

HOSPITAL WASTE MANAGEMENT
A CASE STUDY
IN
KATHMANDU, PATAN, BHARATPUR AND POKHARA



Medical waste disposal at Mahendra Adarsha Chikitsalaya, Bharatpur Hospital

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1. Introduction

Nepal's public health sector consists of five national hospitals concentrated mainly in Kathmandu. Similarly, there is one regional hospital and 11 hospitals (with an average of 150 beds) at the zonal or sub-region. There is also provision for a district hospital (primary level) with 15-25 beds on an average in each of the country's 75 districts. At the primary level, there are approximately 160 primary Health Care centres, 710 Health Posts and 3169 Sub-Health Posts. The public health sector employs a total of 26,000 staff. Moreover, there are 9 teaching hospitals under the administration of the Ministry of Education, of which the Tribhuvan University Teaching Hospital (TUTH) in Kathmandu, with approximately 450 beds, is the largest.

The management of health care waste and its effects on human health has yet to be realised throughout health institutions in the country. The current situation depicts an absence of an effective, hygienic and systematic approach towards health care waste management in all health facilities. The prevailing system is at best, a collection of all categories of waste, infectious and non-infectious, hazardous and non-hazardous at the containers provided by KMC (Kathmandu Metropolitan City) which are later landfilled.

The limited number of incinerators constructed by few hospital over the past 10 years have not changed the health care waste management behaviour in any of the health facilities. Furthermore, municipalities have not been very regular in providing necessary services for the collection and treatment of hospital waste. Due to lack of strict rules and regulations for hospital waste management by the Ministry of Health, health institutions do not seem more concerned about proper hospital waste management.

According to a recent survey conducted in Kathmandu valley, approximately 1189 kgs. of infectious waste is produced daily from all health facilities including private clinics (*environment and public health organizations, Kathmandu 2000*). Over the last decade, there has been a steady increase in the number of health care institutions resulting in a significant rise in the amount of waste generated from these establishments.

2. Healthcare Institutions in Kathmandu

List of Healthcare Institutions Surveyed in Kathmandu

PUBLIC HOSPITALS

- Ayurvedic Hospital
- Bhaktapur Hospital
- Bir Hospital
- Birendra Police Hospital
- Central Veterinary Hospital
- Infectious Disease Hospital
- Kanti Bal Hospital
- Maternity Hospital
- Mental Hospital
- Nepal Eye Hospital
- Patan Hospital
- TB Hospital
- Teaching Hospital

PRIVATE HEALTHCARE INSTITUTIONS

- Annapurna Nursing Home
- B & B Hospital
- Blue Cross Nursing Home
- Everest Nursing Home
- HAMS Nursing Home
- Hargan's Nursing Home
- Himalayan Hospital
- HM Hospital & Research Centre
- Ishan Bal Nursing Home
- Life-care Hospital
- Kathmandu Dental Nursing Home
- Kathmandu Medical College
- Kathmandu Model Hospital
- Medicare National Hospital
- Norvic Nursing Home
- National Dental Hospital
- Nepal Medical College
- Om Hospital
- Saheed Ganga Lal National Heartcare Centre
- Siddhatha Apollo Hospital
- Til Ganga Eye Hospital
- Valley maternity Nursing Home

PATHOLOGICAL LABS and POLYCLINICS

Polyclinics

- Alka poly clinic
- Anamnagar polyclinic
- Chhetrapati Nisulka Chikitsalaya
- Curex Diagnostic Center
- Siddi Polyclinic

Pharmaceuticals and Pathology Lab

- Clinical Pathological Lab
- Medico Pathological Lab
- Royal Drugs Ltd.
- Sankata Laboratory

3. Report Collection on Hospital Waste Management
(Survey done by SEF)

a. HOSPITALS

BIRENDRA POLICE HOSPITAL

Established : 2040 BS (Branches in Nepalgunj and Dipayal)

No. of Medical Staff : 300

No. of Hospital Beds : 150

<i>Services provided/Specialisation</i>	
<i>Medical waste collected in lab</i>	Yes
<i>Provision of sorting hazardous and non hazardous waste</i>	Yes
<i>Disposal method of medical waste</i>	Collected in bins, Pathological waste soaked in chlorine before disposing in containers, provided by KMC.
<i>Method of hospital disposal of hazardous wastes like syringes, needles, blood samples and body parts</i>	Body parts buried within hospital compound, Organic waste used for fertilizers, Saline bottles sold, Plastic bottles disposed of in containers, Used needles separated from plastic body and collected in bins after sterilizing in chlorine
<i>Sterilisation process adopted for various purposes</i>	Yes in autoclave. Vials for blood samples sterilised for re-use instead of disposal
<i>Incinerator present at the hospital</i>	No

Comments: Sweepers do not use gloves while handling hospital wastes. Training classes have been provided regarding handling infectious diseases. Clothes used by patients with infectious diseases burnt and utensils sterilized and reused. The municipality collects the containers twice a month at a fee of Rs. 3000. The hospital is interested if the government collects wastes for a monthly fee and disposes in a central incinerator.

BIR HOSPITAL (Major Government hospital in Nepal)

No. of Hospital Beds : 390

<i>Services provided/Specialisation</i>	All
<i>Medical waste collected in lab</i>	Yes
<i>Provision of sorting hazardous and non hazardous waste</i>	Yes /not satisfactory
<i>Disposal method of medical waste</i>	Containers
<i>Method of hospital dispose of hazardous wastes like syringes, needles, blood samples and body parts</i>	Municipality containers, Bottles and plastic sold
<i>Sterilisation process adopted for various purposes</i>	Yes
<i>Incinerator burner present at the hospital</i>	In the past yes, but was later destroyed due to public protest

Comments: Since there is no provision for security, anybody can walk into the hospital premises and collect the hospital waste. Even dogs are seen to take away body parts. The haemodialysis unit produces a lot of waste. All tools used here were earlier sterilized in 5-10% chlorine. But because of chest pain and complaints from staff, this has been discontinued. Acute water shortage in the hospital has made it difficult to clean tools used by doctors. The hospital buys water worth Rs. 2 lakhs every month. The provision of collecting hazardous and non hazardous waste generated at the hospital is not satisfactory. The hospital does not have required number of bins for hospitals waste collection. During the survey, SEF found heaps of discarded pathological waste lying openly at the corridor of the hospital near the haemodialysis unit. The budget provided by government for the hospital is insufficient.

B & B HOSPITAL, SAATDOBATO

Established : 2054 BS

No. of Medical Staff : Doctors - 60, Others - 260, Sweepers - 30

No. of Hospital Beds : 110

Daily average no. of Patients : 150 - 200

<i>Services provided/Specialisation</i>	All
<i>Medical waste collected in lab</i>	Yes
<i>Provision of sorting hazardous and non hazardous waste</i>	Yes
<i>Disposal method of medical waste</i>	Incineration
<i>Method of hospital disposal of hazardous wastes like syringes, needles, blood samples and body parts</i>	Body parts and syringes/needles burnt in incinerator, Some pathological waste discarded directly in drain,
<i>Sterilisation process adopted for various purposes</i>	Yes, Autoclave
<i>Incinerator present at the hospital</i>	Yes, but out of order

Comments: people who collect wastes use gloves and masks. Hospital is cleaned 3 times with phenyl. Rooms used by patients with infectious diseases cleaned and isolated for a week, blankets, etc are used separately. Workers are given training on proper waste management. The hospital is ready to make use of facilities of a central incinerator at a monthly fee.

BP KOIRALA MEMORIAL CANCER HOSPITAL, CHITWAN

No. of Hospital Beds : 100 (at present with plan of extension for 400 more beds)

Average no. of patients per day : 50 - 60

<i>Services provided/Specialisation</i>	Radiation Oncology, Surgical Oncology, Medical Oncology, Radio Diagnosis, Clinical Biochemistry, Histopathology, Hematology, Cytology, Microbiology, Tumor Marker, Radiotherapy, Chemotherapy, Biopsy, etc.
<i>Medical waste collected in lab</i>	Yes
<i>Provision of sorting hazardous and non hazardous waste</i>	Yes (different colored buckets)
<i>Disposal method of medical waste</i>	
<i>Method of hospital disposal of hazardous wastes like syringes, needles, blood samples and body parts</i>	Organic waste used for making fertilisers., Saline bottles sold, Incineration
<i>Sterilisation process adopted for various purposes</i>	Yes
<i>Incinerator present at the hospital</i>	

Comments: The hospital is cleaned 2 times with phenyl and dettol. Sweepers collect waste materials and are provided with training on management of waste. There is a big store room where where chemo and radiation wastes are collected and will later be burnt in a big incinerator. There is a 2-3 meter wide wall for protection against x-ray exposure.

HIV, AIDS UNIT, TEKU (HEALTH DIVISION)

Total no. of AIDS patients in Nepal - 1807 (male - 1271, female - 536), Estimated no. of people living with AIDS - 34,000, Total deaths - 142

<i>Services provided/Specialisation</i>	Infections diseases diagnosis/ treatment
<i>Medical waste collected in lab</i>	
<i>Provision of sorting hazardous and non hazardous waste</i>	
<i>Disposal method of medical waste</i>	
<i>Method of hospital disposal of hazardous wastes like syringes, needles, blood samples and body parts</i>	There is no provision to burn syringes/needles used by AIDS, Hepatitis patients in incinerators. These are burnt in Hume Pipes (half sized) within the hospital premises.
<i>Sterilisation process adopted for various purposes</i>	Yes, Autoclaved
<i>Incinerator present at the hospital</i>	No

Comments: The possibility of discarded needles and syringes being reused is high when they are not discarded properly. There reports that drug addicts use them late and night and discard them back into the hume pipe. SEF requests the Unit to install an incinerator. There is no provision for management of hospitals, clinics and nursing homes in the country.

KANTI CHILDREN'S HOSPITAL, MAHARAJGUNJ

No. of Hospital Beds : 224

<i>Services provided/Specialisation</i>	Children's hospital
<i>Medical waste collected in lab</i>	Yes
<i>Provision of sorting hazardous and non hazardous waste</i>	Yes
<i>Disposal method of medical waste</i>	Toxic wastes and plastics discarded, Municipality Containers, X-ray solution sold for silver copper
<i>Method of hospital disposal of hazardous wastes like syringes, needles, blood samples and body parts</i>	Body parts buried within hospital grounds, Dead bodies handed to family, Municipality Containers, Syringes disposed, Needles destroyed and buried
<i>Sterilisation process adopted for various purposes</i>	Yes - those that can be reused
<i>Incinerator present at the hospital</i>	No

Comments: Hospital wards and toilets cleaned with phenyl 3 times a day. Gloves used by doctors disposed and masks reused after washing. Infectious disease ward is separate and clothes used by such patients reused after soaking in chlorine water

LALITPUR MENTAL HOSPITAL

No. of Hospital Beds : 21

<i>Services provided/Specialisation</i>	Mental cases
<i>Medical waste collected in lab</i>	Yes
<i>Provision of sorting hazardous and non hazardous waste</i>	Yes
<i>Disposal method of medical waste</i>	Containers
<i>Method of hospital disposal of hazardous wastes like syringes, needles, blood samples and body parts</i>	Needles, syringes, glass and plastic are stored in separate in drums/containers, Needles are destroyed before disposing
<i>Sterilisation process adopted for various purposes</i>	Yes, Autoclave
<i>Incinerator present at the hospital</i>	No

Comments: The hospital is cleaned 2 times. The wastes are collected by sweepers - sweepers do not use gloves.

MAHENDRA AADARSHA CHIKITSHALAYA, BHARATPUR HOSPITAL

Established : 2049 BS

No. of Medical Staff : Doctors - 20-24, Staff - 50-60

No. of Hospital Beds : 150

Average no. of patients per day : 80 - 100 in winter, 100-150 in summer

<i>Services provided/Specialisation</i>	All
<i>Medical waste collected in lab</i>	Yes
<i>Provision of sorting hazardous and non hazardous waste</i>	No
<i>Disposal method of medical waste</i>	Most are buried behind the hospital complexes
<i>Method of hospital disposal of hazardous wastes like syringes, needles, blood samples and body parts</i>	X-ray solution wastes sold, Most of the wastes are left open in the hospital grounds.
<i>Sterilisation process adopted for various purposes</i>	Yes
<i>Incinerator present at the hospital</i>	No

Comments : More than 50% of cases are referred to Kathmandu due to lack of supplies. The hospital is in a bad condition - there aren't even bed-sheets on the beds, 80% of which need to be replaced. In the absence of doctors nurses manage the hospital. A large number of Highway accidents come to the hospital but there are no proper services present. The Ministry has not shown any interest in improving its conditions. Most of the hospital waste has been left unattended on the grounds of the hospital area.

MATERNITY HOSPITAL (PRASHUTI GRIHA, GOVERNMENT HOSPITAL)

No. of Hospital Beds : 320

<i>Services provided/Specialisation</i>	Maternity services
<i>Medical waste collected in lab</i>	Yes
<i>Provision of sorting hazardous and non hazardous waste</i>	Yes
<i>Disposal method of medical waste</i>	Cement tanks and when full are washed into the drainage with water
<i>Method of hospital disposal of hazardous wastes like syringes, needles, blood samples and body parts</i>	Municipality containers, Dead babies buried. Saline Pipe, syringe and blood packets burnt. Syringes locked in tins and burnt, saline bottles sold
<i>Sterilisation process adopted for various purposes</i>	Yes in sterilization machine after soaking in chlorine
<i>Incinerator present at the hospital</i>	Earlier yes but was later destroyed because it was land belonging to the UN Park.

Comments: There is pathology lab in the hospital. The hospital is scrubbed twice a month and cleaned with chlorine and phenyl 3 times in a day. There are two separate rooms for patients with infectious illnesses.

NEPAL TUBERCULOSIS HOSPITAL

No. of Medical Staff : Doctors - 3

No. of Hospital Beds : Outdoor Patients only

Daily average no. of patients : 110

<i>Services provided/Specialisation</i>	TB (25% TB cases detected daily), Allergy Test
<i>Medical waste collected in lab</i>	Yes
<i>Provision of sorting hazardous and non hazardous waste</i>	Yes
<i>Disposal method of medical waste</i>	X-ray solution thrown in drainage
<i>Method of hospital disposal of hazardous wastes like syringes, needles, blood samples and body parts</i>	Incineration of sputum collected for TB test, Used x-rays thrown, Used needles burnt in incinerator
<i>Sterilisation process adopted for various purposes</i>	Yes, Autoclave
<i>Incinerator present at the hospital</i>	Yes

Comments : Other hospital waste materials can be seen scattered within the hospital premises. There is no provision of municipality containers. The sweepers who collect the sputum do not use masks or gloves. Those who work in the Microbiology unit and conduct TB tests also do not use masks. However, there is provision for a yearly TB test for all the workers. H2SO4 Chemical is used in sterisation in the Bacteriology Lab

NATIONAL DENTAL HOSPITAL

<i>Services provided/Specialisation</i>	Dental
<i>Medical waste collected in lab</i>	Yes
<i>Provision of sorting hazardous and non hazardous waste</i>	Yes
<i>Disposal method of medical waste</i>	Bins
<i>Method of hospital disposal of hazardous wastes like syringes, needles, blood samples and body parts</i>	Mostly collected by Municipality containers and Clubs, Syringes are kept in a separate bottle but are needles are not destroyed before disposing
<i>Sterilisation process adopted for various purposes</i>	Yes, Autoclave
<i>Incinerator present at the hospital</i>	No

Comments: Teeth are send for autoclave before disposing. Gloves are sterilized by washing them in chlorine and powdering and cannot be re-used more than 3 times. Gloves with holes are thrown away. Workers are trained n waste management. Hospital is cleaned with dettol and phenyl twice a day. AIDS and Hepatitis patients are isolated. The hospital is concerned about environment pollution due to incinerators.

PATAN HOSPITAL

No. of Hospital Beds : 251

<i>Services provided/Specialisation</i>	
<i>Medical waste collected in lab</i>	Yes
<i>Provision of sorting hazardous and non hazardous waste</i>	Yes
<i>Disposal method of medical waste</i>	Incineration, Municipality containers, Solution from radio active waste sold
<i>Method of hospital disposal of hazardous wastes like syringes, needles, blood samples and body parts</i>	Syringes thrown after recapping and, Waste from Gynae Department and other body parts in big incinerator, Toxic waste like blood thrown directly into drain, Stool thrown in toilets, Glass and bottles sold
<i>Sterilisation process adopted for various purposes</i>	Yes - 3 autoclave machines present in Sterilisation Unit, soaked in chlorine first
<i>Incinerator present at the hospital</i>	Yes, Both are electric incinerators

Comments: Clothes used by patients with infectious diseases and AIDS, burnt and room isolated for 3 days. There is no provision for disposing heavy materials and mercury. Hospital is cleaned 2 times with phenyl. The sweepers who collect the waste materials use gloves and separate them accordingly. The "Infection Control Committee" (with 11 members) supervises and monitors to prevent infections within the hospital. The staff members are also provided with training on hospital waste management. Patan hospital seems more concerned about properly managing the hospital wastes than other hospitals in Nepal.

SAHEED GANGALAL HEART HOSPITAL

Established : 2057

No. of Medical Staff : Doctors -8 , Nurses - 20, Sweepers - 6

No. of Hospital Beds : 9

<i>Services provided/Specialisation</i>	Cardiology, ECG, TM Test
<i>Medical waste collected in lab</i>	Yes
<i>Provision of sorting hazardous and non hazardous waste</i>	Yes
<i>Disposal method of medical waste</i>	Burial
<i>Method of hospital disposal of hazardous wastes like syringes, needles, blood samples and body parts</i>	Needles separated from syringes destroyed in needle destroyer, Pathological waste collected in pits and burnt in hospital ground
<i>Sterilisation process adopted for various purposes</i>	Yes, Autoclave
<i>Incinerator present at the hospital⁶²</i>	No

Comments: Hospital waste is collected by sweepers who use masks, gloves and aprons.

SHREE BIRENDRA MILITARY HOSPITAL

No. of Hospital Beds : 300

<i>Services provided/Specialisation</i>	All
<i>Medical waste collected in lab</i>	Yes
<i>Provision of sorting hazardous and non hazardous waste</i>	Yes
<i>Disposal method of medical waste</i>	Container, Drainage
<i>Method of hospital disposal of hazardous wastes like syringes, needles, blood samples and body parts</i>	Paper, plastic, cotton burnt in incinerator, Syringes and body parts thrown in Municipality Container< Bottles sold, Samples of stool, blood and urine as well as chemicals, medicine thrown in drainage
<i>Sterilisation process adopted for various purposes</i>	Yes
<i>Incinerator present at the hospital</i>	

Comments: This hospital falls under the Ministry of Defence. The Municipality collected the containers once a month. All utensils used by patients are cleaned and steamed. Gloves and masks used by doctors are cleaned in chlorine. The presence of guards at the gate makes it difficult for outsiders to walk in to collect the wastes.

SIDDHARTHA APPOLLO HOSPITAL, PUTALISADAK

Established : 1995

No. of Medical Staff : Doctor - 35

Average no. of patients per day : 65 - 70

<i>Services provided/Specialisation</i>	All
<i>Medical waste collected in lab</i>	Yes
<i>Provision of sorting hazardous and non hazardous waste</i>	
<i>Disposal method of medical waste</i>	
<i>Method of hospital disposal of hazardous wastes like syringes, needles, blood samples and body parts</i>	Needles destroyed in needle destroyer
<i>Sterilisation process adopted for various purposes</i>	Bottles and vials used in blood tests sterilised in Autoclave and reused
<i>Incinerator present at the hospital</i>	No

TEKU HOSPITAL (Govt. Hospital)

No. of Medical Staff : Doctors - 9

No. of Hospital Beds : 100,

<i>Services provided/Specialisation</i>	Infectious Diseases
<i>Medical waste collected in lab</i>	Yes
<i>Provision of sorting hazardous and non hazardous waste</i>	No
<i>Disposal method of medical waste</i>	Containers
<i>Method of hospital disposal of hazardous wastes like syringes, needles, blood samples and body parts</i>	Containers, Needles used by AIDS patients burnt
<i>Sterilisation process adopted for various purposes</i>	Yes but poor
<i>Incinerator present at the hospital</i>	No

Comments : All hospital wastes are discarded in containers. Sweepers collect most of the garbage but do not use any protective masks or gloves. Waste is collected in haphazard manner. There seems to be lack of information and training on infectious diseases. Utensils used by patients are not kept separate. The hospital is in a very poor condition.

TRIBHUWAN UNIVERSITY TEACHING HOSPITAL

Established : 2040 BS

No. of Medical Staff : Doctors - 200, Others - 1200

No. of Students : Medical - 310 (including PG), Others - 1000

No. of Hospital Beds : 450

<i>Services provided/Specialisation</i>	All
<i>Medical waste collected in lab</i>	Yes
<i>Provision of sorting hazardous and non hazardous waste</i>	Yes
<i>Disposal method of medical waste</i>	Paper burnt in incinerators, Municipality containers
<i>Method of hospital disposal of hazardous wastes like syringes, needles, blood samples and body parts</i>	Pathological waste, pathogenic waste, syringes and needles are burnt in the incinerator, Municipality containers, Saline bottles in containers
<i>Sterilisation process adopted for various purposes</i>	Yes, Autoclave and chlorine
<i>Incinerator present at the hospital.</i>	Yes

Comment: A Training on how to separate hazardous and non-hazardous materials was organized with support from JICA. Accordingly, organic wastes, hazardous wastes, recyclable waste and papers are collected in different coloured buckets. These materials are then collected by sweepers who follow necessary safety measures. For this, two sweepers have been trained. The hospital is cleaned with detergent and phenyl. Similarly, classes have been conducted on hospital waste management and proper method of handling such waste. The hospital incinerator run by diesel is 18 years old and does not have adequate capacity to take care of all the wastes. There are plans to install an incinerator with support from JICA. The Municipality collects the containers every alternate day. Earlier saline bottles used to be recycled in India but since this has stopped, these bottles are discarded in containers.

b. NURSING HOMES

ANNAPURNA NURSING HOME, BAGBAZAR

Established : 2026 BS

No. of Medical Staff : Doctors - 15,

Average no. of patients per day : 10 - 15

<i>Services provided/Specialisation</i>	Mainly Cancer, Asthma, Surgery
<i>Medical waste collected in lab</i>	Yes
<i>Provision of sorting hazardous and non hazardous waste</i>	Yes
<i>Disposal method of medical waste</i>	Containers
<i>Method of hospital disposal of hazardous wastes like syringes, needles, blood samples and body parts</i>	Containers, Syringes burnt within hospital complex, Samples of blood, urine and stool soaked in chlorine for 24 hrs. before disposing in containers
<i>Sterilisation process adopted for various purposes</i>	Yes, Autoclave
<i>Incinerator present at the hospital</i>	No

BINAYAK MATERNITY HOME, CHABAHIL

No. of Hospital Beds : 15

<i>Services provided/Specialisation</i>	Maternity services
<i>Medical waste collected in lab</i>	Yes
<i>Provision of sorting hazardous and non hazardous waste</i>	
<i>Disposal method of medical waste</i>	Containers
<i>Method of hospital disposal of hazardous wastes like syringes, needles, blood samples and body parts</i>	Containers
<i>Sterilisation process adopted for various purposes</i>	
<i>Incinerator present at the hospital</i>	

OM NURSING HOME

No. of Hospital Beds : 50

<i>Services provided/Specialisation</i>	All
<i>Medical waste collected in lab</i>	Yes
<i>Provision of sorting hazardous and non hazardous waste</i>	Yes
<i>Disposal method of medical waste</i>	Municipality Container
<i>Method of hospital disposal of hazardous wastes like syringes, needles, blood samples and body parts</i>	Municipality Container, Drain, Burning
<i>Sterilisation process adopted for various purposes</i>	Yes
<i>Incinerator present at the hospital</i>	No

SARVANGA SWASTHYA SADAN, KUPONDOLE

Established : 2048 BS

No. of Medical Staff : Doctors - 13, Others 25, Sweepers - 4

Daily average no. of patients : 30 - 40

<i>Services provided/Specialisation</i>	Except ENT, skin and head related
<i>Medical waste collected in lab</i>	Yes
<i>Provision of sorting hazardous and non hazardous waste</i>	No
<i>Disposal method of medical waste</i>	Bin and later collected by "Women Environment Group" every 2-3 days
<i>Method of hospital disposal of hazardous wastes like syringes, needles, blood samples and body parts</i>	Bin and later collected by "Women Environment Group" every 2-3 days
<i>Sterilisation process adopted for various purposes</i>	Yes, Autoclave.
<i>Incinerator present at the hospital</i>	No

Comments: Staff who collect waste use masks and gloves. There is provision for training on waste management.

EVEREST NURSING HOME

No. of Hospital Beds : 17

<i>Services provided/Specialisation</i>	
<i>Medical waste collected in lab</i>	Yes
<i>Provision of sorting hazardous and non hazardous waste</i>	Yes
<i>Disposal method of medical waste</i>	Municipality Containers
<i>Method of hospital disposal of hazardous wastes like syringes, needles, blood samples and body parts</i>	Burying, Saline bottles sold. Syringes thrown without destroying needles
<i>Sterilisation process adopted for various purposes</i>	Yes, Autoclave. Masks and gloves sterilized with chlorine.
<i>Incinerator present at the hospital</i>	No

Comments: Hospital waste collected comparatively lesser than in other institutions. The Nursing Home is cleaned with chlorine and phenyl twice a day.

HM HOSPITAL AND RESEARCH, MAHARAJGUNJ

Established : Outdoor 2052 BS, Indoor 2053 BS

No. of Medical Staff : Doctors - 25, Staff - 42, Sweepers 14

No. of Hospital Beds : 43

Average no. of patients per day : 35 - 40

<i>Services provided/Specialisation</i>	
<i>Medical waste collected in lab</i>	Yes
<i>Provision of sorting hazardous and non hazardous waste</i>	Yes
<i>Disposal method of medical waste</i>	Some burnt in hospital premises, Bury, Municipality Containers
<i>Method of hospital disposal of hazardous wastes like syringes, needles, blood samples and body parts</i>	Burn, Bury, Syringes kept in plastic containers, Municipality Containers
<i>Sterilisation process adopted for various purposes</i>	Yes, Autoclave
<i>Incinerator present at the hospital</i>	No

Comments: Workers receive training on waste management. They use gloves and masks. Things used by patients with infectious diseases are kept separate and re-used after sterising in chlorine and used in autoclave.

VALLEY MATERNITY NURSING HOME

Established : 2051 BS

No. of Medical Staff : Doctors - 20,

Daily average no. of patients : 15 - 20

<i>Services provided/Specialisation</i>	Maternity services
<i>Medical waste collected in lab</i>	Yes
<i>Provision of sorting hazardous and non hazardous waste</i>	
<i>Disposal method of medical waste</i>	Containers
<i>Method of hospital disposal of hazardous wastes like syringes, needles, blood samples and body parts</i>	All sample (blood, urine, stool) disposed in containers, Some bottles are also discarded in containers
<i>Sterilisation process adopted for various purposes</i>	Yes
<i>Incinerator present at the hospital</i>	No

C. PATHOLOGY LABS

CUREX DIAGNOSTIC CENTRE

Established : 1992

No. of Medical Staff : Doctors - 7

Average no. of patients per day: 20-30 in winter and 30-45 in summer

<i>Services provided/Specialisation</i>	Mainly routine examinations
<i>Medical waste collected in lab</i>	Yes
<i>Provision of sorting hazardous and non hazardous waste</i>	
<i>Disposal method of medical waste</i>	
<i>Method of hospital disposal of hazardous wastes like syringes, needles, blood samples and body parts</i>	Syringes/needles in Municipality Containers, All samples taken by municipality
<i>Sterilisation process adopted for various purposes</i>	Bottles and vials sterilised
<i>Incinerator present at the hospital</i>	No

EVEREST PATHOLOGY LAB

Established : 2045 BS

No. of Medical Staff : 1

Average no. of patients daily: 5-7

<i>Services provided/Specialisation</i>	Mainly pregnancy test
<i>Medical waste collected in lab</i>	Yes
<i>Provision of sorting hazardous and non hazardous waste</i>	
<i>Disposal method of medical waste</i>	
<i>Method of hospital disposal of hazardous wastes like syringes, needles, blood samples and body parts</i>	Syringes and needles thrown in containers, Some bottles and vial thrown, All blood, stool and urine samples collected and disposed by collectors
<i>Sterilisation process adopted for various purposes</i>	Yes, Autoclave
<i>Incinerator present at the hospital</i>	No

HIWI PATHOLOGY LAB

Established : 2057 BS

No. of Medical Staff : Doctors 3,

Average no. of patients per day : 2-5

<i>Services provided/Specialisation</i>	Routine Examinations
<i>Medical waste collected in lab</i>	Yes
<i>Provision of sorting hazardous and non hazardous waste</i>	
<i>Disposal method of medical waste</i>	
<i>Method of hospital disposal of hazardous wastes like syringes, needles, blood samples and body parts</i>	Syringes capped and disposed of in containers, All samples (blood, etc.) disposed of in containers
<i>Sterilisation process adopted for various purposes</i>	Yes. Bottles and vials used for blood samples soaked in Lysole for 48 hours, washed and then sterilised
<i>Incinerator present at the hospital</i>	

NAVADURGA PATHOLOGY LAB

Established : 2056 BS

No. of Medical Staff : Doctors - 4

Average No. of patients per day : 10 -14

<i>Services provided/Specialisation</i>	Medical check-up, sexual problems
<i>Medical waste collected in lab</i>	
<i>Provision of sorting hazardous and non hazardous waste</i>	
<i>Disposal method of medical waste</i>	
<i>Method of hospital disposal of hazardous wastes like syringes, needles, blood samples and body parts</i>	Syringes buried, Plastic containers burnt, Samples thrown in drainage, Others thrown in containers
<i>Sterilisation process adopted for various purposes</i>	Yes,
<i>Incinerator present at the hospital</i>	No

SEAGAN PATHOLOGY LAB, PUTALISADAK

Established : 2047 BS

No. of Medical Staff : Doctor - 1

Average no. of patients per day : 7 - 10

<i>Services provided/Specialisation</i>	Jaundice, Diabetes
<i>Medical waste collected in lab</i>	Yes
<i>Provision of sorting hazardous and non hazardous waste</i>	
<i>Disposal method of medical waste</i>	Containers
<i>Method of hospital disposal of hazardous wastes like syringes, needles, blood samples and body parts</i>	Blood, urine, stool samples thrown in containers
<i>Sterilisation process adopted for various purposes</i>	Yes, Autoclave at 120 degrees
<i>Incinerator present at the hospital</i>	No

SIDDHARTHA PATHOLOGY LAB, PUTALISADAK

Established : 2050 BS

No. of Medical Staff : 2

Average no. of patients per day : 5 - 10

<i>Services provided/Specialisation</i>	All
<i>Medical waste collected in lab</i>	Yes
<i>Provision of sorting hazardous and non hazardous waste</i>	
<i>Disposal method of medical waste</i>	
<i>Method of hospital disposal of hazardous wastes like syringes, needles, blood samples and body parts</i>	Syringes/needles buried in pits and burnt, Blood, urine and stool samples buried
<i>Sterilisation process adopted for various purposes</i>	Bottles and vials used in blood tests sterilised and reused
<i>Incinerator present at the hospital</i>	No

TEKU INFECTIOUS DISEASE LABORATORY

Average no. of patients per day : 100 - 150

<i>Services provided/Specialisation</i>	Infectious Diseases, Mainly blood test of cases of Hepatitis B and HIV/AIDS
<i>Medical waste collected in lab</i>	Yes
<i>Provision of sorting hazardous and non hazardous waste</i>	No
<i>Disposal method of medical waste</i>	All wastes from the pathology lab are burnt together within the hospital grounds.
<i>Method of hospital disposal of hazardous wastes like syringes, needles, blood samples and body parts</i>	Collected at the concrete pipes
<i>Sterilisation process adopted for various purposes</i>	Yes, Autoclave
<i>Incinerator present at the hospital</i>	No

Comments: The Lab has a separate HIV/AIDS and Hepatitis B unit. It is the responsibility of the Ministry of Health, Department of Health and all concerned health personnels to take concern of the proper management and disposal of wastes resulting from infectious diseases. Used cotton swabs are scattered all over the ground. The refrigerator in use is old and rusty. Pathological waste which is burnt is also done in a unsystematic manner. Half burnt bottles, syringes, and gloves are scattered all over the premises, especially around the main entrance. Labs of this nature require an incinerator.

SEF plans to draw the attention of the Ministry of Health towards this grave matter.

d. OTHERS:

BP KOIRALA INSTITUTE OF MEDICAL SCIENCES, DHARAN

Established 1995

No. of Medical Staff : Doctors - 90, Others - 750

No. of Students : Medical 260 (including PC)

No. of Hospital Beds : 400

<i>Services provided/Specialisation</i>	All
<i>Medical waste collected in lab</i>	Yes
<i>Provision of sorting hazardous and non hazardous waste</i>	Yes
<i>Disposal method of medical waste</i>	Incineration
<i>Method of hospital disposal of hazardous wastes like syringes, needles, blood samples and body parts</i>	Incineration
<i>Sterilisation process adopted for various purposes</i>	
<i>Incinerator present at the hospital</i>	Yes

CENTRAL VETERINARY CLINIC, KATHMANDU

Established : 2045 BS

No. of Medical Staff : Vet. Doctors - 4

Average no. animals seen per day : 50 - 75

<i>Services provided/Specialisation</i>	Veterinary
<i>Medical waste collected in lab</i>	Yes
<i>Provision of sorting hazardous and non hazardous waste</i>	
<i>Disposal method of medical waste</i>	Buried and burnt
<i>Method of hospital disposal of hazardous wastes like syringes, needles, blood samples and body parts</i>	Buried and burnt, Saline bottles thrown in containers
<i>Sterilisation process adopted for various purposes</i>	Yes
<i>Incinerator present at the hospital</i>	No

COLLEGE OF MEDICAL SCIENCE TEACHING HOSPITAL (CMS)

Established : 1999 (With land leased from Bharatpur Hospital for 49 years)

No. of Students : 100 per year

Occupancy Rate : 40-45% in winter, 60% in summer

<i>Services provided/Specialisation</i>	Hemodialysis Unit, Surgery
<i>Medical waste collected in lab</i>	Yes
<i>Provision of sorting hazardous and non hazardous waste</i>	Yes
<i>Disposal method of medical waste</i>	Bins
<i>Method of hospital disposal of hazardous wastes like syringes, needles, blood samples and body parts</i>	Most wastes are buried in a pit and collected by a private company every alternate day, Saline and plastic bottles sold, Syringes buried and burnt
<i>Sterilisation process adopted for various purposes</i>	Yes, Autoclave. Disposable gloves used.
<i>Incinerator present at the hospital</i>	No

Comments: CMS is still under construction. At present, it is in very good condition. A Superintendent, Housekeeper and Sweeper has been assigned to take care of hospital waste management. There are plans to install an incinerator to dispose of all hospital waste in a scientific and environmental friendly manner.

EYE CLINIC, BAGBAZAR

Established : 1984

Daily average no. of patients : 15 - 20

<i>Services provided/Specialisation</i>	
<i>Medical waste collected in lab</i>	Yes
<i>Provision of sorting hazardous and non hazardous waste</i>	
<i>Disposal method of medical waste</i>	Containers
<i>Method of hospital disposal of hazardous wastes like syringes, needles, blood samples and body parts</i>	Containers
<i>Sterilisation process adopted for various purposes</i>	Yes
<i>Incinerator present at the hospital</i>	No

HIMALAYA HOSPITAL AND RESEARCH CENTRE - NAXAL

Established :2045

No. of Medical Staff : Doctors -32, Others - 70

No. of Hospital Beds : 28

<i>Services provided/Specialisation</i>	All
<i>Medical waste collected in lab</i>	Yes
<i>Provision of sorting hazardous and non hazardous waste</i>	Yes
<i>Disposal method of medical waste</i>	Containers and then Incinerator
<i>Method of hospital disposal of hazardous wastes like syringes, needles, blood samples and body parts</i>	Syringes and needles collected in bins and disposed in incinerator, Some pathological waste thrown in drain while others thrown in container, Pathological waste and body part taken by sweepers to Aryaghat to be burnt
<i>Sterilisation process adopted for various purposes</i>	Yes, Autoclave
<i>Incinerator present at the hospital</i>	Yes

Comments: Sweepers who collect wastes use masks and gloves. The hospital is cleaned with dettol and phenyl 2/3 times a day. Workers are trained on proper waste management. Blankets used by patients with infectious diseases disposed of and utensils and room fumigated. Hospital is ready to pay a monthly fee for use of facilities of a central incinerator.

MANIPAL MEDICAL COLLEGE / HOSPITAL

No. of Hospital Beds : 500

No. of out-patients : 390 (daily average)

<i>Services provided/Specialisation</i>	All
<i>Medical waste collected in lab</i>	
<i>Provision of sorting hazardous and non hazardous waste</i>	Yes, separate buckets for all
<i>Disposal method of medical waste</i>	Burnt in incinerator daily
<i>Method of hospital disposal of hazardous wastes like syringes, needles, blood samples and body parts</i>	First made germ free, detoxicated, broken and then incinerated
<i>Sterilisation process adopted for various purposes</i>	Put in cidex jar, autoclaving and cleansed
<i>Incinerator present at the hospital</i>	Yes, but has small capacity (2)

Comments : There are separate buckets for segregation of waste placed at every nook and corner of the hospital premises as per the standard norms Act. Yellow coverings are provided for infectious disease as yellow buckets are not in production. Incinerator area is well fenced. Wards for TB and other infectious patients are totally isolated. All staff members are vaccinated against Hepatitis B. Hospital personnels handling wastes are provided with safety devices like gloves, masks and boots. A Hospital Waste Management is in existence since 6 months and inspection is carried out once a month.

NATIONAL IMMURIZATION CENTRE FOR CHILDREN , TEKU

Established : 1979. Since 1988, provisions were made to provide immunization services at the district level. Accordingly, Polio, BCG, DPT, Tetanus and Measles vaccines are provided free of cost in all 75 districts of the country. UNICEF provides these vaccinations free. Health personnels are specially trained for these nation wide immunization campaigns which are initiated with media publicity.

<i>Services provided/Specialisation</i>	
<i>Medical waste collected in lab</i>	
<i>Provision of sorting hazardous and non hazardous waste</i>	
<i>Disposal method of medical waste</i>	
<i>Method of hospital disposal of hazardous wastes like syringes, needles, blood samples and body parts</i>	
<i>Sterilisation process adopted for various purposes</i>	Re-usable syringes used for immunization
<i>Incinerator present at the hospital</i>	

Comments: According to information from the Centre, reusable syringes and needles are used. Because of lack of inspection and monitoring of the sterilization process by the Ministry of Health, this poses a serious health risk to the children of the country. However, according to the Department of Health, the concerned health personnels have received training and are aware of the sterilization process.

SEF recommends that the Ministry give priority to replacing reusable syringes with disposable syringes soon.

NEPAL MEDICAL COLLEGE, JORPATI, KATHMANDU

Established : 1997

No. of Medical Staff : Doctors - 40, Others - 425

No. of Students : Medical - 400

No. of Hospital Beds : 200

<i>Services provided/Specialisation</i>	All
<i>Medical waste collected in lab</i>	Yes
<i>Provision of sorting hazardous and non hazardous waste</i>	No
<i>Disposal method of medical waste</i>	Municipality Containers
<i>Method of hospital disposal of hazardous wastes like syringes, needles, blood samples and body parts</i>	Municipality Containers
<i>Sterilisation process adopted for various purposes</i>	Yes
<i>Incinerator present at the hospital</i>	No

TEKU LEPROSY CENTRE

Average no. of patients per day : 10 - 20

<i>Services provided/Specialisation</i>	Leprosy cases, Out-patient check-up
<i>Medical waste collected in lab</i>	
<i>Provision of sorting hazardous and non hazardous waste</i>	
<i>Disposal method of medical waste</i>	
<i>Method of hospital disposal of hazardous wastes like syringes, needles, blood samples and body parts</i>	
<i>Sterilisation process adopted for various purposes</i>	
<i>Incinerator present at the hospital</i>	No

4. Comments on Findings : Chanda Rana

The findings of the survey on hospital waste management in the country suggest that this area needs relevant focus and management. Although hospital waste management is of grave concern, policy makers, His Majesty's Government, the Ministry of Health, concerned authorities as well as hospital managers and health personnels, have not shown any responsibility or interest.

FINDINGS:

- (a) Wastes collected in containers are not covered during transportation. Colour codes are not used for separating hospital waste.
- (b) There are high chances of health and safety risks of waste handlers.
- (c) Both hazardous and non hazardous wastes are collected in the containers provided by the Kathmandu Metropolitan City which are later landfilled.
- (d) Wastes are not handled properly. The transport personnel are not seen using protective clothing, masks and gloves.
- (e) The hospital management lacks waste management, hygiene and infection control responsibilities.
- (f) Hospitals lack environmental awareness and the legal obligations to provide a safe and effective medical environment.
- (g) Majority of hospitals, clinics and nursing homes do not practice safe waste handling, storage and disposal methods.
- (h) There is a lack of national level policies, legislation and standards regarding medical waste safety.

5. First Phase Pilot Project Implementation at Bir Hospital : SEF

The hospital waste management system in Bir Hospital, Nepal's only government hospital that provides treatment to the poor population at a low cost, was found to be in a extremely poor condition. Hazardous waste materials were discarded in containers carelessly.

In this context, on His Majesty King Birendra's 56th Birthday, SEF members collected Rs. 80,000 and donated 2 handcarts for transferring waste materials, 20 containers for collecting hazardous waste materials and 200 blankets as support to the hospital's waste management.

**6. Recommendations for Hospital Waste Management in Kathmandu Valley:
SEF**

1. To set up a central waste disposal unit including incinerator to dispose of infective medical wastes including needles.
2. To pressurize the concerned government authorities to formulate stringent rules and regulations regarding collection and disposal of medical wastes.
3. To incorporate medical waste collection and disposal methods as well as hazards resulting from them in curriculum of medical and paramedical workers.
4.
 - (a) to convince the government and private hospitals, nursing homes and polyclinics to provide one covered bucket for each bed for collection of waste.
 - (b) sort the waste collected in these individual buckets into four parts - organic wastes, needles infected swabs and gauges and glass bottles.
 - (c) dispose the sorted wastes in the correct manner by dumping organic wastes in municipality containers and treating infective wastes in incinerators .
5. To give orientation to all personnel handling medical wastes about the hazards resulting from such wastes.
6. To immunize all medical wastes handlers against Hepatitis.
7. To give orientation to all doctors, nurses and other paramedical workers regarding correct medical waste disposal methods including sorting in different buckets.
8. For rural areas, used needles and syringes to be broken with portable needles syringe breakers and dispose them in proper compost pits. Infective wastes to be burnt in proper sites correctly.
9. Explore possibilities for proper treatment and recycling of organic wastes.

10. To request all government and private hospitals, nursing homes and polyclinics to pay certain charges according to the amount of organic and infected waste produced by them.

7. Existing Plans, Policies of the Ministry of Health for Hospital Waste Management

Most hospitals and nursing homes depend upon the municipality services for the disposal of waste materials collected, in addition to burning and burying within the institution premises. There are no separate mechanisms for the proper treatment of medical wastes and both medical and general household waste is treated as municipal waste.

In Nepal, there are no special policies, legislation or guidelines related to medical waste. Moreover, according to the report presented at the Workshop on Waste Management held in January 2001 in Kathmandu, more than 50% of government institutions do not practice waste segregation, The reasons for this are mainly:

- poor management;
- absence of policy / guidelines;
- lack of awareness / understanding on the part of health staff and the general public; and
- large influx of patients to government hospitals due to minimal treatment charge.

Unfortunately, there is no reliable data currently existing on injuries or illnesses related to hospital environmental hazards in Nepal. Ineffective waste disposal and subsequent contamination of the population through the environment has a negatively impact on the morbidity and mortality rates. The World Health Organisation (WHO) has classified health care waste as a by-product of health care that includes sharp, non sharp, blood, body parts, chemicals, pharmaceuticals, medical devices and radioactive materials. Poor management of health care waste exposes health care workers, waste handlers and the community to infections, toxic effects and injuries. It may also damage the environment. In addition, it creates opportunities for the collections of disposable medical equipment (particularly syringes) and its resale and potential reuse without sterilization leading to increased disease worldwide. It is assumed that a positive impact could be achieved through the implementation of effective and sustainable waste management strategies. And has advised the government to introduce health care waste management as an integral part of health care system.

Policies and plan for safe management of health care waste should address these three elements :

1. The establishments of a comprehensive system of health care waste management from generation of waste to its disposal to be implemented gradually.
2. The training of all those involved and increasing awareness.
3. The selection of safe and environment friendly options for the management of health care waste.

Thus, it is the responsibility of the government to create a framework for the safe management of health care waste and to ensure that health care facility managers take their share of responsibilities to manage waste safely.

The Ministry of Health is responsible to monitor, supervise and facilitate the health institutions and since these institutions are the major producers of health care waste, the Ministry of Health should give them a leading role in policy formulation, program and strategy development and make them responsible for effective implementation.

In this regard, the second Health Plan (1997-2017) has pointed out that under the National Health Care Technology Strategy a functional guideline to manage medical waste at all levels, including the private sector, has been envisaged.

The ninth five year plan (1997-2002) of His Majesty's Government of Nepal has explicitly described that a policy will be developed to link environmental and occupational health to health services while taking growing environmental degradation and industrialization into account. An arrangement will be made to ensure proper disposal and management of garbage produced by health institutions.

To this effect, the Ministry of Health organized a two days national workshop on hospital waste management on 11-12 December, 1997 in Kathmandu. The workshop was attended by senior government officials and other stakeholders. The main objectives of the Workshop were

- (a) to sensitize the policy makers and health service providers on the impact of hospital waste and its potential risk human health and overall environment; and
- (b) to make suggestions to the government to formulate policies and strategies on medical waste management.

This was the first workshop held in Nepal under the Ministry of Health to address this issue. The recommendation of the workshop included:

1. Develop national policies and guidelines.
2. Develop cooperative treatment facility.
3. Develop national training program.
4. Develop legal provision.

The Ministry of Health has established a project namely Physical Assets Management Project under the German Government Technical Cooperation to address these issues. Focus will be given to develop national guidelines strategies and train appropriate personnel.

Thus, it is time that priority be given to programmes which aim at raising awareness of national and local authorities, as well as the general public, on potential health risks associated with hospital waste, and the importance of its safe and rational management. Such programmes should also focus on enabling national and local authorities, as well as hospital managers, to manage their hospital waste effectively and rationally, so as to prevent possible health hazards.

8. Conclusion

In the absence of necessary legislation and policies to support and enforce the management of hospital wastes it would be difficult to obtain voluntary and compliance of any standards.

It must be impressed upon the authorities that legislation and enforcement is the primary means to bring about proper management of hospital waste. Identifying a short firm solution and using it as the lead for treating wastes would be a precursor to get the momentum going on this subject matter.³