Guidelines for the Management of Clinical & Related Waste
Amrita Vishwa Vidyapeetham — Institutional Guidelines (Version: 2024)

Last Updated: December 12th 2024

1. Introduction

Amrita generates clinical and related wastes from clinical teaching, patient care (where applicable), research laboratories, animal facilities, diagnostic services and outreach health camps. Clinical and related wastes, if not managed correctly, pose risks to human health, animals and the environment (soil, groundwater, surface waters and air). These Guidelines describe responsibilities, segregation, handling, storage, transport, treatment and disposal requirements to: minimise infection and injury risk; ensure compliance with Indian law; and reduce environmental impacts.

Legal framework, minimum standards and regulatory references used in these Guidelines include the **Bio-Medical Waste Management Rules, 2016** (and subsequent amendments), Central Pollution Control Board (CPCB) technical guidance (including Bar Code System guidance and CBWTF guidelines), and applicable State Pollution Control Board (SPCB) directions. These rules and guidance documents are authoritative for HCFs, laboratories and educational institutions operating in India.

2. Scope

These Guidelines apply to all Amrita campuses, centres and units that generate, collect, store, transport, treat or dispose of clinical and related wastes, including but not limited to:

- Clinical teaching wards, outpatient clinics and allied health facilities (if present);
- Research and teaching laboratories (microbiology, molecular biology, animal houses, pathology, biotechnology);
- Diagnostic and sample-collection centres;
- Animal laboratories and vivaria;
- Temporary health camps and vaccination drives organised by Amrita;
- Food service areas and maintenance units only for related waste streams (e.g., greasy wastewater, used oils) to the extent these are regulated by other statutes.

These Guidelines do **not** cover radioactive wastes (regulated separately), general municipal waste, e-waste or industrial hazardous wastes except where they are contaminated and treated as clinical/related waste under the BMW Rules.

3. Objectives

- Ensure safe segregation at source, containment, transport and final disposal of clinical and related wastes.
- Comply with the Bio-Medical Waste Management Rules 2016 and related CPCB/SPCB guidelines.
- Protect staff, students, contractors, waste handlers and the community from infection and injury.
- Minimise environmental impacts (air emissions, groundwater contamination, littering/ scavenging).
- Maintain accurate records and demonstrate regulatory compliance (manifests, receipts, training logs).

4. Definitions and terms (selected)

Definitions follow the BMW Rules, 2016 and CPCB guidance. Key terms used in this document:

- **Clinical (Bio-medical) Waste** — any waste that contains or is contaminated by human/animal tissue, body fluids, infectious agents, cultures, or other materials capable of causing disease.
- **Related Waste** — waste that is contaminated and also contains chemicals, pharmaceuticals (including cytotoxic drugs), radioactive substances (handled separately), or other regulated materials.
- **Common Bio-Medical Waste Treatment Facility (CBWTF / CBMWTF)** — an authorised treatment and disposal facility providing services to multiple generators. Under the Rules, occupiers must use CBWTF services where available within 75 km, unless otherwise authorised.

Figure 1. *Clinical waste Symbol*

- **Generator / Occupier** — the Amrita unit (lab / clinic / department) where the waste originates; responsible for segregation, labelling and local storage until hand-over.
- **Sharps** — needles, scalpel blades, broken glass, or any object that can cause puncture/cuts.

5. Roles & Responsibilities

- **Generator (Principal Investigator / Unit Head / Clinic In-charge / Faculty / Assigned staff & students):** segregate waste at source; use correct colour-coded containers; label with origin and date; ensure containers are closed/sealed; complete local waste logs; notify Chemical/Clinical Waste Contact when containers are ready for transfer.
- **Local Chemical / Clinical Waste Contact (designated at each campus/unit):** maintain local manifests and storage areas; coordinate collections with CBWTF/authorised transporter; ensure training and PPE; inspect storage areas and maintain records.
- **Central EHS (Environment, Health & Safety) Office:** maintain institutional policy; update guidance with regulatory changes; approve on-site treatment/neutralisation procedures; contract/manage relationships with authorised CBWTFs; compile statutory returns and audits; provide training materials.

- **CBWTF / Authorised Transporter:** must hold valid SPCB/CPCB authorisation; provide waste transport certificates, receipts and evidence of final treatment; participate in the barcoding/e-tracking system where in force.

6. Segregation of clinical & related waste (at source)

Segregation of waste at the point of generation is mandatory and the first line of defence. Amrita requires segregation in accordance with **Schedule I** of the BMW Rules (colour coding and categories). The principal categories and treatment options are summarised below (refer to Schedule I and CPCB guidance for full lists):

- **Yellow (Non-recyclable; incineration/encapsulation/alternate treatment):** human and animal anatomical waste; soiled cotton, dressings, blood bags, bodily fluids; microbiology/biotechnology waste (cultures, inoculated media) unless autoclaved; expired/contaminated medicines (certain categories) and chemical waste specified in Schedule I. Disposal options typically include incineration, deep burial (in remote non-population areas and subject to prior permission) or alternative technologies compliant with CPCB norms.
- **Red (Contaminated recyclable / disposable items):** tubing, bottles, IV sets (without sharps), catheters, disposable syringes (without needles) — items that can be disinfected/sterilised (autoclave/microwave/hydroclave) and then recycled or sent for energy recovery as per the authorised CBWTF process.

Figure 2. *Clinical Waste Bin*

- **White (Translucent) — Puncture-proof (Sharps) containers:** needles, syringes with fixed needles, scalpels, broken glass. Must be stored in puncture-proof, leak-proof, tamper-proof containers and treated (autoclaving followed by shredding/encapsulation) or according to the CBWTF method.
- **Blue (Glass & metallic/non-sharp recyclable):** broken glass, vials, ampoules (contaminated with chemical or pharmaceutical residues) — to be disinfected and sent for recycling where permitted.
- **Black / General waste (non-BMW):** ordinary, non-infectious waste. Note: BMW Rules are explicit that waste must only be placed in the correct colour-coded container; contamination of general waste with biomedical material is an offence.

7. Labelling, barcoding & tracking

- Amrita will implement barcode/QR code tracking for biomedical waste bags & containers in line with CPCB Guidelines for Bar Code System for Effective Management of Bio-Medical Waste. Each barcoded bag/container must capture the generating department/unit, date/time of generation, colour category and collection event. The CBWTF operator's barcoding system or the CPCB centralised platform will be used where available. The barcoding system aids chain-of-custody, prevents pilferage/recycling of contaminated recyclables, and demonstrates compliance.

8. Storage & interim storage areas

- **Designated storage rooms**: Each campus must maintain well-ventilated, secured, impervious-surfaced, bunded storage rooms for clinical waste awaiting collection.

Storage rooms must be inaccessible to the public, animals and unauthorised staff. Sufficient space to hold at least **two days** generation is recommended unless more frequent collections are arranged.

- **Secondary containment:** All containers must be placed on impervious surfaces with bunding/secondary containment sized to contain spills from the largest container.
- **Temperature & odour control:** Potentially odorous/pathological waste should be chilled (if necessary) to minimise nuisance.
- **Labelling & segregation:** Stored wastes must remain segregated by colour/category and labelled with the origin, date and expected collection date. Waste ready for collection must be sealed and placed in the designated collection area.
- **Security & access:** Access to storage rooms is controlled; only trained authorised personnel may handle stored clinical waste.

9. Handling & transport within campus

- Internal movement of clinical waste must use rigid, leak-proof secondary containers (e.g., wheeled bins) with lids and appropriate signage. Avoid carrying loose bags. Avoid transporting clinical waste through public areas when possible; prefer service corridors and off-peak times. Double-bagging may be required for particularly wet or hazardous wastes after risk assessment. Staff must use PPE (gloves, apron, masks, eye protection as appropriate).

10. Sharps management

- **Sharps containers:** Use puncture-proof, leak-proof, tamper-proof containers (white/translucent) sited at the point of use (e.g., procedure areas). Containers must be rigid, labelled, and not overfilled (do not exceed fill line).
- **Do not recap** needles. If required by procedure, use one-hand scoop technique or engineered safety devices.
- **Disposal:** Full sharps containers are sealed/closed and sent for authorised treatment (autoclaving/shredding/encapsulation) per CBWTF operations. Sharps contaminated with cytotoxic drugs must follow cytotoxic related-waste handling (see Section 12).

11. Decontamination & pre-treatment (GMO, cultures, microbiology)

- **Microbiology/GMOs:** Cultures, stocks and materials contaminated with Risk Group organisms must be decontaminated (autoclave or validated chemical disinfection) prior to removal from the immediate laboratory, consistent with facility license conditions and biosafety approvals. Autoclave validation and autoclave logs must be maintained. For materials that cannot be autoclaved, follow Central EHS advice and licence/permit conditions.

12. Disposal of related waste (special categories)

Each related waste type has unique handling and disposal requirements—follow the BMW Rules and departmental SOPs.

- **Chemical waste:** segregate chemical waste separately from infectious waste. Refer to Amrita's Chemical Waste Disposal Procedure for solvents, acids/bases, heavy metals, and reagent residues. Many organic solvents and toxic chemicals must **never** be

disposed to drains and must be transferred to an authorised hazardous-waste contractor/TSDF. Neutralisation and sink disposal are allowed only where explicitly permitted, risk-assessed and approved by Central EHS and in compliance with local effluent standards. (See institutional Chemical Waste Procedure for operational details.)

- **Cytotoxic / cytostatic drugs:** Cytotoxic drug wastes (administration sets, vials, syringes, contaminated PPE) must be segregated and handled per CPCB guidance and manufacturer SDS. They are usually disposed via incineration at authorised CBWTFs or other approved destruction methods. Special colour coding (as per Schedule I / State circulars) and handling precautions apply. Consult Central EHS for cytotoxic-specific SOPs.
- **Pharmaceuticals/expired medicines:** Collect expired/unused medicines separately (yellow/ as per Schedule I). Do not discard in general waste. The CBWTF will treat or incinerate pharmaceuticals in line with CPCB approval. Controlled drugs (narcotics, psychotropics) must follow drug-control regulations and institutional Scheduled Substance procedures.
- **Human remains / anatomical waste:** Human tissues and anatomical wastes require special handling, packaging and usually incineration or deep burial where permitted. Do **not** dispose of human remains as general waste. Follow the applicable Anatomy/Transplantation Act and contact Central EHS/Medical authorities for permission and coordination.
- **Radioactive waste:** Handled under Radiation Safety rules and NOT under BMW Rules—contact the authorized Radiation Safety Officer for specific procedures.

13. Treatment and final disposal

- **Use of CBWTF:** Amrita will use authorised Common Bio-Medical Waste Treatment Facilities (CBWTFs) wherever available and practical. Under BMW Rules, if a CBWTF is available within the prescribed distance (commonly 75 km), captive on-site treatment is not encouraged. The CBWTF must comply with CPCB technical standards, emission limits (including dioxins/furans for incineration), and provide receipts/manifests for each collection.
- **On-site treatment:** On-site autoclaving / microwaving / hydroclaving and chemical disinfection may be used for appropriate waste categories if authorised by Central EHS, operated by trained staff, with validated cycle records, and only where CBWTF service is not available or for operational necessity. Any on-site incinerator or thermal treatment equipment must meet CPCB emission norms and have prior SPCB approval—these are exceptional and require strong justification.
- **Incineration & alternatives:** Incineration is acceptable for certain pathological, pharmaceutical and cytotoxic wastes but must meet modern emission standards. Where alternate technologies (pyrolysis, plasma, encapsulation) are used, they must be authorised and proven equivalent or superior in environmental performance.

14. Documentation, manifests & statutory compliance

- **Manifests / Consignment Notes:** All off-site transfers to CBWTF must be accompanied by the statutory manifest / waste transport certificates as required by SPCB/CPCB and by the CBWTF operator (the “Service Advice” and “Waste Transport Certificate” model). Copies of the transport certificate and CBWTF receipt must be retained by the campus Central EHS and the generating unit.

- **Barcoding records:** Where barcoding is implemented by the CBWTF, Amrita will ensure scanned records are archived and available for audit.
- **Retention period:** Maintain all waste manifests, CBWTF receipts, treatment certificates, training attendance lists, autoclave logs and incident reports for a minimum of **five years** (or the period required by the State Pollution Control Board).
- **Authorisation & annual returns:** Amrita will maintain statutory authorisations and provide annual returns to the SPCB/CPCB where required. Central EHS coordinates and compiles required returns.

15. Transport off-site & handover to CBWT

- Collections must be coordinated with the CBWTF and authorised transporters. On collection day, a designated Chemical/Clinical Waste Contact must be present to hand over the stored wastes and receive the transporter's documents (Service Advice, Waste Transport Certificate). Transport vehicles must be covered, labelled and operated by authorised drivers who carry TREM (Transport Emergency) cards where applicable.

16. Emergency response, spills & incidents

- **Immediate actions:** In case of spills or leaks, cordon off area, use absorbents/neutralisers only if safe and trained to do so, prevent drain entry, use PPE, and immediately notify Local EHS and Central EHS. For major spills that threaten public health, notify the SPCB and local emergency services as required by law. Maintain incident register, perform root-cause analysis and implement corrective actions.
- **Exposure & first aid:** SDS guidance and local first-aid procedures apply for exposure to infectious materials, chemical splashes and sharps injuries. Report incidents and ensure prophylaxis or medical follow up as per institutional clinical protocols.

17. Training, awareness & audits

- **Mandatory training:** All staff and students who generate or handle clinical/related wastes must undertake induction training and refresher training annually covering segregation, labelling, handling, spill response and PPE use.
- **Audits & inspections:** Central EHS will conduct periodic internal audits of waste segregation, storage, labelling, autoclave logs and manifest records. Non-conformances will be closed out with corrective action plans and timelines.

18. Procurement & supplier controls

- **Colour-coded bags & containers:** Purchase non-chlorinated, CPCB-specification colour-coded bags/containers (thickness and material as per Plastic Waste Management Rules and CPCB barcoding guidance). Where pre-barcoded bags are procured, ensure compatibility with CBWTF barcoding system.
- **Service contracts:** CBWTF contracts must include performance KPIs (timely collections, receipt issuance, proof of treatment, maintenance of emission standards) and barcoding/electronic reporting obligations.

19. Special events, outreach clinics & mass vaccination

- For temporary camps and vaccination drives, follow CPCB COVID-19 BMW guidance (or current CPCB guidance) and ensure temporary segregation, barcoding (if available) and daily collection/transport to CBWTF. Maintain event-specific records and appoint an event EHS coordinator.

20. Enforcement & penalties

- Non-compliance with the BMW Rules is an offence under the Environment (Protection) Act and may attract penalties, cancellation of authorisations, and other regulatory actions by the SPCB/CPCB. Amrita units must treat compliance as mandatory and report any non-collection or contractor failures immediately to Central EHS and the SPCB.

21. Record of changes & review

These Guidelines will be reviewed annually or sooner if there are material changes to national legislation (BMW Rules or CPCB guidance), State directives, or institutional practice. Central EHS is the custodian of this document.

22. References

1. The Bio-Medical Waste Management Rules, 2016 (and subsequent amendments). Karma Management
2. CPCB — Guidelines for Management of Healthcare Waste (including Schedule & technical guidance). Central Pollution Control Board
3. CPCB — Guidelines for Bar Code System for Effective Management of Bio-Medical Waste. Central Pollution Control Board
4. CPCB — Revised Guidelines for Common Bio-Medical Waste Treatment & Disposal Facilities. Central Pollution Control Board
5. State Pollution Control Board (Kerala / home state) BMW pages and local guidance (CBWTF coverage and State requirements apply locally). kspcb.kerala.gov.in
6. Internal Amrita Chemical Waste Disposal Procedure (separate institutional document for chemical wastes).

AMRITA
VISHWA VIDYAPEETHAM
DEEMED TO BE UNIVERSITY UNDER SECTION 3 OF UGC ACT, 1956