

**Critical Evaluation of Medical Waste Management
Policies, Processes and Practices
in Selected Rural Hospitals in the Eastern Cape**

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ABSTRACT

This thesis critically evaluates the policies, processes and practices of medical waste management in selected rural hospitals in the Eastern Cape. Medical Waste Management is a growing public health and environmental issue worldwide. Research shows large scale incapacity in dealing with medical waste in an efficient and sustainable fashion globally, which demonstrates that it is not merely a developing world problem alone. This study is conducted against the backdrop of an increasing medical waste crisis in South Africa. Although there are an abundance of studies on solid waste management, there is a lack of data and research particularly on medical waste management in rural hospitals. The crisis of medical waste management in South Africa is closely intertwined with the collapsing health care system and an overburdened natural environment. It is an undisputable fact that South Africa's generation of medical waste far exceeds its capacity to handle it effectively. This thesis argues that the neglect of medical waste as an environmental-health issue and the absence of an integrated national medical waste management plan aggravate the medical waste problem in the country.

In explaining the medical waste crisis, this thesis adopts a Marxist perspective which is based on the premise that industrial capitalist societies place economic growth and production at high priority at the expense of the natural environment; creating a society that is engulfed by high health risk due to the generation of hazardous and toxic waste. Industrial societies view themselves as superior and separate from the natural environment, whereas one cannot separate nature from society as they are interlinked. As society attempts to adopt a sustainable environmental approach towards environmental management, science and technology are enforced as a solution to environmental problems in order to continue developing countries' economies whilst sustainably managing and protecting the environment, which is contradictory. This thesis emphasises that medical waste management is a socio-political problem as much as it is an environmental problem, hence the need to focus on power relations and issues of environmental and social justice. The results of the study identified gaps in policy framework nationally and institutionally on medical waste management. In addition, there were poor waste management practices due to poor training, inadequate infrastructure and resources as well as poor budget support.

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LIST OF ACRONYMS AND ABBREVIATIONS

AI	Avian Influenza
AICP	Avian Influenza Control and Human Pandemic Preparedness and Response Project
AZT	Zidovudine, Retrovir
BAN	Basel Action Network
CDC	Centre for Disease Control and Prevention
DA	Democratic Alliance
DACEL	Department of Agriculture, Conservation, Environment and Land Affairs
DANCED	Danish Co-operation for Environment and Development
DCC	Dhaka City Corporation
DCC	Dhaka City Corporation
DEAT	Department of Environmental Affairs and Tourism
DME	Department of Minerals and Energy
DOE	Department of the Environment
DOH	Department of Health
DSD	Department of Sustainable Development
DWAF	Department of Water Affairs and Forestry
DWW	Dominant Western World
ECA	Environmental Compliance Approval

EIA	Environmental Impact Assessment
EIP	Environmental Implementation Plan
EJNF	Environmental Justice Networking Forum
EMI	Environmental Management Inspectorate
EPA	Environmental Protection Agency
GEAR	Growth, Employment and Redistribution
HCW	Healthcare Waste Management
HEP	Human Exceptionalism Paradigm
HSC	Health and Safety Commission
IGU	International Geographical Union
IWM	Integrated Waste Management Policy
MOH	Ministry of Health
NEMA	National Environmental Management Act
NEP	New Environmental Paradigm
NHCMP	National Healthcare Waste Management Plan
NHS	National Health Services
NHWM	National Healthcare Waste Management
NIOSH	National Institute for Occupational Health and Safety
NMWMP	National Medical Waste Management Plan

OTA	The Office of Technology Assessment
PCB	Polychlorinated Biphenyl
RCN	Royal College of Nursing
RDP	Reconstruction and Development Programme
SAMWU	South African Workers Union Strike
SARS	Severe Acute Respiratory Syndrome
UK	United Kingdom
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UNECA	United Nations Economic Commission for Africa
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organisation
USAID	United States Agency for International Development
WHO	World Health Organisation

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CHAPTER 1

AN INTRODUCTION

1.1 Conceptual Framework

The World Health Organisation (WHO) defines medical waste as healthcare waste which is waste generated by healthcare establishments, research facilities and laboratories (WHO, 1991:1). This includes waste that originates from sources produced in the course of health care undertaken in the home (WHO, 1999:9). This definition is quite vague, non-specific and broad. Medical waste is defined as “any hospital/health care waste which consists wholly or partly of human or animal tissue or blood or any other bodily fluids, excretions, drugs and pharmaceutical drugs, swabs, dressing, syringes, needles or any other sharp instruments” (Moritz, 1995:521). The health care sector produces an enormous amount of medical waste that includes infectious, hazardous, pathological, chemical and toxic waste, understandably so because they are dealing with health issues. This waste is deemed as hazardous and possibly infectious and is of prime concern because of its risk to cause acute or epidemic infections, and the improper management and treatment of this infectious waste may cause detrimental health and environmental problems (Dong et al., 2006:10). This is why the management of medical waste is of primary social and environmental concern and is worth looking into.

Medical Waste Management refers to the management of waste produced by health care facilities which requires following certain procedures in order to limit and avoid the spread of diseases (WHO, 1999:12). Key aspects of a good management system of medical waste should include “an awareness of the medical waste problem; a health care management plan or written policy at national level and organisational level; clear delineation of roles and responsibilities on how to handle the waste; effective implementation, regular training; and periodic evaluation and consideration of safety” (WHO, 1999:45). Inadequate management and disposal of generated medical waste can have a negative impact, either directly or indirectly, on the health of medical staff and waste handlers, as well as on the community, the natural, health care and home environment.

The term medical waste will be used throughout this paper to refer to potentially infectious waste generated by health facilities.

According to Oelofse and Godfrey (2008:242), in South Africa there are currently at least two legal definitions of waste in the legislation. The Environment Conservation Act 18 provides a definition of waste in terms of its unwanted nature (Oelofse and Godfrey, 2008:242). The National Water Act 20 took the same approach, defining waste in terms of its polluting potential rather than its hazardous effect on public health. South Africa is characterised by the non-existence of any comprehensive policy on medical waste management and definition of medical waste.

It is important that waste is categorised accurately. Hazardous waste disposed of as infectious medical waste or municipal solid waste, or infectious medical waste disposed of as municipal solid waste, is seen as a violation of the law and has detrimental health and environmental implications. Correctly identifying and segregating medical waste for treatment can reduce the cost of disposal, as infectious medical waste makes up only a small portion of the total hospital waste stream. WHO classifies medical waste into communal waste or general waste and special waste. Communal or general waste is all solid waste excluding infectious, chemical, or radioactive waste (WHO, 1999:2). This includes items such as packaging materials, bedding, waste water from laundries, office supplies and other substances that do not pose a special handling problem or hazard to human health or the environment (WHO, 1999:3). Special waste consists of several different subcategories such as infectious waste containing pathogens: these include bacteria, viruses, parasites, or fungi in sufficient concentration or quantity to cause disease in susceptible hosts (WHO, 1999:2). Another category includes cultures and stock of infectious agents from laboratory work, waste from surgery and autopsies on patients with infectious diseases, waste from infected patients in isolation wards, waste that has been in contact with infected patients undergoing haemodialysis and waste that has been in contact with an infectious agent or suffering from an infectious disease (WHO, 1999:2). Pathological waste consists of tissues, organs, body parts, human foetuses and most blood and body fluids. Within this category, recognisable human or animal body parts are also called anatomical waste. Anatomical waste is considered as infectious waste, even though it may also include healthy body parts (WHO, 1999:2).

Sharps are items that could cause cuts or puncture wounds, including needles, syringes, scalpels, saws, blades, broken glass and nails, and are usually considered as highly hazardous healthcare waste (WHO, 1999:3). Pharmaceutical waste includes pharmaceutical products, drugs and chemicals that have been returned from wards, have been spilled, are outdated or contaminated, or are to be discarded because they are no longer required (WHO, 1999:3). These include discarded items used in the handling of pharmaceuticals, such as bottles or boxes with residues, gloves, masks and connecting tubing (WHO, 1999:3).

Genotoxic waste is highly hazardous and may have mutagenic, teratogenic, or carcinogenic properties (WHO, 1999:4). This type of waste raises serious safety problems, both inside hospitals and after disposal, and should be given special attention (WHO, 1999:22). Genotoxic waste may include certain cytostatic drugs, vomit, urine or faeces from patients treated with cytostatic drugs, chemicals, and radioactive material. Cytotoxic drugs have the ability to kill or stop the growth of certain living cells and are used in chemotherapy for cancer patients (WHO, 1999:23). Chemical waste consists of discarded solid, liquid and gaseous chemicals, for example from diagnostic and experimental work and from cleaning, housekeeping and disinfecting procedures (WHO, 1999:5). Chemical waste from healthcare facilities may be hazardous or non-hazardous but in the context of protecting health, it is considered to be hazardous if it is toxic, corrosive, flammable and genotoxic (WHO, 1999:5). Non-hazardous chemical waste consists of chemicals with none of the above properties, such as sugars, amino acids, and certain organic and inorganic salts (WHO, 1999:5). Wastes with high heavy-metal content fall under hazardous chemical waste, and are usually highly toxic (WHO, 1999:5). Mercury wastes are typically generated by spillage from broken clinical equipment and are considered hazardous (WHO, 1999:5). Radioactive wastes are wastes containing radioactive substances: these include solid, liquid and gaseous waste contaminated with radionuclides generated from in-vitro analysis of body tissues and fluids, in body organ imaging, tumour localisation, and therapeutic procedures (WHO, 1999:7).

1.2 Context of the Study

1.2.1 Context of the Health Care Problem in South Africa

This research stems from a study conducted during an honours research project that explored “Medical Waste Management in Grahamstown, Makana Municipality” (Maseko, 2010:1). This was a micro-scale project that investigated the nature and extent of medical waste management in Grahamstown. This study is an expansion of this project that serves to critically analyse the management of medical waste practices as well as policies, and broadens the research into another area of the Eastern Cape. This study is motivated by the extent of the medical waste crisis in the country as well as the limited research and lack of literature and data on medical waste in South Africa and more especially research on medical waste management in rural hospitals.

This research is conducted against the backdrop of an increasing concern globally about the management of medical waste; its effects on public health and the environment and the oversight and neglect of medical waste management in South Africa. This study argues that South Africa is facing a medical waste management crisis. The medical waste management problem is further exacerbated by the “crumbling” health care system coupled with a poor environmental management record. In arguing this, this thesis draws the intrinsic relationship between the health care sector and environmental management which are crucial in this discussion on medical waste management. The inability of health facilities to control and manage the waste that they generate has dire environmental-health implications.

The bio-medical model dominates health care systems globally increasing the reliance on pharmacotherapy (Giddens, 2006: 263). This increases the number of people who depend on health care facilities for health and illness. Furthermore, an increasing proportion of the population has become immune-compromised therefore more susceptible to health care related infection (Adams et al., 2008). As a result, the provision of health care has become more complex, generating a high production of hazardous and infectious waste. Studies globally have noted the increase of epidemics and waste-related diseases as a result of poor waste management practices. The problem of waste-related diseases from unsafe health-care settings is increasing.

According to WHO, several major health threats have occurred over the past few years which can be attributed to the failure of the health care system to manage their waste appropriately (Harhay et al., 2009:2). About 5.2 million people, including 4 million children, die each year globally from waste-related diseases (Akter, 2000:3). Without effective action, the situation is likely to deteriorate.

Health care-settings provide an opportunity for the general population to minimise disease transmission by providing targeted messages and a “model” safe environment, which it is itself failing to maintain (Ditmer, 2010:9). Health care facilities have become an unsafe and unhealthy environment due to poor working hospital conditions and neglect of medical waste management. A number of factors have played a role in the decline of the quality of healthcare but the recurring factors include: failure in governance of the healthcare system; an increasing number of people affected by Human Immunodeficiency Virus (HIV) and Acquired Immunodeficiency Syndrome (AIDS); Tuberculosis (TB) as well as malaria which take priority; lack of institutional and organisational capacity; inadequate financing of health care as a result of weaker priorities; and lack of trained staff and expertise, which have all affected the ability of healthcare systems to deliver (Umukoro, 2011:13). A country’s failure to safeguard its population from ill health displays a problem with the healthcare system itself. Competition with other sectors such as the military sector has left insufficient resources for the health sector (Ugoh and Ukpere, 2009:843). Limited external aid resources, a fragmented system and the lack of effective co-ordinated mechanisms, inadequate management capacity, and concentration of health care professionals in the urban areas are collectively responsible for the weakness of a health care system (USAID, 2005:33).

In terms of most governments’ overall priorities in their health and environmental policies, medical waste remains the invisible industry globally. The need for African governments to improve the standard of living of its people through increased economic growth inevitably increasing debt and efforts to eradicate poverty has led to the neglect of significant environmental issues that require critical attention. Developing countries are faced with epidemics and an outbreak of diseases such as HIV and AIDS, malaria and TB which are a healthcare priority, placing medical waste management on the backseat. Governments are failing to put in place policies and regulatory controls that will address the medical waste management problem (WHO, 2003).

Medical waste management is often excluded in health care policies. It is ironic that the very process that could be helpful in mitigating health care problems is neglected, whereas through adequate and functional waste management systems the outbreak of a number of illnesses and viruses could be controlled (Bassey et al., 2008:62). The global crisis of medical waste management is closely intertwined with the collapsing healthcare system and the overburdened natural environment.

The media reports regularly on the conditions of the health care system in South Africa. They have described the health care system as “appalling”, “shocking”, “in dire straits”, in a “precarious state” and it has also been described as “crumbling” (Al Jazeera, 2012; EthicsSA, 2001:5). According to the audit by the South African ethics commission (2001:iii), the workings of public hospitals in South Africa are characterised by poor infrastructure and lack of access to resources, debilitating buildings, shortage of equipment and understaffed units, lack of safety, influx of HIV/AIDS patients and unhygienic conditions. All these factors have been identified as contributing factors to the poor health care system (EthicsSA, 2001:7). The audit showed that hospitals in South Africa were under severe strain (EthicsSA, 2001:7). Over 30% of hospitals nationwide were in a similar condition; 11% of these hospitals needed to be replaced altogether and 19% were in need of some major upgrading and renovation (EthicsSA, 2001:2). This reflects that health care workers and patients in South Africa are constantly being exposed to an unhealthy environment. If these hospitals are in such conditions it is not surprising that medical waste management is a neglected sector; contributing to unsafe, unhealthy and hazardous working conditions. There is poor coordination between the Department of Environment and municipalities in South Africa which has contributed towards slowing down any form of progress currently in medical waste management systems. Moreover, the existing environmental laws are generally out-dated and characterised by low penalties, and sometimes no penalties at all, for offenders (Leonard, 2005).

The state of the environment and how the environment is managed, affects the health care of people in society. The environment and human health are interlinked to such an extent that the millennium development goals have identified them as being interdependent (Irish Aid, 2008).

The health care system of countries in both the developed and developing world is overburdened by the increase of diseases which are responsible for the deaths of 1.8 million people every year (WHO, 2008:12). 88% of the widespread diseases are attributed to a poorly managed environment characterised by poor sanitation, poor waste management, poor water quality, and indoor and outdoor pollution (Irish Aid, 2008). Environmental health problems have been an issue of concern for the past decade, yet these issues have not yet been resolved despite all the research, media attention, conferences, government policies and public awareness (Harris, 2012:3).

Africa faces an array of challenges when it comes to the management of the environment. Medical waste management practices in developing countries are quite poor and are dealt with, with much difficulty, against a backdrop of poor environmental policies and organisational structures, poor funding, environmental problems such as widespread land degradation, desertification, loss of arable grazing land, declining soil productivity, loss of bio-diversity, water, land and air pollution, depletion of wetlands and freshwater resources, toxic waste and oil spillages dumped in water resources, poor sanitation and management of solid waste management (UNEP, 2005:92). All these environmental concerns have wider implications for food security and human health and impede the effort towards poverty eradication in the continent which is regarded as high priority. Poverty and socio-economic needs are seen as more pressing issues than the need for environmental controls. Effectively, the neglect of the environment has a negative impact on socio-economic needs. A wide range of environmental problems now affect our entire world. The earth's natural processes transform local problems into international issues.

The failure to manage the environment is a global problem faced by both developing and developed countries. Medical waste is not just a developing country problem; it is also of high concern in the developed world. Medical waste management is not an isolated or new problem in South Africa. South Africa has a poor environmental management record, manifesting in industrial pollution, mining waste, chemical waste, acid rain and water pollution, which affects the livelihoods and health of workers and surrounding communities. Effectively, the crisis of medical waste management poses additional challenges to the South African environment that is already massively afflicted by these and other environmental problems.

The capacity of the environment to act as a sink for waste is increasingly being exceeded. It is true that communities are victims of environmental injustice and racism on a daily basis, especially the poor, vulnerable and marginalised communities, hence the right to a safe, secure and healthy environment as enshrined in the Bill of Rights is highly compromised. In order to deal appropriately with medical waste management production, treatment and disposal it is crucial that it is understood within broader aspects of the environment and sustainable development (Townend and Cheeseman, 2005:362). Hence the need to look into South Africa's environmental management record and health care system.

Research evidence shows large scale incapacity in dealing with medical waste in an efficient and sustainable fashion. A substantial number of illegal dumps have been discovered in a number of locations in recent years (EthicsSA, 2001: iii). A survey conducted on healthcare risk waste generation and treatment capacity by the Department of Environmental Affairs and Tourism (DEAT) indicated that the available medical waste treatment capacity in South Africa exceeded generation by over 35% (2005). A subsequent study by DEAT (2008) indicated that total medical waste generation across South Africa amounts to about 42,200 tons per year which is about 6,000 tons more than any treatment facility in the country can handle. In addition Williams (2006:133) established that over 45% of the generated medical waste is unaccounted for and that health facilities lack the capacity to handle and dispose of waste in a satisfactory and safe manner. As much as 800 tons of medical waste is believed to be illegally dumped each year in the country (Argus, 2009:7). Leonard (2005) and Barbeu (2009) estimate that the figure for illegally disposed of and unaccounted for medical waste in KwaZulu-Natal is approximately 45%.

Reliable statistics and associated data collection on medical waste management is basically non-existent and at the same time is clouded in secrecy, denial and lack of accountability. According to the Democratic Alliance's discussion document on healthcare waste management (2009:5), issues such as delineation of responsibility, poor regulation, irregularities in tender procedures, lack of funding, poor training and enforcement of regulations is at the heart of this problem. Similarly, the preliminary research by Maseko (2010:60) identified critical areas requiring urgent attention, such as developing institutional capacity, eliminating fragmentation and piecemeal interventions, whilst at the same time promoting pro-active and appropriate contingency measures in cases of emergency.

South Africa does not have a documented National Medical Waste Management Plan, lagging far behind other developing countries such as Kenya ((Kenya National Health care Plan 2008-2012 , Nigeria, (National Healthcare Waste Plan 2007), Lesotho, (National Health care Plan Lesotho, 2005) and Angola (National Health care Waste Plan Angola, 2008). There is a dearth of literature and research conducted on medical waste management in South Africa. There is also limited research on the current state of medical waste practices and processes in rural hospitals in South Africa. According to Sheps (1981:8), the inability of government to fully equip rural hospitals is a problem for these rural communities as it affects how they manage their waste and is an issue of social injustice. Different countries and stakeholders have a variation of definitions for what constitutes a rural hospital, depending on the purpose the definition is used for. In this research the definition of what is considered a rural hospital in the South African context takes into account issues such as geographical location, access, distance and services provided (Couper, 2003:2). Rural hospitals in this research relates to “those health care facilities where there is no readily available specialist, intensive or high technology care and where both human and material resources are lacking” (Couper, 2003:2).

In South Africa medical waste management is a relatively new field of social enquiry. The social implications of the mismanagement of medical waste is an area that has been neglected whereas it should be an area of huge concern.

1.2.2 Private/Public Health Care Sector Divide

There is a huge gap in the South African healthcare system between the public and private health sector. Apartheid policies were a large contributing factor to the inequitable access to healthcare in South Africa (Wadee et al., 2003:4). The health sector was highly fragmented in structure during apartheid and was shaped to maintain a divided system in healthcare delivery between the different population groups (Wadee et al., 2003:4). A priority of the post-apartheid government was to overcome these fragmented policies. The health care system in South Africa is strongly shaped by Growth, Employment and Redistribution (GEAR) policies geared towards increasing economic growth (Wadee et al., 2003:10). This has encouraged more investment into the private health sector whilst government funding of the public health sector remains stagnant (Wadee et al., 2003:27). The private sector in South Africa still predominantly serves the white population and high income groups (Wadee et al., 2003:10). There is a stark contrast between the facilities offered and infrastructure in the

private and public sector. According to a report documented by Al Jazeera (2012), South Africa's public health sector is characterised by rundown buildings, broken equipment and widespread corruption, while the private health sector enjoys world-class hospitals with advanced equipment. Much of the writing in this thesis about the health care industry and their perception of the environment and management of medical waste has been informed by Marxist writings which emphasise the destructive nature of the capitalist system which is deeply rooted within institutions and systems in modern society. The ecological Marxist perspective suggests that the capitalist mode of production and processes are exploitative in nature, especially towards the environment. Marxists assert that humans are interconnected to nature and are not above it; therefore what happens to nature has a direct impact on humans as well. Capitalism in itself is destructive and has a negative impact on the human population.

There is an on-going conflict between capitalist systems and the environment. It has become clear that the environment has reached its limit to act as a waste sink and is not an infinite resource, yet the elusive solutions that have been brought forward are geared towards increasing economic growth rather than protecting the environment.

1.2.3 Historical Background of the Study Area

The study area for this research is the Eastern Cape. The two sampled hospitals used for this study are Settlers Hospital, Grahamstown, under the Makana Municipality in the Cacadu district, and Nompumelelo Hospital, Peddie, under the Ngqushwa Municipality in the Amathole district. The Eastern Cape province has the third largest population in South Africa, and is generally seen to be one of the two poorest provinces in South Africa (Fukweni, 2006:26), and has been labelled as a space of poverty, "ruralness", tradition and underdevelopment.

The former homelands in South Africa continue to suffer from the legacy of the apartheid system in terms of inequitable access to basic services. Aspects such as social, health, economic and environmental facets from which the former homelands were excluded still play a huge role even in post-apartheid South Africa (Irvine, 2012:i). The apartheid's division of space and the socio-economic inequalities imposed in the past are still evident. The Bantu Authorities Act of 1951 set up African ethnic homelands in rural areas with their own regional authorities and this resulted in the segregation of space between urban and rural areas (Irvine, 2012:21).

These Bantustans were located in poor areas with a lack of resources and services (Fukweni, 2006:26). Bank and Minkley (2005), cited in Fukweni (2006:38), argue that:

“rural development in the Eastern Cape has remained highly polarised and continues to reproduce a series of colonial dichotomies such as those between the modern and the traditional, between the urban and the rural and between the local and the global, which in many ways hinder rather than advance our understanding of rural social and economic change”.

Grahamstown is a small former settler/colonial city located in the Eastern Cape which continues to be divided by race and class (Irvine, 2012:i). Over 23% of the households in Grahamstown fall below the poverty line (Irvine, 2012:i). Grahamstown has a high unemployment and poverty rate in comparison to the district and provincial levels (Makana Municipality, 2018). The high poverty level is a major concern in the Ngqushwa Municipality and Makana Municipality. This situation is worsened by the high rate of unemployment in the area. Unemployment rates are the highest at 48.5% in comparison to the national average unemployment rate of about 33.9% (Fukweni, 2006:26). Statistics show that 67% of the province’s population live below the poverty line, and in the Amathole district alone it is estimated that more than half of the population live below the poverty line (of R9,600 per annum in 1999) (Fukweni, 2006:52). The Amathole area has no access to on-site water, 30% of the population have no flush sanitation or pit latrines and 70% of the population are without electricity (Fukweni, 2006:26). Access to basic services such as a sewerage system, waste management, water and electricity is inadequate.

1.3 Goals of the Study

The principal objective of this study is to critically evaluate the policies, processes and practices of medical waste management in selected rural hospitals in the Eastern Cape. The secondary goals include:

- To examine the current state of medical waste management in selected rural hospitals in the UKhahlamba and Amathole Health District, Eastern Cape.
- To evaluate the current knowledge and practices of health personnel concerning medical waste management practices.

- To identify medical waste management challenges and constraints faced by selected rural hospitals.

1.4 Structure of the Thesis

The first chapter is an introductory chapter which provides an overview of the conceptual issues on medical waste management. It also gives a brief history of the study area and discusses the challenges faced in the area. The chapter also contextualises the medical waste management problem in South Africa within a collapsing health care system.

The second chapter provides a comparative analytic study of global trends on medical waste management. It maps out practices in both developed and developing countries, noting similarities and differences with the management of medical waste. The main argument is that medical waste is not a problem that the developing world alone is grappling with but draws on literature across the globe to demonstrate that it is in fact a global crisis. It also argues that there is a gap in literature on medical waste management.

It is impossible to discuss medical waste management without making reference to the history of South Africa's environmental context focusing on the concept of environmental governance in the country as well as environmental justice. Chapter three focuses on South Africa's medical waste management practices and explores approaches and findings of literature on medical waste management in South Africa. It argues that there is a gap in the literature on medical waste management, particularly in rural hospitals. It also explores South Africa's health care system in an attempt to highlight why medical waste has come to be known as a medical health, public health and environmental crisis and problem in South Africa.

Chapter four places medical waste management in the context of an environmental Marxist perspective. It highlights the social and environmental-health impacts of the healthcare industry within capitalist societies. It incorporates the Marxist perspective as a lens to examine how the society-nature dialectic within capitalist society has affected medical waste management as an environmental-health crisis.

Chapter five outlines the research methodology and methods used in this study. It details the methods and tools used to tackle the objectives of this study. It also reflects on the obstacles encountered in the course of the study and how these may have an influence on the findings.

The results of the study identified gaps in policy framework nationally and institutionally on medical waste management. Chapter six reports on the findings and analyses them with regard to the research problem. The results of the study show poor medical waste management practices due to poor training, inadequate infrastructure, resources as well as poor budget support and poor environmental governance.

The final chapter provides a summary of key emerging issues from the thesis and also draws together important results and provides recommendations for improving the management of medical waste in the study areas.

CHAPTER 2

A GLOBAL COMPARISON OF MEDICAL WASTE MANAGEMENT PRACTICES

Since the early 1980s the management of medical waste has received much global attention due to its infectious and hazardous nature (Harhay et al., 2009:2). Even so, definitional challenges still exist when it comes to defining medical waste. There is no universally agreed upon terminology on medical waste and it remains a highly contested term with several debates on how it should be defined (Rutala and Mayhall, 2002:39). The lack of a universally accepted definition has created differences in terms of how the term is understood hence making implementation of medical waste management ineffective (Rutala and Mayhall, 2002:39). Terms used include “hospital waste”, “medical waste”, “special waste”, “infectious waste”, “hazardous waste”, “pathological waste” and “clinical waste” which are used interchangeably and remain poorly defined, causing much confusion. The interchangeable use of the term is quite problematic and raises a lot of ambiguity in terms of its use when it comes to developing and implementing laws and policies on medical waste management (Moritz, 1995:521). The ambiguity of definition constitutes a major gap in the establishment of any sectoral policy at national and institutional level which requires the recording of unambiguous and precise definitions in a legal document (NHCMP, 2003:11). Determining which portion of medical waste is infectious is at the heart of the definitional problems associated with medical waste management (OTA, 1988:3). However, what is widely agreed upon is that this type of waste is a high health risk with detrimental health effects as well as environmental hazards.

According to Marinković et al. (2008:1049), the biggest producers of medical waste are hospitals. Research shows that hospitals globally are failing to implement existing legislation on medical waste management (Marinković et al., 2008:1049). It is the duty of health care facilities and other medical waste generators to ensure that their waste is safely disposed of in order to protect the public from ill health. Healthcare facilities also need to ensure that their hospitals are a clean, safe and healthy environment for their employees and communities

(Marinković et al., 2008:1049). The safe handling, segregation, disinfection, storage, transportation and final disposal are vital steps for safe management of medical waste in any hospital.

Studies suggest that healthcare facilities in developed countries have managed to develop more effective medical waste management systems than developing countries, because they have been able to develop and implement specific rules and regulations for their medical waste management systems (Yong et al., 2009:1376). Management of medical waste in many developing countries is often practised with much difficulty (Prüss et al., 1999: xi). However, the medical waste management problem is not unique to developing countries but is a global problem. Through reviewing medical waste management studies conducted in both developed and developing countries, this study aims to show that it is in fact a global crisis.

This chapter provides a global overview of medical waste management practices and processes of selected countries. This comparative analysis will be helpful in attaining insightful details on the various strategies and policies used by different countries in tackling issues surrounding the mismanagement of medical waste. Valuable lessons can later be drawn from these case studies that could be useful in achieving an efficient and sustainable medical waste management system. Most importantly this chapter will draw linkages between the health care system and its effect on the natural environment as well as public health to highlight their intrinsic relationship.

2.1 Structural Framework of National Policies on Medical Waste Management

Medical waste management is an important part of environmental health and safety as well as hygiene and should be integrated within national policies on environmental planning and health care (Basseyy et al., 2006:59). The passing of national legislation on medical waste regulations is of key importance for countries, because it is the basis for improving medical waste management practices as it establishes national legal controls for the handling, transportation and disposal of medical waste (WHO, 2009:32). It is the mandate of the Ministry of Health to apply pressure for the implementation of a national policy of this nature. The Ministry of Environment may also be involved, and a clear designation of responsibilities between these departments is crucial (WHO, 2009:32).

The law on medical waste management should be complemented by a policy document, and by technical guidelines developed for implementation, compliance and enforcement of this law (WHO, 2009:32). This legal package should specify regulations on treatment for different waste categories, segregation, collection, storage, handling, disposal and transport of waste, responsibilities, and training requirements. A national law on medical waste management may stand alone but most importantly this law should include a clear definition of hazardous medical waste and of its various categories; a precise indication of the legal obligations of the medical waste producer regarding safe handling and disposal; specifications for record-keeping and reporting; specifications for an inspection system to ensure enforcement of the law, and for penalties to be imposed for contravention; and designation of courts responsible for handling disputes arising from enforcement of or noncompliance with the law (WHO, 2009:33). The technical guidelines associated with the legislation should be practical and directly applicable (WHO, 2009:33). From a global perspective, countries are failing to develop medical waste management national policies and legislation that are suitable and practically applicable for their local hospitals to adopt and comply with.

Multiple studies have provided findings that indicate that countries without medical waste management legislation have poor medical waste management practices because their healthcare facilities have no legal binding to strictly follow proper medical waste management procedures (Kaiar et al., 2006:37). A study conducted in India revealed large scale mismatches in the segregation and coding of medical waste by the hospital staff, which indicated the absence of a working guideline on medical waste management in the hospital as well as unwillingness to comply with any existing medical waste regulations (Rao, 2008:298). Indeed some countries lack a clear directive from national government which is one of the biggest challenges pertaining to the management of medical waste management. Moreover hospital management and staff in some health facilities are oblivious to the existence of national medical waste management guidelines in their countries, a clear indication of poor implementation and enforcement (Kaiar et al., 2006:37). Tanzania has legislation on solid waste management but the legislation is incomplete as it excludes medical waste management (Republic of Tanzania Ministry of Health and Public Welfare, 2007).

At a national level Tanzania has various environmental acts and policies that touch on certain aspects of medical waste management but these are sector specific and outdated, displaying a fragmented approach in dealing with medical waste management (Republic of Tanzania Ministry of Health and Public Welfare, 2007). There is also a lack of a national policy on medical waste management in Bangladesh, as with many other developing countries (Sakar et al., 2006:36).

Unlike many other developing countries, Nigeria, Kenya, Lesotho and Angola have their own documented national medical waste management plans, namely: Kenya National Health care Plan 2008-2012, Nigeria, (National Health care Waste Plan 2007), Lesotho, (National Health care Plan Lesotho, 2005) and Angola (National Health care Waste Plan Angola, 2008). Nigeria's medical waste management plan was a reactive policy which was a result of a project funded by the World Bank as an attempt to regulate the spread of the deadly avian influenza (World Bank, 2007:ix). This plan was developed to minimise the spread of such infectious diseases. Even with this plan in place, Nigeria has failed to pass a law on medical waste management guidelines (Coker et al., 2009:803). The absence of a medical waste legislation has exacerbated the situation (Orabuchi, 2005).

Europe has given the issue of medical waste a fair amount of attention, as is evident in the European Union's pressure for countries to adopt environmental and waste management directives geared towards medical waste management into their national legislatures (Alagoz et al., 2006:220). An increasing number of European countries have developed national medical waste frameworks and specific regulations in order to efficiently manage medical waste in their countries (Townend et al., 2009:366; Insa et al., 2010:1046). With much research focusing on medical waste as an emerging issue of concern they have attempted to identify possible support solutions and gain as much knowledge as possible about the risks associated with medical waste. Despite these attempts these countries continue to grapple with medical waste management challenges. There are still a lot of inconclusive and unclear areas pertaining to medical waste risks, reproduction of pathogens and disease transmission (Muhlich et al., 2003:260). European health care face problems such as lack of training, awareness and financial support, just like the majority of countries in the developing world (Birpinair et al., 2009:445). European health care facilities fall short of practical implementation (Blenkharn, 2005:62). Research studies still show inadequate medical waste

management practices across Europe (Tudor et al., 2005:608; Townend et al., 2009:369).

As much as countries in the European Union have managed to shift their research focus into medical waste management and have managed to enact laws, medical waste management still remains an orphaned sector that is merely incorporated into general waste legislation (Insa et al., 2010:1048). The Ministry of Health and Environment in the United Kingdom (UK) jointly work together in dealing with the medical waste problem, and this has led to the new edition of the “HSC publication Safe Disposal of Clinical Waste” (1999) developed by the joint working group (Townend et al., 2009:369). This joint venture and co-operation is one that most countries have failed to achieve, and this fragmentation of government sectors and lack of co-operation is one of the challenges fuelling the medical waste problem.

2.2 Compliance, Enforcement and Implementation

An assessment of medical waste management in 22 developing countries conducted by the WHO (2002) showed a significantly high number of health care facilities that did not implement or follow any form of guidelines on medical waste management (Azage and Kumie, 2010:120). Even with the presence of a national policy and guidelines, it is important that countries also follow through with monitoring the enforcement and implementation of these guidelines in health care facilities. Longe and Williams (2006:133) conducted a survey on medical waste management practices in Lagos, Nigeria. The hospitals in their study all failed to comply with the country’s guideline for handling medical waste (Longe and Williams, 2006:133). Despite all of these provisions, medical waste is still handled and collected by the municipal collection system and disposed of in open dumps (Longe and Williams, 2006:135). The study concluded that Nigeria had poor and a lack of medical waste management practices as a result of their failure to train health care workers, and to enforce and implement medical waste regulations in health care facilities.

Ndidi et al. (2009:464) argue that one of the key issues that continue to stand in the way of efficient waste management in Tanzania is the lack of implementation of policies which seem to remain only on paper and are never practically implemented. Similarly in Brazil, solid waste management has not received sufficient attention, especially medical waste. In Southern Brazil, a survey conducted in 91 health care facilities indicated poor medical waste

management practices as a majority of these hospitals failed to comply with the principles in the Brazilian legislation on waste disposal (da Silva et al., 2004:603).

In comparison with other developing countries in the Middle Eastern region, Jordan seems to be paying a fair amount of attention to medical waste management. The total amount of Gross Domestic Product (GDP) spent on health is 9.3%, which makes Jordan one of the few countries in the region to spend such a high amount on the health sector (WHO, 2006:43). It is one of the few countries in the Middle East region that spends more money on health care than on the military sector (Patterson, 2007). It is not surprising that Jordan has one of the most modern health care infrastructures in the Middle East. It is also one of the few countries to include medical waste management in their “Country Report on Solid Waste Management” (2010). The Ministry of Health (MOH) is the main agency responsible for monitoring and managing the medical waste sector in Jordan and it has managed to develop and issue regulation No. 1 in 2001 that deals with the management of medical waste (Country Report on Solid Waste Management, 2010:18).

2.3 Practices and Processes of Medical Waste Management

Nigeria has a poor medical waste management system evident in the results of selected studies conducted in the country. A study of hospitals in Nigeria showed the lack of a segregation system of the medical waste generated (Longe and Williams, 2006:137). The study found that medical waste was often mixed with domestic and general municipal waste (Longe and Williams, 2006:135). Similarly, a study by Coker et al. (2009:803) found poor segregation methods in Nigerian hospitals, where there was inconsistent containerisation of the medical waste generated (Coker et al., 2009:803). It was either collected in metal dustbins, baskets, plastic bins, pans, bowls or cartons for temporary storage before being transferred and disposed of into a larger container for transportation to the disposal site (Coker et al., 2009:803). Results of various surveyed hospitals showed poor storage facilities of medical waste, as well as lack of a waste collection routine which resulted in medical waste being left to accumulate for days and weeks at times (Ndidi et al., 2009:461). This uncollected and untreated waste is exposed to different weather effects, and during rainy seasons this waste is washed into the drainage system and possibly into rivers and streams which poses a health risk to the population as well as to aquatic life (Ndidi et al., 2009:461). In their research on

medical waste management in Zimbabwe, Taru and Kuvarega (2005:153) discovered that medical waste generated from patients was stored on the bedside of the patients as a result of a lack of a temporary storage area. Similarly in Bangladesh, health care facilities did not have designated storage facilities, instead infectious medical waste was stored anywhere around the hospital premises or outside the hospital and all waste was placed in municipal bins (Kaiar et al., 2006:36). Ananth et al. (2010) reported on the dumping of body parts on the streets of Bangladesh by health care facilities as a common practice.

A survey conducted in Tanzania revealed on site and off site transportation of medical waste as one of their biggest problems (Manyele and Lyasenga, 2010:310). None of the surveyed health facilities had a designated vehicle to transport the hospitals' hazardous and infectious waste (Manyele and Lyasenga, 2010:310). As a result these facilities relied on on-site treatment and disposal of waste which was more than their infrastructure and resources could handle (Manyele and Lyasenga, 2010:310). The hospital staff used wheelbarrows to transport medical waste to the central storage area (Manyele and Lyasenga, 2010:310). Of the surveyed facilities in Tanzania more than half the disposal sites were not fenced off and were in close proximity to human settlements and were easily accessible to members of the community and waste reclaimers, posing a serious environmental and health hazard to the surrounding communities who could be at risk of exposing themselves to infectious medical waste as well as contaminating their environment. Manyele and Lyasenga (2010:311) deemed these health facilities unsafe and unsustainable because of their medical waste management practices.

A similar trend of poor medical waste management practices is evident in developed countries. Even with adequate infrastructure and equipment, sustainable waste management remains a difficult challenge (Tudor et al., 2005:606). A report on hospitals in the UK revealed poor segregation methods for medical waste (Townend et al., 2009:372). A survey of UK hospitals observed deficiencies in medical waste management, particularly in the handling and storage of this type of waste (Blenkharn, 2005:62) A majority of the surveyed health care facilities showed little if any clear separation of storage areas intended for medical waste and general refuse (Townend et al., 2009:303). One of the most common observations

noted in these studies was medical waste sacks piled in corridors, often close to ward entrances, as well as overfilled waste carts with gaping lids and protruding sacks, both at the main cart stores and at satellite locations within hospital buildings (Townend et al., 2009:303). A similar study conducted in Portugal showed that the surveyed health facilities had deficiencies in medical waste management processes, especially the processing of waste segregation and separation in which the staff showed poor knowledge (Ferreira and Teixeira, 2010:2662).

2.4 Training and Knowledge of Staff

Workers who handle medical waste are at a much greater risk of exposure to potentially infectious waste. Poor medical waste management practices start with the clinical workers who generate the waste without proper knowledge of the potential risks or access to necessary protective gear, including the workers who collect and transport the wastes through the hospital, the staff who operate a hospital incinerator or who take the waste to municipal bins, the municipal workers who collect waste at the municipal bins and transport it to various dumping sites, and the waste pickers who represent the informal waste management sector, but play an important role in reducing the amount of waste disposed of (BAN, 1999:5). All these people, whether they are formally or informally part of the health care waste system, are involved in the waste management system and their personal safety and health must be considered. Proper education and training on handling medical waste and the risks involved should be provided.

A study conducted in Nigeria revealed that the staff handling infectious medical waste in some of the health care facilities opted to carry the waste themselves without any protective gear (Coker et al., 2009:803). This in itself shows the lack of awareness and knowledge about the potential risks involved in handling medical waste and indicates lack of training of staff handling waste in healthcare facilities. In Tanzania some of the health care facilities had the resources and equipment but, because of lack of awareness and poor management, they failed to segregate the waste appropriately (Manyele, 2010:304). A similar study in Bangladesh found that poorly trained waste handlers such as cleaners were subjected to occupational

health risks because they were responsible for disposing amputated body parts from operation theatres collected in municipal general waste bins without any formal training (Harhay et al., 2009:8). Some of the cleaners would ignorantly go through these bins looking for used sharps and needles and test tubes to resell or reuse (Harhay et al., 2009:8).

The results of a study conducted by Dehghani et al. (2008) in Iran showed that none of the interviewed health facility supervisors had been trained on medical waste management. If the supervisors lack knowledge and training on medical waste management, this in turn leads to a lack of training of staff members in junior positions, as well as lack of proper monitoring and enforcement of medical waste management procedures and guidelines. Research on Brazil's waste management system concludes that Brazil's medical waste problems are exacerbated by a lack of sensitivity from the management of health care facilities (daSilva et al., 2004:606). This is evident in the lack of awareness of the community members concerning health risks and environmental issues (daSilva et al., 2004:606).

A study of staff members of healthcare facilities in Portugal showed inconsistencies regarding levels of knowledge of medical waste legislation and guidelines on the separation of waste which, according to Ferreira and Teixeira (2010), reflects poor training concerning issues of managing waste. Doctors were observed to have the lowest participation rate in medical waste management training programmes in comparison to housekeepers and nurses and were therefore more prone to making mistakes with regards to disposing medical waste in the correct bins in their consulting rooms (Ferreira and Teixeira, 2010:2660). Additionally, Ferreira and Teixeira (2010:2661) noted that a higher number of housekeepers were reported to have been involved in needle pricks, cuts and blood splash incidences than nurses, which shows knowledge gaps in the training of staff on handling of medical waste. A study in India found the prevalence of hepatitis C to be considerably higher in health care workers than in the general population (Rao, 2008:297). This was believed to be due to exposure to infected blood products of hepatitis C patients and, more specifically, due to accidental needle pricks and infected medical waste (Jindal et al., 2006 cited in Rao, 2008:297).

2.5 Disposal Methods

Dumping untreated medical waste in a landfill poses numerous health and environmental hazards (da Silva et al., 2004:604). This is because this untreated waste is regarded as uncontrollable and transmits infectious pathogenic micro-organisms to the environment either via direct contact through wounds, inhalation, or ingestion, or via indirect contact through the food chain or a pathogenic host species (WHO, 1999:20). Also, wind easily blows over the dumped waste, dispersing air pollutants to nearby communities (Coker et al., 2009:806; Nemathaga et al., 2008:1240). Medical waste landfills can produce gas and contaminate water, as well as wind-blown litter and dust (Narayana, 2009). The main potential impacts on health arise from inhaled landfill gas and exposure to groundwater contaminated by landfill leachate (UNEP, 1996; Williams, 2006:220). Leachate poses a threat to surface and ground water systems (Williams, 2006:221). It has also been reported that leachate from solid waste landfill sites may be mutagenic and carcinogenic, which means that it is a threat to both human health and the quality of the environment (Kjeldesen et al., 2002:320).

Another disposal method that is commonly used is incineration. Historically, small incinerators located on hospital grounds were used to dispose of both risk and non-risk waste. In that context, waste was generally not seen as an activity that needed to be monitored closely. Hospital incinerators failed to meet increasing environmental standards and were closed in the late 1980s and early 1990s, and attention was given to finding alternative cost-effective ways to treat and dispose of risk waste. Since then, increasing costs and tighter regulations governing waste disposal provide a growing incentive for hospitals to improve the management of all forms of waste.

Waste disposal seems to be a recurring problem in most health facilities globally. There has been increasing public concern over the improper disposal of medical waste and the effects it has on human health and the environment. In developing countries, medical waste landfills are operated like an open dump. Medical waste is dumped in the landfill mixed with general waste, and later burned (Nemathaga et al., 2008:1244). The lack of adequate disposal technologies and expertise have been used as an excuse by developing countries for their failure in successfully managing their waste, even though the main problem lies in the first

part of the systematic chain, which is the segregation of the waste which does not require hi-tech technologies.

Open dumping has always been known as the most common method of clinical waste disposal in developing countries (Al-Khatib and Sato, 2009:2400; Coker et al., 2009:305), although developed countries seem to be adopting the same practice of waste disposal. In 2009 the Irish Environmental Protection Agency discovered about 4,487 dumping sites of which about 2,000 were illegal sites where hazardous material and toxic substances were disposed of (Birchard, 2002:52). Evidently developed countries are equally facing challenges on appropriate disposal methods of hazardous medical waste. Effectively, developed countries are struggling to manage their hazardous waste as they lack sanitary landfills hence waste management has become an issue of political concern (Marinković et al., 2007:1049).

An audit by the Department of Health (2005:15) revealed that Ireland was rapidly losing its landfill capacity to dispose of hazardous and infectious waste and had limited resources to create new landfill facilities. The generation of waste from healthcare facilities has continued to increase significantly over the years and a large number of developed countries lack the availability of land as a sink base to dispose of all this waste, hence illegal dumping of waste is of huge environmental concern in these areas. Similarly, England has had to deal with an enormous amount of fly-tipped industrial waste, domestic waste, waste from construction sites, chemical waste and waste from excavation activities as well as medical waste (Environment Agency, 2010:28).

The UK is the largest producer of medical waste in Europe, and in 2007 and 2008, hospitals in UK produced approximately 190 000 tonnes of medical waste (Pudussery, 2011: 16). Blenkarn (2005:62) states that the cost of disposal exceeds £450/tonne in the UK which reflects the complexity of control imposed on the transfer, storage and destruction of waste, and the disposal of treated residues (Tudor et al., 2005:606). It is costing the government about £73 million annually to dispose of medical waste (Pudussery, 2011:13). The amount of infectious medical waste generated in the UK continues to increase exponentially which is why medical waste disposal continues to be an area of concern (Pudussery, 2011:13).

Developing countries, especially in Africa, have ample land to be used for the disposal of hazardous waste but, like Nigeria, they lack designated landfills for the safe disposal of infectious medical waste (Longe and Williams, 2006:135). A study conducted in Nigeria indicated that liquid medical waste was disposed of into the municipal sewer system by all the health facilities surveyed (Bassey et al., 2006:60). Direct disposal of this kind of waste could contaminate water resources and possibly cause an outbreak of epidemic diseases (Bassey et al., 2006:62). As the number of hospitals in Nigeria continue to increase, hospital records confirm acute cases of typhoid, cholera, dysentery, infectious hepatitis and guinea worm in both rural and urban areas of the country (Sangadoyin, 1995 cited in Coker et al., 2009:801). Coker et al. (2009) state that it is highly likely that some of these diseases are the result of inappropriate contact with medical waste based on the current practices of medical waste management in the country. The researchers in this study observed several ignorant waste-reclaimers scavenging through waste which was mixed with untreated medical waste in order to re-sell the materials, especially sharps and needles (Coker et al., 2009:805). The haphazard disposal of this untreated medical waste places the nearby oblivious communities at risk. This study demonstrates poor and inefficient medical waste management practices (Coker et al., 2009:805).

In Libya a study revealed that surveyed hospitals all lacked regulations regarding the disposal of medical waste (Sawalem et al., 2009:1375). The dumping sites lacked fences to prevent access by stray animals and waste reclaimers (Sawalem et al., 2009:1375). These medical waste dumping sites were located near agricultural areas and occasionally near residential areas (Sawalem et al., 2009:1375). In October 2008 in Kabul, Afghanistan, the by-products of a mass vaccination campaign of 1.6 million against polio were discarded into the local municipal waste, causing infectious injury to individuals scavenging landfills for reusable items (Reuters News 2008 cited in Harhay et al., 2009:1). It has been estimated by the Sanitary and Environmental Engineering Brazilian Association that 76% of towns in Brazil dispose domestic and medical waste together in municipal dumpsites (da Silva, 2005:600).

An article entitled “the unhealthy state of the health care system in Bangladesh” paints a picture of the poor conditions of hospitals and appalling services which have led to ill-health and an increasing number of deaths (Vaughan et al., 2000:5). This was based on an observation of one of the largest hospitals in Dhaka which was characterised by lack of facilities, shortage of staff and medical products and poor service delivery

(Vaughan et al., 2000:7). Findings of a study conducted in selected health care facilities in Bangladesh found that the most common disposal methods of medical waste used included: burning, burial, selling, dumping, reuse and removal by municipal bins (Akter, 2000:14). About 59% of the waste was disposed of into municipal bins without any treatment or separation (Akter, 2000:14). There have been reported cases in Bangladesh of body parts from health facilities being dumped in public open spaces and even found on the streets, and there are numerous cases of medical waste being found mixed in garbage heaps of general municipal waste (Harhay et al., 2009:8). This survey also showed that all the health facilities discharged their liquid pharmaceuticals and chemical waste into the general sewers or drains because they all lacked proper liquid medical waste management facilities (Harhay et al., 2009:8). This liquid waste, which is generated from surgical units and operation units, is disposed of into lakes and water streams which exposes the nearby communities to health risks. Animals and vegetation are also put at risk. The study also discovered that in one of the health care facilities waste from the gynaecology department and operation theatres, such as napkins, placentas, gloves and liquid waste, was collected in plastic buckets and disposed of into general municipal bins without being separated (Harhay et al., 2009:8).

Bangladesh has a large poor community of waste reclaimers and recyclers who depend on recycling and selling of this untreated, contaminated, infectious solid waste mixed with medical waste. These people are poor and uneducated and unaware of the deadly consequences of exposure to this kind of waste. They go through municipal bins without any protective gloves or clothing unaware of the nature of the materials present in these bins at risk of coming into contact with sharps and other types of waste and at risk of contracting hepatitis and HIV/AIDS for drug users reusing syringes and chemical waste (Kaiar et al; 2006:37). According to Singh (2004), India had over 2,000,000 new hepatitis B cases, 400,000 hepatitis C and 30,000 HIV-positive cases in one year due to needle-prick injuries. These statistics reflect the negligence of health care facilities which are clearly failing to dispose of their infectious waste in an appropriate and environmentally sustainable manner.

2.6 Infrastructure and Resources

Research has highlighted the lack of infrastructure and resources as one of the greatest obstacles in the proper management of medical waste in health facilities. This is supported by a high record of poor medical waste management practices in health facilities with lack thereof especially in rural areas globally which lack adequate resources and infrastructure. In most cases health facilities in the rural areas are old and suffer from a lack of upkeep and maintenance (Schaefer, 2010). In addition, these facilities lack running water and are subject to frequent power cuts (Schaefer, 2010). Health care facilities are struggling to deal accordingly with the medical waste generated due to poor financial resources, inadequate equipment and facilities as well as infrastructure. The human rights group Amnesty International, citing WHO statistics, found that North Korea spent under \$1 per capita on healthcare (Amnesty International, 2010:47). About 40,000 people interviewed by Amnesty International all had tragic stories to share about their experience with the health care system in North Korea. They all complained about the unsanitary health facilities, lack of infrastructure and facilities such as medicine and bandages and lack of food in hospitals (Los Angeles Times, 2010 citing Amnesty International, 2010). Amnesty International emphasises that North Korea's health care system has collapsed and also termed their health care system a "crumbling health care system" (Amnesty International, 2010:3). If health facilities fail to offer basic healthcare services, questions are raised about their ability to manage other sectors of hospital management such as healthcare waste management.

Developing countries suffer the most as they have to deal with pressing ecological problems on a daily basis and have to provide relief measures and services under financially constrained and indebted economies (Vumase, 2009; Longe and Williams, 2006; Mato and Kaseva, 2005; Mohee, 2005). They are unable to deal with all environmental issues equally because of poor funding, and waste management is always first to suffer during government budget cuts as it does not hold much priority compared to other pressing issues that demand urgent attention (Vumase, 2009:8). Without funding, health care facilities and other waste-producing institutions are unable to equip themselves with the appropriate infrastructure necessary to handle, treat, transport and dispose of waste, although, Insa et al. (2010:1058)

argue that the cause of poor waste management practices is not necessarily funding but rather poor management and governance.

Tanzania seems to be facing administrative, technical and financial challenges which hamper the effective management of medical waste (Manyele and Lyasenga, 2010:305). Tanzania allocates a relatively high proportion of its budget to the health sector compared to its neighbouring countries. However, shortage of funds and weak management have meant that many public health care facilities face lack of essential supplies and equipment and have also led to deteriorating infrastructures affecting the management of medical waste.

In Ibadan, Nigeria, it is a common practice for hospitals to reuse material and some hospitals lack adequate water and electricity (Coker et al., 1999 cited in Coker et al., 2009:802). Bangladesh is one of the most populous countries, as well as Nigeria, China and India, which are all facing medical waste management burdens, putting over 50% of the global population at an environmental, occupational and public health risk from poor medical waste management practices (Harhay et al., 2009:8). Harhay et al. (2009:1) suggest that as a result of the exponential growth of the population and rapid urbanisation in countries such as Bangladesh, the medical waste management infrastructure used, even though basic, is becoming overwhelmed.

In the developed world, studies in the UK, Spain and Portugal reveal that in spite of the availability of resources and infrastructure needed for the proper handling of medical waste, these countries continue to grapple with medical waste management problems (Insa et al., 2010:1056; Tudor et al., 2005:614). Countries in the developed world have the expertise, technologies, infrastructure and financial resources to deal with the medical waste that they generate, although one has to consider the severe financial constraints the developed countries are in too. For example the National Health Service (NHS) Trust in the UK is facing major financial constraints, is in debt and has been emphasising saving money and reducing resources at all costs which ultimately impacts on the way medical waste is managed in NHS hospitals (Tudor et al., 2008:434).

2.7 Transboundary Movement of Waste

An improved waste management system and pollution control is one of the key factors in achieving sustainable development. Over 26 international treaties have been signed pertaining to integrated pollution and waste management globally (Karani and Jewasikewitz, 2006:168). The Basel Convention is one of these and is signed by more than 100 countries. It concerns transboundary movements of hazardous waste, and is also applicable to medical waste (WHO, 2009:32). Countries that signed the Convention accepted the principle that the only legitimate transboundary shipments of hazardous waste are exports from countries that lack the facilities or expertise to dispose safely of certain wastes to other countries that have both facilities and expertise (Andrews, 2009:171). According to a report by the Basel Convention in 2009 in Switzerland, there has been an increase in illegal cases of transboundary movements of medical waste that have occurred due to the unavailability of licensed landfills to dispose of hazardous waste. There has been a tendency for these countries to deceive: they conceal this medical waste being exported as other types of waste such as municipal waste or plastic waste (Andrews, 2009:178).

In South America, shipping containers when examined appeared to be municipal waste but later appeared to be mixed with medical waste (Andrews, 2009:173). The “polluter pays” principle implies that all producers of waste are legally and financially responsible for the safe and environmentally sound disposal of the waste they produce (WHO, 2009:32). The precautionary principle is a key principle governing health and safety protection (WHO, 2009:32). When the magnitude of a particular risk is uncertain, it should be assumed that this risk is significant, and measures to protect health and safety should be designed accordingly (WHO, 2009:32). The duty of care principle stipulates that any person handling or managing hazardous substances or related equipment is ethically responsible for using the utmost care in that task (WHO, 2009: 32). The proximity principle recommends that treatment and disposal of hazardous waste takes place at the closest possible location to its source in order to minimise the risks involved in its transport (WHO, 2009: 32).

With the introduction of neoliberal policies, privatisation of industries has become a norm. This has affected waste management services which have been privatised as well. As a result waste management becomes profit-driven rather than being about providing a service and

being accountable and ensuring that no harm is inflicted on people or the environment throughout the waste management process.

2.8 Lessons Learned and Recommended Priority Policy Measures and Actions

A proper management plan should take into account the contents of the waste, the quantities generated and the local socio-economic and industrial conditions. The efficient management of medical waste requires all stakeholders to integrate their plans and work co-operatively. This involves the government, policy makers, law enforcement authorities, academia, waste management service providers, health care facilities staff and care takers as well as the community. Good health care waste management in any healthcare facility depends on a clear, comprehensive and detailed medical waste management plan, a dedicated medical waste management team, good administration, careful planning, a sound and structured organisation, underpinning legislation, adequate financing, and full participation by trained staff (WHO, 2005). A number of authors have indicated the importance of other aspects, including a national regulatory framework (Askarian et al., 2004; Gonçalves, 2005; Shinee et al., 2008), an internal management system and training programme for related personnel (da Silva et al., 2004; Abdulla et al., 2008), the estimation of the amount and type of healthcare waste generated (Tsakona et al., 2007), and the use of appropriate techniques for disposal (Lee et al., 2004; Diaz et al., 2005). From reviewing studies and comparing medical waste management practices globally, lessons can be drawn from the observations made on the issues that contribute to poor medical waste management practices.

2.8.1 Institutional Fragmentation

One of the recurring problems globally is the fragmentation of government institutions. This complex web of overlapping relationships within the spheres of government impede on the successful management of medical waste (Barriga et al., 2008). The environmental department is normally responsible for waste management in countries but legislation tends to exclude medical waste and the health department facilitates health facilities and their everyday activities and tends to ignore environmental implications of medical waste. These departments

are interlinked in the sense that health issues are in fact environmental issues in their cause and effect and there is a need for these departments to work together instead of being fragmented. It is indeed good to have some level of co-ordination between ministries such as the health and environment in order to converge their focus and resource on medical waste management (Ananth et al., 2010:158). There needs to be clear co-ordination and delegation of roles on different responsibilities on the management of waste.

Tudor et al. (2005:613) state that the UK lacked co-operation between medical waste management stakeholders and recommend the facilitation of closer working relationships to improve medical waste management. This would be made possible through the pooling of skills and resources, while at the same time allowing for the health care facilities to focus on their core task of providing health care to the community (Tudor et al., 2005:610). This enables medical waste management to be managed in a holistic and sustainable manner. Sustained cooperation amongst all key actors such as the government, hospitals and waste managers is important in implementing a safe and reliable medical waste management strategy, not only in legislation and policy formation but also particularly in its monitoring and enforcement, which can be achieved through the cooperation (Khalaf, 2009: xii).

2.8.2 Lack of National Policies and Guidelines

To ensure improvement and continuity in management practices, it is of utmost importance that healthcare institutions develop clear plans and policies for the proper management and disposal of medical waste. These policies need to be integrated into routine employee training, continuing education, and management evaluation processes for systems and personnel (da Silva et al., 2004:602). Countries such as Algeria, Libya, Ethiopia, South Africa, Spain, Brazil, Swaziland, Algeria, Zimbabwe, Mongolia, Bangladesh and Iran lack national policies on medical waste management which various authors highlight as one of the mitigating factors for poor medical waste management practices (Insa et al., 2010; Sgudla., n.d; Leonard, 2010; Ndidi et al., 2009; Longe and Williams, 2006; Manyele, 2003; Manyele and Lyasenga, 2010; Coker et al., 2009; Azage and Kumie et al., 2002; Mato and Kaseva, Patil and Shekdar, 2001; Askarian et al., 2004; Mohee, 2005; Oweis et al., 2005). The lack of a policy means the lack of defined rules for the collection and handling of medical waste in health facilities as well as failure of the health facilities to budget for medical waste management infrastructure and equipment for the correct management of medical waste (Askarian et al., 2004:351). Countries

without a national policy show lack of a systematic medical waste management plan and tend to deviate from medical waste management principles on the segregation, collection and disposal of medical waste because of the lack of a national policy (Hassan et al., 2008; Dehghani et al., 2008:135). Without a national policy, there is the danger of differences within countries on how medical waste is defined, classified, segregated, collected, treated and disposed of. The absence or presence of a national policy is evidence of the lack of attention given to medical waste within a particular country.

2.8.3 Lack of Research

There is a dearth of literature and research conducted on medical waste management particularly in the social sciences. The issue of healthcare waste management is inadequately studied, a factor common in most developing countries (Azage and Kumie, 2010:120). Studies have prioritised general household, industrial and chemical waste over medical waste management. Information to the public on generation rates, types of waste, related environmental health risks, and problems of waste management is generally not available in local literature (Azage and Kumie, 2010:120). Neither government nor health facility authorities seem to pay enough attention to medical waste related issues except when it reaches public attention. Research is required to establish a database, information and statistics on medical waste generation, collection, storage, transportation, treatment and disposal. This will form the basis of planning and design of a medical waste management plan. Research on medical waste management informs policy makers on waste management issues.

2.8.4 Lack of Institutional Capabilities

Institutional Capacity refers to the ability or inability of health facilities and waste generating institutions to deal accordingly with the amount of medical waste generated. The lack of institutional capacity was seen as the main deterrent to a successful medical waste management system in a study conducted in Eritrea, similar to findings of studies conducted in Iran, Bangladesh and Tanzania (State of Eritrea (MOH), 2004; Dehghani et al., 2008:131; Hassan et al., 2008; Manyele and Lyasenga, 2010:304). The reinforcement of the institutional capacities of the main stakeholders participating in the medical waste management process through the development of in-service training programmes and adequate curricula, the formation of operation and maintenance teams and the set-up of an extended awareness and education programme were highlighted as essential issues to improve

medical waste management (State of Eritrea (MOH), 2004). According to Hemanth et al. (2007:25) internally, responsibilities should be clear for all health care personnel involved in health facilities, and all staff should know the consequences of the mismanagement of medical waste. Even if a country has a national policy it is vital for a member of staff to be responsible for implementing and monitoring the enforcement of this policy at facility level. Infection control and health and safety officers should be responsible for the monitoring of medical waste management guidelines in health facilities. A study of medical waste management in Asian countries showed that medical waste management was an issue that required the understanding of detail and intricacies because of its scientific and medicinal nature (Ananth et al., 2010:155). A high degree of informed judgment is required while segregating the waste, requiring expertise and training on medical waste management (Bendjoudi et al., 2009:1386). Medical waste management requires both technology and knowledge management and expertise. National governments and healthcare facilities often have the technology but lack the required knowledge and required skills (Ananth et al., 2010:158). It is important that a balance is maintained because without the required skills the successful use of these technologies for the suitable management of medical waste cannot be ensured. In order for environmental and health laws on medical waste management to be implemented, education and equipping hospital personnel with the required skills should be made an important component (Marinković et al., 2008:1053). The general population should constantly be instructed about waste sorting, recycling, composting and ways of disposing the waste so that they are aware of the environmental and health risk implications of being in contact with medical waste (Marinković et al., 2008:1055). The final goal is a system that is in harmony with sustainable development, and protects the environment and human health which requires the integration of all stakeholders (Marinković et al., 2008:1055).

2.8.5 Piecemeal Intervention

Sustainable and successful management of medical waste requires governments to discontinue reactionary medical waste management policies and piecemeal interventions. Medical waste is a neglected sector and countries tend to develop medical waste policies as a reaction to epidemics or natural disasters or when it has caught media attention and might cause public hysteria. In China, medical waste management became a crucial issue and received attention as a result of the SARS epidemic (Yong et al., 2009:1377). Studies were conducted on medical waste management and reactive policies were developed in order to find ways to

contain the spread of the SARS epidemic. Similar cases occurred in Nigeria and Tanzania (environQuest, 2007:5; Ministry of Health and Social Welfare Tanzania, 2007) where the government was compelled to pay attention and prioritise medical waste as a result of influenza. In Sri-Lanka a medical waste management plan was developed as a result of the tsunami disaster (Hemanth et al., 2007:9). After the tsunami hit Sri-Lanka the country failed to deal with the enormous amount of medical waste which was generated because they lacked emergency and contingency measures put in place in case of emergencies. In relief efforts, waste management is seen as important to prevent the outbreak of diseases, hence the development of a national medical waste management plan as a re-active, piecemeal intervention policy.

2.8.6 Weak Governance

Even though quite a significant number of studies on medical waste management in Nigeria and other developing countries have concluded that poor funding is the main challenge impeding impeccable medical waste management practices, Eno (2008:354) argues against that notion. Eno (2008:354) argues that even though poor funding is a factor, the main reason for this inadequate funding in developing countries is weak governance coupled with corruption. Corruption and swindling of funds results in inadequate funding, affecting budget allocation in health facilities. Funds allocated for health services at national level are diverted to serve personal interests. The premise is that a proactive and accountable government would prioritise health care of the people and this would reflect in how it deploys resources for service delivery including building requisite human resource capacity (Eno, 2008:344). However, accountable political leadership and good governance have been in short supply in Africa, and bad governance is thought to have adverse implications for public service delivery which has seriously affected the health care system (Eno, 2008:343). Effective policy making and implementation, transparency and accountability in the conduct of governance require good governance (World Bank, 2000 cited in Eno, 2008:344). Good governance emphasises concepts of accountability, transparency, public participation, administration, co-ordination, compliance and efficiency as well as social equity and justice, which are vital for the sustainable management of medical waste (Barriga et al., 2008:3).

Weak governance is at the centre of economic, political and social problems in most countries. As a result of weak governance which persists in African states, service delivery is still a problem affecting the healthcare system, inevitably implicating poor medical waste management practices in health facilities.

2.8.7 Outdated Strategies and Laws Unresponsive To Current Challenges

Hassan et al. (2008) state that outdated strategies and laws have a negative effect on the management of medical waste as it affects its implementation and enforcement. If existing environmental laws are outdated then that means their penalties are low or non-existent and enforcement and monitoring of the implementation of these laws becomes inadequate (Hassan et al., 2008). Awareness of the adverse negative health and environmental effects of the mismanagement of medical waste and formulating new tougher laws against these healthcare facilities could be effective in protecting people and the environment from contamination and public health risks. Khalaf (2009:70) suggests that ministries of governments should implement laws and regulations specifically on medical waste management outside and within healthcare facilities in order to successfully monitor and control medical waste management.

2.8.8 Conclusion

The literature on medical waste management tends to focus more on the scientific part of medical waste management. Developing countries focus more on competing priorities impeding medical waste management and used almost as an excuse for the poor medical waste management practices. Developed countries on the other hand tend to focus on conceptual issues, policy making and decision making on medical waste management as well as strategising on new technologies and ways to minimise and recycle medical waste management. The problem is that they all fail to appreciate the fundamental interrelated, feedback relationship between the medical, environment and social sectors. All these are dealt with as separate entities. For example the clear link between the negative implications of the mismanagement of the environment and how this affects the larger communities is not dealt with sufficiently. Only the health implications are mentioned and other deeper issues, such as environmental injustice issues, issues of social injustice and environmental racism are totally neglected.

What happens in the hospital environment ultimately has a negative impact on the natural and social environments. Medical waste is not just a health issue or an issue of environmental concern but is also a social issue impacting on the livelihoods of communities and aggravating inequalities and the sustainability of communities. In order to combat this medical waste problem these sectors need to be viewed in a holistic fashion in an integrative approach and not as separate entities.

Studies on the environment have concentrated mainly on the ecological aspect of waste management and have neglected the social aspect. By using sociological thinking this paper aims to look deeper into human and environmental health interactions. Medical waste remains a neglected area of social inquiry globally. It remains dominated by the natural sciences and requires input from sociologists, because through sociology medical waste management can be seen as an issue that requires an integrative process between the environment, health sector and civil society.

CHAPTER 3

MEDICAL WASTE MANAGEMENT IN SOUTH AFRICA

Globally, research evidence shows the inability of health care facilities to efficiently control and manage medical waste in an environmentally sustainable manner. This research is conducted against the backdrop of an increasing concern globally about the management of medical waste, its effects on public health and the environment and a neglect of medical waste management in South Africa. During the apartheid era, environmental management was a neglected issue and not considered a political issue worth addressing (DEAT, 2009:14). As a result of South Africa's poor environmental track record, one of the biggest environmental issues that the country has been confronted with is the issue of poor waste management. The poor and working class are subjected to hazardous and unhealthy living working environments because of industrial activities which fail to manage their pollution and waste. In Africa, waste reclaimers are generally viewed as social misfits (Tevera, 1994:22). Tevera (1999) and groundWork (2008b) argue that these waste reclaimers are not social misfits but are ordinary people who treat waste as a resource. As a result of poverty and the need to meet basic needs these people are compelled to earn their livelihood by pursuing stigmatised activities such as dump scavenging (Tevera, 1994; 1999). This demonstrates that issues of race, justice and the environment are intertwined in South Africa (Khan, 2002:17).

The issue of the mismanagement of medical waste is a mounting problem, yet it has not received sufficient attention. In South Africa medical waste management is a relatively new field of social enquiry. Studies on waste management have prioritised general-household, industrial and chemical waste over medical waste management (Vumase, 2009; groundWork, 2008a; groundWork, 2008b; DEAT, 2004). However, recent scholarly research has shifted its focus onto medical waste management but it is still dominated by disciplines such as Public Administration, Management and Sciences, Environmental Science, Environmental Health, and Environmental Engineering. While these studies provide valuable

insights, the social implications of the mismanagement of medical waste is an area that has been neglected. Pilot studies on medical waste management have focused mainly on urban hospitals, revealing an urban bias in research.

There is limited research on the current state of medical waste practices and processes in rural hospitals in South Africa. Waste Management in general has been poorly defined and practiced in South Africa, particularly medical waste even though it poses significant health and environmental risks (Delcarme, 2004; Vumase, 2009; DEAT, 2004). There is no integrated waste management action plan in the country, and there is no directive from national government, as is reflected by the incomplete, uncoordinated, piecemeal and reactive interventions on medical waste. Effectively South Africa does not have a documented National Medical Waste Management Plan.

Studies in South Africa have identified gaps in terms of policy, legislative framework and practical implementation as well as enforcement of medical waste management guidelines in hospitals and poor and inadequate medical waste management systems. There is also evidence of poor segregation of medical waste, inappropriate storage facilities, insufficient training of hospital staff and waste handlers, and lack of hospital policies and guidelines on medical waste management. Data on medical waste, if it exists, is fragmented and unreliable (DEAT, 2006:19). A combination of these factors has resulted in poor management of medical waste in health care facilities. According to the Democratic Alliance Discussion Document on health care (2009:9), waste management issues such as delineation of responsibility, poor regulation, irregularities in tender procedures, lack of funding, poor training and enforcement of regulations are at the heart of this problem.

The right to the highest attainable standard of health is understood to mean healthcare. Good food, nutrition, housing, access to safe water and adequate sanitation, safe and healthy working conditions and a healthy environment are the core underlying determinants of health (Amnesty International, 2010:26). Therefore to attain a healthy society, it is imperative that the environment is managed well. No matter what the structure of a particular health care system, the core reason for the system is to provide healthcare and to advance the health of its target population. The focus worldwide of Departments of Health has been to manage illness

rather than to achieve health and there has been a transition to focus more on achieving health (Chudi, 2010:10). Managing illnesses means focusing on curative measures rather than on preventative measures. Some health care systems fail to provide the essential services and some are under the strain of inefficient provision of services. A number of issues including governance in health, financing of health care, human resource imbalances, access and quality of health services, along with the impacts of reforms in other areas of the economy, significantly affect the ability of health systems to deliver (Chudi, 2010:10).

The developing world bears 90% of the disease burden, but allocates less than 10% of its annual budget to healthcare (Chudi, 2010:10). This misplaced priority is disastrous and places these countries in a vicious cycle of ill health, disease and poverty. Chudi (2010: 10) also argues that a great deal of underlying causes of diseases and ill health in developing countries goes beyond the inefficiency of the health care system and lies within poor environmental management and physical factors such as inadequate sanitation, access to and quality of water, drainage systems, and waste disposal.

Despite an array of new developments with regard to environmental policies and environmental management, the historical link of the environmental impact of apartheid policies still lingers (Steyn, 2005:2). Khan (2000:159) concurs and argues that given the history of South Africa, one cannot ignore the inextricable link between politics and the environment. There are high levels of continuity between contemporary environmental problems and the environmental, economic and political policies of the apartheid government (Steyn, 2005:2). This demonstrates the need for an inclusive ecological politics which brings together social and environmental justice issues as well as environmental management (Cock, 2007:150). A review of literature of South African studies during the apartheid era highlights that there is a complete research lacuna on medical waste management policies. As a result there is a danger of relying on and adopting data and recommendations from industrialised countries which are inapplicable in the South African context because of the lack of research in South Africa. Prior to 1994 within the health services, little consideration was given to linking environmental issues to health and development (Department of Health, 2009:13). Little attention was paid to issues of how development could have an impact on health and the

environment. Furthermore there was an absence of policies on how to deal with developments that had a negative impact on the state of health and the environment (Department of Health, 2009:13). The current government has adopted international policies that view environmental pollution as negatively impacting on health and perceived environmental health problems as key issues on the international political agenda to deal with the problem at a global scale (Department of Health, 2009:22). This has ultimately led to the Department of Health having to adopt environmental management functions, although the environmental management functions fall mainly in the area of chemical waste and pollution management (Department of Health, 2009: 22). Yet again medical waste is excluded as an environmental health hazard.

It is the responsibility of the Department of Health to provide the public with public health services including preventative, palliative, rehabilitative, promotive and curative health which all inevitably produce medical waste (Department of Health, 2009:7). The mismanagement of medical waste contributes to the unsustainable patterns with which the country is confronted with and affects the environment in a way that threatens the health conditions of both present and future generations (Department of Health, 2009:9). When hospitals fail to control and manage their medical waste, it becomes an environmental hazard. Poor environmental quality has been estimated to contribute 10% of all preventable ill health on a global scale (Department of Health, 2009:9). As the custodians of the health and well-being of the citizens of South Africa, the Health Department is obligated to ensure a healthy society as per their constitutional and legislative responsibility (Department of Health, 2009:9).

Medical waste management is not an isolated new problem in South Africa. The capacity of the environment to act as a sink for waste is increasingly being exceeded. The interests of poor and vulnerable members of society have been neglected in waste management policy and decision making and as a result these groups have been adversely affected. These marginalised communities have become victims of social and environmental injustice. Environmental justice is the extension of social justice concerns which now includes the environment in which people live in (groundWork, 2008a:17). Environmental racism, on the other hand, proposes that people of colour are often subjected to diverse and disproportionate exposure to environmental and occupational hazardous waste (Lee, 2002:141). Issues of environmental injustice and racism are a reality in South Africa, more so with regards to the mismanagement of medical waste.

This chapter is divided into three sections. The first section examines medical waste management policies and considers power relations and inequalities in policy formulation and decision making. The second section looks at the neglect and dearth of literature on medical waste in South Africa. This section also analyses medical waste management studies in South Africa and looks into urban bias in medical waste management studies. The last section considers medical waste management as a field of social inquiry and examines the social and environmental implications of the mismanagement and neglect of medical waste management in South Africa.

3.1 Medical Waste Management Policies and Power Relations

Studies conducted in South Africa show poor medical waste management practices as well as lack of adherence to medical waste management codes of practice (Department of Health, 2001:9). Policy decision making and formulation of medical waste management are characterised by intense struggles between different social actors, whose interests, aspirations and beliefs often collide, making policy making a difficult task (Liasidou, 2011:887). Policy formulation is inevitably characterised by unequal power relations which underpin environmental policy making in South Africa (Liasidou, 2011:887). The contradictory nature of policies is evident within the policies themselves. The poor are often excluded in decision making in policy formulation (Social Development Department, 2006). Poor and marginalised groups are notably not visible to policy makers in terms of considering their interests and how certain policies may affect their livelihoods.

During apartheid, legislative authority over the environment was centralised and responsibility for the administration of environmental law was fragmented (Lazarus et al. cited in Bethlehem and Goldblatt, 1997:11). Under the post-apartheid government both legislative and administrative powers over the government are fragmented (Lazarus et al. cited in Bethlehem and Goldblatt, 1997:11). The constitution devolves legislative powers to provincial legislation and governments, dividing powers between national and provincial levels of government (Lazarus et al. cited in Bethlehem and Goldblatt, 1997:10). The power to make and administer laws is placed in the hands of provincial governments. Environmental problems and issues are dealt with in different sectors such as agriculture, administration of indigenous forests, nature and soil conservation, planning, pollution control, tourism and

recreation as well as the environment itself (Lazarus et al. cited in Bethlehem and Goldblatt, 1997:11).

Currently, the Department of Environmental Affairs and Tourism (DEAT) plays a major role in the administration of environmental affairs at national level (DEAT, 2009). The DEAT is responsible for formulating general environmental policy, co-ordinating and monitoring the administration and application of these environmental policies by the different national executive institutions (Lazarus et al. cited in Bethlehem and Goldblatt, 1997:12). Although, several other departments are involved in environmental planning, which indicates the level of fragmentation and lack of co-ordination which results in problems in terms of efficient and clear management of medical waste management. Certain aspects of waste management fall under the Department of Health and others under the Department of Environmental Affairs or the Department of Water Affairs (Lazarus et al. cited in Bethlehem and Goldblatt, 1997:12). As a result of poor fragmentation and enforcement of environmental laws, environmental management planning is not integrated into organizations' and industries' long-term "sustainable development" (Lazarus et al. cited in Bethlehem and Goldblatt, 1997:8).

Over the years South Africa has witnessed an increase in the number of cases of illegally dumped and stored medical waste even though there are environmental laws put in place to penalise such offences. Even with the placement of the Environmental Management Inspectorates, the "Green Scorpions", through which polluters have had to face up to their environmental crimes, the penalties of environmental damage are seldom sufficiently severe to deter polluters from committing the crimes again (Lazarus et al. cited in Bethlehem and Goldblatt, 1997:8). Industries continue to commit environmental crimes and remain under-regulated. Medical waste management is not recorded by a majority of the provincial health and environmental department (South African Environmental Outlook, 2005:6). Waste volumes have increased over the years but adequate responses this have not corresponded to this increase (South African Environmental Outlook, 2005: 19).

3.1.1 Policies at National Level

It is the responsibility of national government to set the general framework on medical waste management in the country. The national government has to formulate medical waste management policies and relevant regulatory tools that are comparable with international environmental and health standards. National government must also ensure that medical waste management practices and plans adopted in the country do not have negative impacts caused by either storage, transportation or treatment and disposal process of medical waste. They also need to ensure that the budget is adequate for an efficient medical waste management system. They need to provide the required skills, expertise and capacity to implement medical waste management policies.

The control and management of medical waste management in South Africa falls directly into the portfolios of the Department of Health, the Department of Environmental Affairs and Tourism and the Department of Water Affairs and Forestry, with some involvement from the Department of Transport (DEAT, 2009:9). It is therefore essential that these departments reach agreement on their respective areas of jurisdiction in order to develop a management and control strategy that will be effective and efficient. The national departments are responsible for the development of the strategy and overall guidelines, whereas the responsibility for implementation of the strategy is the responsibility of the provincial Departments of Environment and the provincial Health Departments. Provincial and local governments are expected to independently design waste management strategies and solutions based on the national policies. Within health care facilities, the waste material should be controlled through the infection control programmes of the hospitals, but when it leaves the premises it must be treated and disposed of according to the regulations published by the DEAT, DWAF and the Department of Transport (DEAT, 2000). Clearly, co-operation and agreement between departments at all levels is required.

Up until now, there are currently no specific national regulations that define the concept of medical waste and which offer clear guidelines for its effective management. Currently, the management of medical waste is regulated under the National Environmental Management Act, 1998 (Act 107 of 1998), under which the Department of Health is required to formulate their own national environmental plan (Department of Health, 2009:6). The Health Department, like several other departments, was given the mandate of developing their own

environmental plan as an initiative towards environmental management. In light of the increasing medical waste problem, South Africa has developed and implemented various legislatives and policies to ensure a safe and healthy environment. A set of laws pertaining to different waste management objectives has been passed in South Africa. Such measures include the Human Tissues Act (Act 56 of 1983) (Molefe et al.,2006:9) which is administered by the Department of Health, and which stipulates that all human anatomical parts have to be incinerated. However this goes against environmental regulations on emission of pollutants. All medical waste has to be incinerated at a licensed incinerator in order to render the waste sterile and ensure that it is unrecognisable as being of medical origin (Parliamentary monitoring group, 2000:1). The Environment Conservation Act (Act 73 of 1989) stipulates that disposal facilities have to be licensed in terms of section 20 of this Act, which is governed by the DWAF (Parliamentary monitoring group, 2000:1). Disposal facilities include all areas used for the accumulation, treatment and disposal of waste. Incinerators and waste treatment facilities therefore have to be licensed in terms of (or exempted from) this Act. This is governed by the provincial DEAT. Other legislation that is of relevance to the management of medical waste includes the following: Health Act (Act 63 of 1977), Hazardous Substances Act (Act 15 of 1973), Occupational Health and Safety Act (Act 85 of 1993), National Nuclear Regulator Act (Act 47 of 1999), National Environmental Management Act (Act 107 of 1998) and the National Water Act (Act 36 of 1998) (Parliamentary monitoring group, 2000:1).

These laws remain void because they fail to include all aspects specific to medical waste management, therefore they are lacking in their legislative relevance. Without a clear directive from national government these policies reflect incomplete, uncoordinated, piecemeal and reactive interventions on medical waste. The Medical Waste Summit held in South Africa in May 2011, was an attempt to address the anomalies of policies, practices and processes of medical waste management. It is not clear at the moment what the outcome of the summit is. The government acknowledged the uncoordinated and fragmented ways in which pollution and waste were being handled in the country. This is evident through legislative changes that have taken place since the adoption of the White Paper on Integrated

Pollution and Waste Management for South Africa in 2000 that are in line with global agreements on pollution and waste management (DEAT, 2000). This White Paper identified waste as a key issue, and subsequently the development of a National Waste Management Strategy for South Africa was undertaken over the period 1997–1999 by DWAF and DEAT, with financial support from the Danish Co-operation for Environment and Development (DANCED) (DEAT, 2000:iii). This eventually led to the formulation of the Starter Draft on the Management of Health care Waste as a follow up of the National Waste Management Strategy. The DEAT does provide a Starter Draft on the Management of Health care Waste (2000:1) which discusses the current status of what is known about medical waste and outlines how medical waste should be managed step by step as per the WHO guideline, although it does not provide a monitoring and assessment framework to ensure implementation of the document. This document is not legally binding but remains a draft without any legislative power, which means that healthcare facilities are not compelled to adopt and follow the instructions given.

In 2001, the DEAT convened a National Waste Summit which issued the Polokwane Declaration (groundWork, 2008a:52). This declaration consists of statutory reforms and legislation on waste management agreed by government, business and civil society stakeholders (Polokwane Declaration on Waste Management, 2001). This declaration served as a reaffirmation of the commitment to the White Paper on Integrated Pollution and Waste Management Policy. Groundwork (2008a:53) argues that the need to re-affirm after a year that the White Paper policy had been issued shows that nothing was being done, and that there was a lack of implementation on enforcement on the White Paper policy. This declaration recognises waste management as a priority and the need for national waste management strategies to be enforced at national, provincial and local level (Polokwane Declaration on Waste Management, 2001). Poor waste management practices still persist.

National annual reports of the Health Department and Environmental Department fail to acknowledge the existence, let alone the production, of medical waste in the country, yet continue to promote immunisation and testing of HIV/AIDS which all inevitably generate medical waste. The government fails to account for the safe management and disposal of this

infectious and hazardous type of waste. A national policy on medical waste is necessary to harmonise medical waste management principles in the country.

3.1.2 Policies at Provincial Level

In the absence of national legislation regarding the regulation of medical waste in South Africa, some provincial governments have formulated their own regulations concerning medical waste management to guarantee health and environment protection in their provinces such as the Gauteng Integrated Strategy and Action Plans for Sustainable Health Care Risk Waste (2004); City of Cape Town Integrated Waste Management Policy (2005) and the North West Environmental Management Plan (2003). These provincial policies are meant to be guided by a national framework and legislation, however because there is a no national policy, the constitution allows for provinces to establish their own legislation. This sectoralisation of the law results in negative consequences in the management of medical waste. It creates significant differences in the definition and classification of medical waste, making it hard to have a clear and overall idea as to how much waste is produced throughout the country (Insa et al., 2010:1048). It also creates differences in the waste management process which could have health implications as well as environmental and economic consequences. Furthermore it results in uncoordinated efforts nationally in dealing with medical waste (Insa et al., 2010: 1048). Molefe et al., (cited in Vumase, 2009:2) asserts that the widespread cases of medical waste illegal storage and dumping is evidence of the uncoordinated efforts in each province when it comes to dealing with medical waste, which makes it even tougher for the government to develop a national action plan. Similarly, studies conducted in South Africa on medical waste management concluded that poor medical waste management practices in healthcare facilities are mainly the result of a lack of a national medical waste management plan which hospitals can adopt and implement (Vumase, 2009; Mudau, 2006; Nemathaga et al., 2008; Gabela, 2007). In their research, Gabela (2007) and Nemathaga et al. (2008) identified gaps in terms of policy and legislative framework and implementation for the actual management of medical waste at local level.

North-West Province

In 2001, the North-West Province developed an Environmental Implementation Plan in accordance with the National Environmental Management Act of 1998 which included medical waste management (2003). It is the responsibility of provincial government to coordinate and support the actual implementation of policies at local level. As a result of the highly fragmented nature of national policies on environmental management across the spheres of government, the province saw the need to formulate more coherent and effective Environmental Implementation Plans (EIPs) (North-West Environmental Plan, 2003). These EIPs are statutory reforms that promote co-operative environmental governance in order to align policies, plans and decisions with respect to the environment (North-West Environmental Plan, 2003). This plan notably discusses and accounts for medical waste management in the province. It stipulates how medical waste should be disposed of and treated and even discusses the need for the monitoring of medical waste landfills because of their environmental implications (North-West Environmental Plan, 2003). It also takes into consideration environmental injustice and equity issues such as waste reclaimers who are exposed to medical waste in landfills which policy makers at national level fail to include (North-West Environmental Plan, 2003).

Eastern Cape Province

The Eastern Cape lacks a working policy on medical waste management and relies on the National Waste Management Strategy as a guideline. What has transpired from DEAT (2004) reports is that the Eastern Cape is struggling to manage medical waste as well as to develop and implement their own medical waste plan. As a result the amount of medical waste generated remains unknown; there is limited capacity to treat and dispose medical waste; health care facilities continue to rely on outdated treatment technologies that are insufficiently maintained and overall poor environmental standards (DEAT, 2004). The management of medical waste is highly fragmented. Findings by the auditor general showed that this province was experiencing serious medical waste management problems and the illegal disposal of medical waste in general waste landfills was one of the key problems (DEAT, 2004:2). The Eastern Cape lacks an integrated policy on medical waste management. Different health facilities have formulated their own strategies and regulatory tools to manage

medical, waste and there is a need to form an integrated system for all health facilities in the province.

Western Cape Province

The Western Cape Province passed a law on medical waste: Western Cape Health Care Waste Management Act (No. 7 of 2007) (Province of the Western Cape: Provincial Gazette, 2007:3). This act provides a legislative guideline with regard to the management of medical waste, including handling, storage, collection, transportation, treatment and disposal (Province of the Western Cape: Provincial Gazette, 2007:3). Under this legislation, medical waste is clearly defined and it stipulates how waste should be handled and which waste is considered a health care risk waste as well as the responsibilities of the generators, handlers, disposers and transporter (Province of the Western Cape: Provincial Gazette, 2007: 6). The act also provides contingency measures to be taken in an incidence of spillage of medical waste (Province of the Western Cape: Provincial Gazette, 2007:7). People in the Western Cape who fail to comply with the stated regulations are prosecuted and convicted under this Act. Although this Act outlines the definition and classification of medical waste it fails to give detailed guidelines on medical waste management. It does not include how and where the waste should be stored and the duration of storage, the indoor and outdoor transportation of waste management, or effective and sustainable treatment and disposal methods.

Gauteng Province

The formulation of the Health care Waste Management (HCW) Policy formed part of a process of facilitating the implementation of sustainable healthcare risk waste management in Gauteng (Gauteng Integrated Strategy and Action Plans for Sustainable Healthcare Risk Waste Management, 2004). The Policy for Environmentally Sustainable HCW Management in Gauteng was formulated in 2001. It included preliminary investigations and analysis of the current problems related to medical waste management in Gauteng (Integrated Strategy and Action Plans for Sustainable Health Care Risk Waste Management for Gauteng, 2004:iii). Based on the identified problems, the policy included a number of overall policy statements for the management of medical waste in Gauteng. Furthermore, the policy provided the province with a number of minimum requirements in dealing with a variety of medical waste

management related issues, including environmental, occupational health and safety, institutional, legislative, financial, information and training matters (Integrated Strategy and Action Plans for Sustainable Health Care Risk Waste Management for Gauteng, 2004:iv). As a result, the Integrated Strategy and Action Plans for Sustainable Health Care Risk Waste Management for Gauteng is laid out as a more detailed guideline for dealing with hazardous and infectious medical waste. This action plan is in accordance with the following vision:

To ensure that integrated, environmentally sustainable and occupationally safe medical waste management be established in Gauteng; within the frames and principles of the National Waste Management Strategy (NWMS), and covering the full HCW stream and to facilitate the establishment of an integrated, environmentally sustainable, occupationally healthy and safe, financially viable, institutionally feasible and operationally practical, comprehensive “cradle-to grave” management system for medical waste in Gauteng, covering all medical waste generators in the province, addressing the short, medium and long-term needs (Integrated Strategy and Action Plans for Sustainable Health Care Risk Waste Management for Gauteng, 2004:iv).

This strategy and action plan was not only informed by the Gauteng Policy for Sustainable Health Care Waste Management, but also took into consideration other pilot studies such as the Health Care Waste Pilot Projects at Leratong and Itireleng Clinics as well as the feasibility study for Suitable Provincial Health Care Waste Management Scenarios (Integrated Strategy and Action Plans for Sustainable Health Care Risk Waste Management for Gauteng, 2004:iii).

The Gauteng Action Plan outlines the institutional framework for the management of medical waste which includes legal frameworks and policies as well as the duties and responsibilities of stakeholders involved (Integrated Strategy and Action Plans for Sustainable Health Care Risk Waste Management for Gauteng, 2004:11). It clearly states all the requirements applicable to medical waste generators, transporters, transfer stations, persons operating treatment facilities and disposal methods required (Integrated Strategy and Action Plans for Sustainable Health Care Risk Waste Management for Gauteng, 2004:33). It also outlines the protocol of enforcement from provincial level to local level.

The remaining provinces have not afforded the same amount of attention to medical waste management and do not have provincial policies on medical waste management.

Policies at the Local Level

Waste management is a local government competence that must be executed to protect human and environmental health (Constitution, S.24). Quite a number of local governments in the country have taken the initiative to formulate local municipal policies on medical waste management. Departments at local level are meant to adopt and implement policies formulated at national level within healthcare facilities in their municipalities. With the absence of a directive from national government with regard to medical waste management, municipalities across the country fail to monitor and enforce medical waste management guidelines in healthcare facilities, which exacerbates the waste problem in those areas. As a result of medical waste management problems in health care facilities, there is limited capacity to handle, treat and dispose of medical waste. Various municipalities have taken the initiative to formulate their own Integrated Environment Plan which provides guidelines on medical waste management. Local municipalities are becoming more accountable to their communities, ensuring that they have an integrated medical waste management plan in place. These include the Cacadu district in the Eastern Cape Province, Mbombela municipality in Mpumalanga Province, eMnambithi municipality in KwaZulu Natal Province, eMalahleni municipality in Mpumalanga Province and Makana municipality in the Eastern Cape Province to name a few.

However, even with these local municipal medical waste management plans, there is a lack of reliable statistics and data on medical waste, in terms of how much waste is being generated in all the healthcare facilities and the disposal rate. Municipalities all seem to recognise the fact that medical waste is being generated in their municipalities but fail to discuss in detail how the waste is being managed, giving the assumption that their municipalities are dealing with medical waste appropriately (Mbombela Local Municipality, 2007; Emalahleni Local Municipality, 2007; and the Makana LEAP, 2005; Makana Integrated Environmental Plan, 2008; eMnambithi Municipality, 2010). They fail to acknowledge the dangers and hazards of the mismanagement of medical waste. These guidelines have a provision for how medical waste should be managed but the enforcement and monitoring of these guidelines within healthcare facilities is unclear (Mbombela Local Municipality, 2007; Emalahleni Local Municipality, 2007; and the Makana LEAP, 2005; Makana Integrated Environmental Plan,

2008; eMnambithi Municipality, 2010). These local municipal environmental plans fail to give a comprehensive and detailed account of the rate at which waste is being generated, or how it is stored, treated and transported for disposal. It is evident that the issue of medical waste is clouded in secrecy. As a result of fragmentation of policies at national level, fragmentation and un-coordinated efforts persist at local levels. There is also lack of research on medical waste in these areas, making it difficult for these municipalities to formulate more detailed and comprehensive medical waste management plans that health facilities can possibly adopt and implement.

3.2 Neglect and Dearth of Attention Paid to Medical Waste Management

Historically under the apartheid government, waste management was not afforded any priority as an issue worth looking into to prevent pollution and protect the environment and health of the society (DEAT, 2003:iii). As a result, insufficient funds, and human resources were allocated to waste management (DEAT, 2003: iii). This neglect led to a lack of long-term planning of waste management related issues, lack of information, dates and statistics on waste generation, waste types and its disposal, as well as a lack of appropriate legislation and capacity (DEAT, 2003: iii). The post-1994 government attempted to confront this and pay more attention to waste management as an issue that could negatively impact upon the environment and health. The White Paper and National Waste Management Strategies are meant to address the waste management crisis in the country but also fail to prioritise and incorporate medical waste as an issue of environmental and health concern.

Medical waste management is not allocated any budget, evident in the Department of Health budget analysis of 2010/11. Medical waste is not even mentioned in the DEAT 15 year review. This shows the dearth of attention given to medical waste management by the South African government. A direct correlation to the issue of the neglect of medical waste management is the lack of data on medical waste management in South Africa. The Department of Health's annual reports and Environment Plans fail to provide information and data on medical waste or guidelines to be adopted by health care facilities (DOH: 2010/11). It is evident that the Department of Health does not regard medical waste as an issue of prime concern that could have an enormous impact on environmental health. The fact that South Africa lacks a national policy on medical waste management is evidence enough to highlight the lack of priority the government has given to medical waste issues.

Harhay et al. (2009) discuss medical waste as a neglected research area even though it is a widespread health problem. Medical waste management should be part and parcel of total management and infection control in any healthcare facility, yet it continues to be neglected. Financial burden should not be an excuse as medical waste management ought to be budgeted for as it is a necessary and critical service, not a privilege.

3.3 Medical Waste Status and Practices

The DEAT (2000) undertook a brief study assessing the status of medical waste management in South Africa as part of the implementation of the National Waste Management Strategy. The study concluded that the current state of medical waste management in South Africa is generally poor. On the issue of medical waste in South Africa, the deputy director general of the DEAT in 2007 was quoted as saying that:

“The industry is in crisis. It is cut-throat and something is very wrong, the stockpile is symptomatic of a bigger problem” (Sunday Times, 2 December 2007 cited in DA, 2009).

The Sunday Times has referred to this medical waste crisis as a “ticking bomb waiting to explode” (Sunday Times, 2009). South Africa produces approximately 81,000 tons of medical waste annually from hospitals (DEAT, 2000:11). Although, as a result of lack of record keeping of medical waste, lack of data, and poor separation and segregation of medical waste at source, this suggests that a large quantity of this waste could possibly be non-infectious general waste.

According to a DEAT report (2005) a survey conducted on health care risk waste, generation and treatment capacity indicated that the available medical waste treatment capacity in South Africa exceeded generation by over 35%. Williams’s (2006:133) study on medical waste established that over 45% of the generated medical waste is unaccounted for and health facilities lack the capacity to handle and dispose of medical waste in a satisfactory and safe manner. Over 800 tons of medical waste is believed to be illegally dumped (Lovemore, 2010). According to Barbeau (2009) nearly half of KwaZulu-Natal’s healthcare waste cannot be accounted for, which suggests that it is being illegally dumped, buried or burnt, threatening the health of the province’s people and the environment.

According to a paper presented by Leonard (2005), the figure for illegally disposed of medical waste is 45%. There appears to be little or no available data in South Africa about the general amount of medical waste generated as well as the impact that medical waste has on workers, the public and the environment (DEAT, 2000:13).

The disposal of medical waste in South Africa is characterised by illegal dumping, pollution and little or no enforcement. There is a lack of capacity of enforcing agents for monitoring and control of medical waste management in health care facilities (Sapa, 2001 cited in Visser, n.d). Existing medical waste legislation is fragmented and difficult to apply. Furthermore Leonard (2005) argues that South Africa lacks the capacity to properly dispose of the huge amounts of generated waste, hence the increase in the number of cases of illegal dumping of medical waste which poses a threat to the communities and the environment. There is a lack of capacity at national, provincial and local level to implement and monitor infectious medical waste in health care facilities.

Medical waste management in South Africa is said to be on the verge of a national crisis (Sunday Times, 2010; News24, 2001; DA, 2009). Incidents of indiscriminate dumping of infectious medical waste have been well publicised in the media. In April 2008, it was reported that 78 children died from diarrhoea in the Ukhahlamba district of the Eastern Cape because water was contaminated, possibly by medical waste (Groundwork, 2008a:78). The Green Scorpions uncovered a 300-ton stash of filthy bandages, used needles, vials and discarded pills buried in Welkom, one of the biggest discoveries to date (Sunday Times, 2009). This medical waste dump contained tons of highly infectious raw medical waste including blood swabs and body parts that were said to have been collected from South Africa's biggest state and private hospitals found in the backyard of a brick factory in Welkom in the Free State (Sunday Times, 2009). There have been a number of "known cases" of illegal dumping in South Africa in a short period of time, which shows the mismanagement of medical waste in South Africa (DA, 2009:6). These cases include Manenberg, Cape Town in the Western Cape, where waste was dumped in an area close to where children play; Ibika, Eastern Cape, where waste was illegally stored in warehouses; Springfield, Gauteng, where used needles, bloodied bandages and body parts were found; Barkly West, Northern Cape, where waste was dumped in the veld; and Tongaat, KwaZulu-Natal, where waste was dumped at a beach parking lot (Sunday Times, 2009).

This shows the widespread and intensification of the mismanagement of medical waste problem across South Africa . During the South African Workers Union Strike (SAMWU) in Grahamstown on 13th April 2010, medical waste was found on New Street which was emptied from one of the rubbish bins in a black general waste bag scattered all over the road which contained used medical products such as swabs, sharps and gloves (Grocott's Mail, 2010).

In Tygerberg Hospital in the Western Cape, 48 children were treated with an anti-HIV drug Zidovudine (AZT) after some were pricked with needles and others ate potentially lethal pills they found in a field at Elsie's River (Cape Argus, Septemeber 1999). This shows the negative implications that the negligent disposal of medical waste has on communities, as it poses health hazards. Evidentially, the medical waste problem is not only confined to the hospital environment but spills into the home environment and the natural environment. In January 2011 (News24), medical waste was discovered in southern Pretoria dumped near a soccer field used primarily by children. A recycling facility was shut down in Mariannhill, KwaZulu-Natal after medical waste was discovered mixed with domestic waste (News24, 26 May 2010). Additionally, Corpses were found stacked in industrial fridges in residential areas, while 80 tons of medical waste was removed from a house in Johannesburg (The Star, August 2000). Medical waste is being illegally stored in residential areas which are not equipped to store hazardous waste of this nature. This poses a serious environmental and health risk to these communities. Diamond Fields Advertiser (22 September 2011) ran a story on the illegal dumping of medical waste that had been discovered early in that year in Wrenchville landfill site near Kuruman, which took months to be removed even after it had been reported. A funeral parlour in Durban was fined for illegally dumping its medical waste supplies in the Clermont neighbourhood and the owner was fined only R300 (IOL news, 22 April 2012). There is a need for harsher sanctions for breaking environmental laws in order for people to start regarding these environmental laws.

The increasing number of medical waste illegal storage and dumping shows the poor practices of medical waste management in health facilities in the country and how widespread the problem of medical waste is in South Africa. Medical waste is not only endangering workers in the health facilities but surrounding communities where medical waste is being dumped. By

virtue of waste being dumped haphazardly without any precaution a high health risk is posed, which negatively impacts on the sustainability of the natural environment. As a result of waste management being such a poorly researched domain, recent scholarly research has shifted its focus onto medical waste management (Abor, 2007; Vumase, 2009; Ramokate, 2008; Mudau, 2006; Mosia, 2006; Gabela, 2007). Studies on medical waste management conducted in South Africa have described medical waste management in the country as being poor (Abor, 2007; Vumase, 2009; Ramokate, 2008; Mudau, 2006; Mosia, 2006; Gabela, 2007).

The DEAT (2000:15) conducted a study in the Northern Province and found some disturbing medical waste management practices in major hospitals in the province. Cardboard boxes and Coca-Cola cans were used to collect sharps and other medical waste; there was poor segregation of medical waste from general waste as all types of waste was collected and placed in black bags which could easily get mixed up; and some hospitals were found to be sending human anatomical waste to a general waste disposal site (DEAT, 2000:15). A similar survey on medical waste management practices was carried in the Gauteng region in which 29 health facilities were surveyed. The main findings highlighted problems such as lack of motivation and awareness; insufficient and inadequate training as well as lack of time and accountability which contributed to the poor medical waste management practices (DEAT, 2000:16).

Gabela (2007:1) focused on investigating health care waste management practices in 31 rural and urban public health clinics in the iLembe Health District, KwaZulu-Natal. The study revealed that medical waste was not adequately managed and this had implications for cost, infection control and education (Gabela, 2007:3). This study concluded that rural areas lacked a functional healthcare waste management plan. The DEAT (2005) conducted research in Zeerust, North West Province, focusing on the management of medical waste in 19 clinics and 6 mobile clinics. The aim of the project was to develop a cost-effective, integrated management system of healthcare in the rural environment through the centralisation of healthcare waste treatment facilities at district level (DEAT, 2005). The findings of this project revealed major inconsistencies in medical waste management. Vumase (2009) evaluated operational administrative procedures for healthcare waste management in public district hospitals in South Africa. The findings reveal that as a result of financial challenges, hospitals are unable to prioritise activities that are necessary to be undertaken to meet minimum requirements of healthcare waste management.

Ramokate (2008) studied knowledge and practices of doctors and nurses on healthcare waste management in Johannesburg hospitals. The findings showed that, although there were instances of good knowledge, generally doctors and nurses showed lack of knowledge about key documents regulating health care waste, and there was poor compliance with healthcare waste regulations.

Mudau (2006) provides an analysis of health care waste management in selected hospitals in the Central District Municipality of the North-West Province. Major findings of the study identified gaps in terms of the policy and legislative framework for the management of medical waste management and issues relating to the mishandling of medical waste, as well as poor segregation, inappropriate storage rooms and insufficient training on medical waste management (Mudau, 2006: 95). Mosia (2006) assesses the feasibility of healthcare waste management strategy in Soshanguve. The investigation showed a lack of proper handling, and that healthcare facilities generated a higher quantity of infectious waste than they could handle (Mosia, 2006: 82). A large number of the health care services in Soshanguve failed to follow appropriate medical waste management standards with regard to the segregation of waste, lack of treatment of waste, inappropriate methods of storing medical waste and infrequent collection of medical waste (Mosia, 2006: 82).

Nemathaga et al. (2008) conducted a similar study on medical waste management. This study was aimed at assessing solid waste management practices in Limpopo Province, South Africa, by looking at two hospitals. It analysed the issues and current shortcomings faced by many hospitals in the province and the nation for implementing the required hospital waste management practices (Nemathaga et al., 2008:1245). The study found that there was a serious mismanagement of medical waste in South Africa, more so with semi-rural hospitals (Nemathaga et al., 2008:1245). The findings further revealed a lack of a proper separation and segregation system of waste according to classification of waste provided by the national government (Nemathaga et al., 2008:1245). Abor's (2007) study examined the medical waste management practices of Tygerberg Hospital in the Western Cape. The results of this study showed that medical waste management was not practised according to WHO recommended standards (Abor, 2007:iv). The study revealed that Tygerberg Hospital did not have a clear policy in place for managing medical waste, neither did they have a set budget for the purchasing of necessary equipment for providing facilities with proper medical waste management (Abor, 2007:iv).

The main medical waste management problems confronted by Tygerberg Hospital included the lack of necessary rules, regulations and instructions on different aspects of handling, collection and disposal of waste (Abor, 2007:74). There was no personnel in charge of the supervision and monitoring of medical waste management and infection control, and the hospital lacked any reliable records on the generation of medical waste (Abor, 2007: iv).

The Gauteng Provincial Government, Department of Agriculture, Conservation, Environment and Land Affairs (DACEL) in collaboration with the Gauteng Department of Health embarked on a programme to improve the standards of medical waste management in the Gauteng Province (Gauteng Provincial Government, 2003). This programme included a pilot project to trial and test an improved management system for public institutions in Leratong Hospital in Krugersdorp and Itireleng Hospital in Soweto (Gauteng Provincial Government, 2003). The results of the study showed that there was a critical mis-segregation of medical waste in the province (Kristiansen, unpublished paper: 6). The poor segregation practices had significant negative impacts on the safety, health and finances of these hospitals as well as the country at large (Kristiansen, unpublished paper: 6). Furthermore the project concluded that there was a widespread medical waste management problem in Gauteng at both private and public healthcare facilities (Kristiansen, unpublished paper: 7).

From the preceding discussion it is evident that South Africa is confronted with widespread medical waste problems and is indeed confronted by a medical waste management crisis. The evidential looming medical waste crisis highlights inadequacies in the healthcare system in terms of dealing with issues of health and safety and protecting the public from any possible contraction of infectious and communicable diseases. All the studies reveal poor medical waste management practices characterised by lack of medical waste management guidelines; lack of supervision and monitoring of medical waste management practices; poor segregation practices; lack of treatment of infectious waste; lack of storage infrastructure and storage containers; high open dumping of medical waste in general waste landfills and open spaces as well as lack of training and knowledge of doctors and nurses on the handling of medical waste. South Africa's health facilities do not have a set budget on medical waste management equipment, facilities and transportation of medical waste, because there is no directive from national government on medical waste management, and there is also poor enforcement,

implementation and monitoring of existing legislation on waste management in general. The poor practices of medical waste management pose serious health risks to the personnel handling waste and to the waste reclaimers and recyclers at the dumping sites and the ignorant public exposed to the haphazard dumping of untreated medical waste. The consequence of these poor medical waste management practices also extends to the environment, polluting surface water and the natural environment. This leads to an unhealthy, hazardous living environment around the hospital environment and surrounding communities.

Although some of these studies do touch on social issues such as the social implications of the mismanagement of medical waste, it is not dealt with sufficiently. These studies lack a social inquiry into medical waste management. This includes issues such as social exclusion, social and environmental injustices, and urban bias of studies, as well as power struggles and inequalities in society that impact on the management of medical waste. These issues are overlooked whereas they form the basis of issues that affect society with regard to the social and environmental implications of medical waste mismanagement. The social implications of the mismanagement of medical waste is an area that has been neglected despite the fact that environmental problems are also social problems in terms of their cause and effects (Feris, 2010:76).

3.4 Medical Waste Management as a Field Of Social Inquiry

3.4.1 Urban Bias in Medical Waste Management Studies

Even though an increasing number of researchers are focusing on medical waste management not enough attention is afforded to rural hospitals. There is still a research lacuna on medical waste management particularly with the management of medical waste in rural areas which shows an urban bias in research. The urban bias theory argues that the development process in developing countries is systematically biased against rural areas and that this bias is deeply embedded in the political structures of these countries, dominated by urban groups (Varshney, 1993:4). There are issues of power and inequalities in policy making which favour the urban group as the hegemonic group. Rural areas are economically poor as a result of political powerlessness (Varshney, 1993:4). In the South African context rural areas remain poorly researched and therefore not much is known about the practices of waste management

in those areas. With the history of apartheid, the former Bantustans, which were characterised by poorly resourced environments, poor environmental quality, environmental pollution and degradation as well as poor infrastructure, are still confronted by similar problems (Irvine, 2012:78). Former Bantustans and rural areas remain poorly developed, with people of low income, poor health facilities, a high rate of unemployment and enormous environmental and health hazards. Lemon and Clifford (2005:10) argue that small towns in South Africa continue to be neglected in research concerning post-apartheid desegregation. They assert that more research interest is shown in large and medium-sized urban settlements and that this ignores the idea “that small towns have their own, unique story to tell” (Irvine, 2012:78).

Academic research too commonly selects urban areas as focal sample study areas. Indeed, the 2008 International Geographical Union (IGU) Report shows that, within the Commission’ Monitoring Cities of Tomorrow, there was a big city bias with nearly half of the publications focusing on South Africa’s major urban areas. Similar views are shared by Robinson (2006:1) who asserts that there seems to be a strong urban bias in strategies of development especially in the healthcare industry. According to Lipton (1977:13) the most prominent conflict in society is between the urban classes and rural classes. Even though the rural sector is the poorest and most helpless, their concerns and demands are normally ignored and suppressed by the powerful urban sector (Lipton, 1977: 13). There is urban bias in government policy making which explains the huge development gap between the urban and rural areas. The main component of urban bias is expenditure bias (Grabowski, 1994:161). This includes expenditure on health, education and roads, which all tends to be biased in favour of urban areas (Lipton, 1993 cited in Grabowski, 1994:161).

There is limited research on the current state of medical waste practices and processes in rural hospitals in South Africa. Three notable studies have been conducted which focus primarily on rural hospitals: Gabela (2007), Nkqubela et al. (2010) and DEAT (2005). Gabela (2007) focused on investigating healthcare waste management practices in 31 rural and urban public health clinics in the iLembe Health District of KwaZulu-Natal. Similarly, all studies concluded that rural health care facilities areas lacked a functional healthcare waste management plan (Nkqubela et al.,2010; DEAT, 2005; Gabela, 2007). Leonard (2005) states that the worst problems arise from small rural hospitals which are unable to provide proper medical waste management standards because of the lack of resources. Another observation

revealed that rural health facilities in South Africa were characterised by extremely limited technologies and infrastructure (SAPA, 2001 cited in Visser, n.d). There was a lack of monitoring and control over how medical waste is handled, stored and disposed of in these rural health facilities.

3.4.2 Environmental Justice and Waste Reclaimers

In South Africa the social implications of the mismanagement of medical waste is an area that has been neglected despite the fact that environmental management tends to have an impact on the health of communities. Socio-cultural, political and economic issues are intertwined with environmental issues (Motteux, 2002:7). The environment is no longer seen as separate from the social sphere but as part of it. Therefore, there needs to be an acknowledgment of the importance of socio-cultural, historical and economic forces in shaping the environment and communities (Motteux, 2002:7).

Rapid urbanisation has created pressures constraining the capacity of cities to provide adequate employment, waste disposal, water supply and housing, which has led to a widening gap in inequality (Tevera, 1999:21). With development comes mass consumption and production which creates a society that produces more waste than goods (Pardo, 1997). This has become a “wasteful society” in the sense that this society is increasingly generating huge amounts of waste. It is becoming impossible to collect and treat all this waste in order to diminish the danger and to recycle and deposit it without risk (Pardo, 1997). As a result, the dumping of waste into the environment has become the most common and cheapest trend in industrial developing societies.

Inequalities and a high number of waste reclaimers have become a common feature in industrialised and economically developing societies (Pardo, 1997). Environmental justice issues in South Africa and the rest of the world have been recognised as a subset of human rights, hence the right to a safe, secure and healthy environment as enshrined in the Bill of Rights. The liberalisation of South Africa post 1994 created a new space of rethinking of environmental issues. What became the centre of debate was the new discourse of environment justice (Hallowes, 1993:185). During these debates in South Africa, environmental justice was understood as a concept that was about social transformation

directed towards meeting basic human needs and enhancing people's quality of life, economic quality, health care, housing, human rights, environmental protection and democracy (Environmental Justice Network Forum, 1997). In this regard social justice issues were linked to environmental justice issues in order to challenge the abuse of power which infringed on the rights of the poor and marginalised communities (Environmental Justice Network Forum, 1997). Environmental justice is the extension of social justice concerns which now includes the environment in which people live (groundWork, 2008a:17).

Researchers have found that environmental injustice develops in different forms but most agree that a large number of black people as well the working class live in polluted communities close to extremely hazardous facilities, landfills and dumping sites exposing them to harsh living conditions (Bullard, 2005; Ringquist, 2005; Cole and Foster, 2001 cited in Sicotte, 2009:141). Developing countries are characterised by inadequate implementation of environmental policies, excessive exposure, inadequate technical resources, poverty and decreased social support hence hazardous exposure tends to be less controlled and therefore intensified (Cifuentes and Frumkin, 2007). Marginalised and affected communities suffer from poor health due to nutritional deficiencies, infectious diseases, and limited access to immunisation and healthcare services (WHO, 2005). These poor communities are the ones who suffer the most with regard to poor waste management and poor segregation practices in healthcare facilities. Poor practices of medical waste management have significant social and environmental health consequences that impact upon mostly the poorer, marginalised sections of the community and waste reclaimers who have access to landfill sites (DEAT, 2000:9).

The argument by groundWork is quite instructive in this regard:

It is indeed poor people who die. Yet, when government cites poverty as a cause, the sub-text seems to be that poor people's lives are less valuable. Meanwhile, poor people are still living with the dumps fed by the wastes of the rich and products of these health facilities. If waste is not segregated and coded based to differentiate medical waste from general waste it ends up being mixed up therefore leading to instances whereby medical waste is mixed with general waste and dumped in the general waste dumping sites (groundWork, 2008a: 78).

Hence the right to a safe, secure and healthy environment as enshrined in the Bill of Rights is highly compromised.

The relationship between society, nature and environmental health are issues that have been overlooked (WHO, 1994). Hazardous dumping sites are usually located close to township areas in South Africa where the black poor communities live and face the health and environmental effects of this hazardous and infectious waste (groundWork, 2008a: 14). This goes against environmental justice, “those cultural norms and values, rules, regulations, behaviours, policies, and decisions that support sustainable development, so that people can interact with confidence that their environment is safe, nurturing, and productive” (Encyclopaedia of the Earth, 2007). This is a common feature in South Africa which is a country previously segregated along racial lines and class. The failure to effectively regulate medical waste is evidence of environmental racism which refers to:

Racial discrimination in environmental policy making and the enforcement of regulations and laws; the deliberate targeting of communities of colour for toxic and hazardous waste facilities; the official sanctioning of the life-threatening presence of poisons and pollutants in our communities (groundWork, 2008a: 18).

Certain parts of the natural environment seem to be exposed to the effects of illegal dumping of medical waste more than others. GroundWork (2008a:4) argues that environmental injustice is not only about people being subjected to a harsh, inhospitable living environment but it is also about the exclusion of people in policy and decision making. Waste reclaimers are the ones affected the most by waste management policies, yet they are constantly excluded in environmental policy and decision making. Exclusion from decision making is a crucial mechanism for producing environmental injustice (groundWork, 2008a: 4). When information is kept secret by state regulators, communities are excluded from knowledge about how polluted their living environment is and they are denied evidence that would enable them to take legal steps for environmental protection, which is part of environmental injustice (groundWork, 2008a: 4). This is the case in South Africa where communities reside in close proximity to hazardous landfill or even general waste landfill where medical waste is dumped without the knowledge of the environmental health risks involved. Dump scavenging activities often have environmental and economic benefits to society because they reduce the amount of waste that is dumped and have an input in the recycling process, thus prolonging the lives of disposal sites and landfills (Tevera, 1999:22; groundWork,

2008b:23). However, the scavenging of dump sites as a result of poor waste management practices and poor environmental legislation has negative health implications for these reclaimers as illegal dumping of contaminated hazardous waste is a common feature in South Africa (Waal et al., 2005). Poor medical waste management practices have a direct impact on waste reclaimers as they are exposed to this type of waste and are at risk of diseases such as cholera, hepatitis, dysentery and skin infections (Coker et al., 2009).

Scavenging in South Africa and African states has become an integral part of informal work (Carrasco, 2009:4). Studies in India, Nepal and Brazil revealed that waste reclaimers have become a high-risk group of poor marginalised individuals with regard to public health (Carrasco, 2009:4). Waste picking and scavenging as a means of work and survival and the consequent health and social dilemma experiences reflect a complex interplay of socio-economic forces and political forces (Carrasco, 2009:4). It reflects issues of inequalities, issues of environment and social injustices as well as social exclusion.

Little is known about waste reclaimers in South African cities even though they are clearly a large community taking part in waste management systems (groundWork, 2008b:1). To date reclaimers have not been mentioned in any South African legislation. Even though the National Environment Management Act (No. 107 of 1998) endorses recycling as a key element of waste minimisation strategies, this Act does not recognise the role played by waste reclaimers in the recycling process (groundWork, 2008b:2). In an effort to rectify this, groundWork and its allies have proposed an amendment to the Waste Management Bill which recognises reclaimers and the role they play (groundWork, 2008b:2). National policy and legislation should recognise waste reclaimers as key stakeholders in sustainable waste management systems and municipalities should be required to develop strategies to involve reclaimers within waste management policy processes.

3.5 Conclusion

Government regulations are clearly neglectful in protecting the environment as well as the communities confronted with hazardous waste on their “front door” which goes against their mandate of providing a clean, safe and healthy environment for all. The issue of

mismanagement of medical waste should be at the core of priorities of the health care system. The health care system is meant to protect us from, rather than expose us to ill health.

The health care industry plays a complex and significant role in subjecting communities to environmental injustices. Low income communities are subjected to hazardous living conditions fed by the wastes of high income communities, the products of these health care facilities (groundWork, 2008a: 78). Studies conducted in South Africa reveal that dumping in poor black areas, mostly shack settlements, is a common trend for many waste handlers (groundWork, 2008a: 38). In the surveys conducted in Kwa-Zulu Natal Province, the “toxic hub of South Africa” many of the members of these communities suffered from symptoms of toxic poisoning possibly related to chemical waste; waste from the petroleum industry and mercury commonly disposed in local rivers (groundWork, 2008a:38). It has become clear that industries backed by the power of political systems are able to impose externalities on these environments whilst excluding members of these communities from decision making (groundWork, 2008a:17).

Issues of environmental injustice and racism are a reality in South Africa, particularly with regard to the mismanagement of medical waste. Although scientific consensus has not been reached on the direct causal relationship between race and environmental injustices, there are a large number of cases worldwide that suggest that race and class are important determinants of the location of environmental pollution, degradation and associated health risks (Bullard, 1990; Casey et al., 2002; Foster, 1993. Goldman, 1994; Jones, 1998; groundWork, 2008a; groundWork, 2008b). The poor black and marginalised communities are faced with the burden of paying for the hidden costs of an affluent, waste-generating society through high levels of exposure to environmental risks (Jones and Rainey, 2003:473).

The main challenges that impede efficient management of medical waste management include lack of training of staff when it comes to handling of medical waste. Other challenges include lack of record keeping of generated medical waste, lack of systematic co-ordination and control of medical waste, a weak storage system for medical waste, delegation and accountability of medical waste management, and lack of implementation and ineffective and unclear segregation and classification system of medical waste. Contributing to this state of affairs are limited financial resources particularly at provincial level and a lack of capacity

(DEAT, 2000). In addition, a lack of government capacity means that the enforcement of existing legislation is frequently unfocused, especially with regard to waste disposal. It is imperative that waste management be considered as a matter of social policy to enable environmental policy makers to identify and address social issues and concerns surrounding waste management and mismanagement.

CHAPTER 4

THEORETICAL FRAMEWORK

This study finds Marxist writings imperative for the analysis of the effects that capitalist economies have on society and the natural environment and, more importantly, outlining the contradiction between capital accumulation and nature (Arnold, 1990:30). Marx is a huge critic of the crippling and destructive effects of capitalism in society, particularly with the economic institutions and system in capitalist society. The economic system in capitalist society is profit driven and centred around capital accumulation which relies on raw materials for production (Burket, 1999:107). As a result Marx notes the debilitating effect capitalism has on the natural environment as well as on human development (Burkett, 1999: 107). Capitalism in this context is used to describe the economic system as well as the multiple practices within it. Furthermore, this study draws heavily on the interpretation of both neo-Marxist and eco-Marxist writings. In adopting an eco-Marxist approach the main argument is that capitalism is the fundamental cause of the ineffective management of the earth's resources which has ultimately led to the global environmental crisis. This study holds that capitalism is a crisis-ridden system heavily dependent on the exploitation of nature and the labour force (Sayers, 2008:2).

During much of the 20th century, the predominant trend within sociology was for scholars to downplay or even ignore the importance of the environment (Catton and Dunlap, 1978: 41). The focus in sociology was on the benefits of economic development and modernity ignoring the negative effects it had on society and the natural environment. Ecological problems in this approach were regarded as needing to be overcome with grit and ingenuity (Hannigan, 1995: 10). This trend was ultimately counterbalanced by sociological responses to the environmental movement of the late 1960s and early 1970s and by the efforts of sociologists, particularly Riley Dunlap and William Catton, who helped to establish the field of "Environmental Sociology" (Dunlap and Catton, 1994: 7). These sociologists drew from the works of Marx which this study will utilise as an analytical framework. They argued that sociology needs to

shed the blinkers imposed by human exceptionalism and acknowledge the ecosystem dependence of all human societies (Dunlap and Catton, 1994:6). The human exceptionalism outlook permitted humans to exploit nature and view it as a commodity that exists solely for human production.

There is growing recognition and awareness globally about the effects that capitalist practices have on the environment. Despite these attempts, governments do not entirely do away with these capitalist practices but constantly transform their economic and industrial activities in order to overcome the very crisis they have created (Dickens, 2004). Globally there has been a shift in politics with more focus on debates surrounding sustaining the environment for future generations. However, the accumulation of capital and profit to develop economically remains the highest priority which ultimately contradicts environmental management and sustainable development. This notion asserts that the solutions developed under this capitalist economic system are in fact only masked as such and are structured in such a way that they do not hinder the growth of economies. This raises the question whether environmental problems can be solved within a market-based capitalist society.

Marx identified the capitalist economic system as the primary source of conflict between societies and the environment (Foster et al., 2010:74). Marx noted that capitalists view natural resources such as water, land and air as infinite resources, and fail to consider the relationship between industrial economic practices and environmental degradation and pollution. Instead they choose to detach themselves from the after-effects of their activities and refuse to take responsibility for these environmental problems. Moreover, these industrial economic practices perpetuate social class issues and problems within society. These are often neglected (Hannigan, 1995:18). Waste is the result of deliberate or accidental contamination of the environment from human activities (Lowe and Thompson, 1992:98). Society is consuming and using resources in a unidirectional manner, which results in the natural environment losing its ability to sustain itself and people (Lukey et al., 1991:160). Environmental pollution and waste have been regarded as “the price to pay for progress” (Lowe and Thompson, 1992:198). This demonstrates the way society views itself as external from nature and its problems, ignoring the interconnectedness between nature and society. Human beings have a dualistic relationship with the environment, being subject to physical and biological limits and yet being unique in the capacity for culture and symbolic communication (Catton and Dunlap,

1978:44).

Marx viewed capitalism as an economic system which exploits both social relations and the natural environment. For Marx, capitalism was robbing nature of its resources while concurrently creating a rift in human-earth interrelations (Foster et al., 2010:434). This resulted in the undermining of natural conditions in the environment. Marx argued that capitalism was an unsustainable system of production rooted in unceasing exploitation of both society and the natural environment (Foster et al., 2010:435). The natural environment under capitalism is indeed viewed by society as existing as a form of input to meet the needs of this socio-economic system. In the midst of the development of economies and capital accumulation there is an increase of production and industrialisation. These socio-economic activities all entail the extraction of natural resources and inevitably the production of some form of waste. This mass of waste production continues to grow exponentially. Waste management is often seen as a technical issue rather than a social issue that requires the insight of policy makers, which could bring in a socio-environmental perspective. A key focus of using this socio-economic perspective is to examine how modern capitalist and industrial societies with their patterns of production and consumption impact on the livelihood of society as well as their impact on the natural environment.

Waste management has become a means to an end within the capitalist economic system. Additionally, technology is viewed as the answer to any environmental “obstacle”. Waste technologies themselves fail to deal efficiently with the waste problem but instead create environmental health related problems. Over the years we have seen transformation in the healthcare system as a result of modernisation and technology. An increasing number of people are relying on health care and pharmaceutical products to stay “healthy”. The advent of technologies associated with advances in healthcare has led to an increase of generated medical waste. This includes infectious radioactive and hazardous waste that requires efficient treatment before disposal because of their high health risk. Healthcare facilities contribute enormously to the amount of infectious and hazardous waste generated in any country, yet medical waste management is still one of the most neglected areas of concern. An example is the use of incinerators in health care facilities and various industrial facilities to reduce the large amount of infectious waste generated before disposal (Pretschner et al., 2006:7). Although incinerators reduce the volume of infectious waste, they come at the cost of high air pollution risk (WHO, 1999: 84). Research evidence has shown that exposure to dioxins, furans and co-planar PCBs emitted during incineration may lead to adverse health effects as these are

toxic substances produced as by-products of various industrial processes, including the combustion of wastes containing polyvinyl chloride such as some blood bags and fluid bags (WHO, 1999:84). Incinerators also contribute to the increase in the rate of carbon emissions contributing to global warming (WHO, 1999:88).

It is a demonstrable fact that, in terms of production, industrial societies produce more waste than goods (Mull, 2005:1). As a result of increasing population and rapid industrialisation, there has been an increasing amount of waste generation and disposal globally. This has ultimately led to a widespread growth of hazardous waste sites globally, to the extent that the natural environment is losing its ability to act as a waste sink (Catton and Dunlap, 1978:46). According to Marx, capitalism is not only responsible for environmental degradation but a wide range of social ills in society such as the alienation of ordinary citizens from nature, their jobs and exclusion from state policies (Hannigan, 1995:18). Throughout the world it is always the least economically and politically powerful sectors of society that bear the burden of waste dumping and disposal (Lukey et al., 1991:162). The environmental policies that are formulated as an attempt to curb environmental pollution and exploitation are often short-term goals driven by the imperative for capital accumulation. This not only has detrimental effects on the environment but also threatens the longevity of humanity and has an effect on the ability of people to gain access to a clean, healthy and safe environment (Foster et al., 2010:273).

Literature on medical waste fails to appreciate the “health care-people-nature” relationship. To understand the relationship between society and nature or how the natural environment affects the social environment and vice versa, researchers must examine how the two affect each other. In other words, researchers must explore how they interact with each other and describe the relationships that exist between them. The state of the environment and how the environment is managed affects the healthcare of people in society as well as the state of the natural environment. This chapter, therefore, incorporates the Marxist perspective as a lens to examine how the society-nature dialectic within capitalist society has affected medical waste management as an environmental health crisis. This perspective will assist in uncovering the complex interactions between the social environment, the health care industry as a working environment and the natural environment.

4.1 Environmental Sociology

Sociology as a field was perceived by scholars as being anthropocentric in nature, adhering to the Dominant Western World (DWW) view which failed to adequately address environmental issues that were actually affecting society as a whole, including the natural environment such as pollution and waste management (Hannigan, 1995:13). The DWW view is the assumption that the history of humanity is one of progress; therefore for every problem that humans face there is always a solution to make sure that progress does not cease (Dunlap, 2002:333). Another dominant perspective was the Human Exceptionalism Paradigm (HEP) which assumes that culture is cumulative, thus technological and social progress can continue indefinitely which fixes any problem that might impede progress in society (Bowden, 2004:6). HEP assumes that humanity is separate from nature and independent of its influences and constraints. Ecological problems are not viewed as limits or constraints but are seen as minor setbacks that can be “fixed” easily with a technological solution. Nature is viewed only as a resource base with infinite resources. The emergence of environmental sociology was a result of the critique of these anthropocentric paradigms and worldviews.

Environmental sociology as a new field in sociology focuses on social-environmental interactions, and places an emphasis on the dualistic interrelation between nature and society (Freudenberg and Gramlin, 1989:443). This includes analysing not only how human activity impacts on the natural environment but how the natural environment affects humans and their societies (Freudenberg and Gramlin, 1989:444). This paradigm is known as the New Environmental Paradigm (NEP) and addresses the mutual dependency between the environment and society (Catton and Dunlap, 1978:41). The NEP is a result of the collaborative work of Catton and Dunlap (1994:7), and assumes that although human inventiveness may appear, it is a temporary extension of nature’s carrying capacity limits as ecological laws cannot be altered (Bowden, 2004:7). There are intricate linkages of cause and effect and the feedback system in the web of nature of which humans and their societies are a part (Bowden, 2004:7).

4.2 A Marxist Political Economy Perspective: Capitalist Society and the Environment

A capitalist economy is not only characterised by an escalation of production and the exponential extraction and use of natural resources, but also by the unmatched capacity of waste production (De Kadt, 1999:133). For Polanyi (1944:132), capitalism was a constant struggle between economic liberalism, which saw the state losing control of the markets and social protection, which is the state's attempt to protect society from the exploitative outcome of these unregulated markets. Capitalism altered the nature of the relationship between the environment and society masking the extent to which people are dependent on nature (Sayers, 1998:1).

Humans, although obviously entirely part of nature, interfere in this relationship by making deliberate adjustments to the ecological order in order to make nature more usable for themselves (Carton, 2009:25). As a result, the existing balance of nature is adversely disturbed in favour of human beings, forcing other forms of the environment to adjust to sudden and drastic changes in their environment (Carton, 2009:25). Economic growth should always be seen as having a certain ecological cost. The characteristics of a capitalism system according to neo-Marxists include labour markets, private property and economic institutions, fictitious commodities and a free market system. During a pre-capitalist society, the economic system was absorbed in the social system and the self-regulating market was unknown (Maertens, 2005:129). Instead the type of market that existed was an embedded market according to Polanyi (1944:68). The economic system of the 19th century is based on production and distribution that is organised through a self-regulating system of markets which are governed and motivated by economic laws and interest, as opposed to production that was embedded in social relations of a non-economic kind in pre-capitalist societies (Maertens, 2005:132). This market society is trapped in a fatal dilemma (Carton, 2009:35): on the one hand, it needs to ensure the continuation of production and has to continue expanding perpetually in order to avoid a socio-economic crisis (Carton, 2009:35), while on the other hand, it has to protect itself sufficiently from that same, self-expanding market in order to safeguard society itself (Carton, 2009:35). These are perceived as counter-hegemonic forces. There are barriers that accompany the capitalist economy such as environmental policies, which protect it against the debilitating effects of the market society, although the

barriers themselves in time lead to new problems, since capital accumulation depends fundamentally on the commodification of nature, labour and money for its success (Carton, 2009:35).

Polanyi noted that the re-structuring of the economy based on the ideals of a self-regulating market inevitably leads to commodification of land, labour and money which are known as fictitious commodities (Maertens, 2005:129). On the contrary, land, labour and money can never be genuinely commodified and the attempt to do so has devastating consequences. Genuine commodities are goods that are produced for the sole purpose of being sold. The transition from an embedded economy to an economy based on the idea of a self-regulated market began with the commodification of land and money which are essential components of industrial production (Polanyi, 1944:68). Marx viewed this development, the commodification of land, as constituting the origins of capitalism, and as a crucial factor in the human alienation from nature (Carton, 2009:16). This exemplifies the beginning of the separateness of the economy from societal norms and practices.

Subsequent Marxists have argued that institutional interventions on capitalism have rather created an environment conducive for capitalism to persist (Maertens, 2005:141). In industrial capitalist societies, the state, capitalists and corporations have formed a united front in search of wealth, power and profit, acting against the needs of ordinary citizens and the working class (Hannigan, 1995:18). “The new economic system created a devastating anomie which seriously damaged the humanity of workers and affected the whole of society and its relation to the natural environment” (Baum, 1996:9). Production itself, which was based on the motivation of personal and/or social use, was lost through commodification of land, and production was subordinated to the goal of profit.

Political economists blame the destruction of the environment on industrial capitalism’s need for profit and power. The political economy approach draws its inspiration from the 19th century writings of Marx (Hannigan, 1995: 18). Political economy is a theoretical perspective on social structures and change which examines economic class structures and their social consequences, including socio-economic and political dynamics (Schnaiberg, 1980:209).

Importantly, political economy emphasises socio-political legitimation and the social control of economic and related activities (Schnaiberg, 1980:209). This enables analysts to take into account a range of factors that impact on environmental policies and environmental management in society and the importance of dialectics in the behaviours of individuals, groups, the state and industry that come into play (Gould et al., 2004:299). The state perpetually favours economic development at the expense of the neglect of environmental protection and environmental management. Capitalist economies create scarcity through underproduction and the extraction of finite resources in order to make a profit, while at the same time creating the need for certain products and overproducing in order to accumulate profit. Neo-Marxists assert that capitalism is an unsustainable, destructive, exploitative and irrational system (O'Connor, 1994:101). Under this system both humans and nature are being exploited, resulting in the alienation of people from nature and from themselves (O'Connor, 1994:101). For Marx, economic changes have determining effects on social structures and social stratification (Foster et al., 2010). This is evident in the way wealthy individuals' economic status enables them to reside in safe and healthy environments, while those of a lower economic status are subjected to unsafe and unhealthy environments, characterised by pollution, poor sanitation and poor waste management. A Marxian-dialectical approach uncovers contradictions that exist and that are created by a capitalist system (O'Connor, 1994:101).

The excessive production at a very fast rate under capitalism has cumulative environmental ill effects such as air, water and land pollution, mineral depletion, water resource depletion, and production of infectious, hazardous and toxic waste which disrupt the ecosystem and affect the health of people in society. The Living Planet Report (2008) indicates that the world faces a "looming ecological credit crunch" as natural resources are being consumed "faster than they can be replenished." Recent studies have revealed that no area of the world's oceans is unaffected by human influence, even coral reefs and continental shelves have suffered severe deterioration (EarthWorks, 1990). Overfishing and organic pollution from agricultural runoff are driving the collapse of many aquatic ecosystems (EarthWorks, 1990). The accumulation of carbon dioxide in the atmosphere has raised ocean temperatures and caused a drop in the pH of surface waters, making them more acidic, and so harming reef-building species. The global footprint has surpassed the ability of the planet to regenerate by over 30% (EarthWorks, 1990). Waste landfills are filling up rapidly and societies are running out of landfill sites to dispose of

waste. Currently, the North is facing this problem: they have run out of hazardous landfill sites and are finding ways to trade with countries in the south to dispose of their waste (Marinkovic et al., 2007:1049). It is those of a lower-socio economic class that bear the detrimental environmental-health effects of capitalism. In this case the less developing countries where hazardous waste is being disposed. This is why Marx describes capitalism as crisis-ridden as well as crisis-dependent (Foster et al., 2010). As the system goes through an economic crisis, the capitalist system has to restructure in order to find more efficient ways to maintain profit which is always at the cost of the environment (O'Connor, 1994:111). According to Gould et al. (2004:299) current environmental policy initiatives seem to be exacerbating the problems faced.

Schnaiberg (1980:208) likens the capitalist system to a treadmill of production and portrays this treadmill of production as a “complex self-reinforcing mechanism in which politicians are coerced into formulating policies that encourage further economic expansion which inevitably has a destructive effect on the environment”. These environmental policies benefit the upper class while the working class has to bear the negative effects of this political economy. With neo-liberal economies, the state and industries work together and exclude the working class from decision making. The state in conjunction with corporations and capitalist industries decides on the tax rate and the technology used and supplied in that particular country. The state has power over resources and over the industrial activities allowed in that particular country. The state plays a huge role as it gives these corporations enormous power over resources, production, labour laws, tax and distribution (Schnaiberg, 1980:228). The state surrenders its power in order to gain capital and benefit economically from the profit made within these industries. This is known as the political economy (Hannigan, 1995:20). One cannot ignore the inextricable links between politics and the environment (Khan, 2000:159). The state no longer serves the interest of the country in its totality but pushes the agenda of economic expansion and serves the interests of industrial corporations. It has become clear that industries backed by the power of political systems are able to impose externalities on these environments whilst excluding the working class from decision making (groundWork, 2008a:17).

Availability of cheap labour and absence of rigid environmental and health regulations

provide a pleasant atmosphere for dumping waste in developing countries. A distinguishing feature of a less developed country is the existence of a large unemployed labour force prepared to undertake handling of waste. These informal workers make their living under extremely hazardous conditions without any proper training or occupational health and safety measures. Furthermore, these low-income, poor communities are never offered the opportunity of participating in crucial decision-making which has a direct bearing for their quality of life and livelihood (Laha, 2008:10). The developed world relies on the least developed and developing countries to act as a waste sink, the south as a global waste sink and epicentre of the “withdrawal” of resources and the north as the powerful decision makers pushing for economic expansion (Schnaiberg, 1980:23). The dilemma of illegal waste shipment highlights the difficult role of the government under this political economy, which must balance its responsibilities to protect environmental quality and human health and promote commerce and economic growth and relations in an international context (Mitchell, 2001:403). As Schnaiberg (1993:6) discusses, whatever the legislative authority for environmental agencies may be, the state operates within the broader political-economic context of capital accumulation represented by the treadmill of production.

Transboundary waste movements and poor waste management is a manifestation of the capitalist relationship between consumerism, waste and recycling which culminates in such environmental injustice taking the shape of waste imperialism (Laha, 2009:10). The injustice is further deepened by the neoliberal regime of privatisation which has systematically excluded and sidelined a group of people into exploitative and hazardous livelihoods such as waste processing and recycling (Laha, 2009:12). In South Africa, industries such as the mining and chemical industry remain “untouched” regarding environmental laws and sanctions: their statistics and data on the environmental impacts remain secret (Durning, 1990:15). This is mainly because economic development depends on these industries. Time and time again the state attempts to maintain a balance between economic expansion and environmental protection through very minimal environmental intervention such as passing of legislation to curb environmental degradation (Hannigan, 1995:20), although in the case of waste management there is still inadequate and inconsistent environmental legislative framework. From this political economic perspective, global environmental problems are

viewed as the outcome of the interaction between powerful global economic forces representing the interest of the bourgeoisie, the owning and ruling class in industrial societies, and the political, economic and social forces of classes and social groups in every social and economic context (Schnaiberg, 1993:6). Unequal power relations and conflict are key parts of the social systems which have a huge effect on the environment (Hannigan, 1995:20).

4.3 Marx and the Metabolic Rift

Marx also wrote scholarly work on the crisis in the quality of human-social development stemming from the disturbances in the circulation of nutrient cycling of local eco-systems (Burkett, 1999:107). This disruption of the nutrient cycle in the eco-system is generated by industrial capitalism and creates a division between the town and countryside as well as division of labour. Capitalist and industrial societies cause a metabolic rift between nature and society. Marx notes that the rift between country and town predates capitalism and asserts that this separation is the foundation of division of labour in society (Burkett, 1999: 118). The contrast between the town and country has been intensified by modern day capitalist society (Moore, 2000:125). The beginning of capitalist production involved the separation of agricultural and industrial activities which resulted in the alienation of people from the product, from nature as well as from themselves (Burkett, 1999: 120). People no longer have control over the means of production under the industrial economy. Marx's theory on the metabolic rift appreciates the complexity and interconnectivity of ecosystems and their implications for social action; to think holistically and systemically and to integrate, not to separate, human societies from nature, but to live in harmony with nature, rather than dominate it (Moore, 2000:124).

Marx was informed by Liebig's analysis on the loss of soil fertility and its inability to reproduce as a result of chemical fertilisers which were being used to increase yield because of population growth and the increasing demand for food (Foster, 1999:378). Marx critiqued capitalism for exploiting soil fertility and failing to sustain its productivity. As a result of this new form of production, there was an increase in an industrial population moving into urban areas. For Marx, this provoked an irreparable rift in the interdependence process of the metabolic processes between nature and humans (Foster, 1999:379). Resources are extracted from the countryside and transported to urban areas where they are turned into waste which is

never returned to the countryside, affecting the fertility of soils in the country yet accumulating in the urban centres as pollutants (Foster, 1999:379).

Rural societies produced easily assimilable and decomposable food, and durable goods based on natural raw materials. The generated waste was easily recyclable and re-integrated into the biological and metabolic cycles and processes (Pardo, 1997:3). The concept of waste was a foreign concept. These rural societies were characterised by scarce resources and maximum use (Pardo, 1997:3). Furthermore, when waste was produced, it was deposited on site and immediately reused. This fulfilled the metabolic cycle. Urban-industrial societies produce tons of waste that is difficult to recycle. This creates an imbalance as humans in these industrial societies become producers and consumers and not recyclers and decomposers (Pardo, 1997:3), and are unable to recycle and return certain elements taken from nature. Natural resources are considered non-finite, causing the total amount of waste to be more than products manufactured. Given the increasing waste generation, abundant in quantity and in danger for its composition, it is practically impossible to collect and treat all this waste to diminish the risk and hazards it poses (Pardo, 1997:3). This is the metabolic rift that Marx theorised that is now causing irreparable damage to the environment. The lasting damage of this toxic waste on the environment and human health is unknown because waste has long-lasting effects on land, air, water and animals which could ultimately poison agricultural products and other consumer goods. There is a positive correlation between economic level of development and waste quantity: the higher the economic level, the more waste generated (Mull, 2005:1).

Marx believed that the social conflict between the proletariat and the ruling class caused by the capitalist system alienates people from their jobs and from nature itself (Hannigan, 1995:18). This is evident in the way in which industries such as health and mining prioritise the accumulation of profit from the land ahead of human and environmental welfare, through the extraction of resources and using the land as a waste sink (Hannigan, 1995:18). In addition, the working environment itself has become a health risk because of poor waste management within these industries. Consequently, workers are exposed to unsafe and hostile working environments due to poor waste management. Industrial production results in the

clustering of a large population in one urban area which disturbs the metabolic interaction between nature and humans. This prevents the return of the soil constituent elements consumed by people in the form of food and clothing and interrupting the cycle that ensures fertility of the soil (Foster, 1999:379). This metabolic rift not only creates a rift between humans and nature, but through the loss of control over labour it also creates a rift between peoples themselves. For Marx every human activity has a basis in nature, therefore human beings are alienated themselves and from the production process as a result of capitalism. The alienation of humans from nature demonstrates that humans are indeed a part of nature (Foster et al., 2010:228). In essence capitalist production undermines nature and creates a rift in the metabolic interaction between people and nature.

4.4 The Treadmill of Production and Waste Management

Schnaiberg uses the political economy approach to outline the contradictory relations within the structures of modern industrial societies, between economic expansion and environmental problems and policies (Hannigan, 1995: 19). The “treadmill of production” is a term used by Schnaiberg (1980:208) to describe the growth, surplus production and expansion of capitalist societies. For Schnaiberg (1980:208), this type of society was likened to the treadmill of production in the way it operated because of its inherent need to continually yield a profit through the creation of demand for new products which all rely on the extraction of finite natural resources. Technology is a vital instrument that drives the treadmill. Marx argued that technology could never be neutral because it embodies capitalist relations, through division of labour and through increasing production through the exploitation of labour (Foster et al., 2010:80). Similarly, Gould et al. (2004:299) likens the theory of the treadmill of production to an image of society that is running in a place without moving forward. As a result of this system, production is accelerated and ecosystems are depleted through the exponentially increasing rate of extraction which results in pollution because of the unrecyclable dumping of waste into the environment. Schnaiberg (1980:23) noted that as the treadmill of production accelerates, there is an increase of “withdrawals” from the environment as well as “additions” to the environment. Withdrawals from the environment include the extraction of natural resources used in the production process in the treadmill of production (Schnaiberg, 1993:11). Additions include all kinds of waste that is generated during the treadmill of production as well as the products of the treadmill of production itself.

In the case of the mining industry, the mineral being extracted would be the withdrawal part of the process and mining waste being the additions which is generated throughout the mining process. Such withdrawals and additions disorganise the physical-biotic structure of the natural environment (Schnaiberg, 1993:11). With the accelerated rate of production, an imbalance has been created within the natural cycles in the environment as additions and withdrawals exceed the ability of the environment to replenish itself. Humans have altered the conditions of life within the environment surpassing their natural limits as well as undermining the environment's reproduction cycle. As Marx noted, the environment in its totality depends on metabolic processes that involve complex interchange between humans and nature (Foster et al., 2010:402). Implicit in the nature of capitalism is the ability to create and destruct (Foster et al., 2010:157). Capitalism is creative in the sense that it is able to innovate new ways in which to make use of nature's resource, yet it is also destructive as it places such a high demand on nature's resources and at such a fast rate that nature loses its capacity to respond to these demands (Foster et al., 2010:157).

Veblen is critical of conspicuous consumption and wasteful extractive processes of natural resources that characterise modern industrial society (Mitchell, 2001:390). He describes industrial practices as "seizure" and "conversion", "land grabbing" "disembowelling of resources", and "wasteful and destructive" (Mitchell, 2001:394). Like Marx, Veblen blames the capitalist system, especially the bourgeoisie, for ecological problems. However, contrary to Marx, Veblen rejects the notion that technology in itself is responsible for the exploitation of natural resources as well as increasing waste distribution; instead he blames the mismanagement on industries which shed responsibility resulting in poor management (Mitchell, 2001:399). For Veblen, the development of waste treatment technologies which increase waste management efficiency and reduce the risk of hazardous waste is evidence of the beneficiary nature of technology rather than being destructive (Oliver, 2006:1). The failure of society to grasp that everything in nature is interconnected is best described in this quote:

Everything must go somewhere ... In nature, he argues, there is no such thing as waste ... what is excreted by one organism as waste is taken up by another as food (Carton, 2009:23).

The earth is a closed and finite system in which any form of alteration necessarily affects the whole system (Meadows et al., 2004). Capitalist production has proven largely ignorant of these endless environmental cycles. In its drive for profit maximisation, capitalism reduces nature to a source of raw materials and a sink for the disposal of consumer waste, without taking into account that this waste will eventually show up somewhere else in the system.

4.5 Politics of Waste Management

Marxists critique various aspects of the capitalist economic system of which one is the production and management of waste. Human society is creating a “metabolic rift” in which ecological and environmental systems are being overloaded and are unable to cope with the amount of waste being generated. Over the last century, the ways in which waste is processed has fundamentally changed globally. Up until about the late 1800s waste was locally managed by individual citizens (Soper, 2003:135). From the late 1880s and ending in the late 1960s or early 1970s a widespread system of municipal waste managers collecting, transporting and processing waste was put in place as a consequence of waste having become a public health concern (Soper, 2003:135). From the late 1960s to the present, waste processing has gone global: waste management has become a direct source of profit for multinational waste management corporations and has been incorporated into the “treadmill of production” (Soper, 2003:135). Waste managers simply included new industrial materials into their existing routines and the fact that these same materials will never decompose was a problem left to be solved by future generations, “it was, after all, waste no longer needed by individuals or society” (Soper, 2003:135).

Irrespective of organisational form, the trend to privatise is common in neo-liberal economies. Even where waste services are not corporatised, functions are outsourced on the edges of the original core business of collecting and disposing waste from health facilities. Ogu (2000:12) identifies four types of privatisation in the waste sector: contracting, concessions, franchises and open competition. The most common in African states is contracting. Typically, for contracting, after a competitive process a private firm may be awarded the contract for waste collection, transfer and disposal site operations (Ogu, 2000:12). Such a firm is usually paid for its services by a municipal authority, as pre-arranged in the contract.

In the waste management sector, the disposal and transportation of waste has become outsourced to the private sector in order to minimise costs. This has enabled waste generating industries to refute accountability and responsibility of medical waste that is not disposed of according to the right regulations and procedures, and to distance themselves from the health and environmental effects of illegal dumping and mismanagement of medical waste. Industries that generate hazardous and infectious waste are required to contain their waste and to outsource the treatment, disposal and transportation of waste to private companies as opposed to previous waste management practices of dumping on-site. This commodification of waste becomes mobile, crossing local, state and even national borders in search of low cost areas for waste treatment and disposal. Health facilities argue that outsourcing medical waste assists them to minimise costs of medical waste management because contracting is cheaper (Walsh, 2001:1). More often than not these low cost waste sites and facilities are hazardous themselves and are located in or close to poor, working class communities. The politics of waste disposal shifts the burden of toxic waste management to people in underprivileged and underdeveloped locations through illegal exports to developing nations (Marinković et al., 2007:1049). Health facilities argue that outsourcing medical waste assists them to minimise costs when it comes to medical waste management (Walsh, 2001:1). They argue that these specialised handlers of medical waste ensure that the medical waste is disposed of appropriately (Walsh, 2001:1).

4.6 The Greenwashing of Waste Management

It is questionable whether environmental problems can ever be solved under a market-based capitalist society. The environmental crisis of the late 1980s drew attention to the inadequacies of existing political, economic and regulatory structures under capitalist economies (Beder, 2000:8). The state was being pressured by environmental groups to introduce tighter environmental regulations and standards on industries and corporations. As a result of heightened public anxiety on the poor state of the environment, corporations made use of information technologies and public relation techniques to manipulate public opinion (Beder, 2000:8). Global spin reveals the sophisticated techniques being used around the world by powerful conservative forces to try to change the way the public and politicians think about the environment (Beder, 2002:2).

The focus on individual property owners and consumers to create an environmentally sustainable society is an argument founded in neo-liberal economies. This decreases state intervention in environmental problems promoting the commodification and privatisation of the environment. A variant on this argument that is rather popular in the modern 21st century designed to manipulate public opinion is “green washing” or “green consumerism” (Carton, 2009:4). Green consumerism is a state in which sustainability is seen as stemming from the demand from millions of consumers for environmentally friendly products (Klintman and Boström, 2008:40). Green consumerism is seen as state intervention geared towards environmental management and protection. Greenwashing refers to the hypocrisy of industries and corporations who mislead consumers regarding environmental practices or services (Klintman and Boström, 2008:40). In the new atmosphere of environmental concern, waste management is becoming a green business. Waste reduction and recycling has become an important social goal even though that goal may be elusive.

Multinational corporations involved in hazardous and toxic waste generating activities have used their economic powers to influence the state and environmental policies and weaken the influence of environmentalists in policy and decision making (Beder, 2002). They promote their own agenda, which is economic expansion and development with little or no environmental regulation which might impact on their activities and gains (Beder, 2002). The approach to pollution and waste management has changed from that of strict regulation of polluting and hazardous waste companies to a more self-regulatory approach (Jepessen et al., 2006:19). This approach entails industries taking responsibility for the waste they produce and adopting the “duty of care principle” ensuring that the waste they generate is disposed of in an effective and sustainable manner that is not harmful to the public and the environment. This demonstrates the unlikely marriage between environmental sustainability, economic growth and economic liberalism. Within this neo-liberal economy, with the management of increased volumes of waste, municipal governments globally were receptive to the responsibility of new “greener” technologies of disposal. State intervention in the form of environmental regulations such as clean air regulations caused burning of waste to decline (Soper, 2003:135). From the 1980s new and improved pollution control technologies in the waste management sector have been developed. Recycling in the waste industry has become a mainstream capitalist business (Soper, 2003:144).

Private contractors managing these recycling activities for municipalities profit both from managing the discards as waste and from processing them for recycling (Soper, 2003:144). The treadmill of production has adjusted to these new waste reduction activities: it profits from recycling and, at least in its policy statements, supports source reduction (Soper, 2003:144). This illustrates how capitalism systematically undermines environmental sustainability.

Waste management has become a profitable business. Veblen (Mitchell, 2001:403) notes that within the capitalist system industries become more specialised and fragmented, for example the treatment and disposal of waste have become areas of specialisation. This results in industries that control processes having little knowledge of the functioning of their industrial activities because of the fragmentation of certain processes. The focus is more on increasing profit than on improving overall waste management processes and developing better and improved waste technologies (Mitchell, 2001:403). The shift in outlook is being spurred by the recognition that waste disposal based on landfill and incineration is no longer feasible for a complex of reasons, of which pollution, climate change and resource depletion are the most important (Soper, 2003:131). The goal of the Kyoto protocol was to see a reduction of greenhouse emissions by participating countries. Kyoto agreements on climate change cannot be met without reducing primary energy usage and emissions from waste, therefore re-cycling rather than disposal must play a critical role in the waste management sector. This means a shift from “management” of waste to emphasis on “minimisation” of waste (Soper, 2003:131).

Ecological modernists take a critical view on Marxist’s outlook on the environment and the use of technology in production. Ecological modernists provide an optimistic, techno-industrial progressive theoretical alternative to the treadmill of production (Picou, 1999:100). This theory is based on the assumption that super industrialisation is necessary through the development of technology to deal with and correct ecological problems (Cohen, 1998:105). This process involves a shift towards cleaner, less resource-intensive technologies and production processes that will reduce the necessity for expensive, add-on, remedial technologies (Cohen, 1997:105). Ecological modernisation assumes that it is possible to reduce the correlation between economic development and environmental degradation by gearing these industries towards a new type of development.

Ecological modernists state that there is a need for the implementation of stricter environmental regulations which should promote economically viable greener products (Cohen, 1997:106). According to ecological modernist assumptions, capitalism is able to modify itself and adjust itself in such a way as to cope with environmental crises (Mol and Sonnenfeld, 2000:11). Ecological modernisation can be linked to optimism in science and technology. Nature could, or so it seems, be readily controlled and rationalised to human ends through science and technology (Carton, 2009:5). Overcoming ecological problems is resolved to mere “green washing” of existing institutions instead of fundamentally altering and correcting the imperfections which are a result of the market-based mechanism (Carton,2009: 4). Science and technology may have been responsible for getting modern societies into a poor environmental state, but could equally be capable of getting societies out of that state and into a new environmentally sustainable society (Mol and Sonnenfeld, 2000:10). Arguably society is now indeed entering a phase of ecological modernisation. What the ecological modernists ignore is that with the advent of new and advanced technologies more problems, especially ones that touch on social and environmental injustices, are created. This notion is supported by Beck who argues that:

Society now lives in an age of “manufactured risk”, one in which risk is no longer an “act of God” but one in which science-based intervention in the natural world, one originally designed to solve social and economic problems, is now accidentally creating new problems and hazards. Science and politics in our “second modernity” are therefore largely preoccupied with dealing with the risks created by earlier over-optimistic interventions ... Chains of problem solution and problem production are set up, whereby scientific interventions aimed at overcoming environmental problems finish up creating new crises (Beck, 1992).

Ecological modernisation promises to overcome the transfer of pollutants within the natural environment by developing “integrated pollution management” strategies and requiring industries to be more timely and responsive to their generated health and environmental hazards through the development of pro-active policies on waste management (Cohen, 1998:105). This theory assumes that a swift transition from modern to ecologically modern industrial societies is possible. This theory fails to perceive that ecological degradation and economic development cannot continue indefinitely as they require resources which are finite.

This theory perpetuates the notion of separateness of humans from nature as if humans are exempt from the effect of ecological problems and degradation.

Like many industries, the health care industry has undergone a transition to a so called greener and more sustainable processing of waste through the development of treatment technologies and waste disposal technologies. Even with the development of these more sustainable technologies, there is an intensification of various social and environmental risks involved with the use of these new, advanced and supposedly sustainably viable technologies. They pose a high health risk to the workers handling the equipment as well as to the natural environment and society. The environmental crisis, in particular the waste management crisis, is the inevitable result of this counter-ecological pattern of growth (Foster, 1999:7). The capitalist system is not a circular process but a linear one.

4.7 Conclusion

Marxists and neo-Marxists criticise capitalism for enriching capitalists at the expense of workers and for disregarding the risks involved in the production process. Marx's materialist and metabolic approach and critique of capital as a whole, provides an invaluable methodological foundation to critique contemporary environmental degradation, including the waste management problem, and to envision social and ecological transformation. Humans have a dualistic nature with respect to the environment, being both "a biological species in an ecosystem", subject to ecological limits and interdependencies, and at the same time "creators of distinctly social environments" (Freudenburg and Gramlin, 1989:439). However, the explicit focus of sociology has been on the "distinctly social" half of this dualism. Environmental concerns rarely form an integral part of development plans, resulting in social dimensions of environmental problems often being neglected. Through using Marxist theories and political economic approach the complex interface between nature, the health industry and society is clearly situated.

CHAPTER 5

RESEARCH DESIGN AND METHODOLOGY

5.1 Qualitative Methodology

This study utilised an interpretivist paradigm, which subscribes to subjectivism, emphasising how people in society perceive the social world and how they define and view social reality (Sarantakos, 2005:29). Using this approach thick descriptive data could be attained from the participants on their knowledge on medical waste practices. This study adopted a predominantly qualitative approach. Qualitative researchers believe that rich descriptions of the social world are valuable and can be attained through detailed interviews and observation of participants in their natural environment (Denzin and Lincoln, 1994:16). This research employed a triangulation of methods, which is based on the assumption that mixing qualitative and quantitative research tools will improve the credibility of the results (Neuman, 2001:165). A quantitative researcher attempts to fragment and delimit phenomena into measurable or common categories that can be applied to all of the subjects or to wider and similar situations (Winter, 2000). Researchers who use logical positivism or quantitative research employ experimental methods and quantitative measures to test hypothetical generalisations, and they also emphasise the measurement and analysis of causal relationships between variables (Golafshani, 2003:598). Qualitative researchers use a naturalistic approach that focuses on understanding phenomena in context-specific settings and avoids manipulation of the phenomenon of interest (Denzin and Lincoln, 1998:600).

Qualitative research differs from quantitative research in that qualitative research is conducted in natural settings rather than manipulating and controlling the environment to get a reaction from the social actors (Babbie and Mouton, 1998:270). The primary goal of this type of research is the describing and understanding of human behaviour rather than explaining causal relationships as quantitative research aims to do (Babbie and Mouton, 1998:270). In this case,

to evaluate medical waste practices, policies and processes of medical waste management in selected rural hospitals.

From a qualitative analytical point of view, interviews were the most appropriate method for this research. A set of questions was prepared prior to the interviews, however the interview schedule was flexible and not followed strictly but served as a guideline. The participants in qualitative research are asked open-ended questions and are required to respond in their own words. Different groups of people were asked different questions. Semi-structured interviews allowed me to gain individual perspectives of the different stakeholders, and open-ended questions allowed me enough flexibility to keep the flow of an interview going according to the comfort level of the interviewee. The open-ended questions were prepared and modified according to the participant being interviewed. In preparation for the interviews, I tried to learn as much as possible about the interviewees' job descriptions in relation to the medical waste management process before meeting them. I tried to ask questions that were specific to people's involvement in the medical waste management process. Participants were asked specific questions on medical waste generation, separation, storage and transportation in relation to their involvement in the medical waste management process. Digital recorders were used during the in-depth interviews to ensure the trustworthiness and credibility of the data collected. Interviews (except during informal discussions) were recorded and all of them were later transcribed onto a text document. It was important for me to have everything recorded so that I could fully concentrate on the conversation with the participants.

Researchers utilise the texts or words of the participants as data to analyse and interpret. This is why in this research the interpretivist paradigm was adopted, as the aim was to explore issues surrounding management of medical waste in healthcare facilities as viewed by the people handling and involved in the management of medical waste which requires their subjective views and insight. Knowledge of the social world can also be enhanced by using empirical principles which requires the use of senses and scientific methods in order to observe and study the social world (Neuman, 2001:8). This enabled me to also incorporate systematic observation which is a quantitative method. Systematic observation was used to corroborate what was said by the participants and what was observed by the researcher, in terms of how medical waste is handled, stored, transported and disposed of, as opposed to relying solely on the descriptions of

the participants. A journal was kept throughout the fieldwork to write down all observations made.

5.2 Population and Sampling

The population used for this study constituted of the two selected hospitals, as well as municipal government personnel involved in waste management. Sampling involves decisions about which group of people or social processes to observe (Blanche and Durrheim, 1999:45). A portion of the population used in the research from which the researcher was able to deduce results that could be transferable to a similar project or context. Sampling was based on hospital staff who had direct involvement with medical waste. This included the staff involved in the formulation of hospital policy and guidelines on medical waste management, those responsible for the training of staff in the handling of medical waste, and the staff who handle, collect and dispose of medical waste. The sampled staff also included people who worked at different levels in the hierarchy of the hospital. This is because the study was targeting people who had the required knowledge on this research topic. Snowball sampling was used to deduce which participants to use for the study as advised by the infection control officers and senior nurses in these hospitals, as they had more insight into the type of people to interview based on their role in handling medical waste.

A total of 13 participants at Nompumelelo Hospital were sampled. These were the infection control officer, quality insurance officer, two general assistants (cleaners), two nurses, one enrolled nurse, one trainee nurse, one radiographer, one medical waste operating site officer, and three pharmacists. The sample at Settlers Hospital consisted of ten participants: the infection control officer, two nurses from the theatre, a senior nurse from the private wards, four nurses from the private wards, and informal interviews from two nurses from the private wards. Additional data on medical waste management policies, practices and processes was obtained from a representative from the Department of Environmental Health and Cleansing at the Makana Municipality as well as informal discussions with recycle workers and waste reclaimers at one of the Grahamstown general waste landfills.

5.3. Data Collection

5.3.1 Settlers Hospital, Grahamstown

The Environmental Management Inspectorate known as the “Green Scorpions” are required to monitor the safe disposal of medical waste in the environment. They have been involved in a number of medical waste dumping and illegal storage cases in South Africa (Timeslive, 2009). The maximum penalty for illegal dumping of medical waste is a R10 million fine and ten years imprisonment (Timeslive, 2009). The heightened attention and awareness surrounding the issue of medical waste has led to the refutation of responsibility and accountability by health facilities and waste companies and other stakeholders about their involvement in the waste management process. They are unwilling to take part in research studies because of the fear of what the studies may reveal. These waste generators could be held liable and accountable for the impact that their activities have on the status of health and environmental management in the country. Management of medical waste has become quite a sensitive issue, clouded in secrecy, denial and lack of accountability. As a result, negotiating access into the field proved difficult.

Preliminary visits were made to the hospitals prior to the commencement of the study to ascertain what was required in order to gain access to the field and to establish rapport with the relevant hospital staff. Settlers Hospital is divided into two sections: the private section, which is under Netcare, and the public section under the government. Upon speaking with the management of the hospital, I was referred to the Infection Control Officer who assisted in the sampling of participants. Medical waste management and infection control at Settlers Hospital has been outsourced to different private companies. As a result there is a fragmentation of roles and duties in the handling of medical waste. Netcare is responsible for the overall management of medical waste and infection control, enforcement and monitoring of medical waste policies and its implementation in the hospital. The infection control officer was not only responsible for ensuring the efficient management of medical waste at Settlers Hospital but also monitored medical waste management practices in Port Alfred Hospital as the hospital was in partnership with Nalithemba Hospitals. This meant that the infection officer worked between the two towns and was not easily available and proved to be quite busy.

The administration and management at Settlers Hospital were not willing to be interviewed. They insisted that they were no longer involved in any part of the medical waste management process but had outsourced it to Netcare, therefore Netcare was responsible for any medical waste related issue in the hospital. However, during the research process it became clear that Netcare was responsible for managing the private section only. In order to gain access to the private section, which included the theatre and private wards, one had to get permission from the Netcare management team. This was a straightforward task involving some paperwork stating the intention of the research. Interviews took place with the infection control officer and the relevant nurses in the theatre and private wards. The nurses and administration discouraged the interviewing of doctors and claimed that they had the least amount of knowledge on the handling and practices of medical waste. I was unable to interview any of the doctors as it was insisted that it would reflect badly on the hospital management record.

The nurses in the private wards were reluctant to share any information out of fear of divulging information that might get the hospital into trouble. A lot of the nurses were uncomfortable with the use of a digital recorder and shared more information during informal discussions where I had to rely on taking notes as they told their account of their experiences of managing medical waste in the hospital. This showed that they lacked confidence with being interviewed on medical waste management even though it formed an integral part of their daily duties. During the interviews a lot of the nurses would refer back to files lying around their vicinity on infection control procedures, as they were not sure about or familiar with certain details and protocol on medical waste management.

The cleaning staff in the private section are responsible for the collection and internal transportation of medical waste to the central storage area. This entire process is outsourced to a private company, called Royal Serve. To acquire complete information on the entire medical waste process I had to gather information and set up in-depth interviews with the cleaners who are directly involved in the handling of this waste. Contact was made with the various supervisors and I was continually referred to different people who all claimed that they were not the right people to interview. This was one of many bureaucratic problems I had to deal with during this study. After months of communication with some of the supervisors in an effort to gain access to interviewing the cleaners, I ended up failing to get a formal interview with the cleaners. The only information gathered was through systematic observation during on-site visits and informal discussions.

A letter granting research access on the public section from the Department of Health, Research Office in Bisho was obtained (see Appendix 1) when it became apparent that Netcare was only responsible for the management of the private section. This letter granted me permission to freely conduct interviews with relevant participants and also granted the hospital authority to share relevant information needed for this research. Obtaining a letter from the Department of Health was also difficult. It took over a month to be directed to the relevant department and personnel responsible for research in the Eastern Cape Province's Department of Health. Even after the relevant paperwork was submitted, getting a response from the government took a few months. It seemed as if the Department of Health was reluctant to grant permission to pursue this study. These delays are quite discouraging for a researcher. They can be perceived as though the Department of Health is being secretive and reluctant to allow researchers to collect data even though there is a scarcity of data and literature in the country and though government reports urge researchers to do more research on issues pertaining to medical waste management in the country. It is only through the assessment of different hospitals and how they manage their waste and the problems involved, that the government can develop efficient and appropriate strategies to deal with this medical waste problem at hand.

Settlers Hospital seemed quite reluctant to grant full access for this research to be conducted, especially in the public section. They insisted that all the information needed was already shared by the infection control officer who was specifically employed as an expert in the medical waste management field to deal with medical waste related queries. Hospital management refused to understand that medical waste management as a whole had various processes and practices which for one to understand in its totality required interviews with all the staff directly involved in the process regardless of their level. Countless meetings were set up to meet with someone from the management team at Settlers Hospital in order to acquire the "go ahead" to conduct the study. For the study to take place, the board of the hospital also had to approve the conducting of this study. After several emails and follow up phone calls, I did not get any feedback from the board meeting and therefore could not continue with the research and collect data from the public section. This raises alarming questions and suspicions regarding the hospital's conduct and management of medical waste.

5.3.2 Nompumelelo Hospital, Peddie

Upon making contact with the administration at Nompumelelo Hospital, meetings were set up to present all the relevant documents needed to conduct research. The administrator of the hospital was quite helpful and willing to assist and allow full access into conducting the study. However, the board of directors of the hospital caused major delays. The letter from the Department of Health, Research Office (see Appendix 1), was attached as well as the proposal of the study and a letter that binds the researcher to abide by the University's research ethical conduct. The board and the rest of the management of the hospital showed reluctance to allow this research to take place. Eventually access was given, but even so, the hospital itself needed to draft its own letter granting permission to conduct research within their premises. This letter required the signature of various people within hospital management. There seemed to be contradictions within hospital management with regard to the conducting of this research.

Nompumelelo Hospital relies fully on government support, unlike Settlers Hospital and unlike Settlers Hospital, they deal with their own management of medical waste. It was not outsourced to any private company except when it came to the disposal and transportation of this waste. Interestingly enough, unlike Settlers Hospital, they had their own team of nurses who dealt with medical waste in the hospital. They had their own infection control officer and quality assurance officer who worked closely together in monitoring medical waste management within the hospital. I was able to take photographs during observation at Nompumelelo hospital. This however was not possible at Settlers Hospital in the public section, given that full authorisation from hospital management had been withheld.

The degree of risk posed by exposure to medical waste is still unknown, but some studies speculate that the increase in the spread of diseases and various epidemics in developing countries could be promoted by the failure of health facilities to contain and control medical waste disposal and management (Coker et al., 2009:803). Health facilities have a duty of care to ensure the safe and proper management of medical waste that is generated in their facilities. Even with the outsourcing of certain processes in the management of medical waste, health care facilities are still accountable and responsible for the waste generated and to make sure that these private companies have the capacity to dispose of the waste in the correct manner.

Medical waste is a sensitive issue and is a national problem affecting all health sectors which is the reason why it was hard to find medical staff who were willing to talk honestly about the medical waste problems faced in their workplaces. Hospital staff feared being held responsible and accountable for mismanagement of medical waste. The hospital staff during the research voiced their concern with regard to the possibility of losing their jobs if they were to divulge information that could get the hospital into any kind of trouble. Their anonymity was observed throughout the study.

In both hospitals, I asked the infection control officer to assist in selecting a sample for this study. The infection control officer has more knowledge of the different roles and duties that the hospital staff play in relation to the handling and processes of medical waste management. Field observations were also conducted in the main wards of the two hospitals, and in and around the areas where medical waste was stored in order to gain an overall assessment of the day-to-day management of medical waste. This allowed for the study not to rely only on the participants' responses but to have a visual experience of how medical waste was managed in these hospitals. The data collected was compiled and transcribed into text. Thematic analysis was used for this research. The text that was derived from the respondents and field notes taken from observation during on-site visits and the text was used to identify themes and patterns. Some of the themes were derived from the WHO (1999, 2005, 2006, 2011) "Guideline on Management of Health Care Waste" as well as "A Guide For Southern African Health Care Institutions" on Managing Hospital Waste (Leonard, 2004). The interview questions and systematic observation were derived from the WHO (2006) step by step approach on medical waste management. According to the WHO (2006), medical waste should be managed from the point of generation until disposal also known as the "cradle to grave" approach. This is a strategy that was commissioned in 1993 by the European Commission as part of its health care waste project that has been adopted by health care systems internationally (WHO, 2006). However, one needs to note that the WHO guidelines on managing medical waste are not best suited and applicable to poor resource based rural hospitals in the developing countries. The study also utilised "A Guide for Southern African Health Care Institutions" on Managing Hospital Waste (Leonard, 2004). Both these guidelines were insightful in guiding this study, although minor adjustments were made to suit this specific study. The questions used during the interviews were designed to capture the actual processes and practices regarding medical waste management generation,

collection, storage, transportation, treatment and disposal. This is why the research focused on interviewing hospital personnel who actually handle medical waste directly and indirectly in order to obtain key information. The questions asked sought to attain information regarding the objectives and sub-objectives of the study. Questions on the generation, handling, storage, transportation and disposal of medical waste were to attain information in relation to the practices and processes of medical waste in the hospitals. Questions on medical waste management guidelines and training were to establish the knowledge of the participants on medical waste management. Participants were also asked questions regarding government and management support as well as adequacies on medical waste management in order to gather information on challenges and constraints faced.

5.3.3 Waste Generation and Handling

This part of the interview investigated the different types of waste generated within these hospitals and if they kept any record of the waste generated. The WHO (2006:64) requires medical waste to be collected daily or as frequently as possible depending on the waste generated in a day. The questions asked during the interview were to establish how many times waste was collected in the wards and consulting rooms and who was responsible for the collection of this waste. They were also questioned on the types of waste they dealt with on the daily and how they handled that particular waste. Participants were also asked about any relevant training regarding handling of medical waste management.

5.3.4 Waste Segregation

Questions on waste segregation were asked in order to ascertain whether the hospital actually classified the waste and segregated it appropriately as required by the WHO and the South African Bureau of Standards (see Appendix 2). The study also sought to establish whether the waste was separated into different colour-coded and labelled containers or bags. The study also wanted to investigate the availability of these containers for the use of the hospital. Observations were a key tool in order to take note of how the hospitals segregated their waste and the type of containers they used.

5.3.5 Waste Storage

This part of the interview focused on determining whether the hospitals had demarcated storage areas for the storage of medical waste inside the hospital which is used as a temporary storage facility. This involved checking the presence of a safe, inaccessible, well-built and ventilated central storage area. Observations were made in these storage facilities, as captured in the photos taken during fieldwork. I also wanted to determine the number of hours that the medical waste was stored both in the temporary storage and in the central storage before disposal.

5.3.6 Transportation

I also sought to discover what mode of transport the hospital used to transport medical waste internally and externally from the wards to the temporary storage area. This part of the interview also explored how it was transported out of the hospital for final disposal. This also meant trying to ascertain how much accountability and responsibility the hospital took for the waste generated in adopting the “cradle-to-grave approach” and making sure that their waste is disposed of appropriately.

5.3.7 Treatment and Disposal

This part of the research included the examination of the type of treatment methods that the hospitals used to treat their medical waste before disposal to ensure minimal infections and hazards. It also sought to document the disposal methods used. Managers of health facilities have to ensure that they use appropriate disposal methods that will not expose the public to any health risks and will avoid contamination of the environment.

5.3.8 Management Issues

This part of the research explored whether the hospitals offered any formal training for the staff on a proper step-by-step guide on handling medical waste as well as the risks involved and the frequency of these training sessions. This aspect of the research also looked into the policies on medical waste management available in the hospital as well as a budget for

medical waste management. The knowledge of the staff on issues pertaining to medical waste was key. One has to consider the omission of certain information. There were quite a few discrepancies between the answers provided by the participants and what was observed during the on-site visits. After gathering information from the participants from these hospitals, it was necessary to corroborate it with the actual practices of these hospitals, hence the importance of systematic observation.

The mismanagement of medical waste has a direct negative health impact on the municipal workers collecting refuse waste as well as recycle workers and waste reclaimers in the general waste landfills. The inappropriate disposal of medical waste has a detrimental health and environmental impact endangering the health of these people. Contact was made with a few representatives from various departments of the Makana Municipality dealing with issues pertaining to environmental affairs and waste management to gather their view on this issue. The municipal management were reluctant to comment on the issue of medical waste and stated that it did not involve them as they dealt with general waste and other types of waste excluding medical waste. They felt that it was an issue that had more to do with the Health Department and hospitals and was not under their jurisdiction. A representative from the Environmental Health Department was of assistance and agreed to be interviewed and gave insightful information on the issue of waste management in Grahamstown. I made a point of revisiting the general waste landfill to gather information and observe the processes of waste disposal in the area in comparison to my former research findings (Maseko, 2010). I wanted to explore further whether these municipal and recycler workers came across any medical waste, which ultimately would mean poor segregation of general waste from medical waste and improper disposal of medical waste in general waste landfills. I managed to have an informal discussion with the recycler workers as well as the reclaimers about their personal experiences regarding waste management in this municipality as well as issues regarding health and safety.

5.4 Credibility and Trustworthiness of Data

Scientists have viewed the research done by qualitative researchers with scepticism claiming that their findings cannot be trusted as they pay insufficient attention to issues of reliability and validity (Golafshani, 2003:599). Guba and Lincoln (1985) substituted reliability and validity

with the parallel concept of “trustworthiness”, containing four aspects: credibility, transferability, dependability, and confirmability. Confirmability is a measure of how well the study’s findings are supported by the data collected (Guba and Lincoln, 1985). Credibility is an evaluation of whether or not the research findings represent a credible conceptual interpretation of the data drawn from the participants’ original raw data (Guba and Lincoln, 1985). Transferability is the degree to which the findings of this study can be applied beyond this project (Guba and Lincoln, 1985). Dependability is an assessment of the quality of the integrated processes of data collection; data analysis and theory generation (Guba and Lincoln, 1985). Unlike quantitative researchers who seek causal determination, prediction and generalisation of findings, qualitative researchers instead seek illumination, understanding, and extrapolation to similar situations (Golafshani, 2003:600). Although reliability and validity are treated separately in quantitative studies, these terms are not viewed separately in qualitative research. Instead, terminology that encompasses both, such as credibility, transferability and trustworthiness, are used.

Qualitative researchers pride themselves more on issues of credibility, trustworthiness and transferability (Neuman, 2001:214). The researcher in qualitative research uses the “self” as the main instrument in the research process, which quantitative researchers view as research bias because the presence of the researcher interferes with the research process adding to the level of error (Babbie and Mouton, 1998:270). Qualitative researchers argue that it is impossible for a researcher to remain objective and unbiased as every research undertaking will have a significant level of error or irrelevant information (Babbie and Mouton, 1998: 270). The use of triangulation in methodology, methods used and analysis is seen as one of the primary ways of enhancing issues of validity and reliability in qualitative research (Babbie and Mouton, 1998:270). By combining methods and investigators in the same study biases that qualitative research is said to have are eliminated. It also makes up for all the deficiencies that other methods may have (Babbie and Mouton, 1998:275). With qualitative research credibility is acquired through the researcher’s reports and the verification steps applied throughout the research process (Creswell, 1994:157). To ensure the credibility and trustworthiness of this study, a digital recorder was used when permissible, to ensure that the participants’ responses were not altered. Field notes were also taken throughout the study, especially noting down what was being observed during the site visits as well as what was said during informal discussions.

In instances where it was permissible, photos were taken during observations as well. Systematic observation was used throughout the study to corroborate what was being said by the participants. Triangulation of research methods was used to improve the credibility and trustworthiness of the study. Thematic analysis was used to analyse the data collected. This data was interpreted in relation to the context of the whole study to strengthen the credibility of the study. The use of snowball sampling in order to identify key purposive sampled participants who are actually experts or involved in the management process of medical waste was important to ensure transferability of the results to different contexts. The design of the research and data collection instruments were adopted from “A Guide for Southern African Health Care Institutions” on Managing Hospital Waste (Leonard, 2004) and changed in order to accommodate the rural context of this study. This ensures the dependability of this study.

5.5 Challenges

Due to the nature of this research, a number of challenges were encountered. The lack of literature on this topic was one of the biggest challenges, as well as lack of data and statistics on medical waste management in South Africa. The breakthrough was when I was able to gather data made available by groundWork which is a non-governmental environmental justice organisation based in South Africa, that emphasises assisting the disadvantaged and vulnerable afflicted the most by environmental injustices. As already indicated, negotiating and gaining access into the field was another challenge. Hospitals fear sharing information on this topic as well as opening up their hospitals to be “investigated”, especially to academic researchers. They were reluctant to share any information or to be interviewed for this study. The same applied to the municipal workers, who shifted responsibility which showed how uncomfortable they were to be interviewed on this sensitive topic. The medical waste management process has become a highly fragmented area which made gaining access yet another obstacle. Certain processes and practices such as handling, cleaning, transportation and disposal have been outsourced to various private companies which are not easily accessible.

5.6 Ethical Considerations

This research adhered to Rhodes University's policy on ethical guidelines on research and the ethical guidelines stipulated by the Department of Health. A research ethics form was also signed at Nompumelelo Hospital which the researcher was expected to abide by which was a privacy and confidentiality clause and one that ensured that I did not divulge information that was not related to the research study and respected the hospital staffs' anonymity and autonomy. These ethical guidelines, which were revealed to the participants prior to the research, included maintaining confidentiality, making use of pseudonyms to ensure the participants' anonymity, and informed consent. The ethical guidelines also emphasised the autonomy of the participants, indicating that should they feel uncomfortable with the research they could withdraw at any time. They were informed that they were going to be recorded and permission was received from them prior to the research. I received permission from the hospitals to take photos in and around the hospital premises.

5.7 Conclusion

This chapter described the methodology and highlighted various techniques that were employed to conduct this study. The research design covered the paradigm used, type of study, target population and sampling. The data collection process in the two hospitals, the landfill and municipality were done in person. Ethical considerations were observed throughout the study. Permission was obtained from the Provincial Department of Health, hospitals' management as well as from the participants themselves. The analysis formed the basis for the discussion and interpretation of the results.

CHAPTER 6

ANALYSIS AND FINDINGS

The application of the methodology presented in Chapter 4 led to the collection of the data presented in this chapter. The participants were interviewed and recorded individually and were asked questions based on their involvement in the medical waste management process. Due to the sensitive nature of this research, participants seemed more comfortable to freely share information during informal discussions than during the actual interviews. Keeping a journal and taking notes was key. During site visits in the hospitals I was able to go in and around to view the hospital's facilities and infrastructure with the participants to observe. This chapter consolidates all the data collected from interviews, observations and informal discussions. Themes have been generated based on the findings. The themes generated are in relation to the existing structures, processes and practices used in the management of medical waste. Findings of each hospital are highlighted and a job description of the participant is provided. In order to give more clarity photographs have been inserted. South Africa is confronted with a widespread medical waste management problem. The government is failing to successfully formulate policies to best mitigate this problem. This study attempts to examine the complex interplay between the health care waste generating industry, the natural environment and society. It looks into the extent in which health care facilities adopt and enforce medical waste management policies. It also examines the medical waste management process from the point of generation to its disposal and the underlying issues that impede efficient medical waste management in rural hospitals. More importantly this research uncovers the unequal power relations in the waste management sector and how this has an effect on social and environmental justice.

This chapter examines the management of waste management in Nompumelelo Hospital and Settlers Hospital by analysing the research findings against the Marxist perspective presented in Chapter 4 which is based on the premise that capitalist societies are mass waste-producing societies. The notion of economic growth and mass production through science and

technology in the waste management sector has undermined environmental management and the livelihoods of communities, putting nature and humans at risk of waste-related diseases and a hazardous, polluted environment. This thesis views the healthcare industry, and more specifically the waste management sector, as the “treadmill of production”, a system that is supposedly progressing, running in place without actually moving forward because it concurrently represses progress in society (Gould et al., 2004:297). While society is viewed as progressing economically and in terms of development, certain aspects such as environmental health and the livelihood of communities continue to suffer and to be exploited. The lack of policies regulating the profitable waste management sector demonstrates the state’s inability to act on issues that impede on economic growth. This emphasises the influence of corporations and the private sector on the state in order to gain profit and power at the expense of ordinary citizens. Recurring themes in this analysis are the lack of medical waste data in these health facilities, lack of knowledge and support educative systems, and environmental and social injustices borne by low income communities, reclaimers and recycler workers which demonstrates a poor waste management system.

6.1 Lack of Record Keeping Of Generated Medical Waste

The waste generation phase is a crucial stage, and waste generators should be trained to know how to classify, segregate and store medical waste from its point of generation. It is the duty of hospitals to manage their waste in an efficient and environmentally sustainable way from the point of generation. The findings of the study reflect that Nompumelelo Hospital does not accurately weigh or record the waste that they generate. The operational officer stated that the hospital relied on the waste collection and transporting company, Compass Waste, to weigh and record the amount of waste generated by the hospital. Commenting on this he said:

When compass waste comes to collect the waste, they weigh the waste and write it down here ... and give me this paper ... I keep it. (Operating Officer, Interview with author, 2012)

The infection control officer at Nompumelelo Hospital raised concern over the inability of the hospital to weigh and keep records of their own waste and pointed out that it would be a great idea for the hospital to have their own weighing system. An important fact that emerged was that the nurses seemed to think that it was the duty of the waste collection company to record

the waste generated by Nompumelelo Hospital. As stated:

It's done by Compass Waste, we don't get involved in that. (Trainee nurse, Interview with author, 2012)

Responding to the same question another respondent said:

It is not our duty to record but when they collect the waste, Compass Waste, they record. (Nurse A, Interview with author, 2012)

However, the infection control officer pointed out that they were not sure as a hospital whether the amount recorded by the waste company was accurate because there was a strong possibility of the waste company increasing the amount in order to charge them an additional amount to make a profit. Similarly, Settlers Hospital did not keep a record of the waste that they generated but relied on the waste company to record the waste that they generated. As cited by the infection control officer:

The technical services department is always there when the contractor comes to collect the waste, to make sure that the waste company does things properly and that what they record on paper correlates with what is actually being done and that they weigh correctly. (Infection control officer, interview with author, 2012)

The study found that although other types of medical waste were not clearly recorded and weighed on a regular basis, anatomical waste was accounted for. The theatre kept a record of the amount of anatomical waste generated as indicated:

We've got a book where we write the patient's name and phone number and doctor's particulars and who came to pick what specimen and record that so that when they find tonsils somewhere or anything we can say no it is written here such and such a number of tonsils were taken by so and so. (Theatre Nurse A, interview with author, 2012)

While the nurses in the theatre had a rough idea of the amount of waste that they generated daily, the nurses in the private wards did not have the vaguest idea of the amount of waste generated in the wards and shared similar sentiments as the nurses at Nompumelelo Hospital that record keeping of generated waste was not their duty. One nurse stated:

We don't do it but others do, ours is just to put it in the right containers. (Nurse A, interview with author, 2012)

Even the senior nurse had a similar view:

We don't weigh it, but maybe they do weigh it when they fetch it for like boxes. (Senior Nurse, interview with author, 2012)

The fact that the nurses did not have all the necessary information on the entire medical waste management process highlights the fragmentation of the labour process in modern society. It also shows the alienation of the working class from their work and their lack of control over what they do. It is quite clear that the recording of the amount of waste that these hospitals generate is not a priority. It is perceived as a duty of the contracted waste company to weigh the medical waste, and then notify the hospital about the amount of waste that they generate. It is important that hospitals keep a record of the amount of waste that they generate in order to assess their ability as a hospital to handle the waste generated. It is important for them to keep their own records to combat possible corruption with waste companies exaggerating weight in order to charge more money. It is said that South African health facilities and South Africa as a whole has exceeded its capacity to handle the waste that is generated (Leonard, 2005:4). This is mainly a result of the lack of data in hospitals on how much waste they generate in order to monitor the hospitals' ability to efficiently dispose of the waste generated. Illegal dumping of waste by waste companies has been a common practice in South African and waste generators have a duty of care principle to ensure that the waste generated does not end up being a health hazard or environmental risk. Collection frequency, storage capacity, treatment facility and disposal methods are all dependent on the amount of waste that the hospital generates, hence the importance for hospitals to assess and keep a record of the amount of waste that they generate.

6.2 Poor Segregation of Medical Waste from Other Types of Waste

According to the WHO (1996:61), all medical waste should be categorised then segregated and separated according to that particular country's national guidelines. No matter what final strategy for treatment and disposal of waste is selected, it is critical that waste is segregated at the point of generation prior to treatment and disposal (BAN, 1999:5). In order to maintain a clean and healthy working environment, it is critical that medical waste is segregated

appropriately. The segregation of medical waste assists in the safeguarding of the occupational health of hospital staff as well as the general public and the environment. If the hospital fails to segregate waste appropriately it results in the mixing of infectious waste with general waste which lands up in general waste landfills, exposing waste reclaimers, recyclers, municipal workers and the environment to health risk. Efficient segregation of medical waste minimises the costs of medical waste management in a hospital. When hospitals fail to segregate their waste appropriately the amount of waste that is handled as special waste increases, which ultimately means increasing costs because of the specialised ways in which medical waste is meant to be treated from its generation to its disposal. Hospitals' failure to segregate their waste has led to many hospitals incurring high costs in their management of waste, costs that they can ill afford (WHO, 1999:139).

Hospitals are required to place appropriate bags and containers in all locations in the hospital where particular categories of the waste may be generated (WHO, 2008:35). Hospital management needs to ensure that instructions on the required segregation and separation of medical waste are easily accessible to all staff and posted in every waste collection point (WHO, 1999:62). This will remind the staff at all times of the appropriate procedures for waste segregation. Containers and plastic bags are to be collected and removed when they are three-quarters full and should not be full to the brim. Avoiding the stockpiling of medical waste is a health and safety precaution which is necessary in order to avoid the spread of infections within the hospital, as well as to protect waste handlers from any possible accidents and spillages. All containers and plastic bags should be closed at all times. Data collected from Nompumelelo Hospital highlighted that the hospital had poor segregation practices. Amongst other medical waste management problems, the hospital battled with the appropriate segregation and separation of the various identified types of waste. The mixing of medical waste and general waste was a common practice. According to the cleaners (general assistants), who are responsible for the collection of medical waste in the wards, there were two bins between the beds in every ward: a bin with a red bag for infectious waste and one with a transparent bag for general waste. All pharmaceutical waste, which consists of expired medication, was collected by the pharmacists themselves using green buckets and stored by them. Posters were evident in selected collection points, although insufficient, to remind the hospital staff of how to segregate the waste correctly.



Figure 6.1: Medical waste segregation at Nompumelelo Hospital (Maseko, 2012)

In order to maintain a clean and healthy working environment, it is critical that medical waste is segregated appropriately. Hospitals in the Third World are said to generate significantly higher volumes of waste than hospitals in developed countries (NHCMP, 2003: 4). The problem lies in the failure to classify the waste at the point of generation, which results in an increased amount of waste classified as infectious medical waste that requires special handling and disposal. Proper segregation of medical waste ensures the reduction of infectious medical waste that is disposed of. However throughout the study at Nompumelelo and Settlers Hospital it emerged that there was little or no distinction between infectious waste and non-infectious waste. Whilst conducting interviews at Nompumelelo Hospital I noted that the hospital considered a large quantity of the medical waste that they generated as infectious waste, although not all waste that is generated in a hospital is infectious and hazardous and therefore should not be treated as such.

According to the EPA and CDC, infectious waste is waste that is capable of producing a disease that is infectious (OTA, 1988:81). The South African Bureau of Standards (1993:1) regard infectious waste as waste that contains blood, therefore this can include things such as cotton wool, swabs and bed sheets (see Appendix 2). It is important for the hospital to have a medical waste management plan in which the hospital identifies the different types of waste generated by that specific hospital and specifies how that waste should be treated and whether it can be rendered infectious and poses a high risk factor. As a result of poor knowledge and training on the handling of medical waste, a large amount of medical waste is rendered infectious and hazardous and treated as such even though it is not. This perception was stated by one of the nurses at Nompumelelo Hospital who, when questioned on how they segregate and separate their waste, stated that:

Everything used on a patient is considered infectious ... from gloves to masks. (Nurse A, Interview with author, 2012).

One of the nurses at Nompumelelo Hospital also mentioned how they had instances of poor segregation and separation of medical waste to the extent of sharps blocking the drainage system resulting in plumbing problems at Nompumelelo Hospital. Municipal waste collectors in Peddie and Grahamstown constantly reported finding sharps and other types of medical waste in the general waste refuse collected. This evidently shows poor segregation practices in the hospital to the extent of sharps being disposed of haphazardly in this manner instead of being disposed of in an appropriate container. The absence of rigid environmental and health regulations in modern capitalist societies create a pleasant atmosphere for the poor management of medical waste. The hospital staff at Nompumelelo Hospital attested to how segregation of medical waste was one of the practices they struggled with:

Yes sometimes it happens, for example after washing your hands you take the tissue and put it in the red bag instead of the black one for general waste or even put the tissues in the sharps container, so we do try to motivate people to use the appropriate bins. (Nursing Assistant A, Interview with author, 2012).

The infection control officer highlighted how negligence and poor knowledge of doctors in particular as well as nurses contributed to poor segregation practices in the hospital. The infection control officer highlighted that Nompumelelo Hospital was in need of more regular training.

Poor segregation practices were a recurring theme at both Nompumelelo Hospital and Settlers Hospital. At Settlers Hospital, they also struggled to implement good practices in the segregation and separation of medical waste within the hospital. The private wards at Settlers Hospital and the various consulting rooms all had two bins for the collection of infectious waste in one bin and disposal of general waste in the other. In both these hospitals, the containers were left open and were easily accessible, even though these containers are supposed to remain covered at all times to ensure protection of patients from any infections (WHO, 1999: 122). All the collection points at Settlers Hospital had posters illustrating how and where to segregate the different kinds of waste. This is a good attempt to remind the hospital staff about how to segregate the waste.

When asked on the issues of segregation of waste, the infection control officer at Settlers Hospital said:

Yes, segregation of waste, you've got your medical waste container and they don't always care about putting it in the correct container, because for general waste you put it in the black bag and medical waste is usually in red bags, that way we have to regularly train them on that you don't put normal paper towel in the red bag. (Infection Control Officer, Interview with author, 2012)

Settlers Hospital also treated a large amount of medical waste as infectious waste which increases the amount of waste that requires specialised handling. This was gathered from the comments made by the senior nurse:

We have red bags in each ward for infectious waste, but everything is treated as infectious regardless of whether it's infectious or not. Whatever comes from a patient goes into a red bag. (Senior Nurse, Interview with author, 2012)

Health facilities are trying to safeguard society by treating a large number of generated waste as infectious waste which requires specialised treatment and disposal. By doing so health facilities end up lacking funds to efficiently deal with the large amount of medical waste to be handled as infectious waste.

6.3 Collection and Handling of Medical Waste

All hospital personnel who handle and collect medical waste should be trained intensively on the handling and collection of medical waste. They should be made aware of the risks involved in the handling of infectious and hazardous waste (NHS, 2008:7). Staff dealing with and handling medical waste should wear protective clothing at all times and be immunised against hepatitis B (NHS, 2008:7). The staff handling waste should be familiar with the procedures of handling medical waste as stated in the hospital's medical waste management plan. It is advised that all waste should be disposed of in cardboard boxes which arrive as collapsed structures (Mudau, 2006:68) and require less storage space than bins. The disadvantages of cardboard boxes are that when in use the lid cannot be tightly closed and more often than not, they are left open, as observed at Settlers Hospital. These cardboard boxes are also not user friendly in wet areas as water can easily permeate them (Mudau, 2006:68). Nevertheless, hospitals are still recommended to use non-reusable bins because they are destroyed together with the waste to avoid the spread of infection.

Nompumelelo Hospital used metal bins (see Figure 6.3) as opposed to cardboard boxes to collect their waste, and during collection the red bags and transparent bags were removed and replaced with new ones. Given that these bins were not disposable, if not kept clean and disinfected regularly these bins could possibly be infectious themselves. This is why it is advisable to use the cardboard boxes which are meant to be disposed of when full. Hospitals globally are trying to minimise the amount of waste that they generate in an attempt to go "green", therefore re-using of bins and thoroughly washing and disinfecting them is seen as a more waste reduction efficient option towards sustainable development. The health care industry is constantly trying to find new waste reduction activities that ensure profitability and yet undermine environmental sustainability. Nompumelelo Hospital seemed to have adopted the strategy of re-using bins. However, it was noted that at Settlers Hospital these cardboard boxes were being re-used (see Figure 6.2): the cleaners only removed the red bags and black bags from the wards and transferred this waste into bigger boxes and re-used these cardboard boxes.

One of the nurses at Nompumelelo Hospital gave an account of the day-to-day handling of medical waste as follows:

No it's the general assistants that collect, then the men from the workshop put it to the storage, then they are divided, the black plastics are taken to the municipality, we use the bins for foetus and limbs which is closed then sealed. (Nurse B, Interview with author, 2012)



Figure 6.2: Infectious waste containers at Settlers Hospital (Maseko,2012)



Figure 6.3: Infectious waste containers at Nompumelelo Hospital (Maseko, 2012)

The cleaners at Nompumelelo Hospital were responsible for the handling and collection of medical waste in and around the hospital and the wards. The infection control nurse stated that they were responsible for the training of the cleaners and made sure that they were kept up to date about the risks involved in handling infectious medical waste. Through interviews with the respondents at Settlers Hospital, it was gathered that the handling and collecting of medical waste at Settlers Hospital has been outsourced completely to a private company, Royal Serve. It is questionable whether Royal Serve trains their staff regularly and extensively on the handling of medical waste and whether the cleaners have adequate knowledge of the risks involved in the handling of infectious waste.

Even though the management at Nompumelelo Hospital and Settlers Hospital both asserted that they trained their cleaners regularly, based on observations it was clear that the cleaners in these hospitals need more extensive training. During observations at Settlers Hospital, it was noted that some of the waste handlers at times collected medical waste without any protective clothing such as masks and gloves. This could be due to ignorance and lack of adequate training on the risks associated with handling medical waste. One of the most essential occupational health and safety regulations of any hospital includes the provision of proper protective clothing for all workers handling and collecting medical waste (Leonard, 2004:38). All workers directly involved in the handling of infectious waste are at a much higher risk and are therefore required to be provided with adequate protective clothing. It is important that the hospital ensures the health and safety of its workers. It is recommended that these workers wear hard hats at all times, as well as face masks, safety goggles, overalls, industrial boots and heavy duty gloves (Leonard, 2004:39; WHO, 1999:140).

Inadequate protective wear was an issue in both hospitals. It was not only the cleaners at Settlers Hospital who did not wear adequate protective clothing while handling medical waste but also the nurses. During one of the site visits, the nurses in the wards at Settlers Hospital were observed handling multiple patients and drawing blood from them without wearing protective gloves. This puts both the staff and patients at risk. The protective gear varies slightly based on the task of the hospital staff but generally they need to have hard hats, protective gloves, and safety goggles dependent on task, overalls, and industrial boots, as illustrated by the operating officer at Nompumelelo Hospital (see Figure 6.4).



Figure 6.4: Protective clothing for handling medical waste at Nompumelelo Hospital (Maseko, 2012)

While the management at Nompumelelo Hospital seemed satisfied with the way in which waste was being handled, the cleaners had a different take on the matter. The cleaners at Nompumelelo Hospital were not at ease about their working conditions especially the lack of adequate protective clothing whilst dealing with high-risk waste, and one respondent noted:

We have gloves, the aprons, but they do not give us shoes we use ours and ah, we don't even want to. (General Assistant A, Interview with author, 2012)

It is crucial that infectious waste within the hospital is collected on a regular basis depending on the rate of generation. The bins for infectious waste should not be more than about $\frac{3}{4}$ full before the waste is collected, they are certainly not meant to get completely full (Leonard, 2004:19). All wards and collection points are supposed to have all the necessary boxes or containers for the different categories of waste, which in turn should correlate with the different bags. By observation it was quite clear that the private section at Settlers Hospital was kept clean, it even had a cleaner and fresher smell compared to the public section which had a stale smell. The cleaners had specialised cleaning equipment and machinery which they

used to clean regularly throughout the day. The public section did not seem to be cleaned as regularly. Collection of medical waste within the private wards at Settlers Hospital was done several times a day and the cleaners constantly checked the containers and disposed of the bags which needed to be disposed of. One of the general assistants at Nompumelelo Hospital gave an account of the rate of generation of waste as well as the collection of medical waste within the hospital:

In a day, we collect about four to five times because the bins are very small in the wards and put the bags in the big bin in the sluice room and when they get full we put them outside the hospital using the big trolley bins about two times and they get full, even worse when it gets busy. (General Assistant A, Interview with author, 2012)

This was supported by another respondent who said:

We take it from the smaller ones in the wards to the bigger bin, buckets are emptied in the morning, during the day time from three and before we knock off for the day. (General Assistant B, Interview with author, 2012)

However, there were inconsistencies during the interviews at Nompumelelo Hospital on how medical waste was collected and the different roles and responsibilities of the staff members. From the interviews it was gathered that general assistants handled and collected all medical waste on a daily basis in and around the wards. On further enquiry it was discovered that the operating site officers are the ones officially trained to collect and handle medical waste and are supposedly the ones who collect the waste from the wards as mentioned by one of the respondents:

Me and the team of us guys we collect sharps from the wards and medical waste stored outside the wards to the central storage area, although we do not have a storage container, we just put it in that room. (Operating site officer, Interview with author, 2012)

The quality assurance assistant nurse at Nompumelelo Hospital supported this statement and added:

With sharps, you close it and label it with your ward, for example maternity if it's from the maternity ward, then operating management site officer will take it from the ward because we don't put them outside, so now we keep them in the sluice room. (Quality Assurance Assistant nurse, Interview with author, 2012)

When questioned on who was responsible for collecting medical waste in and around the hospital, some of the senior nurses insisted that only the trained personnel such as nurses and operating site officers handled medical waste, as noted:

It's the nurses, when it's full you close it and leave it in the sluice room then the property caretaker comes and takes the waste to the temporary storage area, cleaners are not involved in the handling of medical waste, no they are not. The operating site officer is supposed to collect daily, each and every morning, that why I say it's strenuous for him because he is alone, prior, they would help each other. (Quality Assurance Assisting nurse, Interview with author, 2012)

This portrays unclear roles and responsibilities that each staff member plays in the daily management practices of medical waste. It also shows the lack of familiarity with the hospital's medical waste management plan or guidelines. From the findings, it is clear that the healthcare industry has become a highly fragmented industry as a result of the division of labour. The production process in capitalist societies has been subjected to a process whereby there is a division of the different waste management processes (Sayers, 2008: 84). This results in a few number of skilled professional who have the knowledge of one side of the operation (Jones and Martin, 2000). These skilled professional would be the infection control officers as well as the waste management companies. There is also yet another side that is unskilled who are oblivious and lack knowledge on the waste management process and risks involved. These unskilled workers in this case would evidently be the cleaners, recycle workers as well as municipal workers. According to Marx, many workers are intentionally deskilled and stripped off their knowledge, power and control over the labour process and the knowledge is concentrated in the hands of the elite, and the government (Jones and Martin, 2000). The unskilled workers bear the effects of the risks involved in working under unhealthy working conditions. The findings reveal that these hospitals themselves are forming an unsafe, unhealthy and hazardous environment. Healthcare workers are perceived as labourers supporting and accelerating the treadmill of production which in turn alienates and displaces the very same workers exposing them to a hazardous and unsafe working environment (Schnaiberg and Gould 1994:83).

6.4 A Weak Storage System of Medical Waste

All hospitals are required to have two storage facilities: an intermediate storage area used to temporarily store medical waste from the wards and other collection points, and an outside storage area which is a more permanent storage facility used to store medical waste before it is

transported and disposed of. The main use of an intermediate storage is to avoid accumulation and decomposition of the waste in the wards and consulting rooms within the hospital and in the containers, which should be collected on a regular daily basis (WHO, 1998:15). This intermediate storage area where these containers are kept before removal to the central storage area should be close to the wards, inaccessible to unauthorised people and kept locked at all times (WHO, 1998:15). This storage area should be kept clean and full waste bags should not be thrown inside (NHS, 2008:7). It is vital that even when stored the waste should be monitored and documented to know how much waste is collected and stored on a daily basis in order to be able to monitor waste management. It is also important that this waste is labelled and coded accurately when stored (NHS, 2008:8). The centralised storage area should be sized according to the volume of waste generated and frequency of collection (WHO, 2008:36). This area should be “as far away from food stores as possible and should be kept locked and inaccessible to unauthorised persons” (WHO, 2008:36). “It should also be easy to clean, have good lighting and ventilation, and be designed to prevent rodents, insects or birds from entering” (WHO, 2008:36). “Storage times should not exceed 24-48 hours especially in countries that have a warm and humid climate” (WHO, 2008:36). It is assumed that all health facilities have adequate funding and infrastructure to provide large enough buildings for different storage areas. In some developing countries houses are turned into health facilities because of the shortage of health facilities and are hardly large enough to accommodate vital hospital equipment.

The findings of this study showed that both Nompumelelo and Settlers Hospitals had inadequate storage facilities hence a weak storage system for medical waste. This study found that medical waste was stored for periods that exceeded the recommended 24-48 hours storage period. Medical waste at Nompumelelo Hospital was stored for about a week and at times for even much longer periods because of delays faced by the waste company that collects and disposes their medical waste. Settlers Hospital also stored their medical waste for longer periods than recommended. What surfaced that was quite alarming was that both hospitals did not have proper storage facilities and infrastructure to store infectious waste for such long periods. The extended storage period of this untreated possibly infectious medical waste poses a serious occupational hazard as well as putting the entire hospital environment at risk. This compromises the health and safety of the hospital environment. Upon questioning the staff at Settlers Hospital on the number of days the waste was stored, inconsistencies were discovered

on the number of days the waste is meant to be stored before collection and how it is actually stored and collected in practice. The infection control officer stated that all medical waste was collected every week although the study gathered that anatomical waste was stored for longer than a week but was collected monthly at times as explained by one of the nurses:

Stored? It's every month, so every month they come and fetch it. We keep it in the deep freezer and we check the temperature in the morning and evening. (Theatre nurse A, Interview with author, 2012)

The workers from Royal Serve at Settlers Hospital are required to collect medical waste regularly from the point of generation to the outside centralised area. As a result of the lack of a centralised storage point, all anatomical waste is kept in the theatre in a fridge and is collected separately. It was observed that after collection from the wards at Settlers Hospital, this medical waste was temporarily stored in the sluice rooms then later transported and stored in a centralised area at the back of the hospital. This area was not completely covered and was easily accessible to passers-by. This area was hardly a fully-fledged structure but rather looked like temporary unfinished structure. It was easily open to reclaimers and dogs as well as rodents to scavenge through the waste. This poses a serious health and environmental risk. This area was said to be a storage area while the waste awaits collection. The cleaners were observed collecting a number of boxes labelled as infectious waste and leaving them under that structure, although it was not clear how long the medical waste was stored in that open space.

During the on-site visits at Nompumelelo Hospital it was observed that the hospital lacked both an intermediate storage area and a central storage area for the storage of medical waste. The hospital management were well aware of the required storage procedures, but because of financial constraints, they could not afford to build a centralised storage area. The sluice room (see Figure 6.5) was used as an intermediate storage area similarly to Settlers Hospital, which is not its main function. Within the hospital every ward has small bins where the waste is disposed of. The general assistants collect that waste from the wards and dispose of it in the big thick bins in the sluice room and then the bags are clip tied and stored outside as stated by one of the cleaners:

there are three big bins in the sluice room, one for infectious waste which is put in red bags and other for the yellow bags, then transparent bags and black bags are used interchangeably for general waste and we take from the wards and store it in there.
(General Assistant A, Interview with author, 2012)



Figure 6.5: Nompumelelo Hospital sluice room (Maseko, 2012)

However, it was observed that even though the sluice room served many functions apart from being a storage area it was kept clean and disinfected regularly using biocide. It is required that in areas where infectious waste is stored, this room should be locked at all times to protect outsiders from exposing themselves to these infectious and hazardous wastes, but this study found that the sluice room was in fact easily accessible to unauthorised personnel as the door was kept wide open. Anatomical waste was stored in the mortuary in a large fridge at Nompumelelo Hospital. The majority of the hospital staff were uncertain about the period medical waste was required to be stored for and how long it was stored for in practice.

This shows ignorance, poor training and knowledge on one of the main practices of medical waste management. After the waste is collected and stored in the sluice room, when the large trolley bins are full, they are kept outside until collected (see Figure 6.6).



Figure 6.6: Medical waste awaiting collection at Nompumelelo Hospital (Maseko, 2012)



Figure 6.7: Medical waste awaiting collection outside the wards at Nompumelelo Hospital (Maseko, 2012)

WHO (2008:36) requires all medical waste to be stored in an area that is inaccessible to avoid unauthorised personnel from handling infectious waste. Medical waste is meant to be stored away from the wards to avoid interference from passers-by and to avoid public exposure to infectious waste. It was noted that there have been cases where oblivious patients and members of the community have interfered and tampered with medical waste stored outside in the trolley bins at Nompumelelo Hospital. This poses a serious health risk to these people who are not trained to handle medical waste and who are unaware of the risks involved in handling this type of waste. It is unsafe for infectious waste to be stored in an outside area that is easily accessible because reclaimers and patients can easily manipulate and open these bins and expose themselves to health risk. The hospital also had instances of patients in the psychiatric ward taking some of the medical waste and fiddling with the bins when left outside.

The management staff mentioned that they made sure that the bins were at least clip-tied and tightly closed to avoid such cases. When questioned on the poor storage practices, the senior management nurses indicated that they were well aware of the risks involved in storing medical waste in an outside area but because of financial constraints and lack of infrastructure they could not do much about it, as stated:

The government is meant to supply us with everything, they don't tell us their budget but they supply us with what we need, except now we need a proper more permanent storage area, ours is a temporary one and we told them and we are still waiting for them to bring us or buy us one with a fan or fridge because now the storage area does not have a fridge for the placentas and foetuses. (Quality Assurance Assistant nurse, Interview with author, 2012)

All pharmaceutical waste was collected by the pharmacists themselves and stored at the pharmacy department. The pharmacy department lacked a storage area to store this waste and as a result the waste was stored haphazardly wherever there was space (see Figure 6.8).



Figure 6.8: Nompumelelo Hospital: storage of pharmaceutical waste (Maseko, 2012)

The general assistants at Nompumelelo Hospital mentioned how they struggled with the workload of collecting and transporting medical waste in and around the hospital because of staff shortages. Even though they could manage the workload fairly well during the day, it was a challenge at night with fewer general assistants working during the night shift. As a result collection times for medical waste became more and more irregular and medical waste would pile up and be stored for longer periods within the wards, as explained:

Before you go at the end of your shift you check the bins by the wards, the day staff has to make sure that the bin is not full say at 3.30pm before you knock off at 4pm because there is only one person working as a general assistant at night, it's better with the day shift because sometimes it's three general assistants. There is not supposed to be one at night because sometimes it is too busy especially casualty like sometimes with motor vehicle accidents it's too much blood, then rush, rush, rush. (General Assistant B, Interview with author, 2012).

All waste types from infectious waste and sharps to food waste and general waste at Nompumelelo Hospital are collected and stored in one centralised area which is an old building where the no longer functioning incinerator is situated which is now used as a centralised storage area (see Figure 6.9).



Figure 6.9: Nompumelelo Hospital: old incineration site used as a central storage area (Maseko, 2012)

This storage point is not built to store medical waste and therefore lacks all the necessary components such as a fan and fridge to store anatomical waste. It is also not well ventilated and has a deteriorating roof (see Figure 6.10). This structure is old and the fencing around this storage unit is not well secured. The hospital does not appear to have any personnel guarding this storage unit at all times, which means that trespassers could easily gain access. The deteriorating roof means that this area is susceptible to leaks, especially during the rainy season. During this study, the Eastern Cape had been experiencing heavy rains and floods. It was clear during the on-site visit that the roof was leaking as there were wet blotches and stagnant water inside the storage unit. These conditions are not good for the storage of hazardous and infectious waste. It is not a suitable area to store untreated medical waste especially because the waste is stored for weeks on end. Anatomical waste, on the other hand, is stored in the small fridges in the mortuary because of inadequate storage space in an appropriate infrastructure (see Figures 6.11 and 6.12).



Figure 6.10: Nompumelelo Hospital: old incineration site used as central storage area (Maseko, 2012)



Figure 6.11: Nompumelelo Hospital: anatomical waste stored in fridges in the mortuary (Maseko, 2012)



Figure 6.12: Nompumelelo Hospital: the fridge where anatomical waste is stored (Maseko, 2012)

6.5 Internal Transportation of Medical Waste

WHO (1999:65) requires all hospitals to make use of wheelie trolley bins to transport medical waste in and around the hospital from the wards and other collection points to the central storage area. It is much safer for the hospital staff to load and offload medical waste from these trolley bins. These trolley bins are required to be monitored and cleaned daily and marked and labelled with the relevant colours, red and yellow, depending on the type of waste. Transportation of general waste should be done separately from medical waste collection to avoid potential cross-contamination (WHO, 1999:65). The transportation of waste should follow specific routes avoiding, for example, wards and patients. The WHO does not take into account that developing countries are struggling with financial resources amongst other problems and it fails to suggest alternative means of storing and transporting this waste because not all health facilities can afford wheeled trolleys.

During the onsite visits to Nompumelelo Hospital, it was observed that the general assistants carried the medical waste manually to the sluice room used as temporary storage rather than using wheelie trolley bins, while the waste handlers at Settlers Hospital made use of wheelie trolley bins to collect and transport medical waste within the hospital. At Nompumelelo Hospital there were three trolley bins in the sluice room and a lot more were found outside the different sections of the hospital. These trolley bins found outside the hospital units were seemingly used as intermediate storage areas while the waste awaited collection. Evidently there were insufficient trolley bins for the transportation of medical waste as the majority of them were used as storage facilities due to a shortage of storage space within the hospital. Anatomical waste was said to be carried in its own sealed red bucket containers to be stored in the mortuary, and the nurses themselves were required to carry this waste. The carrying of infectious waste by staff is not advisable as this waste could easily spill on the staff handling this waste, exposing them to a severe health hazard.

6.6 Outsourcing the Transportation and Disposal of Medical Waste

Both Settlers and Nompumelelo Hospital outsourced transportation of medical waste to private waste companies. None of the waste companies were interviewed and all data gathered was that gathered from the interviewed participants as well as literature in South Africa on waste companies. The adoption of a neoliberal economy in South Africa meant changes in processes, one being privatisation of several services in society including the waste

management sector (Sayers, 2008:1).

Privatisation and its devastating consequences bring about debates surrounding the compatibility between society and environmental sustainability. This highlights how economic changes have determining effects on social structures and social stratification in society. A solution that is borne out of neoliberal economies is one that argues that the way in which individual property owners and consumers make decisions with regard to the environment could create an environmentally sustainable society (Saunders, 1995). This solution decreases government intervention with regard to environmental management and promotes increased privatisation and commodification of the environment. As a result, the approach to pollution and waste management has changed from strict regulation of polluting and hazardous waste companies to a more self-regulatory approach (Jepessen et al., 2006:19). This approach requires health facilities to take responsibility for the waste they produce and adopt the “duty of care principle”, ensuring that the waste they generate is disposed of in an effective and sustainable manner that is not harmful to the public and the environment. This of course leaves the responsibility of implementing environmentally sustainable waste management processes to the waste companies which have become a treadmill of production in themselves and are no longer concerned about environmental management but on accumulating wealth and profit. The waste management system has become absorbed and obsessed with enlarging markets and finding ways around environmental costs, resulting in workers being exposed to a hazardous working environment and in pollution of the environment.

The privatisation of medical waste management practices has become a common trend over the years globally. The world has become more and more concerned about environmental management and protection and issues pertaining to sustainable development have become key issues in every institution. Our daily activities are steadily increasing the amount of waste generated, hence the growing concern over the management of this massive supply of waste. This environmental concern sparked an interest in the waste industry as waste became a commodity (de Kadt, 1999:131). Lessons from studies on medical waste management and media have highlighted the failure of the private sector to successfully handle medical waste in an efficient and sustainable manner. However, this outsourcing of medical waste and the externalisation of medical waste management costs has highly compromised human health

and the environment.

Instead of these waste companies ensuring environmental protection and a clean, healthy and safe environment, they are finding ways to undercut environmental laws whilst making more business and generating more and more profit. Ultimately this means that these waste companies are contracted to manage far more waste than they are capable of transporting, treating, storing and disposing of. More often than not, this has led to waste companies stockpiling infectious and hazardous waste, failing to treat the massive amount of waste collected and illegally dumping the waste in open public spaces (Sunday Times Live, 2009).

WHO (1999:67) requires all health care facilities and medical waste generators to preserve a duty of care responsibility towards the waste that they generate. It is the responsibility of the waste generator to package the medical waste safely in appropriate containers and label the boxes correctly (WHO, 1999:67). Hospitals are required to treat their medical waste before disposal to minimise infections in the waste (Bendjoudi et al., 2009:1386). It is the duty of all waste generators to choose a treatment and disposal method that has relatively low health and environmental risks. All the medical waste that is transported should be accompanied by a consignment note “stating its place of generation and the site of disposal” (WHO, 1999:67). In South Africa, the waste company vehicle is required to have the name of the waste company clearly written on the vehicle and to have the bio-hazard symbol on it (Leonard, 2004:21). Hospitals should ensure that the waste company that they contract is a registered Department of Health transporter and carrier (Leonard, 2004:21). All waste should be tightly sealed and closed before transportation to avoid any spillages. The waste companies should always take the shortest and quickest route possible from the hospital to the treatment and disposal site (WHO, 1999:76).

The outsourcing of certain medical waste management practices and processes has enabled health facilities to distance themselves from medical waste management responsibility and divert medical waste management to these waste companies. In a research project conducted in Grahamstown, Maseko (2010:51) discusses how local government gives large scale tenders to under-resourced, unskilled and incapable waste companies which fail to provide the required services. The findings of a study conducted in Grahamstown (Maseko, 2010:49) also shows that these waste companies had become expensive and the government only paid for these waste companies to collect medical waste from all public health facilities once every two weeks. Minimising the frequency of waste collection was a way to minimise costs but had an

enormous impact on the management of medical waste within the hospital environment. This led to a stockpiling of medical waste and storage for longer periods than stipulated, as well as the illegal dumping of some of the medical waste in a nearby general waste landfill (Maseko, 2010:50). Grahamstown has three registered landfill sites but hazardous waste such as medical waste is not permitted in any of these sites and therefore the disposal of medical waste exposed the recycler workers and waste reclaimers scavenging through the waste to untreated hazardous waste (Maseko, 2010:51). Such poor waste management practices led to questions about how often these waste companies are monitored and inspected to ensure that they have the capacity to deal with all the waste collected from the various health facilities and that they do in fact carry out their duties in a legal manner.

The WHO (1999:76) clearly states that all waste companies should take the shortest and quickest route from the institution generating the waste to the treatment and disposal site, which is clearly not the case in South Africa. According to the municipality's environmental-health personnel who were interviewed it was gathered that some of the health care facilities in Grahamstown, Eastern Cape, were compelled to contract waste companies with treatment plants and disposal sites in the Western Province because of the level of mistrust of other waste companies functioning in the Eastern Cape (Maseko, 2010:52). This meant that their medical waste was transported across provinces and for long distances which is discouraged in order to avoid spillages and accidents along the way.

According to Maseko (2010:53) Compass Waste was responsible for the collection and offsite transportation of medical waste at Settlers Hospital, although it was highlighted that the majority of healthcare facilities around Grahamstown were not impressed by their poor and inefficient service and would much rather use another waste company. When this research was conducted it was revealed that Settlers Hospital no longer used Compass Waste but had decided to switch to Solid Waste Technologies instead. Nompumelelo Hospital, however, used Compass Waste to transport and dispose of their medical waste. Solid Waste Technologies collected medical waste on a weekly basis, every Friday at Settlers Hospital. The infection control officer at Settlers Hospital stated that this waste company had been efficient so far and had not given them any problems. They provided the hospital with appropriate containers for the different types of waste. As observed, all the wards and consulting rooms had cardboard boxes from Solid Waste Technologies. The technical

department at Settlers Hospital is responsible for handing over the medical waste that has been stored at the central storage area to the waste companies and ensuring that the waste company follows the right procedure, from the weighing of the generated waste to the signing of the consignment form by the waste transporter and generator on the date the waste was received. The infection control officer stated that the technical department received adequate training on appropriate medical waste management procedures and had sufficient expertise to notify the hospital management should they face any problems with the waste company. Solid Waste Technologies is said to have its treatment plants and disposal sites in Port Elizabeth, although none of the hospital staff could provide full details of what happened to the medical waste once the waste company collected it, and they did not have any knowledge of how the waste was treated or disposed of: all they knew was that a waste company collected and disposed of it. The WHO (1999:76) requires the hospital management to follow up on the waste company to ensure that the waste is treated and disposed of in an environmentally sound manner: this is known as the “cradle to grave” approach. The infection control officer at Settlers Hospital could not provide extensive details on the waste company as it was the responsibility of the technical department to deal with them. It is questionable whether the technical department has adequate knowledge and level of expertise to monitor these waste companies. The infection control officer mentioned how they kept a copy of the consignment forms during the collection of the waste and also received a certificate from the waste company once the waste was disposed of. It is crucial that the hospital takes responsibility and ensures that the waste company disposes of the waste efficiently because, should the waste be found illegally dumped with the hospital labels on it, that hospital is also liable for the breaking of environmental health laws as well as the waste company.

In the past an identified white bakkie would collect general waste from Settlers Hospital which was evidently mixed with medical waste and dumped up to about three heaped loads of waste within a day at one of the identified general waste landfills in Grahamstown (Maseko, 2010: 55). When interviewed, the waste reclaimers and recyclers attested that the dumping of medical waste from Settlers Hospital was a regular thing. This study followed up on this and interviewed the Makana Municipality Environmental Health and Cleansing representative, who confirmed that these practices used to be a common feature in the past. They were notified by the recycler workers at the landfill and they took up the matter with Settlers Hospital and have not had any medical waste dumping problems after that as explained:

Yes yes ... long time in the past a new guy from Settlers did not get told, he would dump medical waste in our general waste landfills ... it is not our duty to make sure hospitals do not dump medical waste, they have their own waste companies collecting waste ... now we told the guys at the landfill to report if anyone dumps medical waste, now no more problems. (Environmental Health and Cleansing Representative, Interview with author, 2012)

In order to corroborate information gathered from Settlers Hospital and from the municipal representative, several on-site visits were made to the general waste landfill in Grahamstown. Through several extensive informal discussions with the recycle workers and waste reclaimers at the general waste landfill, it was gathered that Settlers Hospital no longer dumped any of their medical waste at this landfill. Although there were still instances of the recycle workers and waste reclaimers scavenging through the waste and finding medical waste, it was not as much as it used to be.

Medical waste was collected on a weekly basis, every Friday, at Nompumelelo Hospital by Compass Waste, and treatment of medical waste was done off-site by Compass Waste. The participants at the hospital did not have any knowledge about what happened to the medical waste from the point at which it was taken by the waste company. Showing the extent to which the division of labour has been fragmented and made redundant, alienating the working class from their own jobs. Some of the interviewed staff were not even sure of the name of the waste company that transported the waste. Most of the nurses stated that their knowledge of medical waste practices went as far as when they segregate and separate the waste. A recurring response from the nurses seemed to be that

“it was not necessary for them to know the details of medical waste treatment and transportation of waste as these were part of the duties of the infection control officer and operation maintenance officers”. (Nurses at Nompumelelo Hospital, interview by author, 2012).

However, it is crucial that all health personnel involved and exposed in the handling of medical waste are fully trained on all medical waste management aspects, from policies to practices and procedures. The entire hospital staff needs to be made aware of all details and processes in order to widen their knowledge on handling this waste.

The medical waste at Nompumelelo Hospital was said to be transported to and disposed of in

East London, but the infection control officer stated that she was not certain exactly where it was taken to. The operational site officer was said to be responsible for monitoring the collection of the waste by the waste company. One questions their expertise: whether they know what to look out for and whether they have adequate knowledge to monitor the waste company's ability and capacity to handle the medical waste collected, Although the operating officer provided a record of all the consignment records from Compass Waste that are given to them whenever they collect the waste.

6.7 Lack of Skills and Regular Training

It is crucial that all hospital staff are extensively trained on the handling of medical waste management. Medical waste management is a management issue more than a technical one, therefore it is important that all hospital staff are properly trained on medical waste management and the risks involved (WHO, 2005:6). Lack of training and under-education of waste handlers can result in slip-ups being made because of poor knowledge and lack of awareness. Training is required to overcome this problem. Medical waste management requires both technology and knowledge management and expertise. National governments and healthcare facilities often have the technology but lack the required knowledge and required skills (Ananth et al., 2010). It is important that a balance is maintained, because without the required skills the successful use of these technologies for the suitable management of medical waste cannot be ensured.

The infection control officer is responsible for the supervision of the training of all staff in collaboration with the rest of the waste management team (WHO, 1999:48). Employee training on medical waste management needs to be integrated and made part of continuous and routine employee training. The hospital staff should be trained on a regular basis and should be monitored and evaluated on their medical waste management practices. It is important that they are given extensive training, as opposed to training that is in the form of piecemeal intervention due to specific problems that the hospital faces and needs to deal with rapidly. Appropriate ongoing extensive training and awareness sessions should be organised accordingly to keep practices at the best standards possible (WHO, 2005:6). A respondent at Settlers Hospital stated that the hospital had specifically hired an infection control officer to oversee the entire medical waste management process in the hospital, and explained further:

We are not trained on everything to deal with the entire waste management process as it was outsourced and managed by different companies. We've got cleaners from Royal Serve Cleaners, they actually know exactly what to do and as for us we also know what should go into this red containers and so forth. (Theatre nurse B, Interview with author, 2012)

The infection control officer at Settlers Hospital stated how she ran training programmes but hospital staff more often than not failed to attend these training meetings, particularly the doctors. It is necessary for these training sessions to be integrated into employee training and made compulsory because it is a crucial health and safety issue. In both hospitals the interviews revealed that the staff members in general did not receive adequate training and awareness on medical waste management, particularly the doctors. They lacked knowledge on the great impact that improper medical waste management procedures have on public health and the environment. The majority of the hospital staff at Settlers Hospital were unwilling to be interviewed because they claimed that they did not have adequate knowledge on the processes of medical waste management. This is problematic because they handle infectious medical waste on a daily basis. The interviewed nurses, trainee nurses and general assistants all seemed to have a vague idea about medical waste management practices and the risks involved but were not well informed. A senior nurse at Settlers Hospital mentioned how their training was not regular but they were only trained when the need arises, more so when there are changes in the waste management process.

Based on the interviews at Nompumelelo Hospital, when questioned on the issue of training on medical waste management, it was clear that what the general assistants and nurses regarded as training was more of a briefing and reminder on how to segregate waste once in a while.

As one nurse responded:

Sometimes we do have workshops on infection control in the morning after prayers then we learn how to dispose of waste in the different bins. (Training Nurse A, Interview with author, 2012).

The trainee nurses and nurses only received formal training sessions conducted during their induction which, although more formalised, seemed partial and not extensive enough. Although seemingly medical waste management knowledge has progressed at Nompumelelo hospital, a general assistant explained:

A lot has changed ... things were not like this before ... we were not told like we are told now, now we know what to do, they used to just tell us sometimes. (General Assistant A, Interview with author, 2012)

There was a tendency for the nurses who deal with medical waste on a daily basis to misclassify the types of medical waste and a tendency to overclassify waste as medical, which highlights lack of adequate training and knowledge on medical waste management. All leftover food from patients at Nompumelelo Hospital is regarded as infectious waste, increasing the amount of waste considered as infectious. Leonard (2004: 4) stated that a lot of healthcare facilities in the developing world consider 90% of the waste that they generate as infectious, yet it is not, only about 10% of the waste is actually infectious waste. This is mainly due to lack of knowledge and training that results in poor identification and classification of waste and poor segregation practices. The interviews indicated that training was not provided to doctors at Nompumelelo or Settlers Hospitals. The study further gathered that the infection control officer and quality assurance assistant nurse as trainers and overseers of infection control and medical waste management did not receive adequate training themselves. The hospital staff who were interviewed in both hospitals seemed oblivious to the huge impact their role as waste generators and waste handlers has on the wider public and environment.

6.8 Inadequate Resources and Infrastructure in Rural Hospitals

Kuroiwa et al. (2008:366) highlighted the disparity in medical waste policy implementation in rural hospitals because of the lack of technology, administrative services and finances. Efficient management of medical waste comes with an enormous financial strain on any healthcare centre but it is even more of a financial burden on rural hospitals. There is a high incidence of open burning, placenta pit disposal and burial of waste in rural hospitals which pose as a major health and environment risk to unaware rural communities (Coker et al., 2009:802). Rural hospitals also face issues regarding poor communication systems with provincial or even local government, thus suffering inherent delays when it comes to technological development (Vumase, 2009:6). Rural hospitals face more challenges that are slightly different from urban areas, mainly because of poor resources and infrastructure as well as lack of technology, expertise and knowledge. Implementing recommendations of studies drawn from urban hospitals is problematic at times in their practical application.

It is a fact that medical care resources are a scarcity in rural areas even in the developed world (Sheps, 1981:7). The inability of the government to fully equip rural hospitals is a problem to these rural communities as it affects their ability to properly manage their waste (Sheps, 1981:8). According to Marx, this neglect of rural communities is brought about by capitalism, through industrialisation (Foster et al., 2008:228). As capitalist societies were formed they were centred on industrial zones and that that is where the population was concentrated (Foster et al., 2008: 228). This caused a rift between rural societies and urban societies, causing the neglect of rural societies that did not contribute much to accumulation of wealth and profit.

Evidence from Kenya and Tanzania on medical waste management projects show that there is a need for a “rural approach” when it comes to medical waste management (DEAT, 2004:4). Medical waste management practices adopted from urban hospitals are not fully applicable in rural health facilities mainly because research conducted in urban hospitals does not address rural issues. Smaller rural clinics rely on the bigger hospitals in their municipalities to dispose of their waste, increasing the amount of waste that bigger hospitals can handle. Both Settlers and Nompumelelo Hospitals are regarded as rural hospitals. Maseko’s (2010) study in Grahamstown revealed that all the smaller clinics, especially those located in the township areas and the Healthcare Centre at Rhodes University, transported their medical waste to the main hospital in the area, Settlers Hospital, to be disposed of by the hospital. Settlers Hospital lacked the capacity to store, treat and dispose of the amount of waste that was delivered to the hospital (Maseko, 2010:52). As a result, a large amount of medical waste was left unattended and stored for long periods awaiting disposal (Maseko, 2010:53). Poor budget support from the government and lack of a budget specifically for medical waste management in hospitals hampers the proper management of medical waste in hospitals (Manyele and Lyasenga, 2010:305), as was the case at Nompumelelo Hospital. The hospital lacked storage facilities and infrastructure and relied on government support. The environmental health and cleansing representative mentioned how Makana Municipality in Grahamstown had a budget allocated for general waste management and industrial waste but had no budget for medical waste because it was not their responsibility but the responsibility of the hospitals.

Studies have shown that hospitals improvise with materials that are not appropriate for the collection and transportation of medical waste, which is not only an occupational risk but also

a public and environmental hazard (Rao, 2008; Azage and Kumie, 2010; Manyele and Lyasenga, 2010; Abor, 2007). This study also found similar incidents as the sluice room was commonly used as a temporary storage facility in both hospitals and the old incineration site was used as a central storage area. Nompumelelo Hospital did not have enough trolleys bins to be used for the internal transportation of medical waste hence medical waste was carried around manually by the nurses and general assistants.

The infection control officer at Settlers Hospital stated that the hospital had a budget for infection control of which medical waste management was a part. The hospital drew up a plan for all the necessary stock and made sure that they had enough containers and red plastic bags at all times. They mostly relied on hospital and private partnership funds for budget support. The Environmental Health and Cleansing representative from Grahamstown asserted that Settlers Hospital seemed to be improving in the way that they deal with their medical waste and one of the reasons could be the new partnership with Netcare. Nompumelelo Hospital was fully dependent on financial support from the government, which was evidently inadequate. Problems faced in these rural hospitals highlight the conflict between rural-urban society brought about by development in capitalist-modern societies. The crisis-ridden nature of capitalism creates conflict in society.

6.9 Poor Medical Waste Disposal Methods

It is no secret that this society is indeed a waste-producing society and that the environment has lost its capacity to act as a waste sink (Marinković et al., 2007:1049). The incapacity of hospitals to handle their medical waste and to control where and how it is disposed of has enormous social and environmental implications. As a consequence, the untreated open dumping of enormous amounts of hazardous medical waste into the environment causes irreparable damage to ecosystems on a large scale such as land, water and air pollution, and animal and vegetable poisoning, which all affect human health. This highlights the destructive nature of capitalism whereby industrial profit-generating activities constantly undermine environmental sustainability. It is evident that waste generators in South Africa are failing to manage their waste appropriately. The problem in the waste management sector and health care industry is a consequence of the advancement in industrial societies which inevitably involves the dialectic relationship with the environment with detrimental results (Antonio, 2003:175).

GroundWork (2008a:13) argues that waste is not being managed at all in South Africa. As a radical critic of capitalism, Marx believed that the institutions in capitalist societies were responsible for social ills such as exploitation and alienation (Arnold, 1990:32). Marx argued that these institutions were used to regulate human interaction and nature for the purpose of production (Arnold, 1990: 32). Environmental policies have been developed in South Africa yet the state is failing to regulate and manage certain waste generating industries. South Africa, like many countries internationally, has adopted sustainable development as an environmental and developmental policy framework (Oeufse et al., 2006:61). Within this framework, technocentric approaches to environmental management are widely used. The health sector and waste management is one of many sectors which has undergone reform whereby this technocratic approach towards sustainable development and environmental management has been applied (Oeufse et al., 2006:61). The use of various waste management technologies in the healthcare industry is an attempt to reduce and minimise the amount of waste generated, yet the very same technologies have negative implications exposing health workers to high risk, as well as the environment and society. Technology in itself perpetuates the treadmill of production and exposes society to a world of unprecedented risk. Super-industrialisation is regarded as the answer to ecological problems.

Studies demonstrate that inadequate socio-economic conditions increase the vulnerability of the exposed individuals (Braubach et al., 2010:12). Marx argues that the exploitation and vulnerabilities of low-income communities or the working class, are not incidental but are built into every structure of the capitalist economy (Arnold, 1990:32). In the case of South Africa the majority of people afflicted with environmental injustices are black low-income communities who have to bear the adverse effects of an unhealthy and unsafe environment due to haphazard disposal of infectious medical waste in general waste landfills. South Africa's history has played a large role on issues of environmental management as well as waste management in the country. Apartheid planners located low income and black communities close to mining, industrial and general waste dumps (groundWork, 2008a:17). All individuals exposed to hazardous medical waste are potentially at risk of being infected. A WHO evidence review on the occurrence and extent of social inequities concurred that in terms of exposure to health and environmental risk factors, the marginalised and disadvantaged groups suffer the most (UN General Assembly, 2011:6). Grahamstown only has general waste landfills and no medical waste landfills, therefore hospitals in the area are not

permitted to dispose of any of their hazardous or infectious waste in any of the landfills. However there have been cases captured in a previous study, whereby recycler workers and reclaimers have come across medical waste that had been disposed of in one of the landfills (Maseko, 2010) (see Figures 6.13, 6.14 and 6.15).



Figure 6.13: A waste reclaimer scavenging through medical waste in one of the Grahamstown landfills (Maseko, 2010)



Figure 6.14: Waste reclaimers at the Makana Municipality landfill (Maseko, 2010)



Figure 6.15: General waste mixed with medical waste at one of the Grahamstown landfills (Maseko, 2010)

The waste reclaimers scavenge through waste of different kinds looking for valuable items that they can sell to the recycling plants, or for other valuable items as well as food, and they unknowingly expose themselves to an unsafe and unhealthy environment. In their discussion of medical waste management issues, studies on medical waste management and environmental and social injustices tend to exclude workers in general waste disposal sites or landfills, workers in support services such as laundries if that is outsourced, waste cleaning and transportation services and more especially waste reclaimers, yet these are the people most affected by the medical waste problem. When the environmental health and cleansing representative was questioned on cases regarding haphazard and illegal dumping of medical waste and their involvement, he stated that their departments were overburdened in terms of workload because of a shortage of person-power and resource capacity. Medical waste dumping was not entirely their responsibility and they are not compelled to deal with it, he said:

People refuse to segregate their waste accordingly, they continue to dump waste inappropriately to rivers, bushes ... reclaimers tear it open and take whatever they need ... illegal dumping is not a job that we should do. Each team per day has work that they have to do ... now we take that team and do illegal dumping and the work that they are supposed to do is not done ... We do not have a team of workers just sitting around waiting for illegal dumping. (Environmental Health and Cleansing Representative, Interview with author, 2012)

The quality assurance assistant nurse at Nompumelelo Hospital raised concerns regarding the mixing of medical waste with general waste that ends up at the general waste landfills. The municipal workers in Peddie had reported several cases of waste collectors collecting general waste from the hospital and finding waste mixed with medical waste such as gloves and syringes. This is a health risk because these workers are not trained to handle medical waste. The municipality was mainly concerned because they have seen cases of children playing with condoms, gloves and syringes found at these general waste landfills, and a nurse commented on this:

At times they are the ones who bring the needles to us and there has been some carelessness and the needles have been disposed of in the general waste container and we tell them that if the needle pricks you, you will be infected and they do wear gloves but at times they are in a hurry and don't wear them. (Quality Assurance Assistant Nurse, Interview with author, 2012)

The nurses and enrolled nurses seemed to share the sentiments based on their own observations that the Eastern Cape had problems handling medical waste. They mentioned how one could spot medical waste along the roadside that had been dumped by hospitals in the province. One of the enrolled nurses mentioned that they have had cases of rivers being contaminated because of illegal dumping and disposal of medical waste.

From a Marxist perspective, the exclusion of reclaimers from decision making pertaining to environmental policy is legitimated by the political economy (Schnaiberg, 1980:208). The state no longer serves the interest of the people in society but serves the interests of the capitalists-owners of waste companies and multinational corporations, undermining the interests of the working class and low-income communities. The government's policies tend to be influenced by these owners of capital in order to benefit their interests rather than benefiting the people. This in itself shows how economic growth, production and accumulation continue to override social issues as well as environmental issues. This exemplifies the type of alienation Marx portrayed under industrial societies where workers are alienated from each other and from the production process itself (Foster et al., 2010:228).

Studies conducted globally on waste management have shown a strong relationship between race, ethnicity, income and potential exposure to environmental hazards (Jones and Rainey, 2003:473). A large number of dumping sites and landfills are still found near impoverished communities and township areas in South Africa. From this study it can be gathered that a large number of low income communities rely on the general waste landfills to make a living. Poor medical waste management and poor segregation and dumping systems expose a large number of these communities and workers to an unsafe, unhealthy and hazardous environment. How health care facilities control their hospital environment infringes on the rights of these waste reclaimers to a healthy and safe environment. It is for this reason that one cannot discuss medical waste management issues in isolation without touching on their effect on issues of social and environmental justice (Lopez, 2002:289).

In one of the observed general waste landfills in Grahamstown, a recycling company has been incorporated into the waste management system. This recycling company has hired their own recycle workers who scavenge through the landfill and collect various recyclable items which are sold at ridiculously low prices to recycling plants. Historically, waste reclaimers have always been an integral part of waste management, even though they are not formally

recognised as a part of the waste management system. High levels of unemployment as well as poverty are the main reasons why waste reclaimers continue to visit the landfills. These low income communities are not aware of the potential infections that they could acquire from scavenging through the waste. Waste landfills are a source of income for these waste reclaimers and for a vast majority of them, their only hope of getting access to food. Waste reclaimers collect household items and food as well as recyclable goods to sell.

Private companies are being awarded tenders at the landfills with the hope of supposedly assisting waste reclaimers by providing them with employment. However, these recycling plants often do not often hire the waste reclaimers that are frequent waste pickers in those landfills and most of the time these jobs are only open to a limited number of people. In 2010 at the landfill in Grahamstown (Maseko, 2010:52), the recycle workers expressed their grievances about the meagre pay and long working hours, as well as an unsafe and unhealthy working environment. Two years later the situation had not changed much. However, the recycle workers said that the issue of medical waste dumping had been dealt with to a certain extent. As recycle workers they felt safer. Recycling plants in these landfills have altered the functioning of the waste management system. Before privatisation, waste was viewed as common property but now it has been commodified and privatised, deterring waste reclaimers from gaining access to these landfills. Indeed the recycling industry has become a profitable business and the treadmill of production has adjusted to this new waste reduction activity. GroundWork (2008a:4) argues that environmental injustice is not only about people being subjected to a harsh, inhospitable living environment but also about the exclusion of people from policy and decision making. GroundWork advocates for the formal inclusion of waste reclaimers in decision making and in the waste management sector rather than privatising waste reclaiming and recycling in landfills (groundWork, 2008a:52).

When questioned on this issue, workers from Makana Municipality insisted that the exclusion of waste reclaimers was an attempt to protect them and not necessarily to exclude them. They highlighted a few problems that they had with waste reclaimers, including being exposed to potentially hazardous waste and contaminated food, an inability to keep the landfill orderly and tidy, hassling of companies offloading their waste, accidents and injury due to disruptions during the offloading of waste, and theft of resources and infrastructure, as articulated by a representative from the municipality:

Landfills are not close to any residential areas, the community members are not allowed to go there ... they have stolen the fence, we have guards during the night not day ... we have a recycling plan there with 30 or so people pulling out waste there, and that is their bread and butter ... we want to make it sustainable, only recyclers are meant to be there ... unauthorised people are not allowed, what if they get cut?? We should make sure they are not there ... at this stage we have a problem, they are taking out stuff and selling it to another recycler and that is where the problem is, we can even lose our licence. (Environmental Health and Cleansing Representative, Interview with author, 2012)

One of the waste reclaimers at the Grahamstown landfills shared his grievances about being excluded from the landfills and how they found it unjustified, saying:

We are being denied food and a way of life. (Waste Reclaimer A, Interview with author, 2012)

When questioned on the issue of health and safety at the landfill another waste reclaimer added:

We know what to do, we know the waste that is not good, we see the plastics from the hospital now and not from there ..we know. (Waste Reclaimer B, Interview with author, 2012)

It is as if the government has decided to turn a blind eye to the issue of waste management. It is no secret that hospitals are failing to manage their waste appropriately and that a vast amount of waste is either being burnt or illegally disposed of in general waste landfills. It is also known that hospitals are failing to segregate their waste and that there is a lot of mixing of general waste with infectious medical waste. The practices of health care facilities are no longer confined to the hospital environment but have managed to seep into and have a direct negative impact on social and working spaces. It is for this reason that the issue of medical waste management is no longer just an environmental health crisis but an issue of environmental and social injustice. South Africa is confronted with a waste management problem in all sectors which the government is failing to control. It is the responsibility of waste generators to incorporate sustainable management principles in waste management as well as environmental governance principles which the government should monitor.

6.10 Poor Environmental Governance and Poor Directive from Government

A very important factor that emerged during the course of this study was the linkage between the political climate in South Africa and solid waste management. Decisions made by one set of political players are often not followed up by the new set of players who come to power, thus undermining the work already completed, leading to loss of time and valuable resources. This has been the case in most government ministries in South Africa, which has further exacerbated the neglect of waste management as a key environmental health issue. To achieve an efficient and sustainable medical waste management system, environmental governance must be adopted. Environmental governance is practically manifested through environmental compliance and enforcement which are key elements necessary to achieve environmental management, sustainable development and environmental justice (Patterson and Kotze, 2009: 108). Poor environmental governance and poor direction from the national government on the issue of medical waste management has played a significant role in the poor medical waste management practices and policies in the country.

Medical waste management not only requires efficient government but also requires the integration and unification of health policies as well as environmental policies. Government ministries and departments need to work co-operatively to integrate their policies. Medical waste not only affects and touches on issues of health but also of the natural environment and social issues. Health and environmental issues are interlinked, as a poor environment has an effect on the health of a community, hence the need for the Departments of Health, and Environmental Affairs and Tourism to work co-operatively. There is a lot of fragmentation of laws and policies in the waste management sector which leads to departments working in isolation and at times in contradiction. Some aspects of solid waste management fall under the Department of Environmental Affairs and Tourism, while others fall under the Department of Water Affairs and Forestry and still others under the Department of Health (DEAT, 2000), and there is little or no guidance from the national government. As a result medical waste is currently being managed in a haphazard and uncoordinated manner. The fragmentation of laws and policies impacts on the way medical waste is managed. Hospitals and other waste generating institutions are subjected to clashing of policies placed under various departments.

The issue of illegal dumping of medical waste is at the core of this confusion. In the case where a municipality like Grahamstown has cases of public dumping of medical waste, there is always dispute over which department should be responsible for the cleaning up and removal of the waste. Currently the environmental health and cleansing representative in Grahamstown expressed how cleaning up of illegal dumping of medical waste was technically not their responsibility and they have neither the person-power nor the expertise to remove this type of waste, yet they find themselves doing so. The Department of Health in the municipality similarly refuses to take responsibility for illegal dumping of medical waste because they have outsourced the transportation and disposal of all medical waste to waste companies and therefore no longer feel liable and accountable for such issues. Co-operation, open lines of communication, reliability, accountability and transparency are all crucial elements of good governance which should be central in every environmental management.

This fragmentation also persists within the hospitals. Different departments are responsible for a certain aspect yet fail to work co-operatively. At Nompumelelo Hospital, it was mentioned that the Department of Water and Forestry were responsible for the provision of a central storage area for medical waste and the Department of Health was responsible for providing them with the containers and other aspects of its management. The hospital management have requested a central storage area and management said that they have waited for years for one and have been told by the Department of Health that, that particular aspect of medical waste management is the responsibility and duty of the Department of Water and Forestry and there is nothing much that they as a department can assist them with. The main problem is that different departments have different views and perspectives on how to handle medical waste. These departments need to find a way to harmonise their viewpoints and differences and to develop a more centralised and common approach for the medical waste management to address the health, environmental and waste management aspects of medical waste (WHO, 2005:4).

This study also found that health facilities as well as local government lacked transparency in their medical waste management practices. This was mostly evident in problems faced with getting access to conduct research. There was quite a lot of secrecy around acquiring data and statistics on medical waste management. Hospitals lacked accountability of how their medical waste was transported and disposed of.

They often deferred all the blame of mismanagement of medical waste to waste companies collecting and transporting medical waste. There was also lack of co-ordination within hospitals on the different roles that different staff members play in managing medical waste as well as lack of proper training. The division and fragmentation of labour has seemingly created several problems than solutions. The hospitals had weak systems for the processes and practices of medical waste management. These hospitals showed evidence of poor implementation and compliance of national environmental laws on medical waste management as well as implementation of their own hospital plan which ultimately had an effect on medical waste management. Weak governance is at the centre of economic, political and social problems in most countries, and this affects the management of sectors such as waste management (Fakier et al., 2005:5). As a direct result of weak governance the government fails to develop policies that can be adopted and implemented at local and institutional levels.

Governments need to take the lead in formulating relevant policies that health facilities can adopt and implement in their hospitals. It is important that the development and implementation of environmental policies matches the rate of development in order to safeguard society from an environmental-health crisis. It is essential that every generator of medical waste has some sort of protocol or guideline on how to handle and dispose medical waste in the most environmentally safe manner. The inability of a country or institution to formulate its own medical waste management plan leads to an uncoordinated working environment. South Africa does not have an integrated national plan specific to medical waste management. South Africa lacks a direct, detailed and legally binding policy to address medical waste management practices and processes (Thopola, 2010:146). The lack of a national medical waste management policy ultimately impacts on the ability of healthcare facilities to develop their own medical waste guidelines without any directive from government. This is a common problem in developing countries. However, even though developed countries struggle with medical waste management, definite rules and regulations exist at national, regional and hospital levels. Implementation of the medical waste management plan is the responsibility of the head of the hospital as well as the appointed medical waste management team (WHO, 1999:49). The head of the hospital should be able to prepare annual reports to the provincial government responsible for providing budget support, providing them with adequate data on waste generation, disposal and equipment and

infrastructure costs (WHO, 1999:51).

The two surveyed hospitals, Nompumelelo and Settlers Hospitals, both maintained that they had a medical waste management plan within the hospital that all health staff was fully aware of and thoroughly trained on. Yet this was not the case in practice. A majority of the interviewed staff were not aware of the existence of a hospital medical waste plan in both cases studied, and even those who claimed they were aware of it lacked adequate knowledge of the hospitals' guidelines on medical waste management. A hospital that lacks a guideline on medical waste management is bound to have poor waste management practices. The hospital will lack co-ordination of responsibilities on handling of waste, lack clear collection patterns, lack segregation procedures and colour-code rules and have a poor storage and disposal system. It is only through the existence of a medical waste plan that a hospital can enforce, implement and monitor an environmentally sound medical waste management system. Even though both hospitals attested to the presence of a hospital plan, the information gathered showed poor knowledge of this plan.

The infection control officer and quality assurance assistant manager at Nompumelelo Hospital seemed to be the only staff who were fully aware of this hospital guideline, yet even they were not familiar with national guidelines or policies for medical waste management. They were not fully confident about their knowledge on the hospital policy and kept on referring back to their files and booklets on infection control procedures. The study gathered that Nompumelelo Hospital had never conducted a full assessment of their medical waste practices, which raises questions concerning the basis of the hospital plan. The lack of knowledge on the role of responsibility of different staff members as well as inconsistencies in the day-to-day management practices in the hospital shows the lack of familiarity with the hospital's medical waste management plan at Nompumelelo Hospital. If a hospital has a guideline on medical waste management, it is important that all hospital staff at all levels are familiar with it and that it is implemented and monitored.

An interesting observation at Settlers Hospital was that the theatre nurses were more familiar with the hospital's guidelines on medical waste management than the nurses in the private wards, possibly because the theatre nurses are perceived to be exposed to waste types perceived to be more hazardous. The infection control officer at Settlers Hospital confirmed that the hospital did indeed have a hospital medical waste management plan which included

guidelines from national policies as well as guidelines from the waste companies on their expectations and requirements and the company that handles on site collection of medical waste. It seemed to be a well-informed guideline as she seemed to be clearer about it as she explained:

With waste it's something totally different. First you have to have an agreement with the company and know what their policies are and what the hospital policy is and because they are private partnership rather than public partnership we have to make sure that our policies and their policies correlate and we also have the agreement as well for all two parties and I let them ... I let them have specifics on how to handle waste management ... and then you've got the company that has their own policies. What I do is get in midway. (Infection Control Officer, Interview with author, 2012)

The nurses in the private wards were less inclined to be interviewed on the hospital's medical waste management plan and insisted that the senior nurse and the infection control officer had more knowledge of it. They stated that even though they were trained and knew about these guidelines, they were still not familiar with them. They had even less knowledge about medical waste management policies at national level.

6.11 Conclusion

From the findings it was gathered that health care facilities are struggling to segregate their waste in a proper manner. As a result general waste is mixed with medical waste as they are generated, collected, transported and disposed of, which leads to the contamination of non-infectious waste. This poses a health risk not only to hospital workers but to the municipal workers dealing with general waste, waste reclaimers and recycle workers. Stringent segregation practices need to be implemented within healthcare facilities from the point of generation. It is important that every waste-producing institution keeps a record of the amount of waste it generates and to assess its capacity to handle that waste. It is important to assess whether it has adequate infrastructure, storage capacity, treatment and disposal capacity. Every institution should be able to handle the waste that it generates. This research has shown that health care facilities are producing far more than they can handle. Hence there is a need for legislation that will regulate the handling and disposal of medical waste nationally and institutionally. The absence of national medical waste management legislation contributes to the country's poor medical waste management record. A large number of people are accessing health care facilities daily, for maternity, children's clinics and immunisations, tuberculosis, HIV/AIDS testing and other chronic illnesses.

A majority of these health care initiatives are facilitated and encouraged by the government and they produce a large amount of waste. The government should therefore factor medical waste management into their annual budgets as it is a by-product of hospital activities.

The mismanagement of medical waste affects not only the workers handling the medical waste and the hospital, but the entire surrounding environment and communities. Medical waste carries infectious and hazardous waste which, if not treated or properly disposed of, could affect the health of people who may find themselves coming into contact with this waste. Waste reclaimers and the general public are all at risk. Society needs to realise that it makes up and is part of nature and cannot separate itself from the devastating effects of environmental degradation. The dumping sites received negative assessments due to lack of adequate fencing and control. Just as important is training regarding the handling and management of waste for all personnel in contact with medical waste. Public awareness is also critical given that in developing countries waste reclaimers routinely make their living by seeking items of value in general waste dumping and collection sites. As waste segregation in health care facilities is in its infancy in South Africa, the prevalence of hazardous and infectious waste in general landfill is high (Maseko, 2010:55). There is a need to educate the public on the environmental health risks of medical waste and also to teach them about contingency measures should they come into contact with medical waste.

CHAPTER 7

CONCLUSION AND RECOMMENDATIONS

7.1 Conclusion

The main goal of this research was to critically evaluate the policies, processes and practices of medical waste management in two selected rural hospitals in the Eastern Cape.

The following interrelated goals of the study were undertaken:

- To examine the current state of medical waste management in selected rural hospitals in the UKhahlamba and AmaThole Health district in the Eastern Cape.
- To identify challenges and constraints faced by rural hospitals in the management of medical waste. To evaluate the current knowledge and practices of hospital personnel such as infection control nurses, hospital management and superintendents, and cleaners, and service providers involved in handling and disposal of waste.
- To identify challenges and constraints faced by rural hospitals in handling medical waste.

The Health Act of 2003 stipulates that municipalities must provide appropriate municipal health services in their areas of jurisdiction which are equitable and affordable (DEAT, 2006). The implication of the inclusion of waste management within the definition of municipal health services means that the provision of these services includes the management of health care waste. However the obligation to provide health services contains a subjective element because of the inclusion of the contested word “appropriate” (DEAT, 2006). This Act

fails to provide assistance in establishing what would constitute an “appropriate” waste management service since no detailed provisions regarding healthcare waste management are included in the Act (DEAT, 2006). The DOH lacks an environmental framework that includes the management of medical waste and its disposal. South Africa lacks a master frame of environmental issues and an agreed ideology on the environment (Cock, 2004:2). The DOH focuses on health issues and rights and neglects the crucial area of environmental justice and sustainability which is intrinsically linked to issues of health. This is why hospitals in the study failed to consider environmental implications and environmental injustices subjected to the environment and society due to their poor practices and management.

Cock (2004:2) argues that “there is a failure in South Africa to conceptualise environmental issues because of the constitutional framing of the environment in health terms and the legacy of apartheid which failed to consider the interplay of social and environmental issues”. This shows the failure of the government to provide clear policies with regard to medical waste management which outlines the roles and responsibilities of provincial government and local government and of the health care institutions themselves. As a result, the findings of the study reveal poor practices and processes in the sampled municipalities. The neglect of infection control and waste management in healthcare settings subjects patients, healthcare workers and communities to a type of violence by omission, by being subjected to hazardous waste and a volatile environment. This reflects poor environmental governance which has undesirable effects on the management of medical waste reflected in the lack of transparency, co-operation and accountability of health facilities and the DOH and DEAT. Nompumelelo and Settlers Hospitals lacked data and failed to give an accurate account of the amount of medical waste generated and disposed of. Both hospitals were unaware of the quantity of medical waste they generated. Findings reflected that both hospitals could be generating far more medical waste than their capacity to handle, store and dispose of.

There are some areas where medical wastes are not properly managed. A significant investment in the proper management of medical waste is imperative in order to reduce the health risk it poses. The study also identified challenges faced by these hospitals, such as poor resources and infrastructure, lack of budget support, lack of expertise and training as well as poor governance and directives from national government. The study findings indicate that there is a need to improve medical waste handling and disposal methods. The hospitals both

had limited capacity to treat and dispose medical waste. None of these institutions have proper waste disposal systems in place to manage their medical waste. Deviation and non-compliance of healthcare workers from waste management guidelines is intensified by the lack of policies, lack of training, lack of equipment and resources and an inadequate budget. Health care workers are exposed to hazardous waste because of poor segregation and handling of waste, the lack of a proper medical waste storage facility and ignorance of appropriate procedures for handling medical waste. Neither hospital applied the “cradle to grave” approach, and therefore did not apply the duty of care principle of accounting for waste generation till point of disposal. The lack of responsibility and accountability by both hospitals could lead to illegal dumping of medical waste. This study showed that there was poor knowledge and awareness amongst hospital staff of the medical waste management process and its effects on their health and their immediate environment. The study revealed that hospital staff lacked adequate knowledge on medical waste management even though they dealt with it on the daily and they would require more training and awareness.

Medical waste has a significant impact on health and the environment. There is not enough information on medical waste management technologies and impacts in South Africa. There is an increasing failure of the social and environmental effects of waste technologies. There is a lack of proper medical waste disposal practices and management. The findings of the study show the co-existence of progress and risk in industrial societies. As health care facilities progress and advance in terms of their provision of healthcare and use of technology, as does the exposure to hazardous and infectious medical waste risks as well as a high level of risk towards environmental sustainability.

The treatment and disposal of medical waste management in both Settlers and Nompumelelo Hospitals is handled quite poorly because of financial constraints and inadequate infrastructure which is one of many constraints that these hospitals face. The disposal of waste originating from hospitals is likely to have an adverse effect on the health and well-being of the environment and society. The safe management of health care waste is essential for community and environmental health. It is also important that, irrespective of technologies used for treatment and disposal, standards for the protection of the environment and human health are uniform for all health care facilities, as this ensures a more viable and efficient health care sector.

As much as rural and urban hospitals face similar challenges with regard to management of medical waste, it is a fact that rural hospitals face additional problems such as poor and outdated equipment and infrastructure, as well as lack of expertise and knowledge in the area of medical waste management because of lack of research and data on medical waste management in the rural areas such as the Eastern Cape. Both hospitals had inadequate funding evident in their lack of storage areas as well as treatment of the waste. The roads in rural health facilities are also in bad condition which often affects waste transportation, especially during rainy seasons.

Although privatisation in the handling and transportation of medical waste is seen as a way to improve the management of medical waste because of poor environment governance findings reveal that it has been exacerbating the waste management problem. Waste companies are becoming profit-making businesses and are expensive, especially for poorly financed rural hospitals. There is a tendency for these waste companies to cut costs which impacts on efficient waste disposal, as well as shifting of blame and responsibilities between health facilities and waste companies in cases of poor waste management practices.

This study found that waste reclaimers are not only excluded from the waste management sector but are exposed to environmental injustices because of poor waste segregation and practices. There is a need for communities to be educated and made aware of the medical waste that they are indirectly or directly exposed to in their communities, and how to best deal with it. Medical waste is not only a medical health problem affecting the hospital environment but is also affecting the social environment as well impacting on the livelihoods of communities and the natural environment.

7.2 Recommendations

7.2.1 Development of Hospital Guidelines

There is an urgent need to implement and develop policies and guidelines for medical waste management. These policies should be adopted from national level and implemented at local and institutional level. This enables the establishment of common standardised waste segregation, transport, treatment and disposal methods (Abor, 2007:67). Detailed and clear

regulations and guidelines would enable the medical waste generator and the transport and treatment entities to work and operate in a safe and environmentally friendly way on a standardised basis (Abor, 2007:67). Environmental health experts and waste management experts must be included in the infection control team in the health facilities. This will improve the ability and effectiveness of the infection control team to carry out its operations. Health facilities should develop clear plans and policies for proper management and disposal of medical waste. It is important to formulate a medical waste management policy separately from the hospital's general waste management system.

7.2.2 Regular Training and Assessment

All health workers and municipal waste collectors should be trained vigorously and intensely on all aspects of waste management and its effects on a regular basis. There is a need to focus on segregation of the waste upon generation. The hospitals need to conduct both assessment reports and audit reports frequently in order to verify the amount of waste that the hospital generates and disposes of. These assessment reports will assist the hospitals to find appropriate methods and approaches applicable to their context. It is important that every institution keeps a record of the amount of waste it generates and to assess its capacity to handle that waste and whether it has the adequate infrastructure, storage capacity, and treatment and disposal capacity. From the study the researcher gathered that health facilities are producing far more than they can handle hence medical waste was not properly stored in store houses, treated or even disposed of. Hence the need for health care facilities to increase their capacity. These assessment reports should to be reviewed and updated regularly in compliance with national or provincial policies on medical waste management. This training of healthcare workers will assist in ensuring understanding of risks involved and providing adequate support for hospital staff.

7.2.3 Integrative and Proactive Policies

There should be a clear memorandum on safe medical waste management that advises staff how to deal with accidents or spillage incidences. These should include immediate first aid measures, immediate reporting to a responsible or designated person, recording of the incident or accident, investigation of the accident and implementation of remedial action

(RCN, 2010:10). This assists the health facility to gather information for a subsequent investigation and identify the problems in order to advise on what needs to be done to avoid recurrent accidents (RCN, 2010:10). There should be a clear policy on how to deal with spillages of any kind of medical waste (RCN, 2010:10). This policy should be specific in terms of how to clear up and collect that medical waste, the appropriate methods for decontamination, who to report the spillage to and the kind of protective clothing to be worn (RCN, 2010:10). The DEAT and DOH need to work co-operatively to develop and implement integrative policies which stipulate their roles and responsibilities in the waste management process. The government needs to enforce stricter legislation and to monitor health facilities closely and set stricter sanctions for the illegal dumping of medical waste by health facilities. Hospitals need to be held accountable for the waste that they generate.

7.2.4 Monitoring and Evaluation

From the findings above and from the literature review, one of the key problems identified has been the inability of healthcare facilities to adequately segregate medical waste. As a result general waste is mixed with medical waste as they are generated, collected, transported and disposed of. This highlights the failure to follow segregation protocols, leaving hospitals as a whole potentially infectious and hazardous (BAN, 1999:5). Stringent segregation practices need to be implemented within healthcare facilities from the point of generation. If the benefits of segregation are to be realised then there must be secure internal and external collection and transportation systems for waste (BAN, 1999:5). If waste is segregated at the point of generation only to be mixed together by labourers as they collect it, then the value of segregation is lost and therefore healthcare personnel should make sure that waste is segregated from the point of generation and during collection and transportation to avoid mixture of the waste. Hospitals should develop compliance codes of conduct or disciplinary codes for all categories of employees and enforce sanctions and disciplinary hearings for deviations from the code of conduct.

7.2.5 Budget Support and Planning

One of the challenges faced by rural hospitals is the lack of financial support and a budget on medical waste management which impacts on the way medical waste is managed. Hospitals need to develop a budget for medical waste management processes in order to possibly attain

special funds to address deficits in the hospital such as collection bins, storage areas, and wheelie trolley bins for the transportation of medical waste.

7.2.6 Co-Operation Between Government and Health Facilities

The DOH and the DEAT need to work co-operatively to develop a national policy on medical waste management that is applicable to rural hospitals in South Africa and takes into account social and environmental problems in the country. These medical waste policies should take into account South Africa's legacy of apartheid, which still lingers and had adverse effects on environmental management and waste management, as well as the "crumbling" health care system. This is why it is important that the various departments work together in order to form integrative policies that take into account South Africa's environment and health context. The government and hospitals need to work co-operatively and to be transparent in order to maintain good working relations, especially in dealing with medical waste management.

7.2.7 Formal Recognition Of Reclaimers

Waste reclaimers contribute to the collection of recyclable material and to waste reduction, however they are continually exposed to dangerous and socially denigrating conditions (Mull, 2006:9). Waste reclaimers are often discriminated against as shown in the findings and harassed by local authorities. There is a need to formally recognise and incorporate waste reclaimers into the waste management programme to contribute to the overall sustainability of these low-income communities and protect them from environmental injustices. Even though waste reclaimers form a large percentage of the population in the poverty-stricken Eastern Cape, there is a lack of research conducted on how the structural changes in the waste management sector and the increase in medical waste, hazardous and toxic waste in general waste landfills affects their livelihoods.

7.2.8 Community Education

There is a need for community-based education and awareness on the manifestation of the medical waste crisis in South Africa as well as in the effects that poor medical waste management practices have on the environment and public health. Community education should be recognised as a process by which society can reach its full potential and promote sustainable development in waste management practices within the community.

Household waste can be infectious and hazardous, especially with the emphasis on primary health care, therefore education and awareness is crucial for people to protect themselves from ill health and to protect the environment at the same time.

7.3 Conclusion

The objectives of the research were fulfilled even though gaining access to key participants was an issue. There is a need to conduct a wider research looking into more rural hospitals in different regions of South Africa. As a result of lack of access, waste companies that are responsible for cleaning and transporting medical waste were unable to be reached. There is also a need to research further into the waste companies responsible for the treatment and disposal of medical waste to evaluate their practices. The participants were able to give insight on the management of medical waste in their health care facilities even though gaining their trust to fully divulge information whilst being recorded proved to be a difficult task. Future research will be necessary to improve on this study.

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APPENDIX 1: LETTER OF AUTHORISATION FROM THE EASTERN CAPE MINISTRY OF HEALTH



Eastern Cape Department of Health

Enquiries: Zonwabele Merile
Date: 18th October 2012
e-mail address: zonwabele.merile@implilo.ecprov.gov.za

Tel No: 040 608 0830
Fax No: 043 642 1409

Dear Ms Q Maseko

Re: A Critical Evaluation of Medical Waste Management Policies, Processes and Practices in Rural Hospitals in the Eastern Cape

The Department of Health would like to inform you that your application for conducting a research on the abovementioned topic has been approved based on the following conditions:

1. During your study, you will follow the submitted protocol with ethical approval and can only deviate from it after having a written approval from the Department of Health in writing.
2. You are advised to ensure, observe and respect the rights and culture of your research participants and maintain confidentiality of their identities and shall remove or not collect any information which can be used to link the participants.
3. The Department of Health expects you to provide a progress on your study every 3 months (from date you received this letter) in writing.
4. At the end of your study, you will be expected to send a full written report with your findings and implementable recommendations to the Epidemiological Research & Surveillance Management. You may be invited to the department to come and present your research findings with your implementable recommendations.
5. Your results on the Eastern Cape will not be presented anywhere unless you have shared them with the Department of Health as indicated above.

Your compliance in this regard will be highly appreciated.


DEPUTY DIRECTOR: EPIDEMIOLOGICAL RESEARCH & SURVEILLANCE MANAGEMENT



Isimiso elingqanbileyo!

APPENDIX 2: SOUTH AFRICAN SUMMARY OF MEDICAL WASTE COLOUR CODING AND LABELING

Medical Waste Category	Colour Coding/labelling of waste bags	Type of disposal
1. Anatomical Waste	Red 	Incineration
2. Infectious non-anatomical waste	Yellow and labelled hazardous 	Incineration
3. Sharps	Labelled sharps 	Autoclaving and microwave disinfection

<p>4. Radioactive waste</p>	<p>Radiation hazard symbol</p>  <p>The image shows two boxes representing radioactive waste. On the left is a smaller, white box with a radiation symbol and the word 'CAUTION' in red. On the right is a taller, brown cardboard box, also featuring the radiation symbol and 'CAUTION' text in red. Both boxes have the words 'RADIOACTIVE WASTE' printed on them.</p>	<p>Land filling, land disposal or incinerator</p>
<p>5. Chemical and Pharmaceutical Waste</p>	<p>Black, Dark Green with Cytotoxic Hazard Symbol</p>  <p>The image shows two dark green plastic bins used for chemical and pharmaceutical waste. Each bin has a white lid and a blue label with a white hazard symbol. The bins are set against a blue background.</p>	<p>Combustion and land disposal</p>

