

Clinical Biochemistry Laboratory Biosafety Guidance during COVID-19 Pandemic

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Dear Editor,

COVID-19 outbreak has engulfed different parts of the world affecting more than 6 million people causing more than 378,485 deaths worldwide according to World Health Organisation (WHO) [1]. Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) is transmitted via respiratory droplets, aerosols (≤ 10 micrometer) and contaminated surfaces. Thus, it becomes highly imperative to follow biosafety measures to control infection in the Clinical Biochemistry laboratory who are handling specimens from suspected patients for biochemical investigations according to WHO Interim guidelines released on 19th March, 2020 [1]. Furthermore, the staff should be trained in the relevant technical and safety procedures and should follow relevant protocols for the same. Site specific and activity specific risk assessment should be performed in order to identify and alleviate the risks such as activities carrying potential risk of generating infectious aerosols [2]. These activities include loading and unloading of sealed centrifuge cups, grinding, blending or vigorous shaking or mixing (WHO) [3].

It is suggested that during the COVID-19 outbreak, all samples collected for in vitro diagnostic testing are considered potentially infectious; hence standard precautions should be followed [4]. In addition to this, Centers for Disease Control and Prevention (CDC) also revised its Interim guidelines on 19th September and introduced new link regarding the resources to prepare and support laboratories responding to COVID-19. This included testing, data and informatics resources, biosafety resources, communication and outreach resources and training resources [2]. According to the International Federation of Clinical Chemistry recommendation 1a, social distancing should be adopted as a measure to prevent SARS-Cov-2 infection by splitting the laboratory staff into different teams working on separate days to minimise the chances of cross infection between laboratory personnel [4]. In addition to this, separate stations should be allotted to staff members and group gatherings must be avoided with the purpose of maintaining social distancing.

Laboratory staff should also be trained in proper infection control practices such as frequent hand hygiene such as hand washing for at least 40 seconds and hand sanitization when hand washing not available, cough etiquette, avoiding touching eyes, nose, mouth and surfaces [2]. Only authorised personnel should be allowed to enter the working area and laboratory doors should be closed at all times. Proper collection and transportation of specimens are of paramount importance as they have a high risk of virus transmission. The Phlebotomist should wear a full Personal Protective Equipment (PPE) kit including gown, 3-layer surgical mask or N95 mask, double layer gloves, eye goggles, face shield and shoe cover after following proper "putting on" sequence [2].

According to CDC Interim guidelines, decontamination of work surfaces [2] such as the Phlebotomy area which should be cleaned every two hourly. Appropriate disinfectants against enveloped

viruses such as 0.1% Sodium hypochlorite for general surface disinfection and 1% for blood spills or 62-71% ethanol or 0.5% hydrogen peroxide or quaternary ammonium compounds or phenolic compounds according to manufacturer's recommendations regarding use such as dilution, contact time and expiry date after the working solution is prepared [3]. Leak proof serum separating vacutainers (generate less aerosols on centrifugation) should be used for sample collection and transported in dedicated leak proof secondary packaging box labelled with biohazard sign and COVID-19 samples [3]. Initially, samples should be enclosed in plastic zip lock bag [3] which is then put in the secondary box. After receiving the box, external surface of both box and vacutainers should be cleaned with disinfectant after securing the label of the vacutainer by cello tape. The clinical biochemistry personnel should also wear proper gear including 3-layer mask, double layer of gloves, eye goggles and laboratory coat covering the knees [3]. Online or scanned test requisition forms should be used instead of usual test requisition forms to avoid contamination. Centrifugation should be done in a sealed rotor with lid and allowed to rest for more than 10 minutes afterwards, so that the aerosols settle preventing any risk of contamination [4]. According to CDC Interim guidelines, procedures such as centrifugation with high chances of generating aerosols should be done either using Class II Biological safety cabinets or barrier between lab personnel and specimen should be created by using PPE such as surgical mask, face shield, splash shield, centrifuge safety cups and sealed centrifuge rotors [2]. The cap of the vacutainer should be opened carefully in the direction away from face. The cap should be placed with open side up on a cotton pad soaked with 70% alcohol or 1% sodium hypochlorite to prevent contamination of surfaces.

If any spill or potential exposure to infectious material occurs, it must be reported to laboratory supervisor and infection prevention control nurse along with a written record of such incident. The spill must be covered with 1% sodium hypochlorite [3] for 10-20 minutes and then area should be mopped with soap and hot water followed by 1% hypochlorite treatment. According to CDC Interim guidelines, the samples from suspected or confirmed COVID-19 patients should be considered biohazardous and should be discarded accordingly [2]. The discarded blood or other body fluid sample should be kept in 1% sodium hypochlorite solution followed by discarding in Effluent Treatment Plant (ETP) enabled drain. The vacutainers and their caps must be treated with 1% sodium hypochlorite before discarding them in double layered yellow bag labeled as "COVID-19 Waste" [5]. This Biosafety guidance when followed during invitro diagnostic testing of patient samples can highly reduce the risk of contamination in the Clinical Biochemistry laboratory.

REFERENCES

- [1] Covid19.who.int. 2020. WHO Coronavirus Disease (COVID-19) Dashboard. [online] Available at: <<https://covid19.who.int/>> [Accessed 3 June 2020].

- [2] Centers of Disease control and Prevention. Interim Guidelines for Collecting, Handling, and Testing Clinical Specimens for COVID-19, 19 September 2020. Centers of Disease control and Prevention; 2020.
- [3] World Health Organization. Laboratory testing for coronavirus disease 2019 (COVID-19) in suspected human cases: Interim guidance, 19 March 2020. World Health Organization; 2020.
- [4] Lippi G, Adeli K, Ferrari M, Horvath AR, Koch D, Sethi S, Wang CB. Biosafety measures for preventing infection from COVID-19 in clinical laboratories: IFCC Taskforce Recommendations. *Clinical Chemistry and Laboratory Medicine (CCLM)*. 2020;1(ahead-of-print).
- [5] Revision 2: Guidelines for Handling, Treatment and Disposal of Waste Generated during Treatment/Diagnosis/Quarantine of COVID-19 Patients. 2020.

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