area
  - Name and telephone number of the laboratory director or other responsible person
  - These signs shall be fluorescent orange-red or predominantly so, with lettering and symbols in a contrasting color

Decontamination

Types of Decontamination

Type	Efficiency Level	Description
Sterilization	High	Physical or chemical procedure that destroys all microbial life, including highly resistant bacterial endospores. Sterilants include autoclaves, ethylene oxide gas, and vaporized hydrogen peroxide.
Disinfection	Intermediate	Eliminates virtually all pathogenic microorganisms, except for bacterial spores, on inanimate objects. Disinfectants include Vesphene, alcohol, Clidox and bleach.
Cleaning	Low	Removes visible soil or organic material by using water, detergent, and some mechanical action such as scrubbing with a gloved hand or brush. Cleaning is often a required step before sterilization or disinfection because it reduces the number of microorganisms on an object.

Decontamination and Bleach Dilutions

Type of Bleach	Percentage of NaOCl (Sodium Hypochlorite)	Dilution	Preparing Solutions*
Clorox Regular	5.25%	1:9	1 part (vol) bleach: 9 parts (vol) waste
Clorox Ultra	6.0%	1:10	1 part (vol) bleach: 10 parts (vol) waste
Clorox Concentrated	8.25%	1:15	1 part (vol) bleach: 15 parts (vol) waste

*Bleach to biological for disposal or bleach to H_2O for surface decontamination

Biological Releases

Biological Releases

- Small BBP or OPIM Spill
  - Decontaminate using bleach or other EPA approved decontaminate
- Larger Spill (one that you feel cannot be cleaned safely or requires assistance of EH&S and/or emergency personnel.)
  - Immediately leave the area and from an internal phone call x911 or x511 at MassBiologics

Biological Releases

Disinfection with Clorox bleach is extremely effective. Approximately 1:10 dilution of bleach to waste is recommended.

1. Contain spill/release
2. Cover with absorbent/spill pads or paper towels
3. Pour bleach over towels/spill pads to decontaminate
4. Wait 15 minutes
5. Put spill clean up materials into a biohazard waste box
6. Repeat steps 2 - 5
7. Be aware of corrosive nature of bleach

Engineering/Work Practice Controls

Engineering/Work Practice Controls

UMass Chan provides readily accessible hand washing facilities, sharps containers, biohazardous waste containers, and biowaste bags

All *sharps* must be immediately placed in puncture resistant, disposable, red sharps container bearing a biohazard label.

All contaminated materials must be contained and disposed of appropriately as soon as possible.

Biohazardous waste must be double bagged and boxed to prevent leaks and spills.

Laboratory Waste Disposal Simplified

Regular Waste: *Clear Bag*	**Biohazard Sharps Container**	**Biohazard Box** *Red Bagged*	***Radioactive Sharps Containers***
Uncontaminated: ▪ gloves ▪ Paper towels ▪ Empty bottles with no chemical residue	*ALL:* ▪Needles and syringes ▪ Razor blades ▪ Pipettes, pipette tips ▪ Pasteur pipettes ▪ Slides and cover slips ▪ Capillary tubes ▪ Broken contaminated glassware **NOTE:** Full containers **will not** be removed from the lab if contents are over flowing.	*ALL:* ▪Infectious agents ▪ Pathological waste ▪ Contaminated paper towels, kimwipes, etc. ▪ Cell cultures ▪ Plastic fly vials ▪ Eppendorph tubes ▪ Contaminated personal protective equipment ▪ Unbroken vials	*ALL RADIOACTIVE:* ▪Needles and syringes ▪ Razor blades ▪ Pipettes, pipette tips ▪ Pasteur pipettes ▪ Slides and cover slips ▪ Capillary tubes ▪ Broken contaminated glassware **NOTE:** Radioactive sharps should be in a separate sharp container and per isotope. Should be labeled properly and return to Radiation Safety.

For information regarding the disposal of chemical waste contact Environmental Health & Safety at 508-856-3985

Contact Environmental Building Services at 508-856-2721 to request empty biohazard waste containers or for the pickup of full containers

Questions?

Email Our Team at: Biosafety@umassmed.edu or Contact:

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Resources

- Bloodborne Pathogens Standard [29 Code of Federal Regulations (CFR) 1910.1030]
  - http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10051
- Needlestick Safety and Prevention Act
  - http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=106_cong_public_laws&docid=f:publ430.106
- Protecting Yourself When Handling Contaminated Sharps
  - https://www.osha.gov/sites/default/files/publications/bbfact02.pdf
- Hepatitis B
  - https://www.cdc.gov/hepatitis/hbv/index.htm
- HIV
  - https://www.cdc.gov/hai/pdfs/bbp/exp_to_blood.pdf
  - https://www.hiv.gov/hiv-basics/overview/data-and-trends/statistics
- Exposure to Blood
  - https://www.cdc.gov/hai/pdfs/bbp/exp_to_blood.pdf
- Guideline for Disinfection and Sterilization in Healthcare Facilities
  - https://www.cdc.gov/infectioncontrol/guidelines/disinfection/introduction.html
- How to Remove Gloves
  - https://www.cdc.gov/vhf/ebola/pdf/poster-how-to-remove-gloves.pdf