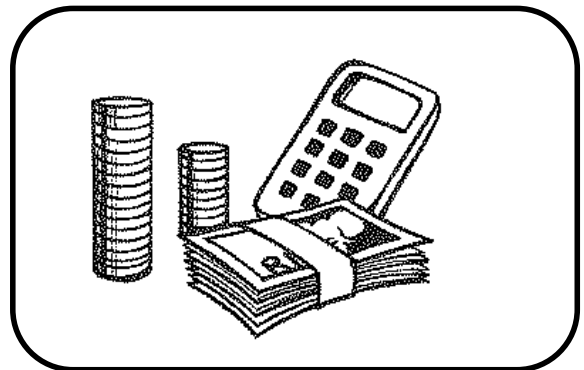
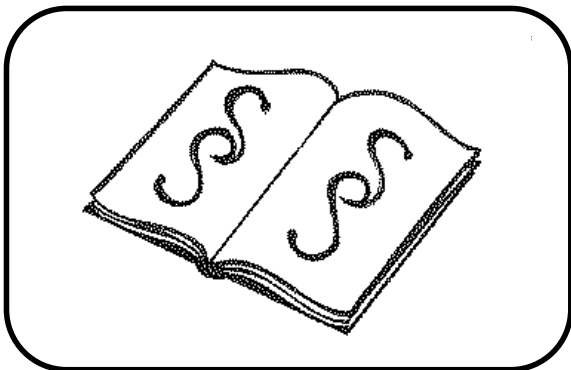
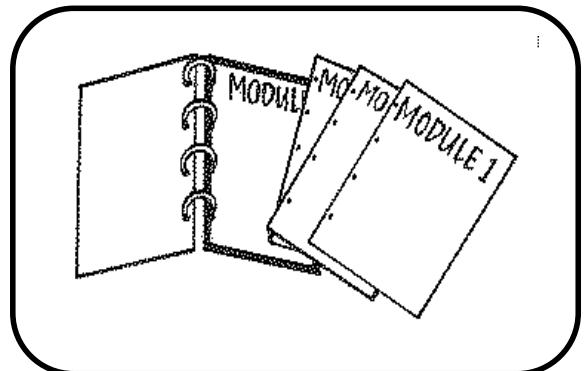
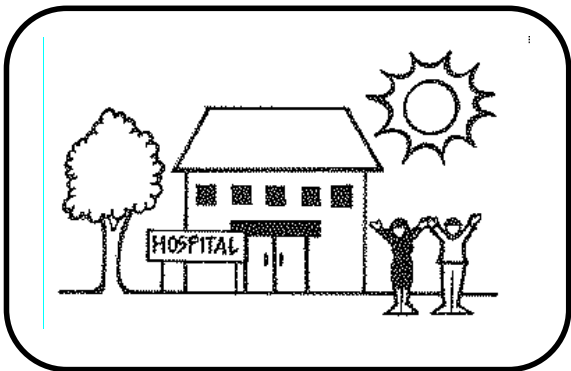


Guidelines on Sustainable Health Care Waste Management in Gauteng

MODULE 1: General Introduction:

- Objectives of Guidelines
- Readers guide
- Definitions & basic data
- Regulation related to HCWM
- How much does it cost ?



1. Module 1: General Introduction

1.1 Objectives of the Guidelines

Health Care Waste poses special environmental and health risks to the staff of health care facilities, to the patients and visitors, to workers collecting, transporting and treating the waste as well as to the society in general, thus requiring special efforts by the people involved to ensure responsible management of the HCW.

In meeting its constitutional responsibilities to ensure that every South African lives in an environment that is not harmful to his/her health or well being, the Gauteng Department of Agriculture, Conservation, Environment and Land Affairs (DACEL) together with the Gauteng Department of Health (DOH) have embarked on a comprehensive programme to improve the standard of Health Care Waste Management. Preparation of these Guidelines is included in the project Sustainable Health Care Waste Management in Gauteng that forms part of this process.

The objective of these Guidelines is to empower managers and supervisors at health care facilities to be able to improve the standard of health care waste (HCW) management. Through planning and implementation of sound HCW management systems the purpose is to eliminate risk to the health and safety of people, whilst at the same time resulting in the smallest possible impact on the environment and reducing costs.

1.2 Background and Reasons for Action

The modern health care sector generates growing amounts of Health Care Waste (HCW), including both Health Care Risk Waste (HCRW) that present special health and environmental risks, as well as Health Care General Waste (HCGW) that can be considered to be similar to general waste.

The special risks associated with HCRW can be summarised as follows:

The infectious parts of the HCW present a risk of spreading infection if not handled properly; Sharp and pointed waste, e.g. needles, scalpels, and broken glass, may cause injuries including abrasions to the skin;

- Used chemicals and outdated pharmaceuticals pose a health and environmental risk if not handled, treated and disposed of properly;
- Treatment of HCRW, as well as the decomposition of some already treated HCRW, may emit environmentally harmful substances to the atmosphere or other media, requiring that the emissions be reduced as much as possible;
- Pathological HCRW not properly controlled and managed, could be obtained illegally for people not authorised to handle the items, which creates strong opposition from the public;

Untreated HCRW or residuals of treated HCRW disposed of at landfills may generate leachate that can pollute both the surface and groundwater as well as the surrounding soil, if the landfills are not operated properly;

There are several good reasons for improving the standard of HCW management in Gauteng, which are among others:

Improving the occupational health and safety conditions for the waste management workers responsible for handling of the waste;
Protecting the health and safety of patients, visitors and staff at health care facilities;
Improving the environmental protection through sound treatment and disposal;
Meeting legislative requirements;

Saving money spent on costly containerisation, transport and treatment of HCRW by improving segregation, thereby only handling what is strictly needed as HCRW and letting the bulk of the waste be handled at a considerably cheaper rate as HCGW;

Improving the morale of the staff at health care facilities;

Improving the service delivery of the health care sector and the industry affiliated with the sector in terms of its commitment to comply with the “duty-of-care” principle.

1.3 Scope of the Guidelines

The Guidelines focus on health care risk waste (HCRW), but the management of the other components of HCW generated at health care facilities such as liquid waste, radioactive waste and HCGW, will be mentioned where its handling is closely related to the handling of HCRW.

Although the Guidelines are primarily developed for the Gauteng Province, it would to a large extent not only be appropriate for other South African provinces, but also to neighbouring countries on the subcontinent.

1.4 Who should read What

The Guidelines are primarily directed towards management and other key personnel, whilst also presenting information that is useful for other groups of employees, e.g. operational staff of health care facilities, including the various types and sizes of hospitals and clinics, affiliated laboratories, etc. In addition to these institutions the Guidelines will also be of value to companies and facilities that specialises in handling, transport, treatment and disposal of HCRW. Finally, the Guidelines may also be useful for officials from authorities that are responsible for environmental as well as performance monitoring of HCRW related activities.

The Guidelines are structured to consist of a number of specialised Modules, each providing relevant information directed towards various target groups within the health care sector. Module 1 - this Module – comprises of general information that is considered to serve as a general introduction to the Guidelines and should therefore be read by all the target groups, before continuing to the relevant specialised Modules, Modules 2- 7.

Table 1.1 below shows in brief the contents of the eight Modules, together with recommended target groups to whom it would apply.

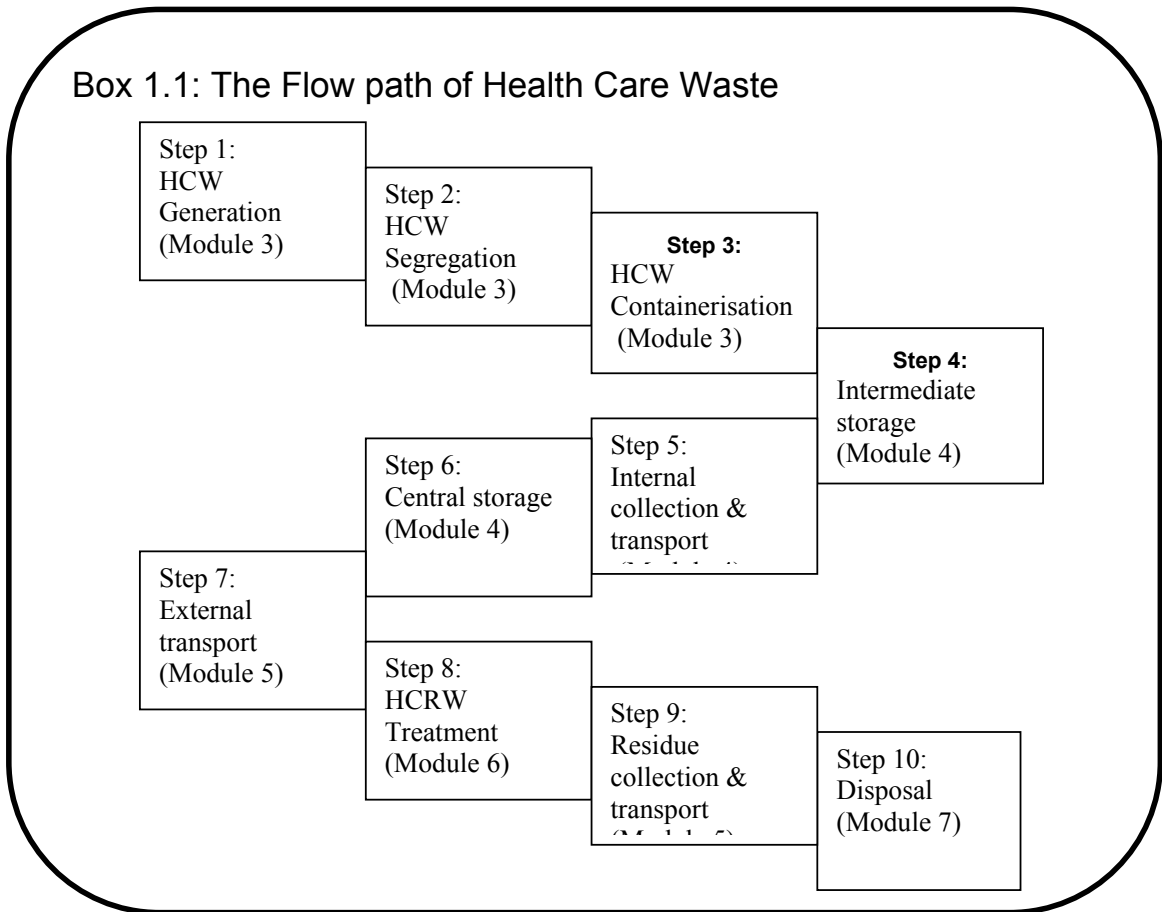
Table 1.1: Readers guide – who should read what

MODULE	CONTENT	MAIN Target groups
Module 1	General introduction to the Guidelines, including: <ul style="list-style-type: none"> • Overview of other modules • Readers guide • Definition of waste categories • Basic data and cost estimates • Overview of legislation • List references, abbreviations & glossary. 	All.
Module 2	Recommendations on how to organise an improved HCW management system. Issues related to decision makers at HCF's.	Senior managers and other managers at HCF's, managers at service providers, as well as Environmental and Occupational Health and Safety Officers at HCF's.

MODULE	CONTENT	MAIN Target groups
Module 3	Recommendations on how to reduce the HCW generation, as well as improve HCW segregation and containerisation.	Managers and supervisors at HCF's with duties related to HCW segregation and HCW Management in general.
Module 4	Recommendations on the internal collection, transport and storage of HCW.	Managers and supervisors with duties concerning internal waste handling, as well as Environmental and Occupational Health and Safety Officers at HCF's.
Module 5	Recommendations on the collection and transport of HCRW for treatment and transport of residues to landfills.	Managers and supervisors responsible for transport of waste, typically service providers.
Module 6	Recommendations on various options available for treatment of HCRW with emphasis on environmental aspects.	Managers and supervisor at treatment facilities as well as managers and environmental officers at HCF's.
Module 7	Recommendations on proper handling of HCGW and treated HCRW residues at landfills with emphasis on environmental aspects.	Managers and supervisor at landfill as well as managers and environmental officers at HCF's.

1.5 The Flow of Health Care Waste

All HCW will pass through a number of different stages from generation at the health care facilities to its treatment/final disposal (from-cradle-to-grave). The diagram in Box 1.1 below illustrates the principles of the HCW flow path that is applied in these Guidelines.



The diagram illustrating the HCW flow path is used in each of the following Modules of the Guidelines to indicate the steps that are considered in that particular Module. The different steps of the HCW flow path can be described as indicated in table 1.2 below.

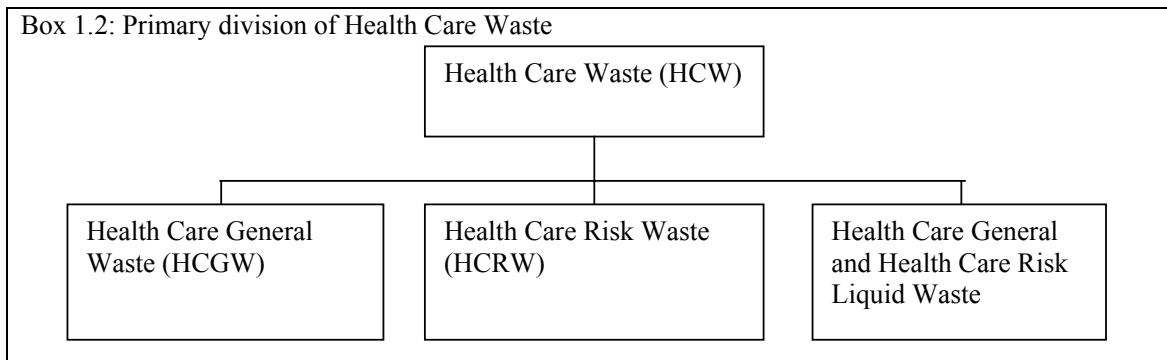
Table 1.2: The Cradle to Grave of Health Care Waste Management

Step 1: Health Care Waste Generation	HCW generation is the activity that will, in the process of rendering health care services, result in the formation of both HCGW as well as HCRW.
Step 2: Segregation	Segregation is the systematic separation at the point of generation of HCW into HCGW and HCRW, after which it is further separated into subcategories as described in Module 4 below.
Step 3: Containerisation	Containerisation is the physical activity of placing the segregated HCW in dedicated containers designed for the various HCW fractions, including the sealing and marking of the containers for further handling along the HCW flow path.
Step 4: Intermediate Storage	Intermediate storage is the placement of the containerised HCW in suitable locations <u>within</u> the health care facility where isolation, and health protection as well as human control (e.g. limitation of access) are provided, with the intention of near future retrieval of the waste for treatment and disposal.
Step 5: Internal Collection and Transport	Internal collection and transport is the action whereby HCW is removed from the intermediate storage areas (or points of generation where no intermediate storage facilities exists), for transport to the central storage area or onsite HCRW treatment facility, should treatment be done on site.
Step 6: Centralised Storage	Centralised storage is the placement of HCW in a suitable location <u>outside</u> , but within the boundaries of the health care facility where isolation, environmental and health protection, as well as human control (e.g. monitoring for radioactivity, limitation of access, etc.) are provided, with the intention of future retrieval of HCW for treatment and/or disposal. The central storage area will serve all potential sources of HCW within that particular health care facility.
Step 7A: External Collection and Transport of HCRW	External collection and transport of HCRW is the loading and removal of HCRW from central storage areas by means of suitable designed for transport to the point of treatment outside of the boundaries of the health care facility. This step of the HCW flow path does not apply where the HCRW is treated on-site.
Step 7B: External Collection and Transport of HCGW	External collection and transport of HCGW is the loading and movement of HCGW by means of municipal or private waste collection trucks from the point of external storage, to the general waste disposal site.
Step 8: Treatment	Treatment of HCRW is any method, technique or process for altering the biological, chemical or physical characteristics of HCRW to reduce the hazards it presents and facilitate, or reduce the costs of disposal. Typical HCRW treatment methods are incineration, steam sterilisation and microwave inactivation.
Step 9: Collection and Transport of Treated HCRW Residues	Collection and transport of residues from HCRW treatment facilities is the loading and movement of treated HCRW by means of suitable designed vehicles from the point of treatment, to the final disposal at an appropriately permitted waste disposal facility.
Step 10: Disposal of HCGW or HCRW Residues	Disposal of residues is the intentional burial or deposit of residues from HCRW treatment processes or untreated HCGW at an appropriately permitted, designed, constructed and operated waste disposal facility.

1.6 Definitions of Health Care Waste Types

The Guidelines cover all categories of HCW generated at health care facilities, but special emphasis is put on the HCRW, as this poses the greatest environmental and health risks. HCGW is only taken into consideration from its generation, through segregation to containerisation. Animal carcasses, other than those used for research purposes, are not included. The radioactive waste is addressed by the National Nuclear Regulator Act, 1999 (Act 47 of 1999), and is handled according to this specific regulation. Hence, the handling of radioactive only interferes to a limited extent with other categories of HCW generated at health care facilities. Likewise, liquid waste is to a great extent discharged together with other wastewater, that is covered by its specific regulation.

The HCW stream can be divided into HCGW and HCRW as well as liquid and radioactive waste as indicated in Box 1.2 below.

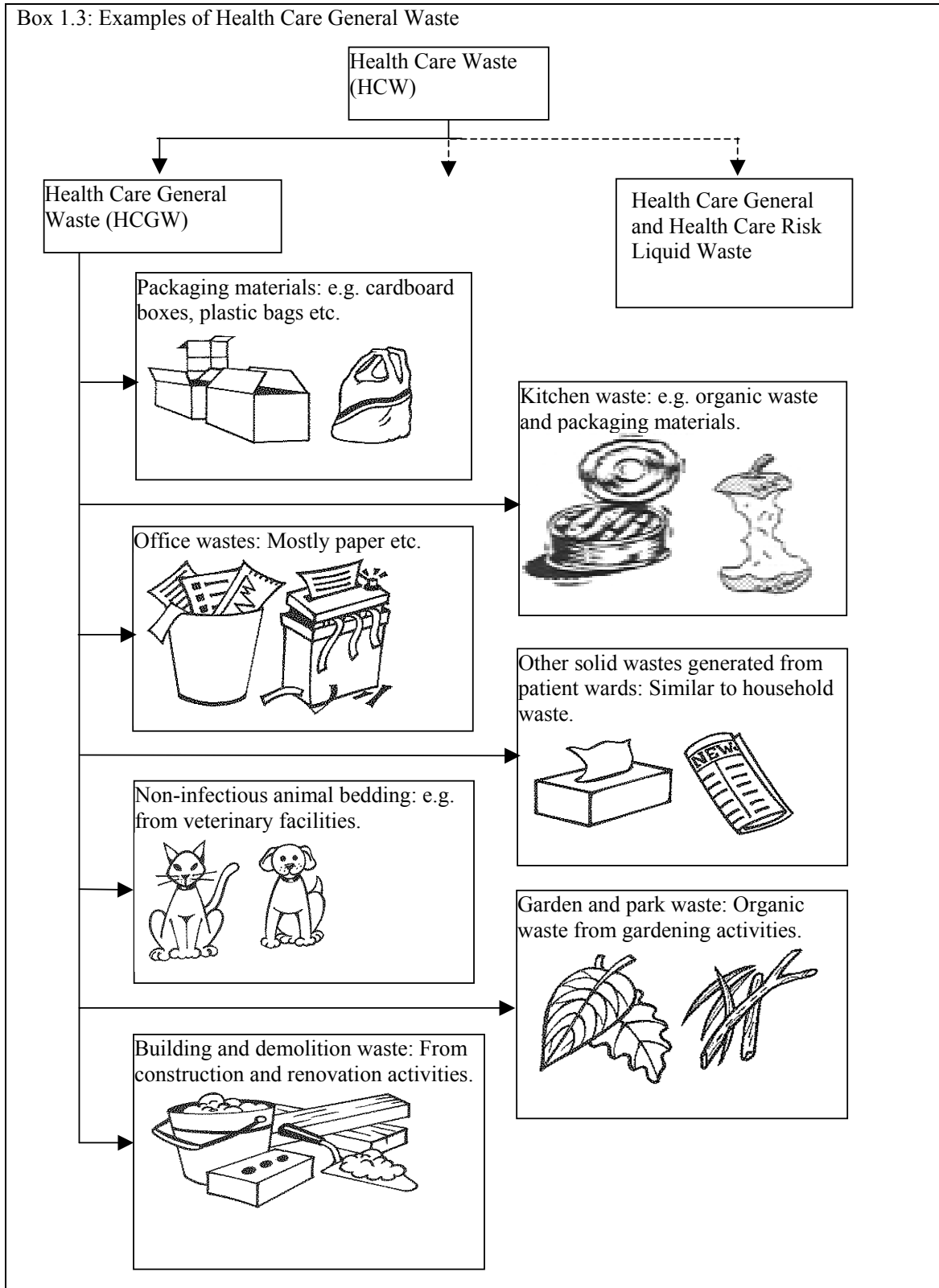


1.6.1 Health Care General Waste

HCGW is the non-hazardous component of HCW that includes many substances similar to general waste, but could also include certain non-infectious and non-hazardous liquids. (See Box 1.3 below). HCGW is generated among others during the administrative and housekeeping functions of health care facilities as well as by patients and visitors. HCGW may include a number of recyclable materials. HCGW generated at health care facilities forms part of the overall HCW management plan.

All HCW generated in isolation wards and TB wards are to be treated and disposed of as HCRW, irrespective of the waste characteristics.

Box 1.3: Examples of Health Care General Waste



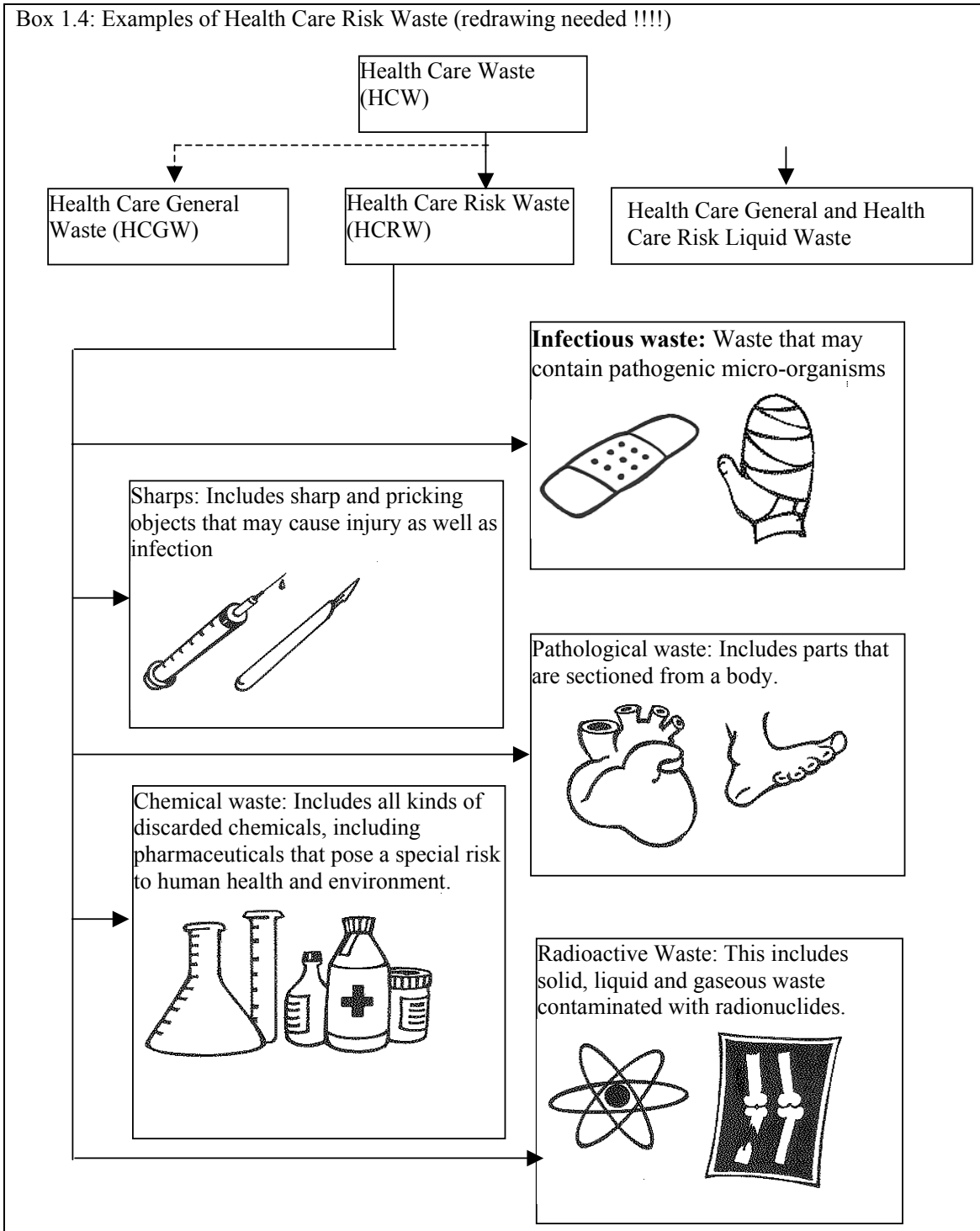
1.6.2 Health Care Risk Waste

HCRW represents the hazardous component of HCW generated at both large and small health care facilities. HCRW has the potential for creating a number of environmental, health and safety risks, depending on the particular type of HCRW that is handled as well as the way in which exposure takes place.

In Box 1.4 the five different categories of HCRW are defined and examples of the most commonly found components are presented. Liquid waste is in this guideline defined as any liquid waste that is discharged to the sewer system, e.g. via washbasins, sluices, drains etc.

Three of the components of HCRW may be infectious (infectious waste, pathological waste and sharps), but since pathological waste and sharps have additional features, it constitutes a separate category. HCRW further includes infectious or hazardous liquids, which may under certain conditions be disposed of to sewer.

Box 1.4: Examples of Health Care Risk Waste (redrawing needed !!!!)



1.6.3 Radioactive Health Care Wastes

The health care sector is one of the major users of radioactive substances. Due to its particular characteristics, the radioactivity, radioactive substances and waste containing radioactive substances can affect both human health and the environment, and hence the materials has to be handled with special precaution. For the same reason special legislation on radioactive substances as well as waste containing radioactive substances has been put into force.

The safe management of radioactive waste within health care facilities is a responsibility of the Directorate of Health Technology, Department of Health in Cape Town.

A radioactive material is defined as (ref. 10):

“Any substance, which consists of or contains any radioactive nuclide, whether natural or artificial, and whose activity exceeds 74Bq/g (0.002 µCi/g) of a chemical element and has a total activity of greater than 3.7kBq (3700Bq, 0.1 µCi).”

Most of the radioactive waste commonly generated by nuclear medicine is defined as low-level radioactive waste. A substance is classified as low-level radioactive material when the radioactive activity is within defined limits, which are based on the Annual Limits of Intake, ALI for specific radioisotopes. ALIs are limits that are based on a recommended annual dose limit of 20mSv for radiation workers and the values differ not only for different isotopes but also for the pathway, i.e. ingestion and inhalation: in terms of the precautionary principle, the lowest value of the two, i.e. the ALI_{min} is used (ref. 10).

The most common unsealed sources from medical facilities contain species such as tritium, ³H; carbon-14, ¹⁴C; iodine, ¹²³I, ¹²⁵I; and phosphorus, ³¹P. Low-level radioactive waste includes items that have become contaminated with radioactive material, or have become radioactive through exposure to neutron radiation. Examples of low-level radioactive waste include:

Solid waste such absorbent paper, swabs, glassware, syringes and vials,
Residues or unwanted solutions used for diagnostic or therapeutic use,
Liquids immiscible with water, such as liquid scintillation-counting residues, pump oil, etc.
Wastes from spills and from decontamination of radioactive spills,
Excreta from patients treated or tested with unsealed radionuclides,
Low-level liquid radioactive waste, e.g. from washing of apparatus, and
Gases and exhausts from stores and fume cupboards.

Radioactive materials of higher activity are normally used as sealed sources and can contain isotopes such as cobalt, ⁵⁷Co, caesium, ¹³⁷Cs; gold, ¹⁹⁸Au; radium, ²²²Rd; and radon, ²²⁶Ra. These isotopes which have longer half-lives are used in therapy, e.g. in cancer treatment. These wastes are generated in low volumes and usually only from the larger medical and research laboratories.

The handling of radioactive waste is further described in Section 3.9 in Module 3, and the treatment of the waste is presented as Section 6.12 in Module 6.

1.6.4 Liquid Waste

Liquid wastes generated at HCFs includes:

- Faeces and urine samples
- Faeces and urine collected from patients (urine bags, stoma bags)
- Termination of pregnancy residues
- Blood and blood products
- General effluents from toilets, kitchens, laundries, etc.
- Rinsing liquids from dialyses, etc.
- Disinfecting and cleaning solutions
- Liquids/effluents from laboratory equipment (autoanalysers etc.)
- Laboratory chemicals
- Solvents
- Liquid pharmaceuticals
- Oil and

- Radioactive liquids.

The liquid wastes listed above fall into three major categories:

Infectious and possibly infectious waste, i.e. items 1 to 5
 Effluents that are chemically or possibly chemically hazardous, i.e. items 5 to 12, and
 Radioactive waste, i.e. item 13

The main disposal options for liquid wastes include discharge to sewer, incineration and direct disposal to landfill. For further details on disposal of liquid waste, see section 3.10 in Module 3.

1.7 Description of Sources of Health Care Waste

The primary sources of HCW are hospitals and clinics and with laboratories, while general practitioners, dentists etc. are smaller primary sources. Furthermore, limited amounts of HCRW are generated by for example old age homes, residential properties, etc. However, there are considerable characteristic and qualitative differences between HCW being generated by the different health care facilities. While the smaller health care facilities (like e.g. primary health care clinics) only generate some of the above-mentioned categories of HCRW, the larger hospitals usually generates all categories of HCRW.

The sources can be divided into two distinct groups, major and minor HCW generators, based on its contribution towards the overall HCRW stream. See Box 1.5 below.

Box 1.5: Definition of Major and Minor HCRW Generators:

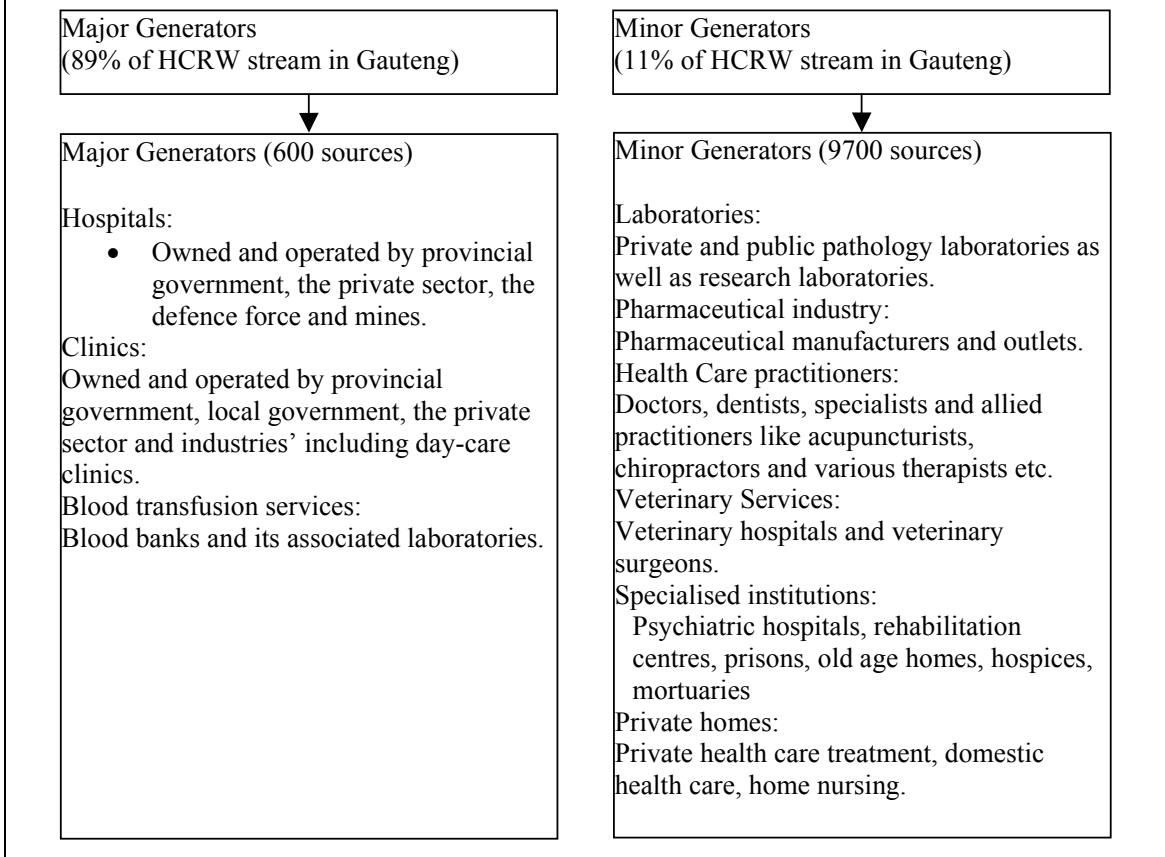
For the purpose of these Guidelines, the following definitions will apply:

Major generators: Health Care Facilities or similar generating more than 10 kg of HCRW per day (cf. Box 1.6 for examples)

Minor generators: Health Care Facilities or similar generating up to 10 kg HCRW per day (cf. Box 1.6 for examples)

In Gauteng, some 600 existing major sources of HCRW were found to generate in the order of 89% of the overall HCRW stream, whilst about 9 700 minor sources of HCRW were found to generate in the order of 11% of the HCRW stream (Status Quo Report, 2000, ref. 1). The HCRW sources were identified to be as presented in Box 1.6 below.

Box 1.6: The HCRW Generators



With the “duty-of-care” principle being entrenched in the National Waste Management Strategy (NWMS), health care facilities have the primary responsibility of ensuring that the HCW generated at the respective facilities, is treated and disposed of in an environmentally sound manner, whilst meeting the relevant occupational health and safety requirements.

1.8 Basic Data on Health Care Waste in Gauteng

The amounts of HCW generated within any particular area, is the basis for the development of any strategic plan. Although the amounts of HCGW generated at any health care facility will be significantly larger than the amounts of HCRW, the environmental as well as the occupational health and safety risks associated with HCRW will be significantly bigger than that of HCGW. The standards set for the management, treatment and disposal of HCRW is therefore significantly higher than that of HCGW.

1.8.1 Estimated Waste Quantities

In the year 2000 a survey was conducted to measure and calculate the amounts of HCRW generated at various types of health care facilities (Status Quo Study. ref. 1). The results of the survey are summarized in table 1.4 below.

Table 1.4: Summary of results from a HCRW survey conducted as part of the Status Quo Study for Gauteng, 2000.

Type of Health Care Facility	Ownership	Monthly HCRW mass (tonnes/month)
Hospitals	Public	430
	Private, mining & military	460
	Total amounts for hospitals	890
Clinics	Public	150
	Private	11
	Total amounts for clinics	161
Minor HCRW sources	Private	130
	Grand total for health care facilities in Gauteng	1 181

1.9 How Much does it cost

The total cost of health care waste management is made up of a number of elements, which includes capital investment as well as operational costs.

The capital investments in durable items typically include the following elements:

Equipment for waste collection (reusable containers, specially equipped nursing trolleys and racks for waste bags etc.)

Equipment for internal transport (trolleys etc.)

Storage rooms (intermediate and central storage rooms, technical installations)

HCRW treatment plant and equipment where treatment is undertaken onsite;

Vehicles and equipment for offsite transport of untreated/treated HCRW and HCGW where service is rendered in-house.

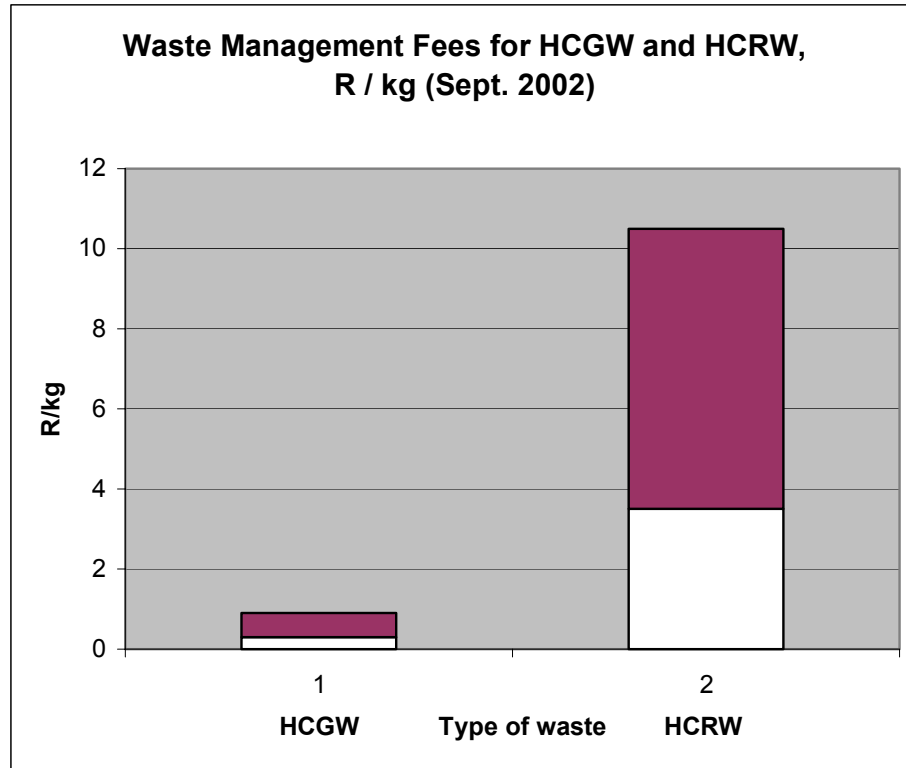
The operational cost elements typically include:

- Labour cost for segregation, containerisation and internal waste collection;
- Labour cost for operation of the treatment plant where the service is rendered onsite;
- Labour cost for offsite transport where the service is rendered in-house;
- Personal Protective Equipment (PPE) for all HCW workers;
- Consumption of waste bags, boxes and disposable containers;
- Consumables for HCRW treatment where rendered onsite;
- Consumables for offsite transport where service is rendered in-house;
- Cost of disposal of treated HCRW where undertaken onsite and HCGW where service is rendered in-house;
- Maintenance of all capital equipment;
- Waste collection, treatment and disposal fee where services are outsourced;
- Training of staff (initially and recurrently);
- Information materials (initially and recurrently).

Due to the increased environmental as well as occupational health and safety risks associated with the transport, treatment and disposal of HCRW, the fees for HCRW management are significantly higher than for HCGW. Typical management fees for HCGW are between R 0.30 /kg and R 0.60 /kg., including collection, transport and disposal. The fees for HCRW management fees typically range from R 3.50 /kg to R 7.00 /kg, including the supply of containers, collection, transport and treatment

of the waste and disposal of residues (all costs exclude VAT.), see Box 1.7 below. Internationally typical treatment fees for HCRW are in the range of R1.50 /kg –R 2.50 /kg excluding containerisation and transport.

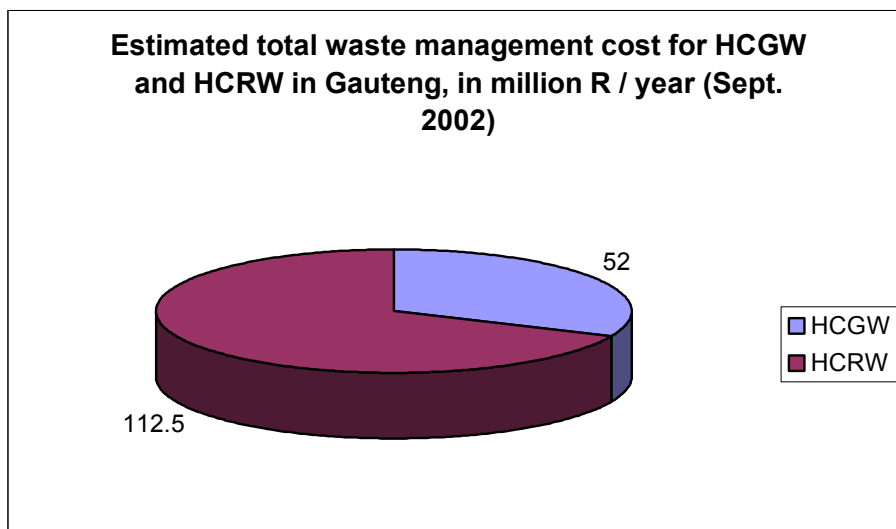
Box 1.7: Ranges of waste management fees for HCGW and HCRW



As indicated, there are major differences in the management fees respectively for HCRW and HCGW, and a wide range of management fees for HCRW. Hence, there seems to be considerable potential for savings by avoiding HCGW being disposed of as HCRW.

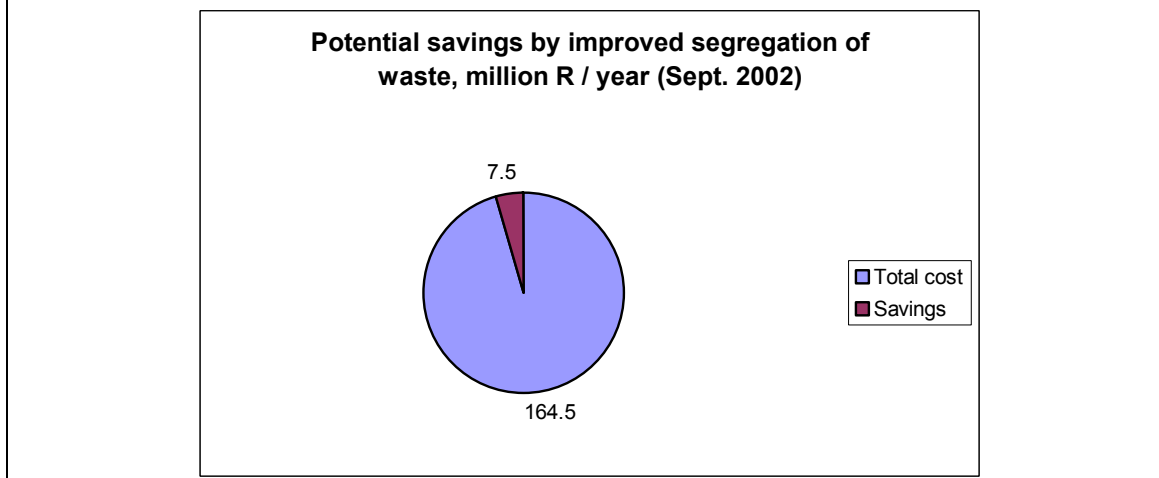
It has been estimated that the total cost of collection, transport, treatment of disposal of HCRW for all HCF in Gauteng amounts to about 52 million Rand per year, while the equivalent cost for HCGW has been estimated to be between 45 and 180 million Rand per year, see Box 1.8 below.

Box 1.8: Ranges of waste management fees for HCGW and HCRW



It is assumed that cost of HCRW disposal can be reduced through improved HCW segregation, which means that non-hazardous elements are moved from the HCRW to the HCGW categories. If it is possible to move e.g. 15% of the present amounts of HCRW to the HCGW category there is a potential for saving 7-8 million Rand per year, see Box 1.9 below.

Box 1.9: Potential savings by improved waste segregation



1.10 Regulation

This section includes a brief introduction to current regulations related to HCW Management. Table 1.5 below contains a list of regulations etc. that makes up the regulatory framework for HCW Management in South Africa that will, in the absence of any provincial legislation, also apply to Gauteng. For each regulation the following aspects are summarised:

The title of the regulation

Brief summary of the content of the regulation that is related to HCW Management

The party primarily responsible for enforcement
 The target groups for reading
 The Guideline module the regulation refers to.

The regulation is divided into the following categories:

Overall regulation (The Constitution, strategies, policies)
 Laws, both national and regional
 Guidelines and standards.

Table 1.5: List of overall regulation (The Constitution, strategies and policies) related to health care waste management.

Regulation TO BE REVIEWED BY LEGAL EXPERT	Contents TO BE REVIEWED BY LEGAL EXPERT	Responsible party TO BE REVIEWED BY LEGAL EXPERT	Target groups and Modules
The Constitution, Act 108 of 1996	States the right of a clean environment and access to affordable health care services for all South African citizens.	All authorities	Everybody; Module 1
White Paper on Integrated Pollution and Waste Management (IPWM), year ?	Establishes the principles for environmental activities, e.g. waste management.	National Department of Environmental Affairs and Tourism (DEAT)	Management at HCFs and treatment plants; Module 1
National Waste Management Strategy, year ?	Sets the framework for new initiatives within waste management nation wide	National Department of Environmental Affairs and Tourism (DEAT)	Management at HCFs and treatment plants; Module 1
Environmental Policy on Waste Disposal, year ?	Sets the framework for new initiatives for HCW Management at health care facilities ?	National Department of Health (NDOH)	Management at HCFs, treatment plants and transporters; Modules 1 -7
Health and Safety Policy 1.24 – Medical Waste Control, year ?	Establishes the overall framework for HCW Management at health care facilities ?	National Department of Health (NDOH)	Management at HCFs, treatment plants and transporters; Modules 1 -7
Infection Control Policy No 24 – Disposal of medical waste, year ?	Establishes the overall framework for disposal of HCRW ?	National Department of Health (NDOH)	Management at HCFs, treatment plants and transporters; Module 7
Infection Control Policy No 33 – Disposal of Human Tissue, year ?	Sets overall policy for management pathological waste ?	National Department of Health (NDOH)	Senior and middle management, Modules 1- 6
Infection Control Policy – How to deal with a blood spill, year ?	Gives practical guidance to prevent and to clean after blood spill ?	National Department of Health (NDOH)	Middle management, Modules 2 - 6
Health and Safety Policy – Recycling Policy, year ?	Sets overall policy for recycling of equipment and waste materials at health care facilities ?	National Department of Health (NDOH)	Management at HCFs; Modules 1- 6

Health and Safety Policy – Hazardous Chemical Spill, year ?	Gives practical guidance to prevent and to clean after spill of hazardous chemicals ?	National Department of Health (NDOH)	Management at HCFs, treatment plants and transporters; Modules 1- 6
Presmed Infection Control Policy – G4.1 year ?	???	National Department of Health (NDOH)	???

Table 1.6: List of national laws related to health care waste management.

Regulation	Contents TO BE REVIEWED BY LEGAL EXPERT	Responsible party TO BE REVIEWED BY LEGAL EXPERT	Target groups and Modules TO BE REVIEWED BY LEGAL EXPERT
Atmospheric Pollution Prevention Act 45 of 1965	Sets the standards for emission of pollutants to the atmosphere, e.g. from HCRW treatment plants	National Department of Environmental Affairs and Tourism (DEAT)	Management at HCF's and treatment plants; Module 2 & 6
Environment Conservation Act 73 of 1989			
Hazardous Substances Act 15 of 1973			
Health Act 63 of 1977			
Human Tissue Act 65 of 1983			
National Environmental Management Act 107 of 1998			
National Road Traffic Act 93 of 1996			
National Water Act 36 of 1998			
Nuclear Energy Act 46 of 1999			
Occupational Health and Safety Act 85 of 1993			
Medicines and Related Substances Control Act, 1965 (Act 101 of 1965);			
National Nuclear Regulator Act, 1999 (Act 47 of 1999)			
Minimum Requirements for Handling, Classification and Disposal of Hazardous Waste			
Minimum Requirements for Waste Disposal by Landfill			

The “Minimum Requirements for Classification, Handling and Disposal of Hazardous Waste” as well as the “Minimum Requirements for Waste Disposal by Landfill” are in itself not acts, but adherence thereto is enforced through the “Environmental Conservation Act, 1989 (Act 73 of 1989)”.

In the context of future South African legislation, it is likely that national legislation will be the framework legislation setting minimum norms and standards which must be complied with by all spheres of government, while provincial and municipal legislation will address specific and technical issues pertinent to regional and local requirements, respectively.

Table 1.7: List of regional laws and local regulation related to health care waste management.

Regulation TO BE REVIEWED BY LEGAL EXPERT	Contents TO BE REVIEWED BY LEGAL EXPERT	Responsible party TO BE REVIEWED BY LEGAL EXPERT	Target groups and Modules
Gauteng legislation on HCW Management		
Gauteng legislation on HCW Management		
Gauteng legislation on HCW Management		
Waste management related By-laws of Johannesburg, Tswane, etc		

Table 1.8: List of guidelines and standards related to health care waste management.

Regulation	Contents	Responsible party	Target groups and Modules
Guidelines on emission standards for incinerators ? year ?	Sets standards for emission of pollutants from incinerators plants	DACEL	
SABS Code of Practice on Hazardous Substances Code 0228			
SABS Code of Practice for the Handling and Disposal of Waste			

Materials within Health Care Facilities – SABS 0248:1993; (being revised 2002)			
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As the SABS Code 0248 (1993) for the Handling and Disposal of Waste Materials within Health Care Facilities is in the process of being revised during 2002, there is a risk of contradictions in standards between the various specifications and guidelines being developed. Ongoing communication and interaction between the parties responsible for the development of the respective documents is however intended to prevent any contradictions and to ensure uniformity in the standards laid down for HCW management in Gauteng.

1.11 Annexure 1.1: List of references

To be finalised

1. Feasibility Study into the Possible Regionalisation of Health Care Risk Waste Treatment / Disposal Facilities in Gauteng (The Status Quo Report), DACEL, Nov. 2000.
2. Sustainable Health Care Waste Management in Gauteng, South Africa, Project Documentation, DANCED, Nov. 2000
3. Health Care Waste Management Policy for Gauteng, DACEL, November 2001.
4. Scenarios for Sustainable Health Care Waste Management in Gauteng Province - A Feasibility Study – 2002.
5. DEAT Air Emission Guidelines, Bureau of Statistics SA. Data on xxxx.
6. Environmental Management System, ISO 14001, International Standardisation Organisation
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10. Department of Health, “Guidelines for the Safe Transport of Radioactive Material”, Directorate of Radiation Control, Cape Town, 2001
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1.12 Annexure 1.2: Abbreviations

to be FINALISED

Cd	Cadmium
CO	Carbon mono oxide
CO ₂	Carbon dioxide
DACEL	Department of Agriculture Conservation Environment and Land Affairs
DANCED	Danish Co-operation for Environment and Development
DEAT	Department of Environmental Affairs and Tourism
DoH	Department of Health
DPTR&W	Department of Public Transport, Roads and Works
DTPW	Department of Transport and Public Works
DWAF	Department of Water Affairs and Forestry
EIA	Environmental Impact Assessment
ETD	Electro-thermal deactivation
EU	European Union
GDACEL	Gauteng Department of Agriculture Conservation Environment and Land Affairs
GDoH	Gauteng Department of Health
HCF	Health care facility
HCF's	Health care facilities
HCGW	Health care general waste
HCl	Hydrochloric acid
HCRW	Health care risk waste
HCW	Health care waste
HCWIS	Health care waste information system
HCWM	Health Care Waste Management
HF	Hydro fluoride
Hg	Mercury
HIV	Human Immune Deficiency Syndrome
MSW	Municipal solid waste
NDoH	National Department of Health
NGO	Non-Governmental Organisation
NH ₃	Ammonia
NO _x	Nitric oxides
NWMS	National Waste Management Strategy
OHS	Occupational Health and Safety
REL	Rear End Loader
Pb	Lead
PE	Polyethylene
PM	Particulate matter
PP	Polypropylene
PPE	Personal Protective equipment
PVC	Polyvinyl chloride
R	South African Rand.
RSA	Republic of South Africa
SA	South Africa / South African
SO ₂	Sulphur dioxide
TOC	Total Organic Carbon
US	United States
USA	United States of America
WHO	World Health Organisation

1.13 Annexure 1.3: Glossary

A number of the terms below are applicable for both health care waste management and other disciplines. However, the following definitions are related to the HCWM, and can as such not without reformulation be applied for other disciplines. The reference numbers refers to the references listed in Annexure 1.

Air Pollution	The presence of a material or substance in air that may be harmful to either the natural or human environment.
Air Quality Standards	The level of pollutants that by law cannot be exceeded during a specified time in a defined area.
Autoclaving	A sterilisation system making use of high-pressure steam for sterilisation of HCRW. The steam is led into the chamber, where the HCRW is heated over a specific period of time to ensure that all infectious micro-organisms present in HCRW are killed.
Awareness	Raising of knowledge of Health Care Waste in specific and defined target groups e.g. communities, pickers and households. Implemented by means of instruments like awareness campaigns, folders, public meetings, television spots, etc. The term is normally not used in relation to formal training programmes.
Biomedical and Healthcare Waste	Solid or liquid waste arising from healthcare (medical) activities such as diagnosis, monitoring, treatment, prevention of disease or alleviation of handicap in humans or animals, including related research, performed under the supervision of a medical practitioner or veterinary surgeon or another person authorised by virtue of their professional qualifications.
Capacity	The Quantity of solid waste that can be processed in a given time under certain specified conditions, usually expressed in terms of mass per 24 hours.
Capacity Building / Capacity Development	The improvement of knowledge on matters related to HCW Management through the dedicated efforts of training and transfer of skills to both individuals and facilities. Capacity Building is normally undertaken as formal training like on-the-job training, courses, study tours, development of systems and tools for facilities.
Chemical Waste	Wastes generated from the use of chemicals in medical, veterinary and laboratory procedures, during sterilisation processes and research.
Collection	The act of removing accumulated containerised solid waste from the generating source. Collection of solid and liquid waste by individuals or companies from residential, commercial, health facility or industrial premises; the arrangements for the service are made directly between the owner or occupier of the premises and the collector.
Community	The people living in the vicinity of a proposed, planned or developed activity.

Container	Reusable or disposable vessel in which HCW is placed at source for further handling, transport, storage, treatment and/or final disposal. The HCW container is an integral part of HCW management equipment.
Containerisation	The packing and storing of HCW in dedicated containers, specially designed and manufactured for the purpose, thereby ensuring the minimum risk of infection or injuries to persons responsible for handling the waste.
Cradle-to-grave	A policy of controlling a HCRW from its inception to its final disposal.
Danger Group	For transport purposes, hazardous substances that are listed in SABS Code 0228 are placed in a Danger Group.
Decontamination	The process of reducing or eliminating the presence of harmful substances, such as infectious agents, so as to reduce the likelihood of disease transmission from those substances.
Destruction	To neutralise or get rid of a waste by incineration or other physical or chemical means.
Disinfection	Treatment aimed at reducing the number of vegetative micro-organisms to safe or relatively safe level. Normally the treatment should result in destruction of pathogenic micro-organism leading to a 10^{-5} reduction in microbial concentration.
Domestic waste	Municipal solid waste generated from households
Duty of Care	This requires that any person who generates, transports, treats or disposes of waste must ensure that there is no unauthorised transfer or escape of waste from her/his control. Such a person must retain documentation describing both the waste and any related transaction. In this way, he retains responsibility for the waste generated or handled.
Electro Thermal Deactivation	Electro thermal deactivation is the selective absorption of energy at differential rates by the cells of the microbe, resulting in the weakening of the cell membrane under the imposed high voltage field, which ruptures the cells and causing it to die.
Emergency	A situation created by an accidental release or spill of hazardous chemicals or infectious materials, which poses a threat to the safety of workers, residents, environment or property.
Emissions	Gases or fumes emitted from a burn or non-burn HCRW treatment technology.
Environment	Environment is defined as i) the natural environment, consisting of air, water, land and all forms of life, ii) the social, political, cultural, economic and working context and other factors that determine people's place in and influence on the environment, and iii) natural and constructed spatial surroundings.

Environmental Impact Assessment (EIA)	An investigation to determine the potential detrimental or beneficial impact on the surrounding communities, fauna, flora, water, soil and air, arising from the development or presence of a facility.
Environmental Impact Control Report (EICR)	A report that details how any detrimental impacts, identified in the Environmental Impact Assessment, can be prevented or ameliorated by means of the design and operation of a facility.
Exposure	The intake of radiation or pollutant by organisms present in a particular environment (i.e. human, natural), which represents a potential health threat to the living organisms in that environment.
Flue gas (or exhaust gas)	Gases and suspended particles emitted from an incinerator or industrial stack or generally through a chimney.
General Infectious Waste	Infectious waste excluding sharps and pathological waste
General Waste	Waste that does not pose an immediate threat to humans or the environment, i.e. household waste, builders' rubble, garden waste, and certain dry industrial and commercial waste. It may, however, with decomposition, infiltration and percolation, produce leachate with an unacceptable pollution potential (see Waste).
Generator	The Generator is an industry or other party whose activities result in the production of waste. The responsibility for a Hazardous Waste remains from cradle-to-grave with the Generator of that waste and the Generator is held liable for any damage that the waste may cause to humans or to the environment.
Genotoxic	Description of a substance that is capable of interacting directly with genetic material, causing DNA damage that can be assayed. The term may refer to carcinogenic, mutagenic or teratogenic substances.
Groundwater	The water contained in porous underground strata as a result of infiltration from the surface. Water occupying pores in the soil and cavities and spaces in rocks in the saturated zone of the profile. This water may rise from a deep, magmatic source or be due to the infiltration of rainfall (recharge).
Hazardous Waste (alternative definition)	Waste that may, by circumstances of use, quantity, concentration or inherent physical, chemical or infectious characteristics, cause ill-health or increase mortality in humans, fauna and flora, or adversely affect the environment when improperly treated, stored, transported or disposed of. (See Waste)
Health Care General Waste (HCGW)	International term for waste generated in the health care system with characteristics similar to general waste, excluding general waste generated in isolation wards and TB wards. The latter will be regarded at HCRW.

Health Care Risk Waste (HCRW)	International term for waste generated in the health care system sector, which requires special management and treatment. HCRW includes infectious waste. General waste generated in isolation wards and TB wards will be included in this.
Health Care Waste (HCW)	International term for all waste generated in the health care system. HCW is the sum of HCGW and HCRW.
Human Tissue	The tissue, organs, limbs, blood, and other body parts that are removed during surgery and autopsy.
IMDG-RSA Code=SABS Code 0228	A code in which over 4 000 hazardous substances are listed and assigned a danger group for transport purposes. The Code forms the basis of the present system for classifying Hazardous Waste and is being upgraded for waste disposal purposes. In future hazardous substances will be assigned a hazard rating for waste disposal in the SABS Code 0228.
Incineration	The controlled burning of solid, liquid or gaseous combustible wastes to produce gases and residues containing little or no combustible material. Incineration is both a form of treatment and a form of disposal. It is simply the controlled combustion of waste materials to a non-combustible residue or ash and exhaust gases, such as carbon dioxide, acidic gases and water vapour.
Infectious waste	As defined in the DWAF Minimum Requirements: Any waste which is generated during the diagnosis, treatment or immunisation of humans or animals; in the research pertain to this; in the manufacturing or testing of biological agents – including blood, blood products and contaminated blood products, cultures, pathological wastes, sharps, human and animal anatomical wastes and isolation wastes that contain or may contain infectious substances.
Integrated Health Care Waste Management	Is a holistic and integrated course of action that specifies the institutional, infra-structural and technological support, as well as human and financial resources required to establish and implement an integrated Health Care Waste Management Strategy.
Irradiation	Exposure to radiation of wavelengths shorter than those of visible light (gamma, x-ray, or ultraviolet), for medical purposes, the destruction of bacteria in milk or other foodstuffs, or initiation of polymerisation of monomers or vulcanisation of rubber.
Landfill (v)	To dispose of waste on land, whether by use of waste to fill in excavations or by creation of a landform above grade, where the term ‘fill’ is used in the engineering sense.
Landfill Operation Monitoring	The auditing and assessing of a waste disposal operation to determine whether it conforms to the site design and to the Minimum Requirements.
Leachate	An aqueous solution with a high pollution potential, arising when

	water is permitted to percolate through decomposing waste. It contains final and intermediate products of decomposition, various solutes and waste residues. It may also contain carcinogens and/or pathogens.
Liquid Wastes	Any waste material that is determined to contain “free liquids” – liquids, which readily separate from the solid portion of waste under ambient temperature and pressure.
Manifest System	A system for documenting and controlling the fate of HCRW from “cradle-to-grave”.
Medical Waste	Waste generated from such places as hospitals, clinics, doctors’ rooms, laboratories, pharmacies, and research facilities (refer to HCW/HCRW)
Micro-organisms	Any microbiological entity, cellular or non-cellular, capable of replication or of transferring genetic material.
Microvawing	Microvawing of HCRW is the sterilisation process making use of microwaves for heating the water within the HCRW, thereby destroying the pathological micro-organisms.
Minimum Requirement	A standard by means of which environmentally acceptable e.g. waste disposal practices can be distinguished from environmentally unacceptable waste disposal practices.
Monitoring	Continuous or periodic surveillance of the physical implementation of a project or activities to ensure that inputs, activities, outputs and external factors are proceeding according to plan.
Municipal solid waste	General waste for collection by municipalities, generated mainly by households, commercial activities and street-sweeping refer to HCGW: Municipal waste generated at health care facilities is characterised as HCGW
Non-thermal HCRW treatment process	
Off-site Facility	A clinical and related waste treatment, storage or disposal facility that is located away from the generating site.
On-site Facility	A clinical and related waste treatment, storage or disposal facility that is located on the generating site.
Permit	The permit issued by Department of Water Affairs & Forestry for the operation or closure of a landfill, in terms of Regulation 1549, promulgated under the Environment Conservation Act (Act 73 of 1989).
Permit Holder	The person who, having obtained a permit to operate a waste disposal site or other facilities that require a permit, in terms of Section 20(1) of the Environmental Conservation Act, is legally responsible for the site, both during operation and after closure.

Permit Procedure	The procedure to be followed and the necessary investigations to provide the Department with the necessary information so that a Permit can be issued.
Pharmaceutical Waste	Wastes from the production, preparation and use of pharmaceutical products.
Precautionary Principle	Where a risk is unknown; the assumption of the worst-case situation and making provision for such a situation.
Pyrolysis	The decomposition of organic material by heat in the absence of, or with limited supply of oxygen
Radioactive substances	Material containing, or contaminated with, radionuclides at concentrations or activities greater than clearance levels and for which no use is foreseen.
Radioactive waste	Material contaminated with a radio-isotope which arises from the medical or research use of radionuclides. It is produced, for example, during nuclear medicine, radio immunoassay and bacteriological procedures, and may be in a solid, liquid or gaseous form. These materials must be disposed of in terms of the Nuclear Energy Act (Act 92 of 1982) and the Hazardous Substances Act (Act 15 of 1973). In particular Section 3A, Hazardous Substances Act (Act 15 of 1973) regulates radioactive substances used for medical, scientific and industrial purposes.
Residual Wastes	Those materials (solid or liquid) which still require disposal after the completion of a treatment or resource recovery activity e.g., slag and liquid effluents following a pyrolysis operation, plus the discards from front-end separation systems.
Residue	A substance that is left over after a waste has been treated or destroyed. For incineration it includes wastes such as ash or slag.
Response Action Plan	A plan intended to counter or minimise the adverse effects of any malfunction of a landfill design element with immediate effect. A Response Action Plan is usually associated with the disposal of Hazardous waste.
Responsible Person	The Permit Holder or her/his legally appointed representative who takes responsibility for ensuring that all or some of the facets of any of the following are properly directed, guided and executed, in a professionally justifiable manner: investigating work, design, preparation, operation, closure and monitoring.
Risk	The probability of dangerous substances contained in the waste, leached there from, or released by emission, entering into the air, the surface environment or the water regime in unacceptable quantities or concentrations. The consequences of such occurrences could be manifested as a threat to public health or as the impairment of an eco-system or resource. Generally, risk is the scientific judgement of probability of harm.

Risk Assessment	The identification of possible impacts of a landfill on the environment, so that they can be addressed in the design phase.
Sanitary landfill	An engineering method of disposing of solid waste on land in a manner that protects the environment, e.g. by spreading the waste in thin layers, compacting it to the smallest practical volume, and covering it with soil by the end of each working day, constructing barriers to infiltration, evacuating the gases produced etc.
Sanitation	The control of all the factors in the physical environment that exercise or can exercise a deleterious effect on human physical development, health and survival.
Scavenging	The manual sorting of solid waste at a landfill or at other places where waste is dumped, and recovering the valuable materials.
Segregation	The systematic separation of solid waste into designated categories
Sharps	Objects or devices having sharp points or protuberances or cutting edges capable of cutting or piercing the skin.
Sludge	The accumulated solids that separate from liquids such as water or wastewater during processing, or deposits on the bottom of streams or other bodies of water
Stakeholders	Any person, group of persons or organisation that may have a direct or indirect interest or involvement with any aspect related to the “cradle-to-grave” management of HCW. Often termed Interested and Affected Parties (I&AP).
Sterilisation	This is a process that kills virtually all micro-organisms, including bacteria, viruses, spores and fungi, thereby making an object free from micro-organisms. In practical terms it is a reduction of the content of micro-organisms of more than 10^6 (more than 99.9999% of the micro-organisms are killed), achieved by physical, chemical or mechanical methods or by irradiation.
Sustainability	A sustainable project should lead to improvements that will persist and spread beyond the project boundaries.
Thermal HCRW treatment process	
Transport	Internal transport is the conveyance of the HCRW from the point of generation to the point of treatment (when on the same premises as the generation) or temporary storage, if treated at a site other than the waste generation site. External transport is the conveyance of HCRW from the point of on-site storage, to the point of treatment, when treatment is done on a site other than that of the HCRW generation.
Transporter	A person, organisation, industry or enterprise engaged in or

	offering to engage in the transportation of waste.
Treatment	Any method, technique or process for altering the biological, chemical or physical characteristics of waste aimed at destroying or at least reducing infectiousness in order to minimise its pollution impact on the environment and its risk to the health of humans and animals. It is further intended to reduce the costs of disposal.
Waste	An undesirable or superfluous by-product, emission, or residue of any process or activity, which has been discarded, accumulated or stored for the purpose of discarding or processing. It may be gaseous, liquid or solid or any combination thereof and may originate from a residential, commercial or industrial area. This definition excludes industrial wastewater, sewage, radioactive substances, mining, metallurgical and power generation waste. After definition in Government Gazett No. 12703, August 1990. (See General Waste and Hazardous Waste)
Waste Disposal Site	Any place at which more than 100kg of a Hazardous Waste is stored for more than 90 days or a place at which a dedicated incinerator is located is termed a Waste Disposal Site. It must be registered as such in terms of the Environment Conservation Act (Act 73 of 1989).
Waste Disposal Site	In the context of this document, a waste disposal site is referred to as a landfill, because the vast majority of all waste is ultimately disposed of on land, whether it be in trenches or other excavations, or above grade.
Waste management	All activities, administrative and operational, involved in the handling, conditioning, storage and disposal of waste (including transport).
Waste Minimisation	The application of activities such as waste reduction, reuse and recycling to minimise the amount of waste that requires disposal.
Waste Segregation	The process of keeping source separated wastes apart during handling, accumulation (interim storage), storage and transport and to assist resource recovery and ensure appropriate designated treatment and/or disposal methods are utilised. Waste segregation should be practised both by generators and waste handling companies at the source for efficient waste management.
Waste Stream	A continuous flow of waste from an industry, activity, process or group.
Working Face	The active part of the landfill; where waste is deposited by incoming vehicles, then spread and compacted on the sloped face of the cell by a compactor. The width of the working face is determined by manoeuvring requirements of the vehicles depositing waste.