# Standards for handling, storage, transport and treatment of cytotoxic waste

Health Protection Agency
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# Foreword

Cytotoxic drugs are used widely in healthcare settings as well as in the community for the treatment of cancers and other diseases. Cytotoxic waste is waste associated with cytotoxic drugs which contain chemicals that are toxic to the cells. This includes materials, equipment and residue that are contaminated by cytotoxic drugs.

Exposure to cytotoxic waste in health care settings is a significant health hazard for employees, patients, visitors, waste handlers. I urge the best use of this standard by all health care providers and all staffs at health facilities.

Development of this standard is intended to assist health care providers in proper handling, storage, transport and treatment of cytotoxic waste to ensure that all Health Care Facilities which provide cancer treatment manage cytotoxic wastes safely. Hence I urge health care providers to play an important role creating a safer environment in the health care facilities and protecting the environment from cytotoxic waste.

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Director General of Public Health

Health Protection Agency

## Acronyms

| | |
|---|---|
| CDSC | Cytotoxic Drug Safety Cabinet |
| EPA | Environment Protection Agency |
| HCF | Health Care Facility |
| IV | Intravenous |
| PPE | Personal Protective Equipment |
| WHO | World Health Organization |

# 1. Introduction

Cytotoxic drugs are used widely in healthcare settings as well as in the community for the treatment of cancers and other diseases. Cytotoxic waste are wastes associated with cytotoxic drugs which contains chemicals that are toxic to the cells including materials, equipment and residue that are contaminated by cytotoxic drugs during the preparation or administration of cytotoxic drug therapy.[2]

Cytotoxic wastes are hazardous substances that have to be managed and disposed with proper precaution to reduce the risks to the workers, waste handlers and the general public.

Situation analysis of health care waste management done in 2016 showed that there is no proper or safe mechanism to manage cytotoxic waste in the country. Development of the standards for handling, storage, transport and treatment of cytotoxic waste is to ensure that all Health Care Facilities which provide cancer treatment manage cytotoxic wastes safely.

# 2. People who are at risk

- Occupational exposure to cytotoxic drugs and related waste may occur when:
    - Preparing drugs
    - Administering drugs
    - Transporting drugs
    - Storing drugs
    - Handling cytotoxic waste
    - Transporting and disposing of waste
    - Cleaning up spills

- Exposure may occur through skin contact, skin absorption, inhalation of aerosols and drug particles, ingestion and sharps injuries

# 3. Potential adverse effects of toxic waste

- Where appropriate measures are in place the risks to health are greatly reduced. However the risk control measures have been inadequate, the health effects on those who prepare administer and handle cytotoxic drugs have included:
    - alterations in complete blood picture (blood cell count, immunology variations, lipid variations, urine anomalies)
    - foetal loss and possible chromosomal aberration in off spring
    - fertility changes in both males and females

- abdominal pain, hair loss, nasal sore and vomiting
- dizziness, nausea and headache
- liver damage
- contact dermatitis

## 4. Protective measures

The recommended personal protective equipments (PPE) for handling cytotoxic waste is described in Table 4.1

**Table 4.1** Recommended PPE for handling cytotoxic wastes[2]

| | **Coveralls and gowns** | **gloves** | **Protective eye wear** | **She covers or overshoes** | **Respiratory protective equipment (RPE)** | **Head covering** |
|---|---|---|---|---|---|---|
| Handling of cytotoxic drug contaminated waste | ✓ | ✓ | | | | |
| Handling contaminated body waste | ✓ | ✓ | | | | |
| Cleaning spills | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Receiving and storing cytotoxic waste | | ✓ | | | | |

** Safety glasses are strongly recommended for contact lens wearers, otherwise optional [2]

## 5. Collection, packaging and segregation

- To minimize the risk of exposure to cytotoxic drugs and ensure and to ensure the safe and correct disposal identification and proper labelling is essential.
- All cytotoxic waste should be placed into suitable bags and or bins and containers that are appropriately labelled with cytotoxic symbol and other hazardous symbols. The bins must be identified by colour coding – PURPLE and the bins/containers must be marked with the words “Cytotoxic Waste” clearly displayed
- Cytotoxic symbol:


- Poison symbol, environmental symbol, danger to human sign



### 5.1 Packaging

- Cytotoxic waste must be packed in a hard walled bin/container for transport to the waste disposal facility.
- Cytotoxic wastes must be packaged inside either; a heavy duty, puncture resistant, leak-proof container, or, a multi-walled paper bag with a polyliner. Bag and container must have secondary containment for capture of spills during transit. Containers for the collection of cytotoxic waste are **not to be re-used**. (AMM clinical)

### 5.2 Segregation

- Cytotoxic waste must be segregated at the point of generation
- Bags must be removed from the initial collection containers in a HCF sealed and labelled properly before transferring to designated and labelled bins by the contractor to transport to the designated waste storage facility
- Separation of cytotoxic drug waste from general and clinical waste during internal transport and storage.
- Containers/bins/should be secured

### 5.3 Waste collection for disposal

- Cytotoxic waste must be:
    - collected by a licensed contractor and a trained person who is aware of the risks of waste type
    - collected in purple liners and transferred to readily identifiable bins
    - collected within 7 days of waste generation
    - sealed prior to collection by waste contractor and ensured not to place the bins in public area.

## 6 Waste Storage

WHO general recommendations for the storage facilities include the following (WHO 2014).

The storage area must:

- not be situated in the proximity of fresh food stored and food preparation areas, and other sensitive areas;
- be appropriate to the volumes of waste generated from each health-care facility.
- be compartmentmented for sorting different types of wastes (chemical waste, pharmaceutical waste, general waste)
- have an impermeable, hard-standing floor with good drainage (away from watercourses) and easy to clean and disinfect;

- keep general waste separated from infectious and other hazardous waste;
- have a water supply for cleaning purposes;
- have easy access for staff in charge of handling the waste;
- be lockable to prevent access by unauthorized persons;
- have easy access for waste-collection vehicles;
- have protection from the sun;
- be inaccessible to animals, insects and birds;
- have good lighting and at least passive ventilation;
- have a supply of cleaning equipment, protective clothing and waste bags or containers located conveniently close to the storage area;
- have a washing basin with running tap water and soap that is readily available for the staff;
- be cleaned regularly (at least once per week);
- have spillage containment equipment;
- be ppropriately signed for the types of waste stored
- Fig 1 is a sample outline  of a chemical storage facility with different compartments for different types of chemicals to be stored.
- Cytotoxic waste storage areas must be dedicated, appropriately, sin-posted, secured and written “cytotoxic waste”
- Waste bins/containers must be sealed prior to collection by waste collectors

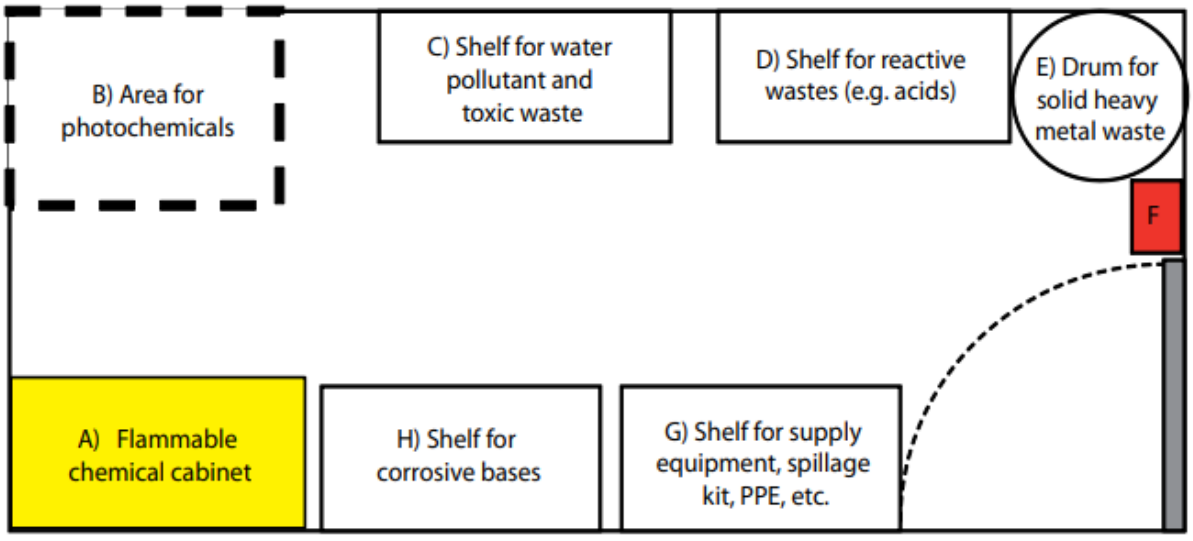


Fig 1 Sample outline of chemical storage (WHO 2014)

# 7 Off-site transport of waste

- Offsite transport is the carriage of health care waste on the public streets away from a Health Care Facility (HCF) by a waste management contractor.
- The HCF / institution producing the waste is responsible for packaging and labeling the waste to be transported out of the facility
- Transporting hazardous health care waste must comply with Waste Management Regulation R-58/2013.

## 7.1 Transport trolleys

- Designated off-site transport trolleys must be available and must:
    - not be used for any other purpose
    - be easy to load and unload
    - have a lid
    - be color coded, labelled and dedicated to a particular waste type
    - not have sharp edges that might damage waste bags or containers
    - be easy to push and pull (with wheels)
    - be of appropriate size according to the volumes of waste generated
    - must be easy to clean with 5% active chlorine solution
    - be closed to avoid any spilling on the road;
    - be equipped with a safe loading system (to prevent any spilling inside or outside the vehicle);
    - be marked with the symbols and written the “cytotoxic waste”

- Poison symbol, environmental symbol, danger to human sign

- Spare trolleys must be made available in case of breakdown and maintenance.
- The trolleys must be cleaned and disinfected daily.

## 7.2. Transport vehicle requirements

1. A designated vehicle must be used by the contractors who are licensed by EPA to transport hazardous health care waste from a HCF/institution.
2. The vehicle has to be roadworthy and labelled to indicate its load
3. Designated trolleys with wheeled, break proof, leak proof trolleys must be available in the vehicle used to collect wastes from HCF's and it has to be color coded for the type of wastes collected.
4. The vehicle used must fulfil the following design criteria:
    a. The body of the vehicle should be of a suitable size proportionate with the design of the vehicle.
    b. There must be a bulkhead (partition) that separates the drivers cabin and the vehicle body, which is designed to retain the load if the vehicle is involved in a collision
    c. The vehicle must be constructed as to prevent the scattering of packaged wastes, odour nuisance, leak proof, and made of materials able to withstand exposure to common cleaning agents
    d. There must be a suitable system for securing the load during transport.
    e. Empty plastic bags, suitable protective clothing, cleaning equipment, tools and disinfectant, together with special kits for dealing with liquid spills, must be carried in each vehicle.

f. The internal finish of the vehicle must allow it to be steam-cleaned and internal angles must be rounded to eliminate sharp edges to permit more thorough cleaning and prevent damage to waste containers
g. The vehicle must be marked with the name and address of the waste carrier and the hazard symbols must be displayed on the vehicle.
h. The driver must be provided with details of the waste being carried.
i. Vehicles must be kept locked at all times, except when loading and unloading, and kept properly maintained.
j. Waste must not be compacted or subjected to any other treatment that could cause bags or containers to rupture.
k. The contractor must provide for security of the vehicle and an emergency procedure plan.
l. Vehicle and transporting containers must be disinfected and cleaned daily or at the end of each haulage with an appropriate disinfectant at an appropriate site where waste water can be properly disposed of.
m. The transportation of health care wastes such as infectious/highly infectious waste must be undertaken **daily** according to approved times on approved routes and in approved vehicle.
n. Health care waste must be transported directly to the disposal or treatment site within the shortest possible time.

### 7.3. Labeling of the transport vehicle

The transport vehicle must be labelled according to the type of waste that is being transported.

### 7.4. Transport documentation

Before sending hazardous health-care wastes offsite, transport documentation must be prepared and carried by the driver. A copy of the document must be given to the Health Care Facility (HCF).

The document for a vehicle carrying a hazardous health-care waste load must include the following information in case of accidents or official inspection:

- Waste classes

- Waste sources
- Pick-up date
- Destination
- Driver name
- Number of containers or volume

Receipt of load received from responsible person at pick-up areas

# 8 Waste treatment and disposal

- Incineration at 1100$^0$C is the only approved technology got treating cytotoxic waste by WHO
- Cytotoxic waste is highly hazardous and must never be landfilled or discharged into the sewerage system. The ash produced after incineration must be disposed as per the EPA waste management regulation R-58/2013
- Disposal options include:
    - Return to the original supplier
- **If the waste consists of a mixture of cytotoxic and other waste, it must be incinerated at the temperature recommended for cytotoxic waste.**

# 9 Spill Management

## 9.1 Spill kits

Contents of cytotoxic drug spill kit:

1. Safe work procedure (instruction for use)
2. Signs to identidy and isolate spill (caution tape can be used to quarantine area)
3. Personal protective equipemnt:
    - Latex (double gloved) gloves x 2
    - Head cover
    - Impermeable gown or coverall
    - Disposable shoe cover

- Safety glasses or full-face chemicals splash shield
- P2 mask (trained personal would ideally use fit tested) or other suitable respiratory protective device

4. Personal protective equipment:
    - Adequate quantities of absorbent materials such as swabs, absorbent towel.
    - A small scoop to collect any glass fragments (e.g. dedicated dustpan or disposable scoop)
    - Plastic waste bags and ties, and bin or container (clearly labelled for cytotoxic use)
    - Suitable cleanin/decontaminating agent may also be included
    - Water for powder spills (to be used to reduce dust and particulate matter)

### 9.2 Spill management

- All cytotoxic drug spills must be attended to immediately.
- Stay calm and alert to others to the spill and do not leave unattended.
- Attend to yourself first: remove any contaminated clothing and wash skin that has been contaminated with soap and water then obtain the nearest spill kit.
- Cytotoxic drug spill procedures are to be followed in the event of a cytotoxic spill and must be available to all workers handling cytotoxic waste
- Refer to the cytotoxic drug safety data sheer for specific information.

## 10 Procedure for accidental exposure

In case of any accidental exposure to cytotoxic waste the following procedures must be followed

### 10.1 Clothing and personal protective equipment (PPE)

1. Immediately remove outer gloves, gown and contaminated clothing
2. Place disposable personal protective in the cytotoxic container
3. Contaminated clothing should be bagged separately, machine washed separately and dried
4. Remove and dispose of inner gloves into the cytotoxic waste disposal container

### 10.2 Penetrating injuries, skin and other body contact

**Skin exposure:**

1. Remove contaminated clothing as above
2. Wash the affected skin with soap and clean thorough with copious amounts of water
3. Report to supervisor immediately
4. Seek immediate medical advice and further medical attention as necessary

**Needle-stick injuries:**

1. Wash thoroughly as per skin exposure
2. Report to supervisor immediately
3. Seek immediate medical advice and further medical attention as necessary

**Mucosal exposure e.g eyes:**

1. Immediately flush the affected area – the eyes - with an isotonic saline solution for atleast 15 minutes
2. Report to supervisor immediately
3. Seek immediate medical advice and further medical attention as necessary

### 10.3 Record keeping:

Document occurrence of the incident

## 11 Training for safe handling of cytotoxic waste

- Appropriate training must be given to all workers handling cytotoxic waste. Untrained workers MUST NOT handle, transport and dispose cytotoxic waste
- The minimum training for health-care waste handlers should include:
    - Instructions on the use of protective clothing at all times during waste collection, transport, disposal and treatment.
    - information on the techniques and risks associated with the handling of health-care waste
    - procedures for dealing with spillages and other accidents
    - Procedures for operating specific treatment technologies used.
    - Handwashing and hygiene

## 12 Procedure for hand washing

# How to Handwash?

**WASH HANDS WHEN VISIBLY SOILED! OTHERWISE, USE HANDRUB**

**Duration of the entire procedure:** 40-60 seconds


World Health Organization | Patient Safety — A World Alliance for Safer Health Care | SAVE LIVES Clean Your Hands



May 2009

# 13 Reference


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