**Laboratory Biosafety Guidelines for Handling and Processing Specimens Associated**

**with Coronavirus Disease 2019 (COVID-19)**

All laboratories should perform a site-specific and activity-specific risk assessment to identify and mitigate risks and determine if enhanced biosafety precautions are warranted based on situational needs, such as high testing volumes, and the likelihood to generate infectious droplets and aerosols.

The risk assessment should identify all potential scenarios of a particular activity that could produce a negative outcome. The risk assessment should prioritize those potential negative outcomes, or risks, based on an evaluation of the likelihood and consequences of each of those identified risks. For each identified risk, appropriate risk control measures including but not limited to the following recommendations should be selected and implemented in order to mitigate the residual risks to an acceptable level.

**PREXAMINATION**

A. SPECIMEN COLLECTION AND LABELING

1.All specimens must be collected in proper vacutainers which must be labeled with:

● Patient (or contact) name

● Age

● Hospital generated (Patient ID)

● Specimen type

● Date collected

2.Test Requisition form: Test Requisition Form should be sent by whats app group or scanned copy through e-mail so as to minimize the risk of transmission through fomites. If that is not possible each specimen must be accompanied by a completed form which should be sent separately and not be contaminated by blood.

3.Patient information on the specimen tube and form must match exactly to prevent delays.

4. Laboratory personnel collect blood or respiratory specimens directly from suspected or confirmed COVID-19 patients, should follow recommended PPE for health care providers while in the presence of these patients.

B. PACKAGING GUIDELINES

1. A leakproof vacutainer

2. Many vacutainers should be kept in leakproof, watertight secondary packaging box or ziplock

plastic container

3. Ideally this secondary box should be placed in packaging box to carry all samples

INFORMATION REQUIRED ON SECONDARY CONTAINER or PACKAGING BOX

Ensure the outer package has been properly marked and labeled with the BIOHAZARD

LABEL and marked as COVID.

The accession department or the handler who receives the specimens should clean the external surfaces of specimen containers using a disinfectant (70% alcohol, 0.1% hypochlorite)

Note : Do not send blood/serum/cytology/ pathology samples rolled up in the forms.

C.Centrifugation of specimens should be performed using sealed centrifuge rotors or sample cups. These rotors or cups should be loaded and unloaded in a Biosafety Cabinet (BSC). Post centrifugation an extra 10-20 minutes should be waited before removing the tubes from the centrifuge.

Note: Disinfectants used sodium hypochlorite (bleach) (0.1%) for general surface disinfection and 10,000 ppm (1%) for disinfection of blood spills), 62-71% ethanol, 0.5% hydrogen peroxide, quaternary ammonium compounds and phenolic compounds, if used according to

manufacturer’s recommendations. Particular attention should be paid not only to the selection of the disinfectant but also contact time (e.g. 10-20 minutes), dilution (i.e. concentration of the active ingredient) and expiry date after the working solution is prepared.

**EXAMINATION**

Non-propagative diagnostic laboratory work (e.g. sequencing, NAAT) should be conducted at facilities and procedures equivalent to BSL-2 and propagative work (e.g. virus culture, isolation or neutralization assays) at a containment laboratory with inward directional airflow (BSL-3).

A. PERSONAL PROTECTION

 1. Laboratory coveralls, gowns, mask, must be worn at all times for work in the

Laboratory. If manipulation of respiratory material or stool is involved, wearing protective eye wear or face shields is recommended.

2. Gloves must be worn for all procedures that may involve direct or accidental

contact with blood, body fluids and other potentially infectious materials.

*Putting on personal protective equipment (PPE)*.

* Clean your hands. This can be done with either liquid soap and running water or alcohol-based hand rub
* Put on a disposable apron. Fasten the back of the apron at the neck and waist or as per the design of the apron.
* Secure the ties of the mask at the middle of the head and neck. Fit the flexible band to nose bridge and ensure the mask is fitted snug to face and below the chin. Do not touch or adjust the mask until you are ready to remove the mask.
* Put on protective eyewear to protect your eyes.
* Put on gloves. It should extend to cover wrist of an isolation gown.
* Once you enter the area, avoid touching your face and don’t touch or adjust your face mask if one is worn.
* If wearing a mask, it should be either on or off – ensure it always covers both the nose and mouth and don’t let it dangle from the neck.

*Removal of personal protective equipment (PPE)*.

* Remove and dispose off gloves. The outside of gloves is contaminated. Remove gloves being careful not to contaminate bare hands during glove removal.
* Remove and dispose of an apron. The apron front may be contaminated. Untie or break fasteners and pull an apron away from the body, touching the inside of the apron only.
* Remove protective eyewear/face shield. The outside of protective eyewear/face shields may be contaminated. Remove eyewear/face shield by tilting the head forward and lifting the headband or ear pieces. Avoid touching the front surface of the eyewear/face shield. Reusable protective eyewear should be placed into a container and washed in detergent and water and allowed to completely air dry.
* Remove and dispose of masks if worn. Do not touch the front of the mask. Remove the mask by holding the elastic straps or ties and remove without touching the front.
* Personnel must wash their hands after handling infectious materials and before they leave the laboratory working areas.

Note: It is preferable to separate laboratory gear/clothing and shoes from street wear.

B. PROCEDURES

Precautions and disinfection of the external surface of the specimens’ containers prior to

touch and open them must be taken using the appropriate disinfecting solution (0.1%hypochlorite) if not done earlier.

1. Pipetting by mouth must be strictly forbidden.

2. Materials must not be placed in the mouth. Labels and forms must not be licked while

flipping.

3. All technical procedures should be performed in a way that minimizes the formation of

aerosols and droplets.

4. For procedures with a high likelihood to generate aerosols or droplets, use either a certified Class II Biological Safety Cabinet (BSC) or additional precautions to provide a barrier between the specimen and personnel.

4. The use of hypodermic needles and syringes should be limited. They must not be used as

substitutes for pipetting devices

5.All manipulations of potentially infectious materials, including those that may cause splashes,

droplets, or aerosols of infectious materials (e.g. loading and unloading of sealed centrifuge cups, blending, vigorous shaking, vortexing or mixing) however, should be performed by trained

personnel with demonstrated capability.

6.Caps of vacutainers should be ideally removed by automatic decapper. If being removed manually, caps should be opened under a biosafety cabinet or with the help of gauge soaked in 1% hypochlorite in a direction away from face

7. All spills, accidents and overt or potential exposures to infectious materials must be reported

to the laboratory supervisor. A written record of such accidents and incidents should be

maintained.

8. Blood and body fluid spill care:

Wear non-sterile gloves.

For large spills, cover with absorbent paper/ rag piece , if any broken glass and sharps, using a pair of forceps and gloves, carefully retrieve.

Use a large amount of folded absorbent paper to collect small glass splinters.

Place the broken items into the puncture proof sharps container.

Cover the spill with sodium hypochlorite (1%)for 10–20 minutes contact time.

•Clean up spill and discard into infectious waste bin, and mop area with soap and hot water.

•Clean the mop and mop area with 1% sodium hypochlorite.

• Wash mop with detergent and hot water and allow it to dry

9.Written documents that are expected to be removed from the laboratory need to be protected

from contamination while in the laboratory.

C. WORK AREA AND EQUIPMENT DISINFECTION

Irrespective of the containment level, work surfaces and equipment must be decontaminated after specimens have been processed with sodium hypochlorite (0.1%) for a minimum of 10-20 minutes. Cleaning equipment including mop heads and cloths should be laundered using hot water and completely dried before re-use. Cleaning equipment, such as buckets, should be emptied and cleaned with a new batch of chlorine bleach solution and allowed to dry completely before re-use.

Refrigerator cleaning- Empty the fridge and store things appropriately. • Defrost, decontaminate and clean with detergent. • Dry it properly and replace the things. • Weekly cleaning is recommended.

E. POINT OF CARE TESTING: For diagnostic testing of specimens conducted outside of a traditional clinical laboratory, follow hand hygiene and the use of personal protective equipment (PPE) such as laboratory coats or gowns, gloves, and eye protection to provide a barrier between the specimen and personnel during specimen manipulation.

**POSTEXAMINATION**

1.Remove biohazardous waste from the laboratory or testing area for decontamination

2.Store specimens at 2-8℃ for up to 72 hours after collection, -10 to -20℃ after 72hours within 7 days, -70℃ after one week.

3.For disposal of waste, please follow your local guidelines for the same and Bio-Medical Waste Management Rules, 2016. It is recommended that vacutainers and caps be soaked in sodium hypochlorite solution and then discard in a separate bag. As precaution double layered bags (using 2 bags) should be used for collection of waste from COVID-19 s to ensure adequate strength and no-leaks.

3.In addition to mandatory labelling, bags/containers used for collecting biomedical waste from COVID-19 wards, should be labelled as “COVID-19 Waste”. This marking would enable Common Biomedical Waste Treatment Facility (CBWTFs) to identify the waste easily for priority treatment and disposal immediately upon receipt.

**REFERENCES**

1.World Health Organization.Laboratory biosafety manual. – 3rded URL: https://www.who.int/csr/resources/publications/biosafety/Biosafety7.pdf?ua=1

2.2007 CDC Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents

in Healthcare Settings :Last update: July 2019

3.Laboratory biosafety guidance related to the novel coronavirus (2019-nCoV) :Interim guidance

12 February 2020

4.WHO- Laboratory biosafety guidance related to the novel coronavirus (2019-nCoV)

5.Guidance COVID-19: safe handling and processing for samples in laboratories. Public health

England

6. National Centre of Disease Control- Guidelines for disinfection of quarantine facility (for COVID-19) Accessed on 31-03-2020.

URL: <https://ncdc.gov.in/WriteReadData/l892s/89168637271584172711.pdf>

7. Guidelines for Handling, Treatment, and Disposal of Waste Generated during Treatment/Diagnosis/ Quarantine of COVID-19 Patients – Rev. 1

8. Bio-Medical Waste (Management and Handling) Rules 28th March, 2016.

Compiled by

Dr.Sudhesna Mohapatra

MD Biochemistry.