

VMMC & SJH Policy on Bio-medical waste management for BMW from patients in COVID-19 Wards/ICUs/Labs etc

Version 5: Dated 21.5.2022

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As per BMW (Principle) rules 2016 and BMW (Amendment) rules 2018, 2019, Guidelines for Handling, Treatment and Disposal of Waste generated during treatment/Diagnosis /Quarantine of COVID-19 patients, CPCB, 26 April 2022

Following specific guidelines for management of waste generated during diagnostics and treatment of COVID-19 suspected / confirmed patients, are required to be followed by all the stakeholders including isolation wards, sample collection centers, laboratories, in addition to existing practices under BMW Management Rules, 2016. These guidelines are based on current knowledge on COVID-19 and existing practices in management of infectious waste generated in hospitals while treating viral and other contagious diseases like HIV, H1N1, etc. These guidelines will be updated if need arises. This Version 4 of guidelines is done mainly to incorporate specific requirements and responsibilities of persons and guidance on BMW and SW. Guidelines brought out by WHO, MoH&FW, ICMR, CDC and other concerned agencies from time to time may also be referred.

Biomedical waste categories and their segregation, collection, treatment, processing and disposal options in Safdarjung Hospital and VMMC. Only pre treatment and segregation will be done only at the point of generation in the hospital and the final disposal will be done by common biomedical waste treatment and disposal facility (CBWTF). Biomedical waste devices, articles generated during diagnosis, treatment, management, immunization etc from patients with COVID-19 and HCW working in such ward/opd should be managed in accordance with safe routine procedures and rules.

Yellow Category

(a) Human Anatomical Waste:

Human tissues, biopsy: Yellow coloured non-chlorinated plastic bags.

(b) Animal anatomical waste: Yellow coloured non-chlorinated plastic bags

(b) Soiled Waste:

Items contaminated with blood, body fluids like dressings, plaster casts, cotton swabs and bags containing residual or discarded blood and blood components are disposed off in yellow bag.

(d) Cytotoxic drug vials shall not be handed over to unauthorised person under any circumstances. Expired cytotoxic drugs to be returned back to the manufacturer or supplier for incineration at temperature $>1200^{\circ}\text{C}$. Leftover cytotoxic drugs and items contaminated with cytotoxic drugs along with glass or plastic ampoules, vials etc to common biomedical waste treatment facility for incineration at $>1200^{\circ}\text{C}$ in yellow bag or container with cytotoxic label.

(e) Chemical Waste:

Chemicals used in production of biological and used or discarded solid disinfectants, residual or discarded chemical solid waste and chemical sludge are discarded in yellow coloured non-chlorinated plastic bags or containers and disposed of by incineration by CBWTF.

(f) Liquid waste generated due to use of chemicals in production of biologicals, used or discarded disinfectants, patients samples infected secretions, aspirated body fluids liquid from laboratory, ward, OT and disinfecting activities etc should be collected separately and made safe by disinfection by chemical treatment using 1-2% sodium hypochlorite solution for a contact period of 30 min and

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directed to effluent treatment system or then discharged into drains/sewers. The combined discharge should conform to the discharge norms given in schedule III, as per BMW (Principal) rules, 2016.

(g) Discarded items:

Linen, Mattresses, beddings contaminated with blood or body fluid Non-chlorinated (lime/alcoholic: 5 % Lysol for 30 minutes, 5% Phenol for 30 min) or 1-2% sodium hypochlorite chemical disinfection followed by shredding and customised to fit in nonchlorinated yellow bag for incineration.

(h) Microbiology, biotechnology waste

Microbiology, biotechnology waste i.e. laboratory cultures, stocks or specimens of microorganisms, live or attenuated vaccines, humans and animals cell culture used in research, residual toxins culture plates dishes have to be pre-treated on site by autoclaving in an autoclave safe plastic bag/container there after sent for final disposal in its respective colour category to CBWTF. The discarded blood bags are to be counted, sealed, weighed and all the records to be made and then packed in autoclave safe plastic bags or containers to be autoclaved on site and then sent in yellow bag to CBWTF for incineration.

Red category

Contaminated Waste (Recyclable)

(a)Wastes generated from disposable items such as tubing, drains, oxygen mask, bottles, intravenous tubes and sets (with needles cut), catheters, urine bags, and gloves are nicked, wherever applicable goggles, faceshield, splash proof apron, plastic coverall, Hazmet suit and put in red bag. The needles of syringes are cut with the needle destroyer/needle cutter preferably. The cut/mutilated syringe is disposed finally in red coloured non chlorinated plastic bags or containers.

Pre-treat viral transport media, plastic vials, vacutainers, eppendorf tubes, plastic cryovials, pipette tips as per BMW Rules, 2016 and collect in Red bags.

Translucent (White) Category

Waste sharps including Metals:

Needles, needles from needle tip cutter or burner, scalpels, blades or any other contaminated sharp object that may cause puncture and cuts. The needles of syringes are cut with the needle destroyer/needle cutter preferably. This includes both used, discarded and contaminated metal sharps. These are stored in tamper proof, leak proof and puncture proof containers for sharps storage. Collect and send for final disposal when 3/4 full. These are sent to central common waste site in tamper proof, leak proof and puncture proof containers for final disposal to CBWTF.

Blue category: Glass and metallic implants

The blood sample glass vials or broken or discarded and contaminated glass like slides etc, have to be disinfected (1-2% sodium hypochlorite for 30 minutes atleast) to be packed in puncture proof and leak proof boxes or containers with blue colored marking and then sent to common central waste site for final disposal to CBWTF. The uninfected glass like medicine bottles or ampoules are noninfected and are put in puncture proof and leak proof boxes or containers with blue coloured marking. The metallic implants are pretreated in the same manner and are to be packed in separate puncture proof and leak proof boxes or containers with blue coloured marking.

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Color-coded bags & Colour Category wise Treatment

Category	Type of Waste	Type of Bag or Container to be used*	Treatment and Disposal options
(1)	(2)	(3)	(4)
Yellow	(a) Human Anatomical Waste:	Yellow coloured non-chlorinated plastic bags	Incineration by CBMWTF
	(b) Animal Anatomical Waste:		
	(c) Soiled Waste: Items contaminated with blood, body fluids like dressings, plaster casts, cotton swabs		Incineration by CBWTF
	(d) Expired or Discarded Medicines: antibiotics, cytotoxic drugs	Yellow coloured non-chlorinated plastic bags or containers with cytotoxic labels	Expired cytotoxic drugs to be returned back to the manufacturer or supplier for incineration at temperature >1200 °C. Leftover cytotoxic drugs and items contaminated with cytotoxic drugs along with glass or plastic ampoules, vials etc to common biomedical waste treatment facility for incineration at >1200 °C.
	(e) Chemical Waste: solid discarded chemicals	Yellow coloured non-chlorinated plastic bags or containers	Disposed of by incineration by CBWTF
	(f) Chemical Liquid Waste: Liquid Waste generated due to use of chemicals and used or discarded disinfectants.	Separate collection system leading to effluent treatment plant (ETP) system.	After resource recovery, the chemical liquid waste shall be pre-treated before mixing with other wastewater. The combined discharge shall conform to the discharge norms given in BMWM rules, 2016

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	<p>(g) Discarded linen: contaminated with blood or body fluid.</p> <p>Masks (including triple layer mask, N95 mask, etc.), head cover/cap, shoe-cover, disposable linen Gown, non-plastic or semi-plastic coverall</p>	Non-chlorinated yellow plastic bags or suitable packing material	<p>Non-chlorinated (alcoholic: 5% lysol, 5% phenol) chemical disinfection followed by incineration.</p> <p>Incineration</p>
	(h) Microbiology, Biotechnology and other clinical laboratory waste, PVC Blood bags	Autoclave safe plastic bags or containers	Autoclave or Pre-treat to disinfect.** Treated waste to be sent to CBWTF for incineration.
Red	<p>Contaminated Waste(Recyclable) Plastics tubing, bottles, intravenous tubes and sets, catheters, urine bags, syringes(without needles and fixed needle syringes), retractable safety syringes and vacutainers with their needles cut) and gloves Latex/nitrile(nicked) Goggles, face-shield, splash proof apron, Plastic Coverall, Hazmet suit, nitrile gloves Pre-treat viral transport media, plastic vials, vacutainers, eppendorf tubes, plastic cryovials, pipette tips, used rapid COVID-19 antigen test kits, cartridges of gene expert, chips and microtubes of CBNAAT</p>	Red coloured non chlorinated plastic bags or containers	Autoclaving/Chemical disinfection. Treated waste to be sent to CBWTF who would send such waste to registered or authorized recyclers or for energy recovery
White (Translucent)	Waste sharps	Puncture proof, Leak proof, tamper proof containers	Disinfection/Autoclaving or dry heat sterilization/ sent to CBWTF and who will ensure final disposal to iron foundries(having consent to operate from the SPCB/PCC.

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Blue	<p>Glass: medicine glass vials or broken or discarded and contaminated glass</p> <p>Metal implants/metal guns etc</p>	<p>Puncture proof and leak proof boxes or containers with blue coloured marking</p> <p>Puncture proof and leak proof boxes or containers with blue colored marking</p>	<p>Autoclaving/Microwaving/hydroclaving by CBWTF and then recycling. Contaminated glass slides require pretreatment (disinfection by sodium hypochlorite)</p>
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*Barcode label will have to be made available on every bag or container as per CPCB guidelines

**For disinfection of BMW articles freshly prepared 1-2% Sodium hypochlorite is recommended

***1% Sodium hypochlorite is 1:100 dilution (525-615 ppm of available chlorine)

****Hospital supply of sodium hypochlorite is 10% or 4% (please see label and manufacturers instructions)

*****All lab waste, patient's samples, blood bags, toxins, vaccines, cultures (liq/solid), devices used to transfer cultures need pretreatment by autoclaving-then their respective category plastic (red)/glass (blue)

Articles: bins, bags, trolleys

Bags: The bags used for storing and transporting biomedical waste shall be in compliance with the Bureau of Indian Standards ($\geq 50 \mu$). Till the Standards are published, the carry bags shall be as per the Plastic Waste Management Rules, 2016.

Yellow, Blue, Red and translucent bags/bins/containers, autoclavable bags are marked with Biohazard symbol, hospital logo and with barcoding labels to be supplied by General store.

BINS:

Containment of waste: An optimum number of easy to use, standard, uniform, covered, foot-operated bins of colors i.e., yellow, red bins of appropriate size would be placed at identified places in all clinical and BMW generation areas.

DISINFECTION OF BINS:

Chemical disinfection of the waste bins using hypochlorite solution (1-2%) should be done **daily**. Label (COVID 19 Waste)

Segregation, package and then transport and storage to common waste site

All the biomedical waste is labeled as waste type, site of generation, date of generation before transportation from the generation site. It is transported in dedicated colour coded trolleys to common

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collection area. Waste is stored in the areas of generation at an identified safe area, for an interim period after which it is transported to CBWTF for final treatment and final disposal. During this period it is the responsibility of the administration, sanitation and security staff to ensure the safety and prevention of pilferage and recycling of the waste. No untreated bio-medical waste shall be kept stored beyond a period of 48 hours.

Collection is done

- Done twice daily or more frequently from wards/laboratories/isolation wards/OTs/ICUs
- Label is filled up by staff on duty and given to waste collectors

Each patient care area has been provided with the waste receipt (log) book to record the quantity /number of yellow, blue, red, white (translucent) bags handed over to HCW. All the staff are required to duly fill in the BMW waste receipt/log book color code wise mentioning the number and size of bags handed over and sign the slip for further record and also to fill BMW register daily colour category wise. 2-3 inspection forms are to be sent from each Dept by BMW Dept nodal officer, Sister Incharge/ Technician incharge through HOD.

TRANSPORTATION:

Hospital waste is transported in securely tied bags from the site of generation to common waste collection area through designated route, on dedicated, color coded, covered and leak proof wheel barrows/Trolleys. Dedicated BMW sanitation workers are deputed at common waste collection area at so that timely waste can be collected from COVID and non-COVID zone and transported to Common Waste Site/Area.

At the waste treatment premises verification of the number/size of the bags is done for each trolley by the sanitation staff for recording and quantification and barcoding before disposal. The central waste storage site is cleaned daily. No segregation of BMW is done at CWS to ensure occupational safety.

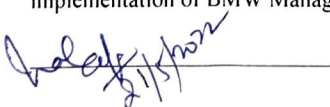
Chemical disinfection of the trolleys using hypochlorite solution is being done at the waste storage site, should be cleaned and disinfected daily both the outer and inner surface.

Transportation to CBWTF

The operator of CBWTF shall transport the bio-medical waste from the premises of an occupier to any off-site bio-medical waste treatment facility only in the dedicated vehicles having label as per BMWM (Principal) rules, 2016. The vehicles used for transportation of bio-medical waste shall comply with the conditions stipulated by the SPCB in addition to the requirement contained in the Motor Vehicles Act, 1988 (59 of 1988), or the rules made there under for transportation of such infectious waste. Global positioning system has been added by the CBWTF.

Important points related to BMW from COVID-19 WARD/ICU/LAB dealing with BMW from COVID-19 pts

-Keep separate color coded bins (with foot operated lids)/bags/containers in wards and maintain proper segregation of waste as per BMWM Rules, 2016 as amended and CPCB guidelines for implementation of BMW Management Rules, BMWM (Amendment) Rules 2018,2019



-BMW bins/containers and Solid waste bins should be kept separate.

- Pre-treatment is not necessary for all of the biomedical waste generated at COVID ward.

however, pre-treatment (autoclaving) of infectious laboratory wastes would be necessary as prescribed under BMW Rules, 2016;

- As precaution double layered bags (using 2 bags) should be used for collection of waste from wards so as to ensure adequate strength and no-leaks;

- Collect and store biomedical waste separately prior to handing over the same CBWTF. Use a dedicated collection bin labelled as "COVID-19" to store COVID waste and keep separately in temporary storage room prior to handing over to authorized BMW sanitation worker.

- In addition to mandatory labelling, bags/containers used for collecting biomedical waste should be labelled as "COVID-19 Waste". This marking would enable CBWTF to identify the waste easily for priority treatment and disposal immediately upon the receipt.

-General waste should be disposed as solid waste as per SWM Rules, 2016: General solid waste comprising of wrappers of medicines/syringes etc., fruit peel offs, empty juice bottles or tetra packs, used water bottles, discarded papers, carton boxes of medicines, empty bottles of disinfectants, left-over food, disposable food plates, etc. should be collected separately as per SWM Rules, 2016.

-No general waste is to be disposed off in BMW biohazard yellow, red, blue bags.

-Used masks, used tissues, used toiletries, etc. used by COVID-19 patient shall become biomedical waste and shall be segregated in yellow bag

- Maintain separate record of waste generated from COVID-19 wards

- Use dedicated trolleys and collection bins in COVID wards. A label "COVID-19 Waste" to be pasted on these items also.

- The (outer and inner) surface of containers/bins/trolleys used for storage of COVID-19 waste should be disinfected with 1% sodium hypochlorite solution daily. 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 CBWTFs to identify the waste easily for priority treatment and disposal immediately upon the receipt.

-Feces from COVID-19 confirmed patient, who is unable to use toilets and excreta is collected in diaper, must be treated as biomedical waste and should be placed in yellow bag/container. However, if a bedpan is used, then faeces to be washed into toilet and cleaned with a neutral detergent and water, disinfected with a 0.5% chlorine solution, then rinsed with clean water.

-Collect used PPEs such as goggles, face-shield, splash proof apron, Plastic Coverall, Hazmet suit, nitrile gloves into Red bag;

-Collect used masks (including triple layer mask, N95 mask, etc.), head cover/cap, shoe-cover, disposable linen Gown, non-plastic or semi-plastic coverall in Yellow bags.

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-Pre-treat viral transport media, plastic vials, vacutainers, eppendorf tubes, plastic cryovials, pipette tips, used rapid COVID-19 antigen test kits, cartridges of gene expert, chips and microtubes of CBNAAT as per BMW Rules, 2016 and collect in Red bags

- Retractable safety syringes used in immunization programme or as injections shall be segregated in red bag.

- Segregation of biomedical waste and general solid waste should be done at the point of generation in ward/isolation rooms. There should be no segregation of biomedical waste and solid waste at temporary waste collection / storage area (Common Waste Site) of healthcare facility of ensure occupational safety.

- PPEs doffed by healthcare workers accompanying diseased body of COVID-19 patient to crematorium / graveyards should be treated as biomedical waste and disposed as per provisions under BMW Management Rules, 2016. Healthcare staff to take-back the PPEs after collecting it in red and yellow bags/bins provided in the hospital ambulance itself or healthcare workers to doff the PPEs at the hospital mortuary.

-Sewage Treatment Plants should continue to ensure disinfection of treated wastewater as per prevailing practices to inactivate coronaviruses.

- Operators of ETPs/STPs should place yellow and red bins in the plant site and dispose their personal protective equipment (PPE) in the colour coded bins as mentioned earlier

- During the period of COVID-19 pandemic, utilization of treated wastewaters within HCFs may be avoided.

- The COVID-19 wards/ICUs/Fever Screening Clinic/ HCW screening clinic/SARI Ward/OTs/Labs will report opening of such dedicated facilities for COVID-19 to BMW unit through Med Suptd so that same can be informed to DPCC and CBWTF. This will ensure that the generated BMW from COVID-19 facilities can be managed at HCF and to expedite its disposal at CBWTF as per mandate of CPCB guidelines, 2020 as revised.

- Report opening or operation of COVID-19 wards/ICUs/Fever Screening Clinic/ HCW screening clinic/SARI Ward/OTs/Labs to SPCBs: Delhi Pollution Control Board, CPCB are being notified by BMW unit through Med Suptd. in phase wise manner on intimation by the respective COVID-19 facilities to BMW unit through MS.

References:

- 1 Bio-Medical Waste Management (Principal) Rules, 2016. Published in the Gazette of India, Extraordinary, Part II, Section 3, Sub Section (i), Government of India Ministry of Environment, Forest and Climate Change. Notification; New Delhi, the 28th March, 2016.
- 2 BMW (Amendment) rules, 2018. Government of India Ministry of Environment, Forest and Climate Change. Notification; New Delhi, the 16th March, 2018.

- 3 BMW (Amendment) rules, 2019. Government of India Ministry of Environment, Forest and Climate Change. Notification; New Delhi, Feb, May 2019.
- 4 Guidelines for Handling, Treatment and Disposal of Waste generated during Treatment/Diagnosis/Quarantine of COVID-19 patients, CPCB, Version 4, 21 July 2020.
- 5 Guidelines for Disposal of Biomedical Waste generated during Universal Immunization Program (UIP): CPCB, 8th February 2021
- 6 Guidelines for Handling, Treatment and Disposal of Waste generated during Treatment/Diagnosis/Quarantine of COVID-19 patients, CPCB, Version 5, 26th April 2022.

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