Biological Safety Practices for Patient-Derived Specimens

Overview

This EHS Update outlines best practices for specific biocontainment, laboratory practices, and personal protective equipment (PPE); as well as guidance for the initial processing, aliquoting, preparing, and analysis of patient-derived specimens (**not known to be from COVID-19 (+) patients)**. Sample types include blood, blood components, urine, feces, CSF, and respiratory samples.

For research activities with SARS-CoV-2 and/or clinical specimens from suspected or confirmed COVID-19 patients, follow the guidance outlined in Biosafety Considerations for Handling SARS-CoV-2 Patient Samples.

Using a certified Class II Biological Safety Cabinet (BSC) is always recommended for handling patient samples and for procedures with a high likelihood to generate aerosols or droplets.

Laboratory procedures that may generate infectious aerosols and droplets include:

- centrifugation
- pipetting
- vortexing
- mixing
- shaking
- sonicating
- removing caps
- decanting liquids
- preparing smears
- flaming slides
- aliquoting and loading specimens
- loading syringes
- manipulating needles, syringes or sharps
- aspirating and transferring blood and body fluids
- sub culturing blood culture bottles
- spilling specimens
- cleaning up spills

Treat all patient material as if it is infectious and utilize good microbiological practices to reduce exposure risks. All procedures must be performed in the Biological Safety Cabinet (BSC), except otherwise stated.

Personal Protective Equipment (PPE)

Laboratory personnel should wear:

1. Surgical mask or N95 mask (as determined by risk assessment)
2. Double gloves
3. Disposable fluid-resistant gown
4. Disposable face shield or eye protection with side shields (e.g., goggles)

PPE must not be worn outside the laboratory work area. Disposable PPE must be disposed of into a red bag immediately at the end of a work session.

Hand washing is essential after removing gloves and other personal protective equipment, after handling potentially infectious agents, and before exiting the laboratory.

Specimen Precautions

CLASS II A2 BIOLOGICAL SAFETY CABINET (BSC) PREPARATION

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Place all materials and tools needed for the procedure in the BSC but do not overload the BSC with unnecessary equipment. For more information on BSC safety, visit the EHS website.

1. Class II BSC must be certified annually.
2. If the BSC is equipped with an ultraviolet (UV) lamp, use UV sterilization before and after sample processing.
3. Disinfect the BSC, allowing 70% ethanol/isopropanol to sit on the work surface for 10 minutes before wiping.
4. Spray /wipe the BSC with 70% ethanol/isopropanol after each use.

SPECIMEN RECEIPT AND OPENING

1. Once a specimen arrives in the laboratory, open the secondary transport container within the BSC. If bagged, the bag should also be opened within the BSC.
2. Perform all procedures in the BSC except otherwise stated.
3. The BSC should be disinfected using 70% ethanol /isopropanol after each use.

SPECIMEN CENTRIFUGATION

Only use centrifuges with sealed bucket covers and load and unload them within the BSC.

1. Take the centrifuge buckets to the BSC to load the specimens. Make sure the bucket is sealed via the safety cover before removing it from BSC.
2. Ensure that the centrifuge buckets are properly arranged and balanced on the rotor.
3. Centrifuge the samples. Upon completion, take the sealed buckets to the BSC to unload the samples for further processing.
4. Once sample processing is completed, disinfect the centrifuge buckets using 70% ethanol /isopropanol, letting it stand for at least 10 minutes before opening, allowing any aerosols to settle.

SPECIMEN ALIQUOT AND STORAGE:

All procedural steps below must be performed in the BSC.

1. Bring all specimens and related materials into the BSC. Wipe down all materials with disinfectant before use.
2. Aliquot the specimens as instructed.
3. Place all aliquots in a properly labeled, plastic freezer storage box. Seal the box using plastic tape or paraffin film.
4. Wipe down all materials with disinfectant before removal from the BSC.
5. Store the specimens in a biohazard-labeled refrigerator/freezer.

SPECIMEN ASSAY

All procedural steps should be performed in the BSC. Patient specimen processing and analysis can only be performed outside BSC after appropriate sample inactivation.

1. Take out the specimens from storage and thaw them in the BSC.
2. Perform the assay in the BSC following the corresponding applicable standard operating procedure.
3. Disinfect materials and BSC using 70% ethanol /isopropanol, letting it stand for at least 10 minutes after each use.

Personal Protective Equipment (PPE)

Laboratory personnel should wear:

5. Surgical mask or N95 mask (as determined by risk assessment)
6. Double gloves
7. Disposable fluid-resistant gown
8. Disposable face shield or eye protection with side shields (e.g., goggles)

PPE must not be worn outside the laboratory work area. Disposable PPE must be disposed of into a red bag immediately at the end of a work session.

Hand washing is essential after removing gloves and other personal protective equipment, after handling potentially infectious agents, and before exiting the laboratory.

Waste Disposal

Decontaminate all materials in contact with patient samples before removing them from the BSC.

1. Liquid wastes must be collected in a container and decontaminated by adding bleach to achieve a solution concentration of 10%, for at least 60 minutes. Follow EHS Tissue Culture Waste Disposal Guide.
2. Solid wastes must be disposed in an autoclave-rated biohazard red bag and sealed for autoclaving. **Note:** WCM-labeled red bags are not rated for autoclaving. After autoclaving, the autoclaved bag must then be placed in a WCM-labeled red bag.
3. Loose sharps items, such as tips and pipettes, must be disinfected in 10% bleach for at least 60 minutes before disposing into a sharp container. The disinfectant liquid may be disposed of down the drain after use.
4. Disposable sharps containers must be closed within the BSC before placement into a WCM-labeled red bag.

Spill Response

A Biological Spill Response Flowchart must be posted in each work area to follow in case of a spill. Detailed information on responding to a biological spill, who to contact, and how to prepare a Biological Spill Kit is outlined in the EHS Biological Spill Planning and Response Manual.

If the spill occurs outside the BSC:

1. Alert other lab staff to leave and post the "Biohazard Spill: Do Not Enter" sign on the door.
2. Evacuate room for 30 minutes to allow droplets/aerosols to settle.
3. Remove any contaminated PPE and dispose in red biohazard bags.
4. Locate the Biological Spill Kit and don new PPE.
5. Follow posted cleanup instructions in the Biological Spill Response Flowchart, or see EHS Biological Spill Planning and Response Manual for more detailed cleanup information.

If a spill occurs inside of the BSC:

1. Cover the spill area with paper towels first, then with appropriate disinfectant. Let sit for minimum contact time.
2. Collect paper towels into a red waste bag. Use tongs/forceps to pick up any sharps or broken glass.
3. Wipe down all nearby surfaces with disinfectant. Discard all the spill materials into a red bag-lined waste container.
4. Dispose of used PPE in red biohazard bags. Wash hands.

Packaging and Shipping Patient Specimens

Only trained shipping personnel are authorized to prepare packages and related shipping documents. *Training must be renewed every 2 years. Visit the EHS website for information on the Biological Material and Dry Ice Shipment training.*

1. Patient specimens are those collected directly from humans or animals, including, but not limited to, excreta, secreta, blood and its components, tissue, tissue fluid swabs, and body parts being transported for purposes such as research, diagnosis, investigational activities, disease treatment, and prevention.
2. Patient specimens containing or reasonably expected to contain Category A or Category B pathogens must be classified as either an Infectious Substance, Category A, or a Biological Substance, Category B, depending on the classification of the pathogen.
3. Patient specimens being sent to screen for the presence of infectious diseases **must** be classified as Biological Substance, Category B.
4. Additional information on how to classify infectious substances is detailed in the EHS Biological Materials and Dry Ice Shipping Manual.