Biosafety and Waste Management
Blood Transfusion Services, Nepal

National Guidelines
2013
Preface

Blood Transfusion Service (BTS) Centres today use a wide variety of substances including chemicals, kits and reagents, syringes, blood, blood bags, and needles/sharps which ultimately become part of BTS waste. A number of hazards and risks are associated with inadequate waste management at BTS centres including injuries from sharps, risks of infection to donors and patients from poor waste management, risks of infection outside the BTS centre for waste handlers, scavengers, and eventually the general public. In addition, there are risks associated with hazardous chemicals and reagents and environmental hazards resulting in air, water and soil pollution, especially due to inadequate treatment and improper disposal methods. These guidelines have been framed to standardize the disposal of various categories of waste generated by BTS centres; so as to provide for the safety of staff, patients, public and the environment.

The guidelines provide instructions on different categories of waste generated by the BTS; its segregation, collection and treatment in a suitable manner depending upon the category of waste and bio-safety measures to be considered. The guidelines also address the development of a waste management system utilizing “treatment technology” to render it harmless and designating BTS personnel not only responsible, but also accountable for the correct management of waste. The technical and financial support provided by WHO and OFID has played a key role in the successful completion of this task. The consultants involved in the draft development, the National Technical Advisory Committee (NTAC), WHO blood safety staff and everyone who provided input into the endeavour are highly acknowledged. I hope that this guide will be implemented by all BTS centres in the country for proper and safe management of waste and implementation of necessary bio-safety measures.

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**Acronyms**

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<tr>
<td>BTS</td>
<td>Blood Transfusion Service</td>
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<tr>
<td>BTSC</td>
<td>Blood Transfusion Service Centre</td>
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<td>HBV</td>
<td>Hepatitis B Virus</td>
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<td>HCF</td>
<td>Health Care Facility</td>
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<td>HCW</td>
<td>Health Care Waste</td>
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<td>HIV</td>
<td>Human Immunodeficiency Virus</td>
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<td>MSDS</td>
<td>Material Safety Data Sheet</td>
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<td>NGO</td>
<td>Non-Governmental Organization</td>
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<td>NPHL</td>
<td>National Public Health Laboratory</td>
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<td>NRCS</td>
<td>Nepal Red Cross Society</td>
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<td>NTAC</td>
<td>National Technical Advisory Committee</td>
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<td>OH&amp;S</td>
<td>Occupational Health and Safety</td>
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<td>PEP</td>
<td>Post Exposure Prophylaxis</td>
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<td>PPE</td>
<td>Personal Protective Equipment</td>
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<tr>
<td>SOP</td>
<td>Standard Operating Procedure</td>
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<td>TTI</td>
<td>Transfusion Transmissible Infections</td>
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<td>WHO</td>
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1 Introduction

Blood transfusion is a life-saving intervention that has an essential role in patient management within the health system. Nepal Red Cross Society (NRCS) established the Blood Transfusion Service (BTS) in 1966. In the initial years, the BTS collected blood from professional donors, but after 1982, blood was collected only from voluntary non-remunerated donors. With the expansion of health services, establishment of medical colleges, government and private hospitals, the demand for blood rapidly increased. Today, blood banks have been established in 86 centres in 62 districts (Central: 1, Regional: 4, District: 21, Emergency units: 31, Hospital units: 29). Blood is collected mostly from institutions like colleges, universities, industry, clubs, and governmental and non-governmental offices. In the year of establishment of BTS in Nepal, 157 units of blood were collected and supplied. In the year 2011/2012, NRCS had collected 177,195 units of blood throughout the country, which is an increase of about 4.5% over the collection of the previous year.

Provision and transfusion of blood is a multistep process that includes donor recruitment, donor selection, blood collection, testing and processing, storage and transportation and finally, transfusion of the blood unit into the patient. At every step, both hazardous and non-hazardous waste is generated. This waste, if not managed properly, increases the risk of injuries, infection and exposure to harmful toxins.

A Standard Operating Procedure (SOP) developed in 2006 and revised in 2011 was implemented and made effective for the management of waste in the BTS. However, blood centres in Nepal are still facing many challenges in Health Care Waste (HCW) management. The most common problems include lack of awareness about health hazards related to HCW, inadequate training in correctly managing waste, absence of waste management and disposal systems, insufficient financial and human resources and the low priority given to the issue. Therefore, an effective system and strategies for implementing HCW management in Nepal needed to be established.

1.1 Objectives

The objectives were as follows:

- Define and implement an effective system to provide for the sound and safe management of BTS generated waste.
- Provide technical and managerial considerations for the waste management process in the BTS.
- Provide direction to BTS staff for waste classification, storage, segregation, transportation, treatment and disposal.
- Define the responsibilities of BTS managers and staff at each stage of waste management.
2 Health Care Waste

HCW is defined as the total waste stream from a health care facility (HCF). It is a by-product of health care interventions that includes sharps, non-sharps, blood, body parts, chemicals, pharmaceuticals, medical devices and radioactive materials. Poor management of HCW exposes health care workers, waste handlers and the community to the risk of infections, toxic effects and injuries.

Classification of waste in the Blood Transfusion Service
Different types of waste are generated in a BTS. The amount of waste generated depends on the scale of activities the BTS carries out. Waste is classified based on the level of hazard it presents; hazardous and non-hazardous.

Figure 1: Classification of waste in a Blood Transfusion Service

2.1 Hazardous waste

Hazardous waste is any waste that poses a substantial or potential threat to human health or the environment. The threat may be due to the quantity or concentration of the waste, or to its physical, chemical, radioactive, genotoxic or infectious characteristics. About 15-25% of HCW generated in a HCF is likely to be hazardous.
2.1.1 Infectious waste

Infectious hazardous waste is any used, contaminated, soiled or discarded material, device or equipment that has the potential to transmit infectious agents. This includes sharps, non-sharps and effluents. Any material contaminated with blood should be considered potentially infectious and should be handled according to standard precautions.

*Infectious sharps:* Items that can cause direct injury, such as cuts or puncture wounds, are considered as sharps. They include needles, lancet blades and broken glassware and ceramics (e.g. glass slides, pipettes, test tubes and tiles). Used sharps are considered to be highly hazardous waste and, if contaminated with blood, they carry a high risk of transmission of blood-borne pathogens, due to their ability to penetrate soft parts and enter vascular tissues.

*Infectious non-sharps:* Non-sharp infectious waste includes all items such as plastics (used blood units), non-plastic materials and glassware contaminated with blood or other body fluids.

*Infectious effluents:* Effluents are liquid waste generated during BTS activities such as testing of samples and processing of blood units. These are also considered hazardous due to their infectious potential.

**Table 1: Examples of types of infectious waste generated in a Blood Transfusion Service**


<table>
<thead>
<tr>
<th>Process</th>
<th>Sharps</th>
<th>Non-sharps</th>
<th>Effluents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Donor selection</strong></td>
<td>• Broken slides and glassware</td>
<td>• Glassware</td>
<td>• Used copper sulphate solution</td>
</tr>
<tr>
<td></td>
<td>• Lancets and needles</td>
<td>• Filter paper strips for haemoglobin estimation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Cuvettes</td>
<td>• Gauze and swabs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Pipettes</td>
<td>• Gloves</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Tiles</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Micro-capillary tubes</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Blood donation</strong></td>
<td>• Broken glassware and ampoules</td>
<td>• Gauze and swabs</td>
<td>• Disinfectants</td>
</tr>
<tr>
<td></td>
<td>• Broken test tubes and glass slides</td>
<td>• Gloves</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Needles from blood collection bags and other used needles</td>
<td>• Blood units</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Pairs of scissors</td>
<td></td>
<td></td>
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<tr>
<td><strong>Post donation care</strong></td>
<td></td>
<td>• Phlebotomy dressings, including plaster,</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>bandages and swabs</td>
<td></td>
</tr>
<tr>
<td><strong>Blood transfusion laboratory</strong></td>
<td><strong>testing</strong></td>
<td>• Blood sample tubes</td>
<td>• Liquids from cell washers</td>
</tr>
<tr>
<td></td>
<td>• Broken glassware and ampoules</td>
<td>• Column agglutination cards</td>
<td>• Blood and serum samples</td>
</tr>
<tr>
<td></td>
<td>• Test tubes and slides</td>
<td>• Gloves</td>
<td>• Red cell suspensions</td>
</tr>
<tr>
<td></td>
<td>• Pipette tips</td>
<td>• Micro-plates</td>
<td>for blood group serology testing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Used test kit materials</td>
<td></td>
</tr>
<tr>
<td>Process</td>
<td>Sharps</td>
<td>Non-sharps</td>
<td>Effluents</td>
</tr>
<tr>
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<td>-----------</td>
</tr>
<tr>
<td>Component preparation and storage</td>
<td>Wafers for sterile connecting devices</td>
<td>Blood units that are: - ruptured; - expired; - seroreactive; or - unsuitable due to other causes</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gloves</td>
<td></td>
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<td></td>
<td></td>
<td>Transfer bags and accessories for component preparation</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Segments from blood bag tubing</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Leukoreduction filters</td>
<td></td>
</tr>
<tr>
<td>Transfusion in the clinical area</td>
<td>Blood administration sets, intravenous sets and other disposable needles</td>
<td>Leukoreduction filters</td>
<td>Used blood bags</td>
</tr>
<tr>
<td></td>
<td>Used syringes</td>
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</tbody>
</table>

2.1.2 Non-infectious waste

Non-infectious hazardous waste is any discarded material that poses a hazard but does not have the potential to transmit infectious agents, e.g. chemical waste.

Chemical waste: This includes any discarded solid, liquid and gaseous chemicals used during disinfecting procedures or cleaning processes that may pose health and environmental hazards (e.g. carcinogens, irritants, toxic, inflammable and corrosive chemicals). Chemical waste should be disposed of in accordance with manufacturer’s instructions.

2.2 Non-hazardous waste

Non-hazardous waste is generally material that is not contaminated with blood or other body fluids, or chemicals. About 75-85% of waste generated in a HCF is non-hazardous and includes items such as packaging, boxes and wrappings. This type of waste should be managed separately from hazardous waste.
3 Waste Management Process in a Blood Transfusion Service

Handling of HCW generated in a BTS poses a risk of infection; therefore, BTS managers should:
- Assess the risks posed by HCW and provide a safe working environment for staff.
- Ensure that staff members are aware of the need to manage HCW appropriately, and are properly trained and supervised.
- Provide staff with adequate equipment and appropriate protective personal equipment (PPE), based on the anticipated risk involved in the handling process.
- Develop guidelines and standard operating procedures for managing HCW that meet the requirements for infection control and occupational health and safety (OH&S).

All waste that is generated within the BTS should always follow an appropriate and well-defined process from its point of generation until its final disposal; this is referred to as the “cradle-to-grave” concept. The process of dealing with HCW consists of the following steps:
- Waste minimization
- Waste segregation
- Waste collection
- Waste storage
- Waste transportation
- Waste treatment
- Waste disposal

3.1 Waste minimization
Minimize waste through the “3R” principle i.e. waste Reduction, Re-use and Recycling.

3.2 Waste segregation

- Collect and segregate waste at the site of generation.
- Use three different kinds of clearly identifiable colour-coded waste containers to separately collect sharps, infectious and non-hazardous waste. Strong leak-proof and puncture-proof buckets/containers with lids/ covers should be used for segregated collection of waste.
  - Red for infectious waste - non-sharps; segregate infectious solid and liquid waste
  - Yellow for infectious waste –sharps (needles, blades/lancets)
  - Blue for non-hazardous waste (general waste such as packaging)
- The size of the bucket/container should be according to the workload of the blood centre.
- Clearly mark the buckets containing infectious waste with the international “biohazard” symbol as shown in Figure 2.

Figure 2: International Biohazard Symbol

![Biohazard Symbol]
• Segregate the waste generated at the mobile blood donation sessions, at the mobile site and transport back to the blood centre for further management.

3.3 Waste collection

• Do NOT fill the waste containers more than three quarters of their maximum volume before sealing them securely, to avoid over-filling.
• Replace the containers for waste immediately with new ones of the same type.
• The containers for collection should be strategically located at all points of generation.
• Wear appropriate PPE such as heavy duty pierce-proof gloves, goggles, aprons and protective shoes or boots when collecting HCW.
• Waste should be collected regularly (on a daily basis) by trained and designated staff.

3.4 Waste storage

• Do NOT store waste for more than 24 hours in a hot or humid climate.
• Do NOT store waste for more than 48 hours under any conditions.
• Always store non-hazardous HCW in a separate location from hazardous HCW, to avoid cross-contamination.
• Waste storage facilities should have a hard floor that is easy to clean and disinfect, inaccessible to animals and insects and kept locked to prevent access by unauthorized persons.
• A schedule for regular cleaning of the storage area and transportation carts should be in place and followed.

3.5 Waste transportation

If the waste treatment facility is within the blood centre, transport the waste in closed containers and if possible using carts or wheeled trolleys that are stable and easy to load/unload, and easy to clean and disinfect. The carts used should not be used for any other purpose.

Figure 3: Cart for on-site transportation of waste

• For off-site transportation, ensure that the waste is safely packed in puncture-proof containers that are adequately labelled.
• Ensure that a consignment note accompanies the waste from its place of production to its site of disposal, and that the note is duly filled out by the waste handler on completion of the journey.
• Do NOT use vehicles designated for transportation of waste, for transportation of other materials. The designated vehicle should be signposted as carrying hazardous waste.

3.6 Waste treatment

• In choosing a waste treatment method, evaluate the relative risks, benefits as well as the ease of adopting the method into the overall waste management strategy.
• Autoclaving at a temperature of 121°C for a minimum of 20 minutes is the preferred method for infectious waste treatment. An autoclave, of a capacity that is appropriate to the needs of the BTS, should be used.
• Place the waste to be treated into an autoclavable polyethylene bag and open the mouth of the polythene bag before placing it in the autoclave chamber to facilitate mixing of hot steam with waste.
• Non-hazardous waste does not require treatment.

3.7 Waste disposal

• Appropriately treated waste can be sent to a secured or municipal landfill for disposal.
• The output from the autoclave is non-hazardous material and can be disposed of with municipal waste.
• Non-infectious liquid waste can be discharged directly into the sewers.
• Non-hazardous waste can be disposed of together with domestic waste or municipal waste.
• Inflammable waste disposal (to avoid explosion or fire): Hazardous chemical/flammable waste should be disposed of according to manufacturer’s instructions.
• Radioactive waste disposal: Blood bank irradiators used in the BTS for irradiation of cellular blood components are self-contained pieces of equipment. The use and de-commissioning of blood bank irradiators should be undertaken according to manufacturers’ instructions. Blood products that have been irradiated are not radioactive; thus, they pose no threat to staff safety, public health or the environment. Discarded or used irradiated blood products should therefore be managed as infectious waste.
4 Specific Management of Various Categories of Hazardous Waste

4.1 Treatment and disposal of infectious sharps

Sharps should be disposed of as shown in Figure 4.

Figure 4: Treatment and disposal of infectious sharps

Using appropriate PPE, separate the needle attached to blood bag tubing; separate other contaminated sharps

Segregate into sharps container

Autoclaving

Chemical disinfection – soak in 1% sodium hypochlorite solution

Secured burial or sanitary landfill

4.2 Treatment and disposal of infectious non-sharps

Non-sharp infectious waste should be disposed of as shown in Figure 5.

Figure 5: Treatment and disposal of infectious non-sharps

Test tubes
Used blood bags

Plastics
Plastic contaminated with blood
Blood bag wrapper, syringe cover

Non-blood units
Contaminated

Autoclave

Bury in secure landfill site or Municipal waste area
4.3 Treatment and disposal of blood units unsuitable for use

- Blood units found to be unsuitable for transfusion or reactive for infection markers, should be promptly removed from the blood stock, and treated and disposed of as soon as possible.
- Autoclave the blood bags under a pressure 2 bar (200 kPa) at a temperature of 121°C for a minimum of 20 minutes.
- Place the blood units in a steel container with a lid or in an autoclavable polythene bag as the bags may burst while being autoclaved and cause blood to spray out.
- Treated blood units can be disposed of by burying in a secured landfill, with or without shredding.

4.4 Treatment and disposal of infectious effluents

- Disinfect infectious liquid waste (e.g. blood samples used for testing, infectious effluent from test procedures) by chemical treatment using at least 1% sodium hypochlorite solution.
- Only after 30 minutes or more of exposure to the disinfectant, may the inactivated liquid waste be discharged into drains/ sewers for safe dispersal.

4.5 Treatment of glass test tubes for re-use

To clean glass test tubes for reuse:

- Soak tubes in a bucket or bowl containing a disinfectant such as 1% sodium hypochlorite for a minimum of 30 minutes.
- Wash tubes carefully with a detergent in a splash-proof sink.
- Rinse tubes with running water and allow to dry.

Table 2: Recommendations on types of disinfectant to use in a Blood Transfusion Service

<table>
<thead>
<tr>
<th>Types of disinfectant solutions recommended for a BTS</th>
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<tbody>
<tr>
<td><strong>Alcohol</strong></td>
</tr>
<tr>
<td>Although effective against many bacteria and viruses, alcohol solutions have poor penetration of organic materials and require sufficient time to act.</td>
</tr>
<tr>
<td><strong>Hypochlorite</strong></td>
</tr>
<tr>
<td>This acts by releasing ‘free chlorine’ and as is therefore not stable and must be freshly prepared for use. They are effective against many bacteria, viruses and fungi and are effective at various dilutions. To clean surfaces, a 0.1% available chlorine solution can be used while a 0.5% available chlorine solution should be used for discarded containers and spillages. A contact time of 30 minutes between hypochlorite solutions and infected material is the minimum required for disinfection.</td>
</tr>
</tbody>
</table>
5 Health Hazards Associated with Poor Waste Management

- Injuries from sharps – applicable to all categories of BTS staff.
- Risk of infection (e.g. HIV, HBV and other TTIs) – applicable to waste handlers and the general public.
- Exposure to harmful toxins like dioxin and furans – applicable to BTS staff, waste handlers and the public.

5.1 Individuals at risk of injury/infection

All individuals exposed to HCW are potentially at risk of being injured or infected. They include:
- Medical staff: doctors, nurses, sanitary staff and hospital maintenance personnel, patients receiving treatment in an HCF as well as their visitors.
- Workers in support services linked to health care facilities such as laundries, waste handling and transportation services.
- Workers in waste disposal facilities, and scavengers able to gain access.
- General public.
6 Bio-Safety Guidelines

The following bio-safety guidelines should be followed by all BTSCs:

- Wash hands thoroughly with soap/detergent and/or antiseptic solutions and water before and after every procedure or any contamination.
- Use protective barriers such as gloves, gowns or aprons, goggles and masks for direct contact with blood.
- Waste handlers should use pierce-proof gloves, aprons and protective shoes or boots.
- All BTS staff should be vaccinated against Hepatitis B.
- Disinfect work surfaces after the procedure and also at the end of each working day with 0.1% sodium hypochlorite solution.
- Place needles and other sharp materials into a puncture-resistant container containing 0.5% sodium hypochlorite solution.
- Safe collection and disposal of needles and sharps in puncture- and leakage-proof containers.
- Do not recap needles, but if unavoidable, use a one-handed technique.
- Cover all cuts and abrasions promptly with a waterproof dressing.
- In case of any spillage, cover the area with 0.5% sodium hypochlorite solution and leave for 15-30 minutes and then wipe dry with disposable paper towelling. Discard soiled paper appropriately. Wipe the surface again with disinfectant.
7 Post-exposure prophylaxis

Post-exposure prophylaxis (PEP) is a special course of treatment that aims to prevent individuals from becoming infected as a result of accidental exposure to HIV contaminated material. PEP is particularly important for those who have been exposed to blood through a needle-stick injury or other accident at the BTS. The aim of treatment is to provide protection against the virus and thus prevent HIV from becoming established in the body. Follow Nepal national guidelines on PEP (Figure 6 below).

Figure 6: Management of post exposure prophylaxis
8 Emergency Procedures

8.1 Spillage of blood

- Check whether individuals in the vicinity of the spillage or breakage have been splashed; it may be necessary to change or wash clothing. Importantly, ascertain whether anyone has been cut or had an eye splash and treat accordingly; also assessing whether or not it is necessary to initiate the PEP protocol.
- Using a pair of forceps and gloves, carefully retrieve broken glass and sharps, and use a large amount of folded absorbent paper to collect small glass splinters. Place the broken items into the sharps container.
- Swab the area of the spillage using absorbent paper towels soaked in 0.5% hypochlorite solution. Place all soiled absorbent material and contaminated swabs into a designated waste container.
- Soak the pair of forceps and all cleaning equipment (i.e. mop, brush, dustpan) used to clean the spillage, in 0.5% hypochlorite solution for 30 minutes and thereafter clean thoroughly and dry. Pour the contaminated disinfectant down the drain, together with large quantities of running water.
- Wash hands thoroughly with soap and water.

8.2 Spillage of chemicals

Hazardous chemicals or those with unknown properties

- Treat spilled chemicals with caution because they may be explosive, flammable, toxic or corrosive – each chemical used in a blood testing laboratory should be delivered with its material safety data sheet (MSDS), which contains information on the chemical, and recommendations in case of spillage or poisoning.
- Instruct staff to keep at a safe distance or evacuate the contaminated area if required.
- Shut off any source of possible ignition where spillage of flammable fluid is involved.
- Ventilate the area well to reduce irritant vapours and evaporate any remaining liquid; however, in the case of a large spillage of a chemical capable of releasing a noxious vapour, do not move the air to other parts of the building – instead, shut down the area until the hazard has been removed.
- Provide adequate PPE to personnel involved in cleaning up; this includes rubber and plastic gloves, face shields, goggles, rubber boots and protective gowns.
- Limit the spread of a fluid chemical using a mop, cloths, absorbent paper, granules or sand (use sodium carbonate to neutralize acids); sweep up broken glass pieces with a household dustpan and brush and place the sweepings in the sharps waste container.
- Ensure that personnel involved in cleaning wash their hands with soap and water.

Non-hazardous chemicals

Spillages of non-hazardous materials, such as water or saline, onto the floor can make the floor slippery and thus a potential danger of causing injury due to falling. Clean up such spills immediately.
8.3 Needle-stick injury

- Strictly avoid re-capping of needles.
- If a needle-stick injury is sustained, for example, on the hand:
  - Remove the glove immediately
  - Wash hands thoroughly with soap under running water for a lengthy period
  - Encourage bleeding from the wound, but do not apply excessive pressure
  - Immediately inform the supervisor or manager
- Follow the appropriate protocol for needle-stick injury. In the case of a needle-stick injury with the potential to infect with HIV, follow the guidelines for management of PEP – Figure 6.
9 Challenges faced by Blood Centres in Nepal

- Lack of awareness about health hazards related to HCW
- Inadequate training in waste management
- Absence of proper waste management and disposal systems
- Insufficient financial and human resources
- Low priority given to the issue
- Lack of land for waste disposal
- Lack of waste-treating equipment

10 Policy and Plan – Health Care Waste Management, National Blood Transfusion Service

Within the national blood programme, a designated committee should be formed, which is responsible for establishing a waste management policy for the BTS, in line with national policy and based on the legal requirements and policy of the country. Based on the policy, the committee can then formulate a national strategy for achieving safe HCW management.

The national strategy for safe HCW management and its implementation should address the following elements:

- Designation of responsible authority
- Assignment of responsibilities
- Role of Officer-in-charge, BTS waste management
- Role of concerned Head/Director of Centre/In-charge

10.1 Designation of responsible authority

Potential members of a designated committee for HCW management – the authority responsible at national level for formulating HCW management policy and strategy, and for implementing and evaluating the strategy – may include:

- Ministry of health
- Environmental agency
- BTS management
- Relevant non-governmental organizations (NGOs)
- Other groups deemed to be relevant

The committee should clearly communicate the risks and responsibilities related to HCW, to all blood centre directors and managers.

The committee should also develop a national training package adapted to meet the training needs of all categories of staff who manage waste; and a national “training-of-trainers” course to provide
the skills for a core of individuals to conduct continuing education on the waste management programme.

10.2 Assignment of responsibilities

The HCW management committee of BTS (for stand-alone centres) / hospital (for hospital based centres), chaired by the centre's director or district chapter chairperson, should assign BTS in-charge/or a suitable individual to be the blood centre's officer-in-charge for waste management.

The committee should assess potential harms related to waste generated in BTS and analyse problems that may lead to unsafe handling or disposal. The assessment should include:

- Review and evaluation of resources available for centralized waste management and disposal
- Analysis of accidents and incidents
- Recommend proactive and preventive measures for avoiding and preventing accidents and incidents

10.3 Role of officer-in-charge of waste management

- The officer-in-charge of waste management will be responsible for the implementation of guidelines and will liaise with the centre's director or district chapter chairperson.
- The officer will be responsible for monitoring the waste programme at various levels i.e. generation, segregation, collection, storage, transportation and treatment including disposal.
- The officer will be responsible for the circulation of all policies/ guidelines/ SOPs related to BTS waste management.
- The officer will be responsible for reporting accidents to the prescribed authority.

10.4 Role of concerned Head/Director of Centre/In-charge

- Responsible for providing a suitable environment for the implementation of waste management procedures in conformity with guidelines issued.
- Responsible for arranging that all staff are trained, and updated regularly, in BTS waste management.
- Liaison with the officer-in-charge of waste management for administrative support.
Table 3: Staff responsibilities and duties in relation to HCW management in a BTS

<table>
<thead>
<tr>
<th>Responsible staff</th>
<th>Responsibilities and duties a</th>
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<td><strong>Designation</strong></td>
<td><strong>Responsibilities and duties a</strong></td>
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</table>
| BTS in-charge     | • Overall responsibilities  
                    • Chairman of the HCW management committee and the HCW management review |
| Waste management officer | • Develop a HCW management plan for reference and implementation by staff; jointly with blood bank manager or hospital administrator  
                          • Advise on HCW classification, segregation, minimization, labelling, packaging, storage, transportation, disposal and health hazard control  
                          • Coordinate HCW management training and provide operational guidelines to staff handling HCW  
                          • Monitor waste handling processes in workplace  
                          • Coordinate and monitor accidents and incidents and measures taken to correct |
| **Designation** | **Responsibilities and duties a** |
| BTS or hospital administrator | • Provide suitable and adequate containers, waste handling materials and labels  
                                • Provide appropriate storage facilities for different groups of waste before delivery to disposal facilities  
                                • Consign authorized or licensed HCW collection contractors to deliver waste to legally permitted disposal facilities  
                                • Assign responsibility to individuals at each stage of waste handling |
| Staff who handle or generate HCW at work | • Attend staff training and refresher courses  
                                         • Follow all SOPs on waste management  
                                         • Segregate HCW at source  
                                         • Properly dispose of HCW in appropriate containers  
                                         • Label and attach HCW tags to each waste container  
                                         • Ensure containers are no more than ¼ full when another one is selected  
                                         • Properly seal each container  
                                         • Secure intermediate storage at workplace before transportation to centralized storage  
                                         • Report all accidents and incidents promptly |
| HCW handlers from contract transporter | • Attend staff training and refresher courses  
                                         • Collect, transport and dispose of HCW according to contractual and legal requirements  
                                         • Report HCW accidents or incidents |

a: includes but is not limited to duties and responsibilities listed
Figure 7: Flowchart for Waste Management in a BTS

**Segregate waste**

- **Non-infectious**
  - e.g. plastic bottles, metal cans, wrappings, packaging, paper
  - Collect in **BLUE** container with lid
  - Disposal to municipal waste

- **Infectious sharps**
  - e.g. used needles, blades/lancets
  - Collect in **YELLOW** leak-proof, puncture resistant container with lid
  - Autoclave: 121°C, 15 lb. pressure, 20 minutes
  - Chemical disinfection: Hypochlorite solution (1-2%)
  - Destroy by using needle destroyer
  - Hand over to municipality

- **Infectious non-sharps**
  - Collect in **RED** leak-proof container with lid
  - Infectious liquid
    - Blood/product unit not for use
    - Place unit in autoclavable plastic bag
    - Autoclave: 121°C, 15 lb. pressure, 20 minutes
    - Chemical disinfection: Hypochlorite solution
      - Add 2% hypochlorite solution; stand for minimum 30 minutes
  - Effluent
    - Place bags in autoclave bucket
    - Autoclave: 121°C, 15 lb. pressure, 20 minutes
    - Destroy by using needle destroyer
    - Hand over to municipality

- **Infectious solid**
  - Collect in **RED** leak-proof container with lid
  - Re-usable: e.g. used test tubes, glassware, tiles*
    - Add 2% hypochlorite solution; stand for minimum 30 minutes
    - Autoclave: 121°C, 15 lb. pressure, 20 minutes
    - Wash with liquid soap and ample water
    - Dry in hot air oven and re-use
    - Hand over to municipality

- **Infectious liquid**
  - Collect in **YELLOW** leak-proof, puncture resistant container with lid
  - Infectious liquid
    - Blood/product unit not for use
    - Place unit in autoclavable plastic bag
    - Add 2% hypochlorite solution; stand for minimum 30 minutes
  - Effluent
    - Place bags in autoclave bucket
    - Autoclave: 121°C, 15 lb. pressure, 20 minutes
    - Destroy by using needle destroyer
    - Hand over to municipality

* *
11 References


