The development and institutionalisation of knowledge and knowledge-sharing practices relating to the management of healthcare risk waste in a home-based care setting

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ABSTRACT

Improperly managed healthcare risk waste is associated with environmental degradation due to its potential to pollute air, land and water; it also poses a public health threat due to risks to community members (adults and children) who may find themselves exposed to waste that has been disposed of improperly. Despite these obvious environmental health risks, there is little information or legislative guidance on how to effectively manage the healthcare risk waste generated by community health workers who move from house to house and do not operate out of a fixed clinic with formal waste management facilities. This poses a challenge for municipal environmental health practitioners who are mandated to ensure compliance and to monitor the management of healthcare risk waste by community home-based care facilities. This educational study looks at how the knowledge held by environmental health practitioners influences knowledge-sharing practices and management of healthcare risk waste by community health workers, and how these knowledge-sharing practices can be developed and institutionalised.

The study takes an interventionist approach within the social constructionist tradition. Cultural-Historical Activity Theory (CHAT) and expansive learning provide the theoretical and methodological framework to surface systemic tensions and contradictions affecting knowledge-sharing and healthcare risk waste management practices. A series of Change Laboratory Workshops using the Developmental Work Research methodology enabled a twenty-seven month expansive learning process with selected municipal employees and community health workers in a small South African city.

The study found that employees (such as environmental health practitioners and waste inspectors) working in municipal activity systems knew very little about the forms and functions of community home-based care facilities in their municipality. As such, their knowledge-sharing practices about the management of healthcare risk waste were restricted and generally unsystematic, which in turn contributed to inappropriate and often haphazard healthcare risk waste management practices by community health workers. As an interventionist project, the study concluded that the participatory, expansive learning process it initiated had built knowledge-sharing networks, enabled professional boundary crossing and potentially institutionalised better knowledge-sharing practices relevant to the effective management of healthcare risk waste.

DECLARATION

I declare that this thesis is my own work, and that all other sources used or quoted have been fully acknowledged and referenced. It is being submitted for the Degree of Masters of Education at Rhodes University, and has not been submitted for a degree or examination at any other University.

Mapula Priscilla Masilela

Signature ……

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF BOXES

ACRONYMS

CHBC	Community Home-Based Care
CHW	Community Health Worker
EATT	Environmental Advisory Task Team
EHP	Environmental Health Practitioner
HCRW	Healthcare Risk Waste
HPCSA	Health Profession Council of South Africa
MCLM	Mogale City Local Municipality

NQF	National Qualifications Framework
SDBIP	Service Delivery and Budget Implementation Plans
SAQA	South African Qualifications Authority
WRDM	West Rand District Municipality

CHAPTER 1: INTRODUCING THE STUDY

1.1 INTRODUCTION

> *Kagiso Township, in Mogale City Municipal area, Gauteng province, South Africa, 18 February 2011: Community members in Otlega Street were up in arms about healthcare waste that was dumped at their street corner next to the park. They blamed the funeral undertaker who is situated close to the area for dumping the waste. The previous day, a community member saw some school children playing with used surgical gloves on their way back from school (inflating them, putting water and drinking out of the gloves); the children said they found the gloves at the waste dump. The matter was referred to the municipal Environmental Health Practitioners who investigated the origin of the healthcare waste. It was discovered that the waste was not from the funeral undertaker since a service provider collects their healthcare waste on a weekly basis and they had records to prove that. What was surprising was that there were also adult nappies on site. The Environmental Health Practitioners conducted a house to house inspection around the area and found that two houses away from the funeral undertaker's premises was a patient under the care of community home-based care givers, who was bed ridden and required pressure wound care. The family admitted to dumping the waste at the street corner. The community home-based care facility also admitted that they were disposing of healthcare waste in the domestic waste bin since they did not know where to dump the waste.*

The vignette above illustrates the kind of work and typical challenges faced by municipal environmental health practitioners (EHPs) in South African towns and cities. This study focuses on the case of environmental health services in Mogale City municipal area and investigates knowledge-sharing practices associated with the management of healthcare risk waste. In this chapter, I introduce the context of environmental health services in Mogale City municipal area; I outline my emerging research interest as an environmental health practitioner; I present a rationale for this study, its research questions and objectives and its potential contribution; and finally, I provide an overview of the chapters to follow.

1.2 OVERVIEW OF LOCAL MUNICIPALITIES INVOLVED IN THE STUDY

This section presents data relating to the West Rand District Municipality as the municipality responsible for providing environmental health services, and Mogale City Local Municipality as the municipality receiving the services.

1.2.1 West Rand District Municipality

The West Rand District Municipality is a Category C Municipality[1] established in terms of the Municipal System Amendment Act of 2000 (South Africa [SA], 2000). It comprises four local municipalities: Mogale City, Randfontein, Westonaria and Merafong. The District Municipality covers an area of approximately 406 623 hectares in size with diverse land uses such as agricultural, industrial, mining, residential, and informal settlements.

The West Rand District Municipality is situated on the border of Gauteng Province, sharing its borders with three district municipalities between Gauteng and North West Province and two metro municipalities in Gauteng. Figure 1.1 below shows how the West Rand District Municipality is situated with regard to its neighbouring municipalities.

Within the West Rand District Municipality's Health and Social Department is a section called Environmental Health Services. This section is headed by the Manager: Municipal Health Services and has four Chief Environmental Health Practitioners, each heading a local municipal area. Mogale City Local Municipality is one of those four municipal areas and, as it is the focal point of this study, I now discuss it more fully in Section 1.2.2 below.

Figure 1.1: Map showing the West Rand District Municipality and neighbouring municipalities

[1] Category C Municipalities are District Municipalities. They have executive and legislative authority in an area that includes more than one local municipality.

1.2.2 Mogale City Local Municipality

Mogale City Local Municipality was established in 1903 as a mining town in the western part of Gauteng Province and was known as Krugersdorp Municipality. Like all other municipalities in South Africa, it has undergone substantial transformation in legislation, structure and demographics since the transition to democracy in 1994. The name Krugersdorp Municipality was changed to Mogale City Local Municipality after local government elections in 2000. Mogale was the name of the chief of the Batswana (Po-tribe), one of the original tribes that occupied the area (Mogale City Local Municipality [MCLM], 2003).

Figure 4.1 above illustrates Mogale City Local Municipality in relation to the West Rand District Municipality (in black border) and neighbouring municipalities in Gauteng and North West Province in South Africa. Mogale City Local Municipality covers approximately 110 069 hectares (MCLM, 2011) and accommodates a population of 362 422 people (Statistics South Africa [STATSA], 2011, cited in MCLM 2013). Settlements within this municipal area consist of a mixture of urban, rural and informal. The urban areas reflect different levels of development, with townships having fully serviced, clearly laid out sections and a concentration of informal settlements (MCLM, 2011). The township settlements also house backyard shacks (especially in older areas). The rural areas consist mainly of farms and informal settlements. Service provision in rural areas is a challenge with residents scattered over large farming areas (MCLM, 2003).

1.3 OVERVIEW OF ENVIRONMENTAL HEALTH SERVICES IN MOGALE CITY MUNICIPAL AREA

Environmental health services aim to create environments that support good health and minimise diseases. This is achieved by controlling environmental factors that impact adversely on human health. Throughout South Africa, environmental health services are vested in local spheres of government, in particular, district and metropolitan municipalities. Environmental health services are provided by environmental health practitioners (EHPs) who have a minimum qualification of a National Diploma in Environmental Health and are registered with the Health Profession Council of South Africa (HPCSA). The scope and function of their work is prescribed by the Regulation defining the Scope of Profession for Environmental Health Practitioners (South Africa [SA], 2009a) (see Section 4.4).

Environmental health practitioners work in the community, they conduct inspections to identify environmental health hazards, collect samples, educate, issue compliance certificates (health certificates and certificates of acceptability in terms of food handling) and ensure compliance with environmental and health legislation. Although environmental health practitioners have legal powers to enforce legislation, a big part of their role in the post-apartheid South Africa is to build relationships and educate the public. Hence, the work of an environmental health practitioner involves educating, negotiating and influencing people across the community, from industry leaders, local business owners and households, to elected councillors and agency managers.

All environmental health practitioners in Mogale City local municipal area are allocated areas of jurisdiction both in rural and urban areas to perform their prescribed functions. The areas are then rotated every two years to expose practitioners to diverse environmental health contexts. Environmental health practitioners are expected to manage their own areas and to make decisions independently on what actions to take. Occasionally they involve the Chief Environmental Health Practitioner, depending on the complexity of the situation. On a weekly basis they meet with the Chief Environmental Health Practitioner to report on their work, share experiences and advise one another.

In the past, approaches to environmental health services in West Rand District Municipality were mainly related to inspections, monitoring and evaluation of health hazards to ensure legal compliance, routinely or often in response to public complaints. New legislation developed after South Africa's transition to democracy in the 1990s marked a shift from the earlier reactive approaches towards more comprehensive, integrated and preventative management of the environment for public health (Mathee, 1999). For example, during inspection of community home-based care facilities, all possible factors (such as food safety, water quality, waste management, occupational health safety, vector control, and chemical safety) are taken into consideration before a compliance certificate can be issued. This shift requires early intervention during planning stages for the establishment of places of care such as community home-based care facilities. It also requires continuous environmental surveillance and evaluation across disciplines (Mathee, 1999).

1.4 MY EMERGING RESEARCH INTEREST AS AN ENVIRONMENTAL HEALTH PRACTITIONER

I have been working as an environmental health practitioner for the past nineteen years in Mogale City local municipal area. I am inspired by the diversity and complexity and scope of the context in which environmental health practitioners must perform their functions. For example, environmental health practitioners normally work with complex and unexpected situations, which require flexibility, resourcefulness and self-reliance. Every inspection is different: every day we go to facilities (ranging from mortuaries to formal food premises and informal food trading on the streets), assess risks and provide information. Consequently, we need to have access to updated information since we are often the first point of contact between the government and the community.

As a government-appointed environmental health practitioner, I am expected to work within the following frameworks:

- Section 24 of the Constitution of South Africa which enshrines the right to an environment that is not harmful to the health or well-being of the citizens; and the right to an environment that is protected, for the benefit of present and future generations (South Africa. Department of Justice and Constitutional Development [SA], 1996);
- The Health for All strategy which requires a focus on environment and health in sustainable development, primary prevention through intersectoral action, environmental health promotion, and community development (World Health Organisation [WHO], 1998);
- Principles of Local Agenda 21 which require that environmental sustainability, the impact on future generations, and the effect of local activities beyond local environments be taken into account when addressing health issues (United Nations Conference on Environment and Development [UNCED], 1992).

Locally, I am expected to ensure that services are provided for the safe collection and treatment of healthcare waste generated by minor generators. To do so, I must map out all the minor generators, ensure that they have approved healthcare waste service providers who collect their waste, and also provide information that will contribute towards developing municipal healthcare risk waste management plans for the municipality (SA, 2004a).

The emergence of community home-based care facilities in the 1990s, in response to the HIV/AIDS pandemic, required EHPs to extend their functions to these new facilities. In Mogale City municipal area, rendering such services became a challenge for the following reasons:

- Community home-based care services are offered at individual houses (WHO, 2002). The location of the services is therefore temporary and EHPs move from patient to patient and site to site. This makes it difficult to evaluate how much healthcare risk waste is being generated and how it is being managed (stored, transported and disposed of).
- Community Health Workers 'are not regulated by any professional council, meaning that their work currently takes place without the guidelines that a mandatory scope of practice may provide, (Cameron, Coetzee & Ngidi, 2009. p. 102). For example, environmental health practitioners are regulated by the Health Profession Council of South Africa (HPCSA), which means that one cannot operate as an EHP without being registered as such by the HPCSA. Community home-based care givers can, however, operate without being registered with any professional body. Furthermore, sometimes the community home-based care facilities can even operate without a compliance certificate provided by environmental health practitioners, until they are required to do so by their funders.
- In the absence of municipal by-laws applicable to the community home-based care industry, environmental health practitioners have to use their own discretion to evaluate such facilities, resulting in multiple (and often uneven) standards in the provision of environmental health services.

In light of the above challenges, and the fact that there was little or no information for either the community home-based care givers or environmental health practitioners about the appropriate management of the healthcare waste by community home-based care facilities, I was propelled to research how the knowledge-sharing practices in Mogale City municipal area influence the management of healthcare waste, and how these knowledge-sharing practices might be developed and institutionalised.

1.5. RATIONALE FOR THIS STUDY

The motivation to conduct this study is premised on the fact that community home-based care services in South Africa are in high demand as a result of the HIV/AIDS pandemic and an increase in chronic diseases on people who have to take care of the orphans. In Mogale City alone, the facilities have increased from two in 2001 to sixteen in 2014. This means that there is also an

increase in the generation of healthcare waste, the disposal of which is a global concern (Gabela, 2007). Healthcare waste is associated with environmental degradation due to its potential to pollute air, land and water; it also poses a public health threat due to occupational health injuries to community members (adults and children) who often find themselves exposed to waste that has been disposed of improperly.

Despite these obvious environmental health risks, little attention has been paid to the management of healthcare risk waste from these facilities by the Mogale City Local Municipality and the West Rand District Municipality: Environmental Health Services are mandated to ensure that minor generators (such as community home-based care facilities) dispose of their healthcare risk waste in an approved manner (South Africa [SA], 2004b). Although community home-based care facilities are minor generators (meaning that they generate on average more than 150g but less than 20kg of healthcare waste per day), little is known about the actual amount of waste these facilities generate individually and collectively (Blenkharn, 2008). This lack of knowledge has been recognised as one of the main reasons for the improper management of healthcare waste (Gabela, 2007; Kgang'eth, 2008; Mari, 2005).

Motivation to conduct this study is also based on the scarcity of research into environmental education and training in local government contexts which, as the closest level of government to the people, is tasked with service delivery of public programmes and services, and plays a key role in improving the quality of citizens' lives and achieving sustainable development goals (United Nations Education, Scientific and Cultural Organisation [UNESCO], 2004).

Municipalities are also mandated by the Constitution (SA, 1996) and the Green Paper for Post-school Education and Training (SA, 2012) to play a more direct role in expanding workplace training. Hence, I recognised the importance of investigating how professional knowledge related to healthcare risk waste management, which is necessary for the development of working knowledge and skill, is produced, distributed and institutionalised in Mogale City Municipal Area. My research questions and objectives are discussed in the next section.

1.6 RESEARCH QUESTIONS AND OBJECTIVES

This study aims to identify how knowledge-sharing practices related to healthcare risk waste management in community home-based care settings in Mogale City Municipal Area can be improved.

The study's research questions are:

(a) How do knowledge and knowledge-sharing practices of environmental health practitioners in Mogale City Municipality influence healthcare risk waste management practices in community home-based care settings; and

(b) How might these knowledge-sharing practices be developed and institutionalised?

To answer these questions, the research addresses the following research objectives:

- To describe municipal officials' knowledge bases regarding their roles and responsibilities in relation to community home-based care workers' healthcare risk waste management practices;
- To describe associated knowledge-sharing practices (i.e. to describe how this knowledge is imparted, by whom, in what forms, and how often);
- To understand the extent to which these knowledge-sharing practices are systematised and institutionalised;
- To identify consequences of these knowledge-sharing practices on healthcare risk waste management practices by community home-based care facilities in Mogale City Local Municipal Area;
- To surface systemic tensions and contradictions influencing these knowledge-sharing practices;
- To gain insights into (and, where possible, to support) ways in which these knowledge-sharing practices can be enhanced and sustainably institutionalised.

1.7 POTENTIAL CONTRIBUTION OF THE STUDY

As an experienced environmental health practitioner working in the Mogale City Local Municipal Area, I am in a position to share the findings of this study with:

- Other environmental health practitioners in the West Rand District Municipality;
- Local politicians through presentations in the Health and Environment portfolio committee;

- Gauteng Department of Health through submission of the findings to the research and development section;
- Other health and environmental health professionals through a presentation at the South African Environmental Health Conference; and
- Environmental education practitioners through a presentation at the Environmental Education Association of Southern Africa (EEASA) conference.

Sharing the results of the study with other strategic partners such as the Waste Management section within Mogale City Local Municipality, the Department of Health and the Department of Social Development may also provide a platform for provincial and national government to revise their policies and to clarify roles and responsibilities regarding management of healthcare risk waste by community home-based care facilities.

The study will not only help environmental health practitioners to take cognisance of the impact of their knowledge-sharing practices, but will help them to develop competencies to share and manage knowledge effectively. The study will further assist environmental health professionals to address challenges brought about by environmental health inequalities.

This study explores a new platform (methodologically and theoretically) for future research into workplace learning and organisational learning in the context of local government. This is the first study to be conducted (at least in the South African context) into environmental health practitioners' knowledge-sharing practices associated with the management of healthcare risk waste.

The next section provides an overview of each chapter and its role in the study towards achieving the research objectives and ultimately answering the research questions.

1.8 OVERVIEW OF THE STUDY

Chapter Two begins with a brief overview of South African Local Government, its roles and responsibilities in terms of services provision and ensuring citizens' constitutional right to a safe and healthy environment. It further describes the following key concepts relevant to the study: knowledge-sharing, knowledge-sharing practices, healthcare risk waste management and community home-based care. The chapter considers how the emergence of community home-based

care services has had consequences for the role of local government. The second part of the chapter demonstrates how Cultural-Historical Activity Theory (CHAT) and expansive learning can foster improved knowledge-sharing systems between the municipality and community home-based care facilities.

Chapter Three discusses the research orientation and methodological framework that guided the research process. This chapter describes how I generated data, beginning with negotiating access to my research sites, the methods I used to generate data, how I managed and analysed the data. The chapter concludes with a discussion on how I observed research ethics, and took steps to ensure validity and trustworthiness of the study.

Chapter Four presents a detailed account of the case data. Data are presented in three sections. The first section presents Environmental Health Services as an activity system, focusing on knowledge circulating within the activity system, knowledge-sharing practices and tensions and contradictions relevant to healthcare risk waste management within the activity system. The second section presents community home-based care services as an activity system, and similarly focuses on knowledge, knowledge-sharing practices, tensions and contradictions. The final section of this chapter describes systemic tensions and contradictions *between* the environmental health and community home-based care services activity systems in relation to knowledge-sharing on healthcare risk waste management.

Chapter Five presents data from Phase Two of the data generation process which involved conducting three 'Change Laboratory' workshops. The chapter also describes how the D-analysis approach was used to identify sequences of communicative actions relating to what has been established, what is yet to be established, and how it might be achieved.

Chapter Six presents findings in the form of analytical statements, based on data presented in Chapters Four and Five. The findings are discussed in relation to the theories and concepts outlined in Chapter Two, most especially with regard to knowledge-sharing in expansive learning processes at work. The discussions in this chapter aim to address the study's research question.

Chapter Seven summarises the research process taking into account the research question. Finally the chapter makes recommendations to improve knowledge-sharing relating to healthcare risk management based on the analytical statements provided in Chapter Five.

1.9 CONCLUSION

This chapter has introduced the study by describing the context and professional practices of environmental health practitioners in Mogale City Municipal Area, highlighting challenges associated with the under-regulation of its rapidly expanding community home-based health care sector. The chapter summarised my emerging research interest as an environmental health practitioner before presenting the study's aims, research questions and objectives, as well as its potential contribution, not only to Mogale City municipal area, but also to other researchers interested in workplace learning, organisational learning and change-oriented environmental learning. Finally, the structure of the thesis with a brief summary of each chapter was provided.

The following chapter elaborates on the legislative and professional context of healthcare risk waste management in Mogale City before describing the study's conceptual and theoretical frameworks.

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

The purpose of this chapter is to describe the socio-political context of healthcare waste management in Mogale City municipal area, South Africa; to introduce key concepts related to workplace learning in that context; and to introduce Cultural-Historical Activity Theory (CHAT) and expansive learning as the theoretical framework of the study. The chapter begins by describing the environmental health services in local municipalities, followed by the development of community home-based care programmes in South Africa. The chapter then describes the development of environmental policies of relevance to healthcare waste management policies in the country and considers some of the challenges associated with implementing these healthcare waste management policies in the context of municipal service delivery in South Africa. It further describes current healthcare waste management practices in the country. The chapter then considers the potential of applied competence as an approach to workplace learning that might improve knowledge-sharing related to healthcare waste management practices at local government level (Section 2.6). The chapter concludes by demonstrating how the theoretical and methodological tools from CHAT, expansive learning and Developmental Work Research can potentially strengthen knowledge-sharing systems within and between the Mogale City Municipal area and the community home-based care industry.

2.2 MUNICIPAL HEALTH SERVICES AND ENVIRONMENTAL HEALTH.

According to Balfour (2004), 'municipal health services' is a term that has evolved in South Africa to define the package of health services to be rendered by local government and includes most environmental health services. The responsibility of delivering Municipal Health Services is identified as a metropolitan and district municipalities' function (SA, 1996; SA, 2000). Environmental health practices seek to protect human health by combating physical, chemical, biological and social threats in the environment (SA, 2013). They aim to create environments supportive of good health and to minimise diseases (Wright, 2014) through assessing, correcting, controlling and preventing environmental factors that can adversely affect human health (SA, 2013). Environmental health practices provide opportunities to enhance health by planning and developing health promoting environments that contribute to better health outcomes (SA, 2013).

Environmental health services are described by the World Health Organisation (WHO) as those services which implement environmental health policies through monitoring and control of activities by promoting the improvement of environmental parameters and encouraging the use of environmentally friendly and healthy technologies and behaviours (Drew, van Duivenboden & Bonnefoy, 2000). They include but are not limited to anticipation and identification of environmental health hazards and risks regarding: water quality monitoring, food control, waste management, surveillance of premises, communicable diseases control, vector control, environmental pollution control, disposal of the dead, chemical safety and noise control. Most of these services are based at local government level as Municipal Health Services (SA, 2013).

2.3 ESTABLISHMENT OF COMMUNITY HOME-BASED CARE PROGRAMMES IN SOUTH AFRICA

According to Spier and Edwards (1990), home-care programmes for people living with HIV/AIDS were first initiated in North America and Europe when it became clear that hospital care was expensive and that families and carers found it difficult to cope on their own with the demands of caring for people living with HIV/AIDS. In sub-Saharan Africa, community home-based care (CHBC) programmes were developed as unsystematic and need-based efforts when it became evident that other options of care were necessary to deal with the effects of HIV/AIDS (WHO, 2002, p. 8). CHBC were and are still run by non-governmental organisations (NGOs), community-based organisations (CBOs) and faith-based organisations (FBOs) (Cullinan, 2000).

Community home-based care is defined by the World Health Organization (WHO) as "any form of care given to sick people in their homes' (WHO, 2002, p. 8). In the South African context, it is understood as 'the provision of health services by formal and informal caregivers in the home to promote, restore and maintain a person's maximum level of comfort, function and health, including care towards a dignified death' (SA, 2001. p.1). Community home-based care facilities carry out enabling services to help families navigate through the sometimes fragmented healthcare systems and create a bridge between the medical regime and the contexts of the community members. This enabling role is essential for isolated or low-income families who are not in a position to access formal services due to socio-economic reasons and related contextual factors (Magongo, 2004).

Community home-based care services are provided by community health workers who are lay workers whose primary function is to promote basic health or the delivery of basic health services

within homes (SA, 2001). Their appointments (by the community home-based care facility) are not based on the level of their schooling or previous education but on the basis that they are: above eighteen (18) years, unemployed, reside within the community to be served, indicate their interest in joining the programme, are willing to undergo training as required by the community home-based health care facility and live under pressure of poverty (SA, 2009b). Because community health workers are usually indigenous to the communities in which they work, they are able to bridge gaps in language, culture, economic status and education and are able to connect diverse communities with the health and social services they need (Cesar, Cavaletti, de Lima & Houthausen, cited in Magongo, 2004).

Duties of community health workers centre on prevention of diseases and minimisation of the impact of existing diseases through provision of services such as assisting patients with personal and environmental hygiene services, assisting with cooking, and accompanying patients to health facilities. In addition to home visits, community health workers provide necrotic wound care, oral hygiene, supervision of medication taking including TB, pain management and follow-ups on chronic diseases (hypertension, psychiatric illness, disability conditions, diabetes etc.) (Magongo, 2004).

2.4 DEVELOPMENT OF ENVIRONMENTAL POLICIES IN SOUTH AFRICA

Prior to 1994, one of the great challenges in South African environmental policy was the fragmentation of environmental management and administrative functions among different spheres of government (Rossouw & Wiseman, 2004). Environmental policy making processes were technocratically driven and broader civil society was excluded from policy deliberations. Stakeholder engagement was restricted to small groups of technical experts (Peart & Wilson, cited in Rossouw & Wiseman, 2004). Public participation, if it occurred at all, was limited to information distribution and occasional consultation with selected interest groups, such as conservation lobby organisations (Rossouw & Wiseman, 2004).When the process of political democratisation started in the early and mid-1990s, the environmental policy discourse also started to change. This discourse saw citizens' rights, socio-economic issues and quality of life included in the environmental policy agenda for the first time. The first democratic elections in 1994 marked South Africa's transition to democracy and ushered in a new era of accountability in policy systems. An elaborate nation-wide environmental policy process followed and resulted in new legislative and administrative requirements based on democratic and participative principles.

Since then, a range of environmental legislation has been promulgated, including, among others:

- *The South African Constitution* (SA, 1996), which introduces a rights-based approach supported by the principles of accountability and transparency in governance. The Constitution obliges the State to protect the environment for the benefit of present and future generations by stating that:

  > Everyone has the right: to an environment that is not harmful to their health or well-being; and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development (SA, 1996, p. 1251).

Through the adoption of the Constitution, environmental rights and environmental justice became the newly accepted values in the environmental policy arena, as evidenced in the following legislation:

- *National Environmental Management Act (NEMA), No. 107 of 1998*, which provides a framework for integrating good environmental management into all developmental activities. NEMA provides principles guiding the exercise of functions affecting the environment and promotes certainty with regard to decision-making by organs of states. It further establishes procedures and institutions to facilitate and promote public participation in environmental governance (SA, 1998).
- *National Environmental Management: Air Quality Act, No. 39 of 2004*, which provides for the protection of the environment by providing measures for the prevention of pollution and also to provide national norms and standards regulating air quality monitoring, management and control by all spheres of government for specific air quality measures (SA, 2004b).
- *National Environmental Management: Waste Act, No. 59 of 2008*, which provides measures to protect the health, well-being and environment and to ensure that people are aware of the impact of waste on their health, well-being and environment (SA, 2008).

- *Gauteng Healthcare Risk Waste Management Regulation of 2004*, which provides requirements for the storage, transportation and final disposal of healthcare risk waste by major generators in Gauteng Province (SA, 2004a).

In the next section (2.4.1), I discuss the development of the Gauteng Healthcare Risk Waste Management Regulation, beginning with defining healthcare waste and thereafter describing what has influenced the development of healthcare waste management policies.

2.4.1 Development of healthcare waste management policies

According to the South African National Standards (SANS, 2011), healthcare waste is categorised into healthcare risk waste and healthcare general waste, defined as follows:

- *Healthcare risk waste categories*: infectious waste, anatomical (pathological) waste, sharps, chemical and pharmaceutical waste, extracted teeth with amalgam, heavy metals, pressurized containers and radioactive waste with a reading less than 74 Becquerel (Bq); and
- *Healthcare general waste categories*: packaging material, kitchen waste (domestic waste), office waste and building demolition waste, waste from patients (for example, fruit juice bottles and magazines), non-clinical glass, non-infectious non-anatomical waste (for example, paper tissues), disposable curtains, nail clippings, hair, decontaminated waste, and garden and park waste (SANS, 2011).

Due to increased public concerns regarding transmission of blood-borne diseases through exposure to mismanaged healthcare risk waste (illegally dumped in communities or on landfill sites), healthcare waste was identified as one of the issues of priority that required immediate attention in the National Waste Management Strategy (NWMS) (Molefe, Gwensa, Kristiansen & Rogers, 2006).

The development of healthcare waste management policies was also influenced by the need to provide:

- A single legislation to regulate the management of healthcare waste;
- A coherent definition of healthcare waste;
- Management mechanisms indicating roles and responsibilities for implementing and enforcing the legislation by both the government and public sector;
- Control mechanisms prescribing conditions under which healthcare waste may be generated, the requirements for storage and handling, the frequency of collection and permissible treatment and disposal techniques; and
- Procedural mechanisms prescribing performance standards and enforcement.

To understand the impact of the policies at local level, I discuss challenges relating to implementation of healthcare waste management policies in Section 2.4.2 below. Full descriptions of how healthcare risk waste in Mogale City Municipal area is managed will be outlined in Section 4.3.

2.4.2 Challenges to implementing healthcare waste management policies in South African local governments

The vision of creating sustainable opportunities for all to live decently involves enormous challenges (Rosenberg, 2008), particularly in the implementation of environmental management policies because environmental and health risks are complex, multidisciplinary in nature, interrelated and often ill-defined with uncertain solutions. Implementation of healthcare waste management policies in South African local government is also encountering the following challenges, similar to those identified as specific to national level (Rossouw & Wiseman, 2004. p. 139):

- Stakeholder engagement and networks are generally not maintained after the policy formulation process is completed, resulting in a lack of awareness;
- There is no integration and cross-sectoral linkages with government departments responsible for service delivery and local planning (such as Public Works, Health and Social Development);
- Ineffective integration of environmental management with the national priorities of poverty eradication and social transformation (the establishment of community home-based care facilities as one of Government's poverty alleviation strategies, does/did not consider its impacts on environmental pollution);
- Enforcement is widely neglected due to a lack of capacity, particularly at local government level where the issue of 'unfunded mandates' is critical. This has resulted in limited control and monitoring of healthcare waste generators and service providers who collect, treat and dispose of healthcare waste;
- Initiatives to build the knowledge capacity of all segments of broader society to understand policy and to participate actively in policy networks and processes are not sustained;
- Clear linkages between national policy and local delivery are not established, even though municipalities are in the front line of social and economic development.

Despite efforts to involve local government in addressing the above policy implementation challenges, a study by Rossouw and Wiseman (2004) still identified lack of responsiveness to learning gathered during policy implementation at the local level as a challenge facing

environmental policy process in South Africa. For instance, experiences encountered at local level during policy implementation (such as that healthcare waste is not being generated at one fixed property) are not being used to improve the policies. Hence, management of healthcare waste by community home-based care facilities remains neglected despite its impact on health and environment.

2.4.3 Current healthcare risk waste practices in South Africa

In South Africa, healthcare risk waste is currently managed in ways that are causing problems to society (Molefe et al., 2006). It is estimated, for instance, that about 45% of healthcare risk waste generated in KwaZulu-Natal alone, cannot be accounted for, indicating that it is illegally dumped, buried or burnt somewhere (Leonard, 2004). Illegal dumping of healthcare risk waste in disadvantaged residential areas has resulted in situations where children have been found playing with the waste (Abor, 2007). Insufficient attention to the threats of these unacceptable healthcare risk waste management practices puts people and the environment at risk. Management of healthcare risk waste is therefore one of the most pressing environmental problems which regulatory agencies currently face (Cliplak & Barton, 2012).

Although there are limited studies on healthcare risk waste management in community home-based care facilities in South Africa, a study conducted in Botswana (Kgan'ethe, 2008) indicated that inadequate community education on healthcare waste management and non-functioning policies contribute to how the waste is managed. Studies (Mokgwaru, 2001; Kang'ethe, 2008) indicated that most community home-based care facilities were handling and disposing of their healthcare risk waste unprofessionally, for example, some of the community home-based care facilities were dumping healthcare risk waste in municipal bins or on vacant land because they struggled to transport the waste to the clinics. Botswana's arrangements for disposing healthcare risk waste generated by community home-based care facilities via the clinics is not available in Mogale City Municipal area, meaning that the healthcare risk waste is currently being disposed of in other ways, about which little is known.

To address the above challenges, local government practitioners require enough knowledge to improve services and contribute to the improvement of healthcare risk waste management policies. Currently, practitioners responsible for the implementation of healthcare risk waste management policies in Mogale City municipal area are the environmental health practitioners as well as the waste inspectors appointed in terms of the Health Professions Act (1974) and the Waste Management Act (2009) respectively. Both groups of practitioners have been trained as

Environmental Health Practitioners, with a minimum qualification of a National Diploma in Environmental Health. As described in Section 1.2, these practitioners are required to identify environmental health hazards posed by healthcare risk waste, assess the risks and recommend corrective measures (including capacity building) to community home-based care facilities on healthcare risk waste management. To provide effective services, these practitioners must be able to share knowledge between themselves and with community home-based care practitioners. The concept of knowledge and knowledge-sharing is discussed in the next section.

2.5 KNOWLEDGE AND KNOWLEDGE-SHARING

From the organisational knowledge literature, knowledge is defined as "a fluid mix of framed experience, values, contextual information, and expert insights that provides a framework for evaluating and incorporating new experiences and information. It originates in and is applied in the minds of knowers" (Davenport & Prusak, 1998). Nonaka and Takeuchi's (1995) definition of knowledge, however, is far broader in scope: "a dynamic human process of justifying personal belief toward the truth" (p. 58). They distinguished between information and knowledge and defined information as the "flow of messages" (p. 58) and knowledge as what is created when the flow of messages interacts with beliefs and commitments of its holders.

From the social practice perspective, Edwards and Daniels (2012) argued that knowledge can only be understood in relation to the practice and the motives that shape it. For example, an environmental health practitioner's knowledge is determined by what she is expected to *do* in her practice, and her *reasons* for doing those things in relation to the priorities and dynamics of the environmental health sector.

Carlile (2002, p. 446) explained that knowledge is one of the means by which individuals demonstrate their competency in solving problems both inside and outside their practices. As such, knowledge is: (i) localised around a particular problem, (ii) embedded in practice (including technologies, methods and rules used by individuals in a given practice), and (iii) invested in practice, that is, in methods, ways of doing things, and successes that demonstrate the value of the knowledge developed.

In later work, Carlile (2004) argued that if knowledge between actors is different, managing dependencies will require capacity to develop adequate *common knowledge* to represent both the

differences and dependence as well as novelties present. Carlile (2002; 2004) and Edwards and Daniels (2012) have drawn attention to the benefits of common knowledge in knowledge-sharing practices. Firstly, common knowledge functions as a 'boundary object', secondly, it mediates how problems are interpreted and practices are aligned, and thirdly, it offers resources for mobilising knowledge. These three benefits of common knowledge are outlined below.

- ***Common knowledge as a 'boundary object'***

Carlile (2002) defined boundary objects as objects that help to establish a shared context between different fields and establish a boundary infrastructure for individuals to manage knowledge across a given boundary. He argued that boundary objects are shared and shareable across different problem-solving contexts and noted the following characteristics of boundary objects which make them useful at any given knowledge boundary:

- They establish a shared syntax or language for individuals to represent their language. For example, they provide terminology relevant to the problem.
- They provide concrete means for individuals to specify and learn about their differences and dependencies across a given boundary. For example, flow charts afford individuals to identify their role in the whole process.
- Finally, they facilitate a process where individuals can jointly transform their knowledge. For example, guidelines allow individuals to alter and manipulate their contents to apply what they know.

- ***Common knowledge mediates interpretation of problems and alignment of practices***

Edwards (2012) noted that during the process of sharing knowledge across boundaries, practitioners readily reveal the meaning of their practices and their use of categorisations. This assists other practitioners to develop a form of professional 'multi-lingualism' needed to negotiate across knowledge boundaries. She argued that the 'knowledge that matters' for each practice, and consequently the knowledge held in common, is then able to mediate action and resolve complex problems.

- ***Common knowledge offers resources for mobilising knowledge***

Carlile (2004) explained that common knowledge mobilises knowledge through one of three processes: transfer, translation and transformation. He notes that during the transferring process, a common lexicon is developed, sufficient for others to share and access knowledge; during the translating process, shared meaning develops the means for knowledge to be shared and accessed;

and that during the translation process, common interests are developed with the potential to transform the knowledge, interests and means of sharing and accessing knowledge.
For knowledge-sharing to be effective, actors must have relevant competencies to share domain knowledge in appropriate ways.

In the light of inappropriate healthcare risk waste management practices exposing the public to life threatening risks and the inability of government practitioners to address challenges relating to implementation of healthcare risk waste management policies, the study identified applied competence and collective competence as the most important competencies that can mediate solution to current situations. The two sections that follow, Section 2.6 and 2.7, discuss applied competence and collective competence respectively.

2.6 APPLIED COMPETENCE AS A FRAMEWORK TO BUILD CAPACITY AT LOCAL GOVERNMENT LEVEL

The notion of applied competence was developed in 1997 by the National Training Board (NTB) in an effort to integrate education and training which were previously seen as two separate fields with little in common prior to the first South African democratic elections in 1994. Applied competence is described as "the demonstrated ability to perform a set of tasks with understanding and reflexivity" (NTB, 1997, cited in Lotz-Sisitka & Raven 2009, p. 312). Applied competence involves the integration of three interconnected types of competence namely: foundational, practical and reflexive competence. Figure 2.1 illustrates these components of applied competence and how they interact with one another.

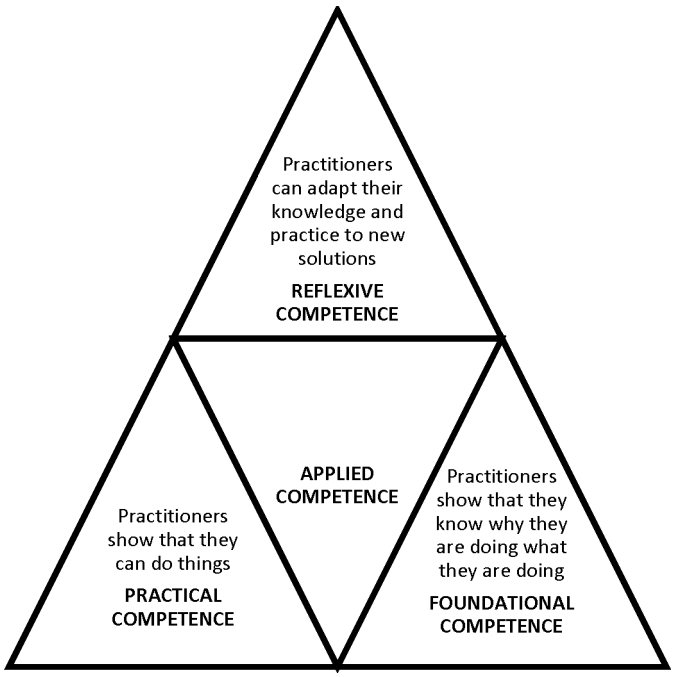


Figure 2.1: The balanced interactions of practical, foundational and reflexive competence combine to constitute applied competence. (from Olvitt & Hamaamba, 2009, citing Le Roux, 2001)

Foundational competence is the demonstrated understanding of what a person does, and why. This form of competence is crucial for effective environmental health management as it ensures that practitioners have an adequate understanding of their work and its context. In the context of this study, practitioners must be able to understand what healthcare risk waste is and why it needs to be monitored and controlled within community home-based care settings. They must also be able to know what to look for when conducting inspections, and which information can or should be shared with community health workers in order to ensure awareness and compliance.

Practical competence is described as the ability to review a range of possible actions in real context, to decide on an appropriate action to follow and to perform the chosen action. For example, environmental health practitioners must be able to identify possible healthcare risk waste management options for community home-based care facilities, decide on the best practicable method and be able to communicate the chosen method to community health workers. Practical competence is thus seen as the practical dimension of effective environmental health management.

Reflexive competence is the ability to connect their performance and decision-making to the underlying understanding and adapt to change or unforeseen circumstances, and be able to explain these adaptations (Lotz-Sisitka & Raven, 2009, p. 312). Although it is easily overlooked, this is a very significant area of environmental health management because it is a form of competence that

requires practitioners to reflect on the work they do and seek ways of improving practice in their area of responsibility. For example, environmental health practitioners should be able to implement healthcare risk waste legislation in complex situations such as community home-based care facilities where healthcare risk waste is not generated at one fixed property (such as in hospitals and clinics) and where there are no resources for the removal and disposal of healthcare waste. In so doing, they will be able to contribute to the development of healthcare risk waste management plans (as legislated) and the municipality's integrated development plans (IDP).

An environmentally educated workforce is needed to fulfil the legal requirements for effective healthcare risk waste management and to address the challenges outlined in Section 2.4.3. Applied competence has been identified by the Education and Training Practices Project to have important links with successful policy implementation. The project reported that although policy is centrally made, it is 're-made' during implementation as the people tasked with realising the policy into practice give it identity and form (Olvitt & Hamaamba, 2006, citing National Training Board, 1998). Olvitt and Hamaamba (2006) went on to suggest that if this (policy being re-made during implementation) is the reality of how transformation happens, then improving professional judgement of those responsible for turning policy into practice should be an important focus to achieve transformation.

2.7 COLLECTIVE COMPETENCE

According to Boreham (2004a), the notion of collective competence is premised on Hofstede's (1980) work on the distinction between 'individualism' and 'collectivism' introduced into cultural studies in the 1980s. In his work, Hofstede argued that 'individualists' value the development of distinctive personality, which encourages self-help, self-directed learning and personal initiatives in making one's way through life; and the 'collectivists' value subordination of personal wishes to the priorities of a group which encourages intra-group harmony rather than individual ambitions (Boreham, 2004a).

The concept of collective competence was further studied by Weick and Roberts (1993, cited in Boreham 2004a) who showed that although crews work as single units, they are guided by a collective mind which comes into existence when each individual gives conscious attention to the system-level consequences of their actions. It is against this background, and the fact that work is

regarded as a group function addressing its efforts towards a common object, that Boreham (2004a) theorised collective competence.

Collective competence refers to the capacity to construct a collective understanding of challenging situations in the workplace. It is guided by the following three normative principles:

- ***Making collective sense of events in the workplace***

Boreham (2004a) asserted that the first requirement for a group to deal completely with a problem is to make sense of the situation through development of a language around a problem, defining boundaries of occupational roles of those involved and resolving contradictions to the object.

- ***Developing and using a collective knowledge-base***

According to Boreham (2004a), research on the use of language in the workplace indicates that many organisations develop specialist sub-languages tailored to the specific events in their domains which are used in conversations and thinking. Carlile (2002) similarly characterised knowledge as localised around a particular problem. Lyles and Schwenk (1992, cited in Boreham 2004a) related collective knowledge to organisational identity, suggesting that the uniqueness of the organisation depends on its capacity to develop 'knowledge structures' which can be maintained on a more enduring basis than the individual knowledge base of its members.

- ***Developing a sense of interdependency***

Boreham (2004b) highlighted that team activity depends on the capacity to overcome different orientations and perceptions of the sub-systems by developing a sense of interdependency. He pointed out that lacking interdependency may result in members of the team acting without regard for each other's needs. For example, when developing healthcare risk waste by-laws, environmental health practitioners also depend on the knowledge provided by community health workers on how they generate the waste. Similarly, community health workers depend on environmental health practitioners' knowledge to manage their healthcare risk waste effectively.

So far, this chapter has described environmental health services and the development of community home-based care facilities in South Africa. It has outlined the development of environmental policies in South Africa, focusing in particular on the Gauteng healthcare risk waste

management regulation. The chapter has drawn attention to the challenges of management of healthcare risk waste by community home-based care facilities and of implementation of policies by environmental health practitioners at local government level, and proposed that the 'applied competence' and 'collective competence' approaches to professional learning might provide a useful framework for the professional development of an environmentally educated workforce that is able to transfer and apply knowledge, skills and values to responsible management of healthcare risk waste by community home-based care facilities. In the following sections (2.8 and 2.9), I introduce Cultural Historical Activity Theory and expansive learning theory which provided the theoretical vantage point and methodological framework to investigate the knowledge-sharing practices associated with healthcare risk waste management practices in community home-based care settings.

2.8 CULTURAL HISTORICAL ACTIVITY THEORY

In this section, I introduce Cultural-Historical Activity Theory (CHAT), the main theoretical framework used in this study. After tracing its origins to Vygotsky's work on the mediation of learning, I describe how CHAT's ability to examine the interplay between dimensions of different human activity systems can shed light on processes of learning and change. This is the foundation of Engeström's theory of expansive learning which I introduce later in this chapter in relation to learningful interactions between environmental health services and community home-based care facilities in Mogale City Municipal area.

2.8.1 Theoretical development of CHAT

Cultural-historical activity theory has its origins in the work of Lev Vygotsky in Russia in the 1920s and early 1930s. Vygotsky's work into human development and learning was further developed by his colleague and disciple Alexei Leont'ev (1978, 1981), and most recently by Yrjö Engeström (1999). CHAT is thus understood to have evolved through three generations of research (Engeström, 1999). The first generation of CHAT centred on Vygostsky's theory of mediation which was prompted by an interest in how the relationship between human agents and their environment is mediated by cultural means, tools and signs. He described the process as 'mediated action', influenced by Marx's political theory on collective exchanges and material production which captures the co-evolutionary processes that individuals encounter in their environment while engaging in shared activities.

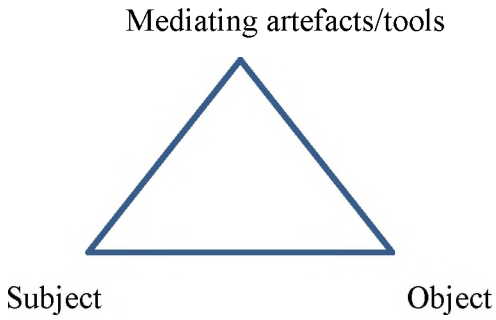


Figure 2.2: First generation activity system (after Vygotsky, 1978)

The idea of mediation was crystallised in Vygotsky's famous triangular model of a 'complex mediated act' (Engeström, 2001), commonly expressed as a triad of subject, object and mediating artefacts (see Figure 2.2). The subject in this model is the individual or group of individuals whose actions are the focus of analysis; the object is the goal or focus of the activity; and mediating artefacts/tools include artefacts, social others and prior knowledge that contribute to the subject's mediated action experiences within the activity (Yamagata-Lynch, 2010). Foot (2014) noted that mediating artefacts or tools reveal the relationship between the subject and their object at the time when the tool was created. They may therefore be both enabling and limiting in that they *empower the subject* in the transformation process with historically-collected experience and skills, but they also *restrict the interaction* to be from the perspective of the particular tool. For example, although the municipal by-laws (WRDM, 2011) and regulations (SA, 2004a) provide guidelines for environmental health practitioners to better understand healthcare risk waste management in general, they are not clear about how community home-based care facilities should manage their healthcare risk waste. These mediating tools empower practitioners to create safe and health conditions in the municipal area, but they also hold them back from attending effectively to challenges in the community home-based care sector.

The limitation of this first generation of CHAT was that the unit of analysis remained individually focused and did not adequately address cultural evolutions which themselves acted to organise and constrain the activity itself (Daniels, 2004a). This limitation was overcome by the second generation of CHAT, which was advanced mostly by Leont'ev who made a twofold contribution to activity theory. Firstly, he shifted attention from a focus primarily on mediation to a concern with the *object* of activity (what is being worked on) and how interpretations of the object give rise to a particular way of acting. He argued that the activity is identified and distinguished by its

object or purpose (Foot, 2001, p. 9). Secondly, Leont'ev introduced an emphasis on the division of labour which he saw as shaping thought.

Leont'ev developed a clear distinction between the concepts of 'activity' and 'actions' which were under-developed by Vygotsky. He defined 'activity' as collective, systematic formation that has a complex mediational structure which produces actions and is realised by actions; and 'actions' as individually focused steps that are temporary in nature, have a clear-cut beginning and end, which subjects takes in the process of participating in an activity. Leont'ev maintained that activity systems evolve over lengthy socio-historical periods, and often take the form of institutions and organisations. He proposed that object-oriented activity involves interaction among subjects, objects, motivation, action, goal, socio-historical context and the consequences of the activity (Davydov, 1999, cited in Yamagata-Lynch, 2010). Although Leont'ev never visually represented Vygotsky's original model, his clarification on activity allowed researchers to explain human learning as a series of object-oriented activities and provided a framework that did not treat the organism and the environment as isolated entities (Yamagata-Lynch, 2010).

Leont'ev's framework, however, did not adequately address the methodological challenges of capturing, analysing, and presenting activity-based data. Engeström (1987) addressed this shortcoming and contributed to the development of activity theory as an analytical framework by expanding the original triangular representation of activity system that was used in the first generation to enable examination of activity systems at the level of collective and community by adding the elements of community, rules and division of labour (see Figure 2.3), while emphasising the importance of analysing their interactions with each other.

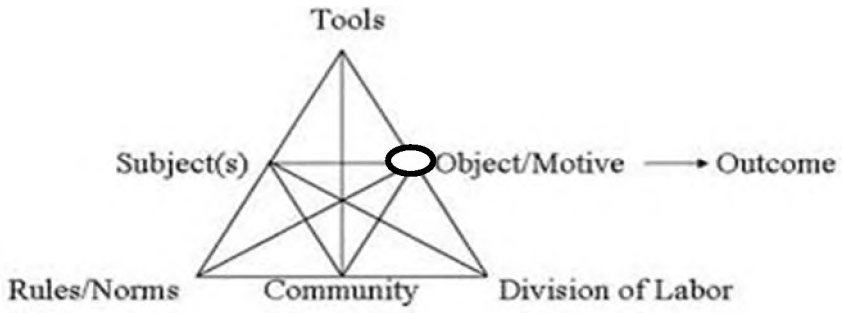


Figure 2.3: Activity system (Engeström, 1987)

Engeström (1999) described the 'community' as a collection of individuals or groups who are all concerned with the same object; 'division of labour' as both the division of and responsibilities as they have been negotiated and distributed by the members of the community, including both the horizontal division of tasks and the vertical division of power and positions (Foot & Groleau, 2011); and 'rules' as any formal or informal constructs that in varying degrees constrain or allow activities to occur, and that provide guidance on correct procedures and acceptable interactions (Engeström, 1992). According to Foot (2014), rules mediate relations between subject and object as well as between subjects and community, while division of labour mediates relations between the subjects and the community. In Figure 2.3, the object is depicted with an oval, indicating that object-oriented actions are always explicitly or implicitly characterised by ambiguity, surprise, interpretation, sense-making and potential for change (Engeström, 1999).

The importance of the second generation of activity theory is that it brings into focus interrelations between the individual subject and his/her community. At the same time, it emphasises the importance of internal contradictions caused by tensions which arise when conditions of an activity put the subject in contradictory situations that can hinder the subject's participation in the activity in trying to achieve the object (see Section 2.7.2). A limitation of this second generation is that it did not address questions of diversity and dialogue between different traditions.

Third generation CHAT, as proposed by Engeström (1987), provides conceptual tools to understand dialogue, multiple perspectives, and networks of interacting activity systems. This generation draws on ideas of 'dialogicality' (the transformation of ideas in and through dialogue) and 'multivoicedness' (recognition that actions and ideas are informed by many 'voices' or perspectives) in order to expand the framework of the second generation. In this mode of research, the basic model of the second generation is expanded to include a minimum of two interacting activity systems. As illustrated in Figure 2.4 below, the object of each activity system moves from an initial state of unreflected, situationally given 'raw material' (objects 1 and 2) to a potentially shared or jointly constructed object (object 3). In this regard, the object of activity is a moving target, not reducible to conscious short-term goals (Engeström, 2001, p. 136).

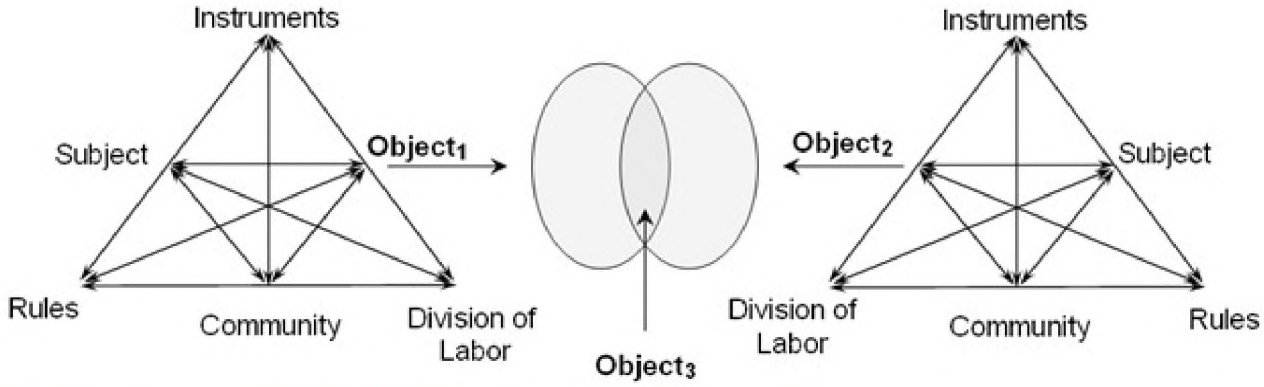


Figure 2.4: Two interacting activity systems of third generation CHAT (from Engeström, 2001)

This section has briefly outlined the development of CHAT from Vygotsky's foundational work on mediated activity in the 1930s, and has provided a brief description of three generations of CHAT's evolution. In the next section (2.8.2), the principles of CHAT are described.

2.8.2 CHAT principles

Engeström (2001) and Daniels (2008) explained that CHAT is characterised by the following five principles:

- The first principle is that CHAT's prime unit of analysis is a **collective, artefact-mediated and object-oriented activity system**, seen in its network relations to other activity systems. As illustrated in Figure 2.4, this principle implies that an environmental health activity system concerned with promoting public health through environmental health education is more fully understood when considered *in relation to* other activity systems such as those that generate healthcare waste through attending to the healthcare needs of those infected with HIV/AIDS or tuberculosis (community home-based care facilities) or those that collect (waste management operations) and dispose waste (landfill site).
- The second principle is the **multi-voicedness** of activity systems. An activity system is always a community of multiple points of view, traditions and interests. The division of labour in an activity creates different positions for the participants, who carry their own diverse histories, and the activity system itself carries multiple layers and strands of history 'engraved' in its artefacts, rules and conventions. In the context of this study, environmental health practitioners have the responsibility to ensure that community home-based care practitioners in their respective areas are knowledgeable about healthcare risk waste management, while their principals or chiefs have the responsibility to ensure that

they (environmental health practitioners) provide the service to community home-based care industry within the limits of the rules or artefacts. Additionally, the beneficiaries of these practices (such as the citizens of Mogale City municipal area, and the patients receiving home-based care) also have expectations of health and safety.

- The third principle is **historicity**. Activity systems take shape and get transformed over long time periods. Their problems and potentials can only be understood against their own history. For example, in order to understand the challenges that environmental health practitioners face with regard to healthcare risk waste management in community home-based care facilities, the history of what shaped their current understandings needs to be considered.
- The fourth principle is the central role of **contradictions as sources of change and development**. Kuuti (1996) explained that since activity systems are not isolated units but more like nodes in crossing hierarchies and networks, they are influenced by other activities and changes in the environment. External changes (such as the rapid emergence of community home-based care facilities) may change some elements of an activity system, causing imbalances between them. Activity theory uses the term 'contradictions' to indicate the misfit within or between elements, between different activities or between different development phases of a single activity system. Contradictions manifest themselves as problems, ruptures, breakdowns, and clashes (Kuuti, 1996). They are defined as historically accumulating structural tensions within and between activity systems (Engeström, 1987, 1999, 2001), and are regarded as the "motive force of change and development within and between activity systems" (Warmington, Daniels, Edwards, Brown, Leadbetter, Martin, Middleton, Parsons & Popova, 2005, p. 4).

Engeström (1987) argued that with any human activity, contradictions emerge and evolve within and between the six elements of the activity system and between networked activity systems. He identified four levels of contradictions:

i. *Primary contradictions* occur within one element of a single activity system. For example, when environmental health practitioners in Mogale City municipal area draw on different (and sometimes contradictory) sources of legislation and policy when issuing compliance certificates for community home-based care facilities (primary contradiction within the rules of that activity system);

ii. *Secondary contradictions* take place when two elements of a single activity system are in conflict with one another. For example, contradictions between the rules and the division of labour, such as when there are no clear job descriptions for environmental health practitioners working with general environmental health and environmental health practitioners specialising in waste management. Warmington et al. (2005) highlighted that when an activity system adopts a new element from the outside (for example, new legislation), it often leads to an aggravated secondary contradiction where some old element collides with the new one;

iii. *Tertiary contradictions* are contradictions that occur when the subjects face conflicting situations by adopting what is believed to be a newly advanced method for achieving the object (Yamagata-Lynch & Haudenschild, 2009, p. 509). Foot and Groleau (2011) noted that the introduction of this new object triggers the developmental phase through which the central activity system is redefined and reconfigured. For example, the introduction of a new object of ensuring safe management of healthcare risk waste triggered a developmental phase in which environmental health practitioners had to learn new ways to monitor and control management of healthcare risk waste. However it became more challenging when they were expected to monitor and control management of healthcare risk waste generated from unstable sources such as community home-based care facilities where waste generation points differ daily.

iv. *Quaternary contradictions* occur when the subjects encounter changes to their activity that result in conflicts with adjacent activities (Yamagata-Lynch & Haudenschild, 2009, p. 509). Transformation of the central activity system's object catalyses disturbances in that system's relations with the other activity systems with which it interfaces (Foot & Groleau, 2011). For example, when environmental health practitioners are expected to monitor and control management of healthcare risk waste generated by community health workers (from individual patients' houses) rather that at fixed health centre (such as clinics and hospitals), disturbances relating to how the waste is handled, stored, collected transported and disposed arise. Furthermore, since community health workers must maintain patients' confidentiality, having healthcare risk waste collected from the place of generation will not only breach the patient confidentiality rule, but can also stigmatise the patients.

- The fifth principle of CHAT proclaims the **possibility of expansive transformation** in activity systems. Activity systems move through relatively long cycles of qualitative transformations. As the contradictions of an activity system are aggravated, some individual participants begin to question and deviate from the established norms. In some cases, this escalates into collaborative envisioning and a deliberative collective change effort, which is called expansive transformation, from where the concept of expansive learning was drawn (Engeström, 2001). Expansive learning and its contributions to this study are discussed further in Section 2.9.

2.8.3 Relevance of Cultural-Historical Activity Theory to this study

Since this is a developmental study, I found CHAT to be relevant for the following reasons:

- CHAT is orientated to understanding contextually and historically specific practices, their objects, mediating artefacts and social organisation. This provides a powerful socio-cultural and socio-historical lens (Daniels, 2004b) through which I could analyse the activity systems of environmental health services and community home-based care in order to understand them in practice.
- CHAT is based on a dialectical theory of knowledge and thinking and is focused on the creative potential of human cognition. As such, the third generation of activity theory provided me with tools to understand dialogues, multiple perspectives and the networks of interacting activity systems of both environmental health services in Mogale City municipal area and community home-based care facilities. Furthermore, expansive learning provides a theory and methodology to examine how groups of people with different experiences and perspectives (environmental health practitioners and community home-based care workers) working on the same object (improved healthcare waste management practices) can work on new problems and jointly develop new knowledge or tools to address the problems (Engeström, 1987, 1999; Daniels, 2008).
- Thirdly, CHAT is a developmental theory that seeks to explain and influence qualitative changes in human practices over time. It acknowledges contradictions, conflict and dis-coordination as inevitable in the functioning of any system and identifies them as useful tools for development.
- Another reason for using CHAT in this study is that it provided me with an interventionist methodology – the Developmental Work Research methodology (Engeström, 1987) – to

engage with cross-boundary learning as community health workers and environmental health practitioners use their practical experiences to propose new interventions.

2.9 EXPANSIVE LEARNING

The theory of expansive learning is rooted in Cultural-Historical Activity Theory and Developmental Work Research (Engeström, Miettinen & Punamäki, 1999). The theory offers a framework to understand forms of learning that do not adhere to standard models of learning in which a person acquires a stable, defined body of knowledge and skills and then ascends through levels of increasing competence (Warmington et al., 2005). In expansive learning, learners learn what is not yet there; new knowledge and practices for newly emerging activities are collaboratively constructed and practised. Daniels et al. (2007) noted that such transformation (expansive learning) may be triggered by the introduction of new technologies or regulations (such as the introduction of community home-based care activities and management of their healthcare risk waste) but it is not reducible to that.

As illustrated in Figure 2.4, during expansive learning, the object of the activity system moves from an initial state of unreflected, situationally-given 'raw material' (object 1) to a collectively meaningful object constructed by the activity system (object 2), and to a potentially shared or collaboratively constructed object (object 3). Object 3 is also referred to as a "boundary zone" (Konkola, 2001, cited in Edwards, 2011), or as the activity system's "zone of proximal development" (Engeström, 1995). Object 3 operates as a neutral space where information is shared, where the values and professional priorities of each practitioner are respected and where trust is built" (Konkola, 2001, cited in Edwards, 2011).

According to Toivianen and Engeström (2009, p. 97), expansive learning is a process in which participants search for solutions to contradictions and move towards their zone of proximal development. The process begins with sharing domain-specific knowledge (healthcare risk waste management knowledge from both environmental health and community home-based care practitioners) and the identification of a common object (improved healthcare waste management). The outcome is an enriched or expanded understanding of the problem or task of effective healthcare risk waste management within Mogale City municipal area.

To achieve this kind of expansive learning, Engeström (1987) proposed working in a seven stage learning cycle in the following sequence: First: individual participants question and criticise certain existing practices. Second: they analyse the situation in order to identify causes, by tracing its origin and evolution or by constructing a picture of its inner system relations. Third: they engage in modelling new solutions to the problematic situation. Fourth: they examine the new model to determine its dynamics, potentials and limitations. Fifth: they implement the new model through practical actions and applications. Sixth: they reflect on and evaluate the process. Finally: participants engage in consolidating outcomes of the new practice into a new, stable form of practice.

Through this expansive cycle, in which the participants focus on reconceptualising their own activity system in relation to their shared objects of activity, both the objects and the existing tools are reconceptualised; the activity system is transformed; and new motives and objects for the activity system are created. It is worth noting that this sequential model should be understood as an ideal or heuristic tool for analysing elements of expansive learning because in practice, the cycles of expansive learning do not necessarily follow any fixed order. This poses a challenge for researchers who seek a standard methodology when applying expansive learning theory. In the next section (2.10), I will discuss Developmental Work Research as a methodology developed by Engeström and his collaborators for supporting expansive learning process.

2.10 DEVELOPMENTAL WORK RESEARCH

2.10.1 Overview

Developmental work research is an interventionist methodology, using participatory approaches to apply CHAT, specifically the theory of expansive learning, in the world of work, technology and organisations (Engeström, 1999). Developmental work research is applied around a series of sessions called 'change laboratory workshops' in which the researcher and participants jointly interrogate tensions and contradictions within and between different dimensions of the activity system, such as the rules, tools and division of labour, that have emerged in collective work practices over time and which constrain the development of future activity (Edwards, 2010).

Change laboratory workshops function as structured formal boundary zones in which negotiations around new professional practices emerge. Konkola (2001) conceptualised these boundary zones as 'no man's land' which are free from pre-arranged routines and patterns. The aim of change

laboratory workshops is to guide members of the workplace community to reflect on their mutual activities, identify developmental challenges with the help of the researcher, develop interventions through collectively constructing a vision of the organisation's future, and implement a series of practical changes. Change laboratory workshops promote questioning of contradictions in existing practices in order to germinate new knowledge and new forms of activity which are learned as they are created. This has a direct link to first, second, third and last stages of the expansive learning cycles outlined in Section 2.9.

2.10.2 Structure and setup of the change laboratory

The central tool of the change laboratory is a set of three areas, with three overlapping surfaces, representing the past, present and future work practices (Figure 2.5). The first area represents the 'mirror', which represents daily work practices and experiences from work practices, particularly problem situations and disturbances, but also novel innovative solutions. Videotaped work episodes as well as photographs, stories, interviews, quotes, narrative accounts are used as mirror data.

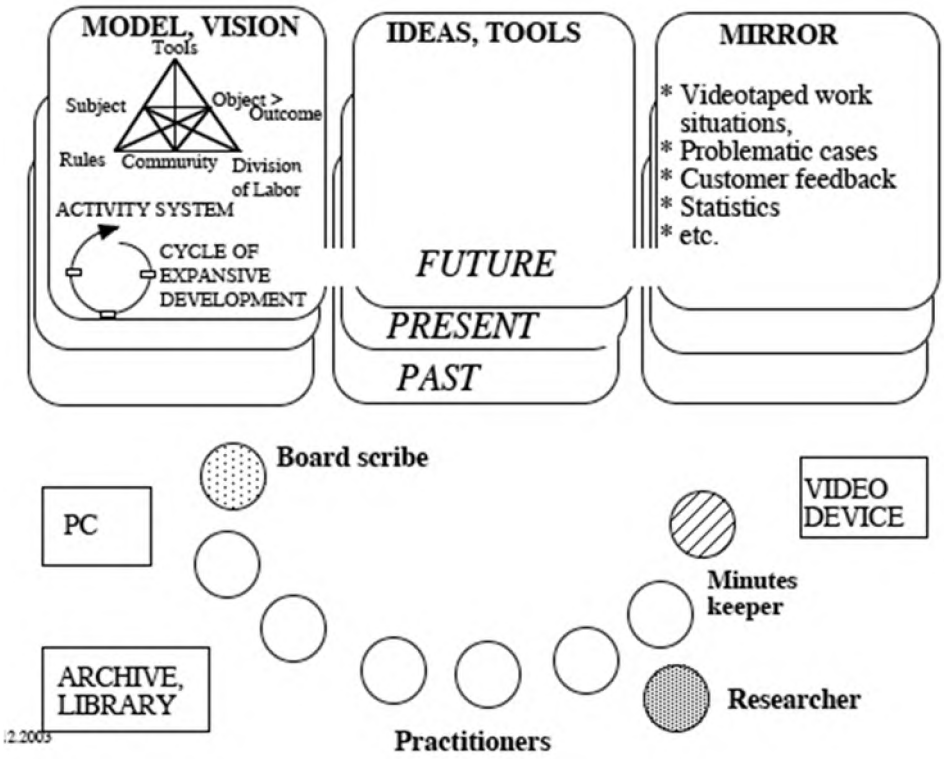


Figure 2.5: Layout of change laboratory workshop (Engeström, 1999)

The second area 'model/vision' is reserved for theoretical tools and conceptual analysis. In this area, the triangular model of the second and third generation of activity system (Figure 2.3 and 2.4) is used to analyse the development and interconnections of the work activities under scrutiny. In addition, the expansive learning cycle is also used to enable practitioners to analyse current and projected stages of their activities and design new models. The third area in the middle is reserved for ideas and intermediate cognitive tools (Engeström, 2007a) in analyses of problem situations.

2.10.3 The Change Laboratory process

Participants in change laboratory sessions face the three areas described above and also face each other. A scribe is appointed amongst the participants to record intermediate outcomes of the discussions on the three areas (Engeström, 2007a).

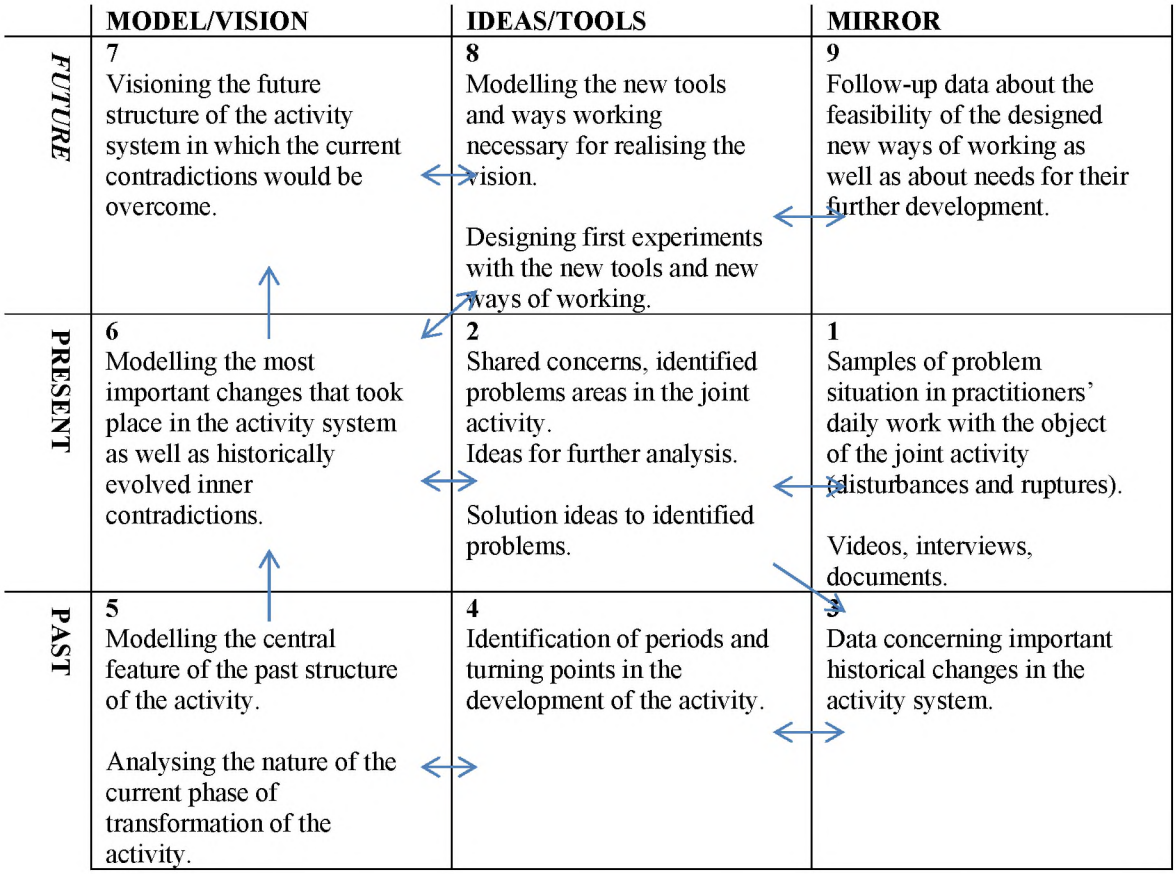


Figure 2.6: The use of the surfaces of representation in the Change Laboratory process (adopted from Virkkunen & Newnham, 2013. p. 18)

As noted in Virkkunen and Newnham (2013), the change laboratory process begins with discussions of mirror data of the current activity, whereby participants observe the mirror data

and relate it to their own experiences and views (**1. Mirror/ Present**). After the collection of observations and comments, discussions move to the identification of the most important problem area that require further investigations and possible solutions (**2. Ideas/ Tools/ Present**). Thereafter, in order to understand how the problems emerged, participants collect data and observations concerning changes that took place in the systemic structure of the activity and record them (**3. Mirror/ Past**). The records are then analysed to identify the rate of change and to investigate causes and connections between observed changes (**4. Ideas/ Tool/ Past**). The past form of the activity is then modelled by characterising specific nature of the elements of the activity system at that time (**5. Model/ Vision/ Past**).

The model of the current activity system is then constructed by identifying elements of the activity in which major changes have taken place and those in which there has been little change. The relationship between the changed and unchanged elements of the activity system is then analysed to identify contradictions and disturbances (**6. Model/ Present**). To provide solutions to the identified contradictions and disturbances, a vision of a new form of activity is developed (**7. Model/ Vision/ Future**) and new forms of action and tools within which participants may begin to experimentally realise the vision are decided upon (**8. Ideas/ Tools/ Future**). Follow-up data about the feasibility of the new tools and forms of action decided in step 8 above is then collected from the first experiments (**9. Mirror/ Future**) and identified problems in the data will be used as mirror for the current activity [step 1. Mirror/ Present].

2.11 BOUNDARY CROSSING

Due to the diversity of stakeholders involved with management of healthcare risk waste in Mogale City municipal area, this study works with the third generation CHAT. It is within this third generation of CHAT, that the concept of boundary crossing gains significance. Boundary crossing represents interactions appearing in the middle ground between activity systems (Kerosuo & Engeström, 2003). According to Akkerman and Bakker (2011), the term 'boundary crossing' was introduced to denote how professionals at work may need to "enter into territories in which we are unfamiliar and, to some significant extent unqualified and face a challenge of negotiating and combining ingredients from different contexts to achieve a hybrid situations" (p. 134). They are described as two-way interactions which cannot happen without participation of other parties, that is, if only one party crosses the boundary without participation of the other, then boundary crossing would be one-way and not expansive (Kerosuo & Engeström, 2003). Katz and Shotter (1996, cited

in Kerosuo & Engeström, 2003, p. 6) defined boundary crossing actions as the means to navigate through different languages, registers and cultural issues, as well as local worlds of meaning.

To understand how boundaries are encountered and crossed, Star and Griesemer (1989, cited in Akkerman & Bakker, 2011) proposed analysing various institutions and different viewpoints of actors involved. Likewise, Engeström, Engeström and Vähäaho (1999) showed that studying boundary crossing requires an analysis of all the loosely connected systems involved. During this process, practitioners reveal the ready meanings of their practices through their use of categorisations. This gives insights into the practices in which they arise, and can assist other practitioners in developing the kind of professional multilingualism that will allow them to negotiate across boundaries (Edwards, 2010).

Although the ambiguous nature of boundaries creates the need for dialogue, it is highlighted that dialogue does not occur automatically with team members; it must be facilitated (Akkerman & Bakker, 2011). Hence, 'brokers' (Wenger, 1998) and 'boundary objects' (Star & Griesemer, 1989) are proposed as possible channels through which groups can communicate. Brokers are defined as "members of multiple communities who are able to make effective connections between those communities, they make coordination possible by opening up new possibilities for learning and exchange" (Brown & Duguid, 1998, p. 102). Their role is to help other actors transfer, translate or transform the meanings encountered during joint activities (Carlile, 2004). Brokers, as Akkerman and Bakker (2011) put it, not only act as bridges between different worlds, but also represent the related worlds. On the one hand, brokers have a very rich and valuable position since they are the ones who can introduce elements of one practice to the other; on the other hand, they face a difficult position because they are easily seen as being at the periphery, with the risk of never fully belonging to or being acknowledged as participants in any one practice (Akkerman & Bakker, 2011, p. 140). In the context of this study, brokers are, from the municipal point of view, environmental health practitioners who present by-laws to community home-based care practitioners in accessible and relevant ways. From the community home-based care point of view, brokers are the facility managers or anyone delegated by the facility to attend meetings and workshops and to acquire information relating to management of the healthcare risk waste and translate that information to others in ways that they will understand. In this regard, when dealing with brokers, Kang'ethe (2008) advocated that language was crucial given the educational status of some community home-based care practitioners. A study conducted in Botswana found that 33% of caregivers had less than primary school education. In order to raise community health

workers' levels of knowledge and coping capacities, informal training and in-service training should be offered by community home-based care facility managers in collaboration with and support of government programmes (brokers).

Like brokers, boundary *objects* are mediating tools and artefacts that link different sets of diverse interests. They are often technologies, drawings, sets of rules, and research projects or documents which allow coordination without requiring consensus or shared goals. Because they have different meanings in different social worlds, they permit a practitioner's local understanding to be reframed in the context of a wider collective activity (Bechky, 2003). In the context of the Mogale City municipal area, boundary objects may be the posters which illustrate the management of healthcare risk waste, by-laws or checklists that can be used by both the environmental health practitioners or by the community home-based care givers. Like brokers, boundary objects have a particular role to play in supporting the different forms of coordination found in collaborative working (Edwards, 2004). However, it is reported that they can fail if they do not fully or rightfully capture multiple meanings and perspectives (Akkerman & Bakker, 2011).

To understand the potential of the boundaries, Akkerman and Bakker (2011) identified four mechanisms which have the potential to improve knowledge-sharing and learning:

- ***Identification:*** They noted that during boundary crossing, practices are defined in line with other practices and differences are delineated. They highlight that the knowledge-sharing potential resides in the development of renewed sense-making of different and related identities.
- ***Coordination:*** In boundary crossing, effective means and procedures are sought, allowing diverse practices to cooperate efficiently in distributed work, even when there is no consensus. They noted that coordination requires communicative connection between diverse practices /perspectives.
- ***Reflection:*** They highlighted that boundary crossing provides a reflective mechanism for practitioners to identify and articulate differences between practices and thereby learn something new about their own practices. Reflection, they noted, involves perspective-making and perspective-taking which results in people looking into the world in more enriched ways.
- ***Transformation:*** This mechanism, they noted, leads to profound changes in practices, potentially even the creation of new, in-between practices sometimes called 'boundary practices' (Akkerman & Bakker, 2011). They highlighted that the mechanism

begins with confrontation of the problem that forces the intersecting worlds to seriously reconsider their current practices and interrelation; followed by recognition of a shared problem space; then engaging in a creative process in which something hybrid emerges and finally crystallising or developing new routines that embody what has been created.

2.12 CRITIQUES OF ACTIVITY THEORY

According to Young (2001), activity theory does not deal with the issue of power; it does not consider who the participants are in terms of their positionality within the workplace and it raises questions of who is doing the questioning and who is being silenced or prevented from participating (Lee, Fuller, Ashton, Butler, Felstead, Unwin & Walters, 2004. p. 13). In this regard Young (2001, p.160) highlights that this dynamic "provides a barrier to the continuation of expansive learning".

The other critique pointed out by Young (2001) is that expansive learning is a theory of learning for learning organisations and therefore it does not accommodate workplaces in which learning cannot take place across teams or where knowledge, skills and qualifications are not considered.

2.13 CONCLUSION

This chapter began with a description of current South African policies, highlighting the development of healthcare risk waste policies, current healthcare risk waste practices and challenges relating to implementation of developed policies. The chapter further provided a description of the concept of knowledge and knowledge-sharing and introduced applied competence and collective competence as a framework that can guide types of knowledge and skills required by local government officials in order to improve knowledge sharing and service delivery. Cultural-Historical Activity Theory (CHAT) was described as the main theory underpinning this study; its theoretical development and principles were described and its relevance to the study. The chapter concluded by providing a description of expansive learning, developmental work research and boundary crossing as some of the frameworks adopted in enhancing knowledge-creation and knowledge-sharing. In the following chapter, I describe the methodological framework that guided the research process.

CHAPTER 3: RESEARCH DESIGN

3.1 INTRODUCTION

This chapter discusses the orientation and methodological framework that guided the research process. Data was generated between April 2012 and November 2014 within Mogale City municipal boundaries. The chapter begins with a description of the orientation and methodologies used in the study. The chapter further describes how data was generated, beginning with negotiating access to research sites, the research methods used, management of data, and finally how data was analysed. The chapter concludes with a discussion on how I observed research ethics, and steps taken to ensure validity and trustworthiness of the study.

Before the presentation of the orientation and methodologies, the following study's research questions are re-introduced to remind the reader about the about the intention of the study:

(a) How do knowledge and knowledge-sharing practices of environmental health practitioners in Mogale City Municipality influence healthcare risk waste management practices in community home-based care settings; and

(b) How might these knowledge-sharing practices be developed and institutionalised?

To answer these questions, the research addresses the following research objectives:

- To describe municipal officials' knowledge bases regarding their roles and responsibilities in relation to community home-based care workers' healthcare risk waste management practices;
- To describe associated knowledge-sharing practices (i.e. to describe how this knowledge is imparted, by whom, in what forms, and how often);
- To understand the extent to which these knowledge-sharing practices are systematised and institutionalised;
- To identify consequences of these knowledge-sharing practices on healthcare risk waste management practices by community home-based care facilities in Mogale City Local Municipal Area;
- To surface systemic tensions and contradictions influencing these knowledge-sharing practices;

- To gain insights into (and, where possible, to support) ways in which these knowledge-sharing practices can be enhanced and sustainably institutionalised.

3.2 ORIENTATION OF THE STUDY

3.2.1 A social constructionist orientation to research

According Terre Blanche and Durrheim (1999) social constructionism is 'the approach that seeks to analyse how signs and images have power to create a particular representation of people and objects (p. 148). Burr (1995) highlights that social constructionism as a multi-disciplinary approach to social science draws its influence from disciplines including psychology and sociology, and its cultural backdrop from postmodernism. The sociologists Berger and Luckmann (1996 cited in Burr, 1995) contributed to social constructionist theory with their argument that human beings together create and then sustain all social phenomena through social practices. They viewed three fundamental processes as responsible for this: externalisation, objectivation and internalisation. They argued that people 'externalise' when they act on their world, creating some artifacts or practices. For example, the idea that healthcare waste has potential dangers to both the health of people and the environment is 'externalised' by sharing narratives and developing legislation in relation to its management. This then enters the social realm; other people read the legislation and extend the narratives. Then the idea of healthcare risk waste management becomes an 'object' of consciousness for people in that society and develops a kind of factual existence or truth. Future generations who join the society where the idea of healthcare risk waste management already exists, 'internalise' it as a part of their consciousness and as part of their understanding of the nature of their world. This account shows how the world comes to be socially constructed by people's social practices, and at the same time is experienced by people as if the nature of their world is pre-given and fixed. Similarly, Terre Blanche and Durrheim (1999) argue that social constructionist researchers strive to show from where people's understandings and experiences are derived.

Drawing on the works of the psychologist Gergen (1973), Burr (1995) argued that all knowledge is historically and culturally specific, and that research must therefore extend beyond the individual into social, political and economic realms for a proper understanding of the evolution of present-day psychological and social life. Gergen (1973, cited in Burr, 1995) argued that there was no point in looking for once-and-for-all descriptions of people or society, since the only abiding feature of social life is that it is continually changing.

Social constructionism also derives its influence from the postmodernist culture which can no longer be understood by appeal to one homogenous and overarching system of knowledge. Instead, the world in which we are living presents to us with many different kinds of knowledge, each one of them operating as a relatively self-contained system of knowledge which we can 'dip' in and out of as we please (Burr, 1995).

Burr (1995) posited social constructionism as an approach which has its foundation in one or more of the following key assumptions:

- *A critical stance towards taken-for-granted knowledge*: Social constructionism cautions us to be suspicious of our assumptions about how the world appears to be. We should take a critical stance towards our taken-for-granted ways of understanding the world (including ourselves). Social constructionism invites us to be critical of the idea that our observations of the world unproblematically reflect how the world really is, and to challenge the view that conventional knowledge is based upon objective, unbiased observation of world.
- *Historical and cultural specificity*: In social constructionism, all ways of understanding are seen as products of culture and history. The way in which we understand the world, the categories and concepts we use, are historically and culturally specific. How a person understands the world depends on where and when in the world she lives.
- *Knowledge is situated in social processes*: It is through the daily interactions between people in the course of social life that knowledge is constructed. Social interactions of all kinds, and particularly language, are of great interest in social constructionism. Therefore, we have to acknowledge that our current accepted ways of understanding the world are not objective but rather products of the social processes and interactions. In this study, for example, the manner in which environmental health practitioners and community home-based care givers understand experience and narrate the management of healthcare waste is shaped by the sociocultural and historical activity systems to which they belong.

Social constructionism is therefore relevant to this study since (i) it recognises the social, cultural, and historical influences of people's knowledge and practices associated with healthcare risk waste, (ii) it acknowledges that forms of knowledge and the learning processes associated with them are not static or homogenous, and (iii) it encouraged me to adopt a critical, reflexive and collaborative approach on the generation and analysis of data. Social constructionism is an

appropriate ontological complement to cultural-historical activity theory (CHAT) which similarly foregrounds the social, cultural and historical dimensions of human development and learning.

3.2.2 Case study approach

Because I wanted specifically to understand how knowledge-sharing practices within and between the environmental health services section and community home-based care facilities in Mogale City municipal area influence management of healthcare risk waste by community home-based care facilities, I adopted a case study approach. A case study approach is used 'when researchers seek to understand complex social phenomenon, while retaining the holistic meaning of real life events (Yin, 2009).

Yin (1984) defined case study as 'an empirical enquiry that investigates contemporary phenomenon in depth and within their real-life context' (p.23). According to Cohen, Manion and Morrison (2007), case studies establish causes and effects and one of their strengths is that they observe effects in authentic contexts (p.253). They further note that because contexts are unique and dynamic, case studies investigate and report the complex dynamics and unfolding interactions of events and other factors in a unique instance (p.253).

In selecting a case study as an approach for this project, I was aware of the following limitations as suggested by Cohen and his colleagues: that case studies are prone to problems of observer bias despite attempt made to address reflexivity; they may not easily open to cross-checking and that they may not be generalised (Cohen, et al. 2007, p. 256). To address the limitation of bias, I shared my observation notes with the people observed so that they could confirm what I had written about their practices. I have acknowledged the non-generalisability of case studies and ensured that the study's findings are case-specific. Another limitation is that case studies generate large amounts of data which often result in lengthy reports and extended fieldwork (Merriam, 2002). This was indeed the case, but the large amount of data meant rich data on which to base the study's findings.

A further challenge in case study research can be the issue of language. Some of the research participants (especially community health workers) were less able to express their ideas in English which is not their home language. As such, I conducted interviews with them in their home language, audio-recorded all conversations and later transcribed them into English.

According to Cohen et al. (2007. p. 72), case study is a research methodology that uses a case or a number of cases as an example to describe a more general theory in which the researcher typically observes the characteristics of individual units. A single embedded case study design was used in this study. Embedded case study involves more than one unit, or object of analysis (Yin, 2009). The multiplicity of evidence is investigated at least partly in sub-units which focus on different salient aspects of the case (Scholz & Tietje, 2002. p. 110). In this study, the main unit of analysis is the environmental health services within Municipal Health Services section in Mogale City municipal area while the sub-units are the waste removal, waste disposal and community home-based care facilities which are also involved in or affected by the main unit (Scholz & Tietje, 2002).

3.3 NEGOTIATING ACCESS TO THE RESEARCH SITES

Negotiating access was an important process since the study involved researching workplaces with their own norms and ethical codes that I had to observe and respect. It also involved working with community home-based care practitioners who work with sensitive groups (patients). Fine (1994) argued that negotiating for access is important because the subjects of the research have the right to be informed that they are being researched and to be informed about the nature of the research. She argued that potential research subjects must understand the intention of the research and sign an informed consent form which must specify that the subjects may withdraw from the project any time.

In my experience, negotiating access helped to establish rapport between myself as a researcher and my research participants. This is important since the relationship with research participants has implications for the quality of data to be generated, particularly because I was using interviews and observations which are influenced by the quality of social relationships.

To ensure that all participants were comfortable to participate openly, I negotiated access to different sites as described below.

3.3.1 Negotiating access to the community home-based care facilities

I anticipated conducting research in two areas, one in a former white residential area and one in any of the black townships in Mogale City. However, the home-based care centre in the former white area declined to participate in the study. The other two township-based facilities were chosen based on their availability and their willingness to participate in the study. Letters requesting permission to conduct the study were submitted to respective facility managers (see Appendix A).

After permission was granted by facility managers, formal letters of agreement (see Appendix B) were discussed in detail and signed by both facility managers and myself as the researcher. The facilities were given a copy of this letter for their records.

3.3.2 Negotiating access to the municipality

In order to obtain permission to conduct the study within Mogale City municipal area, I submitted a letter on 24 April 2012 to the Executive Manager: Integrated Environmental Management, since the study was located in the Municipal Health Services section which forms part of the Department: Integrated Environmental Management. The Executive Manager endorsed the first letter dated 24 April with some comments stating her support (see Appendix C). I received verbal approval on 4 June 2012 after a meeting with the Executive Manager.

After approval was granted, I requested individual officials (environmental health practitioners, the Landfill Site Supervisor and the Manager: Municipal Health Services) to participate in the study. During those negotiations I showed them a copy of the letter dated 24 April on which the executive manager had indicated her support of the study.

During the weekly Environmental Health sub-sectional meetings, I invited environmental health practitioners to volunteer to participate in the study. I then explained the conditions with two officials who volunteered to participate. No documents or agreements were signed in this regard.

To understand how environmental health practitioners' knowledge and knowledge-sharing practices influenced management of healthcare risk waste by community home-based care facilities and consequently affected the community, I observed Mogale City local municipality's Waste Removal and Disposal Services. I did this to determine the potential to which community members could be affected by inappropriately dispose waste. I conducted two on-site observations and verbally requested permission from the truck drivers and the landfill site supervisor to take pictures of their practices. I also conducted an interview with the supervisor at one of the landfill sites.

The landfill site is the final stage of municipal waste removal service where all collected waste is disposed. Inappropriate healthcare risk waste management adversely affects this unit because, when healthcare risk waste is found at the site, the unit must stop all its operations and arrange an alternate disposal area while investigating the origin of healthcare risk waste. For this reason, I invited the landfill site supervisor to participate in the study so that I could establish the extent to which environmental health knowledge and knowledge-sharing practices consequently affects the

landfill operations and also so I could take pictures of the activities on site.

3.4 DATA GENERATION

3.4.1 Overview of data generation process

In trying to uncover ways in which knowledge relating to healthcare risk waste management is constructed and distributed within and between the municipality, in particular environmental health services and community home-based care facilities, I generated data in two phases using the following methods:

In Phase One, data was generated through:

- Review of eight documents (legislation and guidelines);
- Six semi-structured Interviews; and
- Five extensive workplace observations.

At the end of Phase One, the data was analysed and used as stimulus for the second phase of data generation.

As this was an interventionist study, data in the second phase was generated during three change laboratory workshops with environmental health practitioners, waste inspectors and community health workers (see Section 3.4.5.2-3.4.5.4). During these workshops, I generated data by audio-recording interactions which were later transcribed. The use of these methods produced a diverse range of qualitative data which was further used to suggest interventions.

3.4.2 Document analysis

Document analysis involves the 'collection, review, interrogation and analysis of various forms of text as primary sources of data' (O'Leary, 2004, p. 177). Document sources can be extremely useful in all forms of qualitative research as they are rich sources of information and a means of circulating ideas and discourses in society. Document sources are suitable for a social constructionist study because, by their nature, they are constructed and open to interpretive analysis (Terre Blanche, Durrheim & Painter, 2006. p.136). The texts which I analysed were collected from the Internet and from the environmental health services sections. The texts ranged from the national and provincial legislation and guidelines, to institutional documents relevant to management of healthcare risk and general waste (see Table 3.1). The methods I used to analyse the data will be discussed in Sections 3.6.1 and 3.6.2.

Table 3.1. Summary of documents analysed during Phase 1 of data generation

Document	Date	Document source	Document type	Index	Value to this study
Gauteng Healthcare Risk Waste Management Regulations	2004	Department of Agriculture, Conservation and Environment	Regulation	Doc 1	Provides the requirements for the management of healthcare waste
West Rand District Municipality: Municipal Health Services by-laws	2011	West Rand District Municipality, Municipal Health Services	By-laws	Doc 2	Provides requirements for nursing homes and the management of healthcare waste
Policy for Environmentally Sustainable Healthcare Risk Waste Management in Gauteng Province	2003	Gauteng Department of Agriculture, Conservation and Environment	Policy	Doc 3	Provides framework to ensure that integrated, environmentally sustainable and occupationally safe healthcare waste management is established in Gauteng province
National Guidelines on Home-Based Care and Community-based Care	2002	Department of Health	Guideline	Doc 4	Provides a framework for the establishment and management of the community home based care facilities
Minimum Requirements for Waste Disposal by Landfill	1998	Department of Water Affairs and Forestry	Guideline	Doc 5	Provides requirements to which waste disposal by landfill should comply
Landfill Permit in Terms of Section 20 of the Environmental Conservation Act, 1989 (Act 73 Of 1989)	2004	Department of Water Affairs and Forestry	Permit	Doc 6	Provides conditions for the management of waste at the landfill site
Code of Good Practice for NGOs Responding to HIV/AIDS	2009	Health Profession Council of South Africa	Code of practice	Doc 7	Outlines principles of practices that are informed by the evidence and underscore successful NGO response to HIV, including community home-based care centres
Regulation defining the Scope of Profession for Environmental Health Practitioners	2009	Department of Health	Regulation	Doc 8	Provides the scope and functions of the environmental health practitioners in South Africa

3.4.3 Interviews

3.4.3.1 Overview of interviews conducted

Generally, interviewing has become one of the most common forms of data generation in qualitative research since interviews can provide rich, detailed information that is well-contextualised (Byrne, 2001). Interviews are a flexible tool for data generation, enabling multi-sensory channels to be used: verbal, non-verbal, spoken and heard (Cohen et al., 2007.p. 249). They provide an opportunity for the researcher to get to know people quite intimately, so that the researcher can understand how participants think and feel (Terre Blanche & Durrheim, 1999).

Social constructionist approaches regard interviews as an arena within which particular linguistic patterns (typical phrases, metaphors, arguments, and stories) can come to the fore (Terre Blanche & Durrheim, 1999.p. 153). Terre Blanche and Durrheim (1999) emphasised that meaning created through interviews should be recognised as 'constructed' between the interviewer and the interviewee. These meanings are, moreover, not only constructed by two people involved in the interview, but are products of a larger social system for which these individuals act as relays (p. 156).

As mentioned in Section 3.5.3, I used interviews to generate data from the environmental health section, landfill site management section, as well as from the community home-based care setting in Phase one of my data generation process, in order to determine how knowledge-sharing practices relating to healthcare risk waste management in Mogale City Municipal area affected healthcare risk waste practices within the community home-based care settings (see Table 3.2).

Table 3.2: Summary of interviewees

Person interviewed	Date	Focus/aim of interview
Senior Environmental Health Practitioner	13 April and 4 June 2012	To provide personal view on knowledge sharing within the environmental health sub-section
Junior Environmental Health Practitioner	4 July 2012	To provide a personal view on knowledge sharing within the Environmental health sub-section
Supervisor: Landfill site	13 June and 12 July 2012	To provide information on experiences and challenges at the landfill site and the reporting systems and their effectiveness
Manager: Municipal Health Services	7 September 2012	To provide an overview of the available protocols, policies and legislation.
Community home-based care facilities 1	15 April, and 14 June	To provide knowledge on HCW practices, organisational policies, challenges relating to HCW and how knowledge is shared internally and externally and externally and their relations with the municipality

Community home-based care facilities 2	28 August 2012	To provide knowledge on HCW practices, organisational policies, challenges relating to HCW and how knowledge is shared internally and externally and externally and their relations with the municipality

3.4.3.2 Semi-structured interviews in qualitative research

The nature of interviewing allows the researcher to re-enter into conversation with the interview participants at intervals to help clarify or develop concepts as they emerge, as well as to allow the researcher to develop a rapport with the research participants (Dearnley, 2005).

The interviews that I conducted were of a semi-structured type. According to O'Leary (2004), this type of interview is partially flexible in that only a few questions are pre-determined, and respondents are allowed to digress from them. I conducted each interview with the aid of an interview schedule (see Appendix D) on knowledge and knowledge-sharing practices relating to healthcare risk waste management by community home-based care facilities.

To keep accurate records of the proceedings, the interviews were audio-recorded (with the permission of the participants) and later transcribed (see Appendix E). Although I made some field notes during interviews, I relied more on the audio-recordings which I later transcribed.

3.4.4 Observations

As discussed in Section 3.4.1, observations were also conducted in the first phase of data generation. I observed general waste management activities within Mogale City municipal area, environmental health practices during inspections of community home-base care facilities as well as healthcare risk waste management practices within the community home-based care settings. These observations contributed to my understanding of the relationship between the three systems and of how knowledge-sharing practices affected healthcare risk waste management practices.

Because a social constructionist approach emphasises studying phenomena in a naturalistic way, it was appropriate for me to generate data through observations. According to Cohen et al. (2000), data generated from observations allows a researcher to look into a situation and develop a perspective on what is taking place in specific situations. Furthermore, Morrison (1993, cited in Cohen et al., 2007) argued that observation allows a researcher to gather data on the physical settings and the programme settings. Observations can also verify the information obtained in the interviews.

Kelly (1999, cited in Terre Blanche & Durrheim, 1999) highlighted the need to choose the most appropriate observation method. He described three kinds of observations: descriptive, focused and selective observation. Descriptive observation is where the researcher is concerned with a general question such as 'what is going on?'. It is an exploratory or scoping approach, usually done as the first step in order to generate ideas. Focused observation involves asking more particular questions about general events and looking for a particular kind of interaction. Selective observation involves the selection of a particular event regarding which the researcher has specific questions.

In this study, although I planned to use focused and selective observations, I ended up using all three kinds of observations. I found that since I did not have any prior knowledge on community home-based care settings, choosing to conduct descriptive observations helped me to understand what was actually going on.

In order to give full attention to what was observed and to concentrate on writing observation notes (see Appendix F), I opted to become a passive observer throughout the process. I did not use structured observation schedules since I did not know what to expect (particularly with the community home-based care settings) and preferred to keep the possibilities for observations open. I conducted five sets of observations: two within the municipal waste removal and disposal services setting, one within environmental health services and two within community home-based care facilities to see how waste including healthcare risk waste was being generated and managed. The observation noted derived from this process were used to develop narratives of events reported in Chapter 4 (see Vignettes 4.1, 4.2 and 4.3).

My first observations were conducted in Noordheuwel (a suburb in the north of Krugersdorp) on 12 June 2012. I drove around in the area until I could find the waste removal truck in operation. I identified the areas where the truck had already passed by the waste bins which were left opened after being emptied. After locating the waste removal truck, I followed it to observe how waste was collected and to identify contradictions, if there were any. I also took some pictures of the activities with the permission of the truck driver (see Figures 3.1 and 3.2). My second observations were conducted the following day, 13 June, using the same procedure. Observations at the landfill site were conducted on the same day (13 June) following my interview with the supervisor.

Figure 3.1: Assembled waste containers **Figure 3.2: Workers queuing to empty waste bins**

Observations with environmental health practitioners were conducted on the 18 July 2012. I requested permission to accompany the junior and senior environmental health practitioners who were conducting inspections for land-use application for a community home-based care facility.

Prior arrangements to conduct observations at the two community home-based care facilities were made on 19 July and 28 August for Centres 1 and 2 respectively. Based on the information received from the caregivers that patients refused to be bathed during cold weather conditions, I called off the observations for the 19 July and scheduled another appointment on 4 September 2012, where I observed two instances of healthcare risk waste generation. Observations at Centre 2 were conducted as scheduled and I managed to observe one instance of healthcare risk waste generation.

3.4.5 Intervention workshops

3.4.5.1 Overview of the intervention workshops

As discussed in Section 3.4.1, three intervention workshops (two main workshops and one follow-up) were conducted in Phase Two of my data generation process. The workshops took place on 13 July 2012 for environmental health practitioners and waste inspectors within the Municipal Health Services section; and on the 6 September 2012 for environmental health practitioners, waste inspectors and community home-based care facility managers; and on 28 November 2014 for participants of the second workshop.

To prepare for the workshops, environmental health practitioners were invited by word of mouth during their weekly meeting. Community home-based care workers were invited telephonically using the database that was generated after the first workshop with municipal officials. A total of fifteen community home-based care facilities were invited.

The intervention workshops drew on the Development Work Research (DWR) methodology, described by Engeström (1999) as a methodology for applying activity theory, specifically the theory of expansive learning, in the world of work, technology and organisations. The DWR methodology is organised around change laboratory workshops in which evidence of professional concepts and practices are scrutinised by researchers and practitioners, contradictions are surfaced, and new ways of working are proposed (see Section 2.10).

The first two workshops were organised around the presentation of 'mirror data' derived from the analysis of individual interviews, observations and document analysis collected in Phase One of the data generation process. The follow-up workshop was organised around presentation of resolutions taken in the second workshop as mirror data. Participants in all workshops sat around the boardroom table and mirror data was presented using a data projector which was at the other end of the table next to where I, the facilitator, was standing. Presentation of data in the first two workshops was supported by explanations of Engeström's second and third generation activity system, in order to facilitate movement between 'scientific' and everyday concepts. In the third workshop, participants applied Engeström's second and third generation activity system to identify current practices and how they evolved. They also identified tensions and contradictions on their activity systems and jointly developed new solutions using expansive learning. The research team comprised me, the researcher, who presented mirror data for discussion in the workshop and one colleague who took pictures during the second workshop. All the workshop proceedings were audio-recorded and later transcribed as Phase Two data.

3.4.5.2 Change laboratory workshop 1

Eight environmental health practitioners including one student environmental health practitioner and one waste inspector attended and signed the attendance register. From this group, only one environmental health practitioner had participated in an individual interview prior to the workshop. As indicated in Section 3.4.1 above, analysed data from the Phase One data generation process was presented using a data projector so that the participants could identify contradictions and tensions in their healthcare risk waste management practices and develop new solutions.

The interactions were audio-recorded, however, due to some interference with the audio recorder during my introductions to the workshop, the recorded data only commenced from the point at which the environmental health practitioners started engaging with the information (the mirror data) I presented. These were transcribed as Phase Two data.

3.4.5.3 Change laboratory workshop 2

In this workshop, eight environmental health practitioners (including the Manager: Municipal Health Services and one waste inspector) and three community home-based care managers attended and signed the attendance register (see Appendix K). Only one of the three community home-based care centres participated in the individual interviews.

A similar procedure as the first workshop was followed. All the proceedings were audio-recorded and later transcribed as Phase Two data. I asked a colleague to take some pictures during the workshop (see Figure 3.3).

Figure 3.3: Participants in the Change Laboratory Workshop 2

3.4.5.4 Change laboratory workshop 3

Thirteen participants including eight environmental health practitioners, three community health workers and two waste inspectors attended the workshop. All participants had attended the previous workshop except for one environmental health practitioner and one waste inspector. The Manager Municipal Health Services (from Mogale City Municipality) was also not able to attend this particular workshop due to other commitments. As with the previous two workshops, I assumed the role of presenting and facilitating discussions in the workshop. Proceedings were also audio-recorded and later transcribed as Phase Two data and a colleague took some photographs during the workshop.

3.5 DATA MANAGEMENT

Denzin and Lincoln (1994, p. 428) defined data management as "operations needed for a systematic, coherent process of data collection, storage, and retrieval which are aimed at ensuring (a) high-quality, accessible data, (b) documentation of what analysis has been carried out, and (c) retention of data and associated analyses after the study is complete". How data is stored and retrieved is the heart of data management, because without a clear working scheme, data can easily be mis-coded, mis-labelled, mis-linked and mis-laid (Wolf, 1992, cited in Denzin & Lincoln, 1994).

To ensure an easy and flexible data storage system, I used both electronic and physical filing systems. Transcribed audio recordings were electronically filed in three files: the first contained all transcribed raw data, the second file contained analysed data identifying elements of activity systems and the last file contained analysed data identifying knowledge-sharing practices.

All hard copies were filed according to the following categories: acts, regulations, by-laws, guidelines, policies, permits, codes of conduct, raw field notes from observations, audio recording transcriptions, and photos and the documents were indexed Doc1-8 (see Table 3.3).

Table 3.3 Indexed data sources

File	Data source	Index
Interviews	Interview Senior Municipal Official	ISMO, ISMO 1, ISMO 2
	Interview Junior Municipal Official	IJMO, IJMO 1, IJMO 2
	Interview Municipal Official Landfill Site	IMOL, IMOL 1, IMOL 2
	Interview Municipal Official Manager	IMOM, IMOM 1, IMOM 2
	Interview home-based care 1	IHC1, 1IHC1, 2 IHC1
	Interview home-based care 2	IHC2, 1 IHC2, 2 IHC2
Observations	Observation notes: municipality	OM1: Waste Removal Services, OM2: Waste Disposal Services OM3: Environmental Health Services
	Observation notes: home-based care 1	OHC1
	Observation notes: home-based care 2	OHC2
Regulations	Gauteng healthcare risk waste management regulations	Doc 1

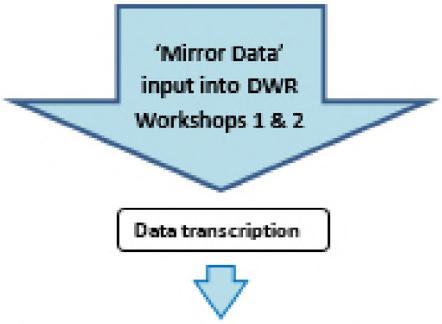
	Regulation defining the Scope of Profession for Environmental Health Practitioners	Doc 8
By-laws	West Rand district municipality: Municipal Health Services by-laws	Doc 2
Policies	Policy for environmentally sustainable healthcare risk waste management in Gauteng province	Doc 3
Guidelines	National Guidelines on home-based care and community-based care	Doc 4
	Minimum requirements for waste disposal by landfill	Doc 5
Permits	Landfill Permit in terms of section 20 of the Environmental Conservation Act, 1989 (Act 73 of 1989)	Doc 6
Code of practice	Code of good practice for NGOs responding to HIV/AIDS	Doc 7

3.6 DATA ANALYSIS

According to Denzin and Lincoln (1994), qualitative data analysis involves organising, accounting for and explaining the data, making sense of the data in terms of the participants' definitions of the situation, noting patterns, themes, categories and regularities. They defined data analysis as having the following three linked sub-processes which I considered throughout the research process: data reduction, data display and conclusion-drawing and verification.

Figure 3.4 is a diagrammatic summary of the process of data analysis undertaken in this study. As per my two data generation phases described in Section 3.4.1, data was also analysed in two phases. Phase 1 was split into parts A and B to analyse the elements of activity systems (A) and knowledge-sharing practices (B), and Phase 2 according to the D-analysis (as will be described in Section 3.6.2).

Phase of data generation	Categories used to analyse data
Phase 1A	**Elements of an activity system:** o Rules o Subjects o Community o Division of labour o Objects o Mediating artefacts/tools
Phase 1B	1. Knowledge sharing practices: o What do they know about healthcare waste management o How knowledge is acquired o What are the practices o Frequency of knowledge sharing o Historicity 2. Roles and responsibilities in relation to healthcare waste management 3. Impacts of knowledge sharing 4. Tensions and Contradictions



Phase 2: D-analysis	o Diexis o Delineation and definition o Deliberation o Departure o Development

Figure 3.4: Summative table of the two phases of data analysis and the categories

3.6.1 Phase One analysis

The aim of the Phase One analysis was to develop a clear insight into the culture of the activity systems in question so that I could determine tensions and contradictions that arose. Additionally, this generated data I used as stimulus for deliberations in the intervention workshops.

The analysis started with document analysis which was the predominant source of information for this phase. In a process of data reduction, the information I had collected from the documents was

summarised, reduced to the most relevant and critical to the study. Later, I was able to consider these documents in the light of data generated through interviews and observations. The collected data was organised into summaries for later discussion in Chapters Four and Five.

Because CHAT is concerned with the historical aspects of human activity, in the first phase, I analysed data to try to understand how things had come to be through past events and how various dimensions of activity systems (rules, mediating tools, subject, object etc.) were interacting with each other to influence knowledge-sharing practices.

In Phase One A, I inductively analysed, categorised and coded data according to rules, mediating tools, subject, object, community and division of labour of each activity system (see Appendix G). An analytical memo was produced from each of these coded data (see Appendix H).

In order to address the study's research questions, data in Phase One B was categorised and coded according to the following categories (see Appendix I):

- Knowledge-sharing practices (which was further sub-categorised into: knowledge base, how knowledge was acquired, frequency of sharing knowledge, their current practices and historicity);
- Knowledge on participants' roles and responsibilities in relation to healthcare risk waste management,
- Knowledge on the impacts of knowledge-sharing; and
- Systemic tensions and contradictions within and between activity systems of environmental health and community home-based care settings.

An analytical memo was produced from these coded data (see Appendix J).

3.6.2 Phase Two analysis

As noted by Engeström (2011), CHAT is an interventionist theory of learning, innovation and change in conditions of complexity and it can be used as a developmental tool. In the development and institutionalisation of knowledge-sharing practices, an intervention workshop is consistent with CHAT's expansive learning process (see Section 2.9) whereby the analysed data from Phase One is 'mirrored' to participants in order to obtain clarity and generate further dialogue and learning.

To analyse data generated in the change laboratory workshops, I drew on David Middleton's approach to analysis which focuses on the forms of social action that are accomplished in talk and

text and the sorts of communicative devices that are used (Middleton, Brown, Daniels, Edwards, Leadbeater & Warmington, 2008). This analysis is termed the 'D-analysis' and it suggests the following protocol for interrogating and analysing workshop data:

- *Deixis*: When an idea is introduced during a conversation to draw participant's attention towards a particular problem.
- *Definition and delineation*: This occurs when other people move on to explain the point from their own perspective by acknowledging or qualifying the point, drawing on local context or emphasising different views that may serve as a basis for expanding the conversation to explore what is seen as important.
- *Deliberation*: This identifies how some working consensus amongst workshop participants on what is the case, emerges through the abovementioned processes.
- *Departure*: This suggests a move away from the problem. For example, an alternative response to healthcare waste management.
- *Development*: This involves finding tools to operationalise the departure. For example, when participants are working on a plan of action towards the departure.

Using the D-analysis approach, I coded the transcripts of the change laboratory workshops 1, 2 and 3, looking for instances of deixis, delineation, deliberation, departure and development. However, due to the duration of the research process which did not include long-term monitoring of institutional developments, the coding did not include the 'departure' level.

3.7 ETHICAL CONSIDERATIONS IN THE STUDY

Bassey (1999) suggested that research should be conducted in a way that shows respect for democracy, truth and for people. As I was conducting this research with community home-based care facilities working with sick people who wished their privacy to be respected, as well as with colleagues in local government positions, I appreciated the significance of Bassey's insights and I took measures throughout the study to respect democracy, truth and people.

3.7.1 Respect for democracy

As described in Section 3.3, I negotiated access with all research sites, first verbally and later writing letters to interested sites (within community home-based care setting) (see Appendix A). One of the community home-based care facilities I approached did not want to participate in the research as a case study. I accepted the organisation's right not to participate in the research and

looked for other interested organisations. Thereafter, I drafted agreement letters that were signed by me as a researcher and the two volunteering community home-based care facility managers (Appendix B). After discussions and understanding of my intentions, participants were informed of their right to withdraw from the research at any time. No participant expressed the desire to withdraw from the research.

All environmental health practitioners and community home-based care facilities managers in Mogale City Municipal area (including the one that did not want to participate in the case study) were invited to attend the change laboratory workshop to propose and discuss interventions on how to improve knowledge-sharing within and between environmental health practitioners and community health workers. Participants in the change laboratory workshop were reminded that the workshop was not to evaluate their practices, rather to evaluate how knowledge was being shared and how this can be improved.

3.7.2 Respect for truth

I occupied a supervisory position in my section and my research participants were both my sub-ordinates and my superior. I clearly explained my capacity as a researcher to participants when negotiating access and before conducting interviews and observations and took measures to ensure that my professional knowledge as well as my authority in my workplace did not affect my research focus, particularly when interviewing my colleagues. To this end, I chose community home-based care facilities that were not in my area of jurisdiction so that they saw me as a researcher rather than as a law enforcer. I did my best to remain neutral and unbiased during the data generation process. Although I chose the areas that were not in my jurisdiction, some community health workers recognised me since I engage with them in other programmes. I had to explain carefully to them that I had not come to critique them but to understand knowledge-sharing practices.

To ensure that my findings and interpretations reflected the meaning as described by participants as closely as possible, I ensured that participants were content with my transcripts by showing them interview transcripts and also by re-playing some extracts of the audio-recordings so that they could clarify certain issues. After confirmation from participants, summaries of the findings from the interviews and observations were further presented in the change laboratory workshop where participants, together with those who did not participate in the interviews, were afforded an opportunity to further discuss the initial findings and decide on a way forward.

3.7.3 Respect for people

Curran (2006) noted that respect for people recognises that individuals are autonomous agents who can enter a research project only voluntarily and with adequate information about the consequences of the research to evaluate their decision to participate. As discussed in Sections 3.3.1 and 3.3.1, I obtained permission to conduct research in all sites. I further requested permission to use audio and visual equipment such as the audio-recorder and camera during interviews and observations. However, I did not always use audio and visual equipment during the observation process, particularly in the community home-based care setting where I sometimes felt it would be an invasion of patients' privacy to take photographs. When I did take photographs, it was with the permission of participants. Some male waste re-claimers were reluctant to be photographed even after I explained to them that their faces would not be shown. I respected their views and sought other male re-claimers until I found one re-claimer who actually insisted that his face be shown so that people can see that he is unemployed (see Figures 3.5 and 3.6).

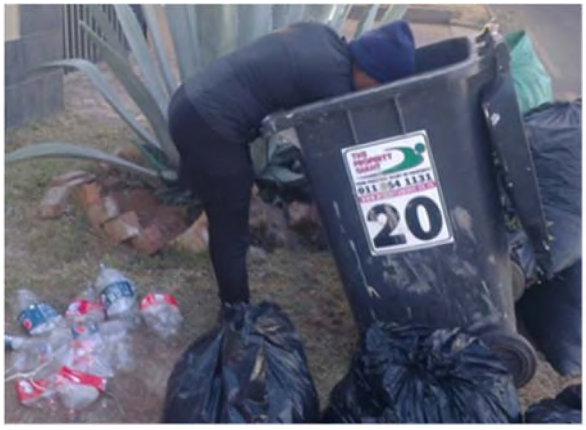


Figure 3.5: Re-claimer without face showing

Figure 3.6: Re-claimer with face showing

Research participants were informed about the purpose of the research, procedures to be followed during the process and anticipated benefits of the research (to strengthen knowledge-sharing and to protect the communities of Mogale City municipal area as well as community home-based care practitioners from possible exposure to healthcare risk waste). Participants were also given an explanation about how they were selected (on a voluntarily basis) and offered an opportunity to ask questions and to withdraw at any time.

I always made appointments with all the participants based on their availability, and if I was delayed somewhere I would call them to inform them of my delay. Although the dependence on the participants' availability affected my plans, I learned to be flexible and I adjusted my plans accordingly.

I ensured anonymity and confidentiality of the research participants by using titles and pseudonyms instead of real names. I used HBC1 & 2 in the case of community home-based care facilities and SO1-5 and JO1-4 for senior and junior environmental health practitioner respectively. This index will not be obvious since there are several community home-based care facilities in the areas selected and the municipality has five senior officials (SO) and four junior officials (JO). I also ensured confidentiality by not disclosing the addresses where observations were conducted.

The use of the Change Laboratory methodology provided an approach that addressed the issues of 'ethics of care', which come to the fore when participants are at risk of being "criticised or even admonished for their practices" (Costly & Gibbs, 2006.p. 95). In this case, participants identified their own knowledge-sharing practices that influenced healthcare risk waste management practices. Participants also identified interventions relevant to their current practices.

3.8 ADDRESSING ISSUES OF VALIDITY AND TRUSTWORTHINESS

In this section, I outline steps taken to ensure that the research process and the resultant data and findings are as valid and trustworthy as I could practically achieve.

3.8.1 Validity

Validity refers to the correctness or credibility of a description, conclusion, explanation, interpretation or other sort of account (Maxwell, 1996). In ensuring validity, I considered Maxwell's three types of understanding for validity which are: description, interpretation and theory.

- *Descriptive validity:* To ensure valid description of the interviews and observations, I recorded all interviews and transcribed them word for word. I also compiled detailed observation notes chronologically, to rule out the possibility of misrepresentations.
- *Interpretive validity:* In order to understand the perspective of the interviewee and the meaning they attached to their words and actions, I asked open-ended questions to give participants opportunities to reveal their own perspectives. I further recorded all conversations so that I could listen attentively to participants and later allowed each participant to review their interview transcript and representation of the information, to check if they had not been misquoted or misinterpreted. This process is referred to as member checking (discussed in 3.8.2.4 below).

- *Theoretical validity*: I ensured that a valid relationship existed between the study's conceptual and theoretical frameworks and the context of healthcare risk waste generation and management in community home-based care facilities. The theoretical vantage point that CHAT provided corresponded with the study's descriptions and interpretations of the data.

3.8.2 Trustworthiness

Trustworthiness is established when findings reflect as closely as possible the meaning as described or experienced by participants (Lincoln & Guba, 1985). Trustworthiness is influenced by the fact that interviews are interpersonal, and that the nature of human interaction means that the researcher will have some influence over the respondent and thus the data (Hitchcock & Hughes 1989, cited in Cohen et al., 2000). In order to manage threats to the study's trustworthiness and validity – such as reactivity and biases – I considered the following strategies suggested by Lincoln and Guba (see Section 3.8.2.1-3.8.2.5):

3.8.2.1 Prolonged engagement

The idea of prolonged engagement stems from anthropological fieldwork in which researchers spend extensive time with their participants to increase rapport, leading participants to be more open in their interactions with the researcher (Lincoln & Guba, 1985). Although my direct interactions with research participants were not of the anthropological kind described by Lincoln and Guba, I visited participants more than once, firstly while I was negotiating access, later during or after the interviews, as well as during or after my observations. Lastly, I engaged with participants in the change laboratory workshops which were sites for rich engagement.

3.8.2.2 Triangulation

Because research methods act as filters through which the environment is selectively experienced (Smith, 1975, cited in Cohen et al., 2007), reliance on one method may be biased or distort the researcher's picture of a particular slice of reality. Maxwell (1996) defined triangulation as collection of information from a diverse range of individuals and settings, using a variety of methods. He asserted that triangulation reduces the risks of chance associations and of systematic biases due to a specific method, and it allows the researcher to gain a better assessment of the validity and generality of explanations.

In this study, I collected data through a combination of participant observations from two independent home-based care facilities and municipal waste management services, individual

semi-structured interviews with both environmental health practitioners and community health workers, document analysis, as well as through change laboratory workshops.

3.8.2.3 Peer debriefing

Peer debriefing involves engaging in dialogue with colleagues outside of the research project who have experience with the topic, population or methods being used (Lincoln & Guba, 1985). The Change Laboratory Workshops allowed participation from members who initially were not part of the first phase of data generation process to provide further input and also to assist with the development of intervention strategies. Other opportunities for peer debriefing arose during peer review processes with academic staff and peers on the Masters programme (MEd – EE) within which this study was conducted.

3.8.2.4 Member checking

Member checking is defined as a process of soliciting feedback about one's data and conclusions from the people one is studying (Guba & Lincoln, 1989). Guba and Lincoln (1989) noted that member checking is the single most important way of reducing misinterpretation of what interviewees say and the perspectives they have on phenomena. I allowed participants to review interview transcripts and listen to audio-recordings so that where they felt that they had not provided adequate information, they could do so.

3.8.2.5 Reflexivity

According to Guillemin and Gillam (2004.p. 274), reflexivity is a process of critical reflection on the kind of knowledge produced from research and how that knowledge is generated. A reflexive researcher is required to reflect critically on how she constructs knowledge in the research process, the factors that influence her construction of knowledge, and how these are revealed in the planning, conduct and writing up of the research.

Because this research project involved observing how healthcare risk waste was being generated and managed in community home-based care settings, in order to understand the impact of my colleagues' knowledge-sharing practices, I had to consider 'ethics of care' (Costley & Gibbs, 2006) or 'micro ethics' (Guillemin & Gillam, 2004) which required me to demonstrate caring responsibilities towards my subjects. For example, the circumstances of some of my observations (observing some patients with septic bed sores, sometimes with offensive smells) required me to behave in such a manner that protected the dignity of the occupants of the house, the patient and home-based care practitioners.

During interviews, I asked open-ended questions so as to allow the subjects to provide their own perspectives. I wanted to avoid my position in the organisation interfering with the content of the interviews. I always assured the subjects that the purpose of the study was not to assess their performance, rather to evaluate how they applied knowledge in the field. By so doing, I was ensuring that they felt comfortable with the data collection process.

3.9 CONCLUSION

This chapter described social constructionism as an orientation that guided the overall research process. A single embedded case study approach within the context of Mogale City municipal area's Municipal Health Services section and community home-based care settings was presented as the study's methodological framework. The chapter further described how qualitative data was generated (including how I negotiated access to the research sites and what research methods were used), how data was managed, and finally how data was analysed through the theoretical lenses of CHAT, expansive learning and D-analysis. The chapter concluded with a discussion on the ethical considerations of the study and described steps taken to ensure validity and trustworthiness of the data and research findings. In Chapter Four that follows, I present a detailed account of what transpired in the first phase of data collection.

CHAPTER 4: PRESENTATION OF ACTIVITY SYSTEMS AND TENSIONS AND CONTRADICTIONS RELATING TO KNOWLEDGE AND KNOWLEDGE-SHARING PRACTICES

4.1 INTRODUCTION

This chapter presents a CHAT-based account of data generated during Phase One of the data generation process described in Section 3.4.1. Data is presented in three main sections. The first section presents environmental health services as an activity system, identifies knowledge and knowledge-sharing practices and identifies tensions and contradictions within the activity system. The second section presents community home-based care services as an activity system, identifies knowledge and healthcare risk waste management practices and identifies tension and contradictions within the activity system. Finally, the third section presents systemic tensions and contradictions between environmental health and community home-based care services activity systems in relation to knowledge-sharing practices on healthcare risk waste management. The reader should note that, for the purpose of this study and to avoid confusion, the name environmental health services will be used instead of Municipal Health Services since there is also a Municipal Health Services section in Mogale City Local Municipality.

4.2 THE ENVIRONMENTAL HEALTH SERVICES ACTIVITY SYSTEM

In this section, I present data relating to the environmental health services activity system in the Mogale City Local Municipality. As noted in Section 1.2, the activity system falls within the West Rand District municipal area. This activity system is illustrated in Figure 4.1 and its elements are discussed in the sections that follow.

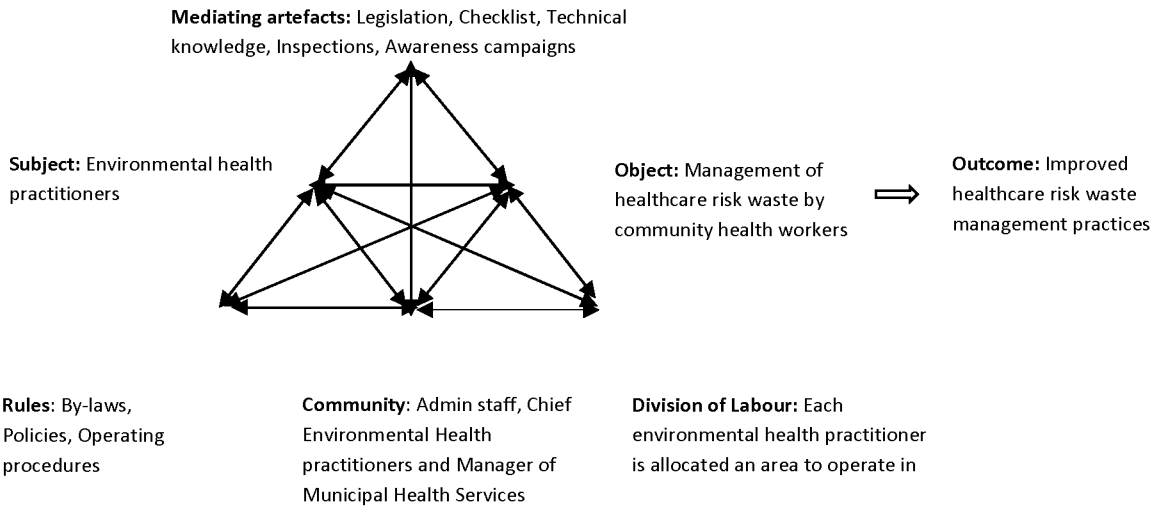


Figure 4.1: Environmental health services represented as an activity system

4.2.1 The subject of the environmental health services activity system

The subjects of the environmental health services activity system are environmental health practitioners. Environmental health practitioners in the West Rand District Municipality are appointed by the mayor in line with the National Health Act (SA, 2003) with a minimum qualification of a National Diploma in Environmental Health and registration with the Health Profession Council of South Africa (HPCSA) as environmental health practitioners. Of the 24 Environmental Health Practitioners in the West Rand District Municipality, ten are stationed in Mogale City Local municipal area (the largest in terms of population). Their experience working as environmental health practitioners ranged from two to thirty years. Although all the environmental health practitioners in Mogale City Local Municipal area were conversant with their roles and functions as: 'Educators, health promoters (promoting healthy lifestyles), preventers of possible health hazards (by identifying and analysing problems at source) and as facilitators (for healthy communication between the community and relevant authorities)' (ISMO, 2012), it became evident that they had limited knowledge of the context of community home-based care services. For instance, most environmental health practitioners were not able to differentiate community home-based care services from other healthcare services. One junior environmental health practitioner indicated that he did not have community home-based care facilities in his area since facilities in his area 'don 't offer 24-hour services' (IJMO, 2012). He indicated that facilities in his area 'are more like day in facilities, whereby the elderly go for meals and exercises…' (IJMO, 2012). The senior environmental health practitioners also confused community home-based care facilities with frail care facilities. One senior official was noted as saying: 'So they [patients] don't stay at the premises, then I'm being confused. Because I thought they stayed there until they were ready to go home' (DWR 1).

The limited knowledge was further confirmed by another junior environmental health practitioner who declared that she did not have knowledge about community home-based care facilities. She said: 'Well, for me, I didn't have much information with these things [community home-based care facilities], because in most cases when conducting inspections I only find the manager; there is nothing happening there, so I didn't know exactly what to do, (DWR 1).

4.2.2 Object of the environmental health services activity system

Amongst other responsibilities, environmental health practitioners focus on the management of healthcare risk waste by community home-based care facilities in Mogale City local municipal area. The outcome is improved healthcare risk waste management practices, which is achieved

through inspections, conducting risk assessments and educating community health workers. It is noted in Section 1.2, that environmental health practitioners' activities shifted from enforcing legislation to applying proactive approaches to preventative management of the environment for public health. They are expected to apply preventative measures during planning stages and also to conduct continuous environmental surveillance and evaluation across sectors.

4.2.3 Community within environmental health services activity system

As noted in Section 2.8.1, the community consists of individuals or sub-groups who share the same general object of the activity. The following three groups from Mogale City local municipality's waste management section were identified as constituting the community for the environmental health services activity system:

- **Waste inspectors.** There are two waste inspectors servicing Mogale City local municipal area. They are appointed by the Mogale City Local Municipality and focus only on waste management issues. Although the waste inspectors have the same qualification as environmental health practitioners, their scope of practice is regulated by the National Environmental Management: Waste Management Act 59 of 2008 (SA, 2008) unlike Environmental Health Practitioners whose functions are prescribed by the Regulations defining the Scope of Profession for Environmental Health Practitioners (SA, 2009a). However, they perform the same function of conducting inspections, providing health education and creating awareness on waste management issues as with environmental health practitioners.

- **Waste removal section and waste disposal section** which together provide safe waste collection services from the households and businesses around Mogale City as well as waste disposal services at two approved landfill sites. During observations, unsafe waste salvaging practices potentially exposing community members to risk were identified within these two activity systems.

4.2.4 Division of labour in the environmental health services activity system

As introduced in Chapter One, each environmental health practitioner is allocated areas (in urban and rural areas) to solely perform all environmental health functions as prescribed in the Regulation defining the Scope of Profession for Environmental Health Practitioners (SA, 2009a). They monitor a variety of facilities such as health facilities, food premises (formal and informal),

government premises, crèches, and so on. Explaining how their work is divided, the senior environmental health practitioner reported that:

> Unfortunately our work is not divided … as an environmental health practitioner we are required to do everything … in other words we are not sort of specialising … every environmental health practitioner is doing everything according to the scope of profession. (ISMO, 2012)

Due to the diversity of the areas and premises to be monitored, practitioners are rotated every two years in order to expose them to different contexts. With Mogale City Local Municipality's population of 36 2422 people (Stats SA, 2011), each environmental health practitioner is allocated to a population of 36 242 people, three times above the environmental health practitioner/ population standards (SA, 2013; SA, 2015).

With such a population allocated to each environmental health practitioner and the number of premises to monitor, the senior environmental health practitioner reported that, 'due to the workload in one's area, we only visit these [community home-based care facilities] places only when they are due to renew their certificates of compliance … at the request of the facility manager' (ISMO, 2012).

4.2.5 Mediating artefacts and tools for healthcare risk waste management in the environmental health services activity system

Healthcare risk waste management appears to be inadequately mediated in the environmental health services activity system. Potential mediating tools such as checklists, operational plans and by-laws seem to overlook community home-based care facilities completely. I encountered talk of an anticipated checklist to guide risk assessment specifically for community home-based care facilities but, at the time of research, this checklist did not exist and did not appear to be under development either. Similarly, community home-based care facilities were not reflected in municipal operational plans, despite healthcare risk waste being identified as a priority area. Community home-based care facilities were not even listed as examples of healthcare facilities in the West Rand District Municipality: Municipal Health By-laws (West Rand District Municipality [WRDM], 2011).

It is also unclear whether community home-based care facilities should be categorised as 'domestic' or 'minor' healthcare risk waste generators. According to the Gauteng Healthcare Risk Waste Management Regulations (SA, 2004a. p. 4), a domestic generator produces: 'less than one

kilogram per day of health care risk waste calculated monthly as a daily average including but not limited to plasters, bandages, nappies or sanitary pads', whereas a minor generator 'can produce up to 20 kilograms per day' (SA, 2004a. p. 6 & SA, 2014. p. 7). Categorisation as either a domestic or minor waste generator has implications for recommended practices and compliance with policies but, due to the variable circumstances of their work, community home-based care facilities can fall into either category.

The amount of healthcare risk waste generated by a community home-based care facility is dependent on the number of bed-ridden patients who require wound management services at any particular time and it always fluctuates. Furthermore, the amount of waste generated by community home-based care facilities is unknown in the Mogale City Local Municipal area since it is not being monitored.

4.2.6 Rules of the environmental health services activity system

As noted in Section 2.8.1, the rules of an activity system are described as any formal or informal constructs that in varying degrees constrain or allow activities to occur; they provide guidance on correct procedures and acceptable interactions. General rules are that provision of environmental health services should be based on the principle that puts prevention at the centre of all environmental health actions, and that precautionary measures should be taken even where there is no scientific evidence to protect human health (SA, 2013; SA, 2015).

The rules relating to inspections are that a minimum of two inspections per facility should be conducted within a one-year period and that during such inspections; risk assessment (using a checklist noted in Section 4.2.5) should be conducted in order to ensure that facilities are treated equally. The other rule is that the owner or a person in charge of the facility should be issued with an inspection report, together with the risk assessment findings, recommendations and compliance certificates if complying. Above all, environmental health practitioners are expected to provide health education using accurate and up-to-date information on identified environmental health risks and their prevention so as to reduce related burdens (SA, 2013). Data revealed that inspections were conducted only once, 'when facilities are due to renew their compliance certificates' (ISMO, 2012) and that the checklist in use was not specifically designed for community home-based care facilities. As indicated in the observation notes the two Environmental Health Practitioners 'competed the checklist for food premise which they brought along from the office…the facility was reported compliant' (OM3, 2012). These provide evidence that inspections were focused more on food preparation programme of the facility rather than on

the healthcare programme. This practice creates more inconsistencies when assessing community home-based care facilities particularly when there is no food preparation involved since environmental health practitioners are using their own discretion while conducting such inspections. Here, the senior environmental health practitioner was noted saying:

> … we look for something that is common in these by-laws [dealing with the homes for the aged, accommodation establishment and health care risk waste … thereafter that we go out to do the inspection and find out conditions that can affect the inhabitants in terms of their health …then we issue the health certificate for the premises. (ISMO, 2012)

The other rule is that since environmental health has functions cutting across different departments such as the waste management, they should maintain coordinated and collaborative efforts with all stakeholders in order to ensure a safe environment for all. Data revealed that inadequate knowledge-sharing between environmental health and the two activity systems [waste removal and waste disposal activity systems] in waste management department increased potential exposure to hazardous substances such as healthcare risk waste (due to increased waste re-claiming). That is, waste re-claimers [both at community level and at the landfill site] were observed re-claiming waste using inappropriate gloves [ordinary laundry and woollen gloves worn during cold conditions] (OM1, 2012, OM2, 2012), (see Figures 3.6 and 4.2).

Figure 4.2: Waste re-claimers wearing inappropriate gloves to reclaim the waste

In the next section, I present data that I generated regarding current environmental health practitioners' knowledge and knowledge-sharing practices on healthcare risk waste in the context of community home-based care facilities.

4.3 CURRENT KNOWLEDGE AND KNOWLEDGE-SHARING PRACTICES

Despite waste management having been part of the environmental health practitioners' curriculum during their professional training, most environmental health practitioners in the Mogale City municipal area only received training on healthcare risk waste management, in particular, while already working. The training they received focused primarily on management of healthcare risk waste at formal healthcare facilities such as clinics and hospitals and did not adequately equip them with competencies to deal with healthcare risk waste generated by community home-based care facilities. Hence they had limited knowledge on the forms and functions of community home-based care facilities and how to monitor them. Even a senior environmental health practitioner reported that: 'nobody told me about the how [to monitor healthcare risk waste generated by community home-based care services]' (ISMO, 2012).

Data from the interviews revealed that environmental health practitioners shared current knowledge and learned from each other when it comes to monitoring community home-based care facilities. For example, when asked what they looked for when conducting inspections at community home-based care facilities, both the senior and junior environmental health practitioners specified requirements for inspections conducted at formal healthcare facilities such as the frail care facilities where patients sleep over until they are ready to be discharged, which are not relevant to community home-based care facilities (IMO, 2012, IJMO, 2012).

My observations also revealed that environmental health practitioners share work-related knowledge amongst themselves daily during their office hours (in the mornings between 07h30 and 09h00 before they leave for their work areas, and in the afternoons between 15h00 and 16h00), (OM3, 2012). They also meet formally on Mondays with their supervisor to discuss operational issues. In this regard, the junior environmental health practitioner explained that:

> We're trying to capacitate each other with as much information as possible … legislation is discussed, policies are discussed. If somebody finds out new policy or if somebody finds something that's newly promulgated, we discuss it and share it with other colleagues (IJMO, 2012.

Although land-use applications (including applications to operate community home-based care facilities) were also discussed in those weekly meetings, and knowledge on how to respond to the applications was shared, it became evident that such knowledge is shared on an *ad hoc* basis, "only

when there are new applications" (ISMO, 2012), and that knowledge relating to how the facilities should manage healthcare risk waste is not shared at all.

As noted in Section 2.2, environmental health services is a district municipality function. Although the West Rand District Municipality's management took steps to develop and maintain a sense of collaboration within the department [Environmental Health Services] by actively involving all environmental health practitioners across the District Municipality in the development of strategic and operational plans for the whole district and for individual municipal areas, observations revealed that knowledge relating to management of healthcare risk waste by community home-based care facilities was never shared. For example, all environmental health practitioners met quarterly to discuss new policies and progress on operational plans but healthcare risk waste issues were never mentioned even if they discussed challenges towards achieving their operational plans (OM3, 2012). The vignette below (Box 4.1) describes how current knowledge and knowledge-sharing practices were used to respond to a land-use application for a community home-based care facility.

Box 4.1: Vignette of actions taken by a junior environmental health practitioner who received a land-use application for a community home-based care facility

Following the interviews with environmental health practitioners, I observed how one junior environmental health practitioner responded to a land-use application for establishing a community home-based care facility. After receiving the application, the junior environmental health practitioner, Bongi, requested Joseph (her senior) to accompany her to conduct an inspection and assist her with responding to the application. Bongi and Joseph allowed me to observe how they conducted their inspection. They prepared for their inspection by reading through the application to establish services offered by the facility and to identify relevant legislation on which to base their inspection. They then decided that the facility required a health certificate and a certificate of acceptability (for preparing food), since the facility was also preparing food for orphans affected by HIV/AIDs.

Upon arrival at the facility on 18 July 2012, community health workers were already preparing for their home visits (filling their home-care bags and updating their supervisors about their visits for the day). We were ushered to the manager's office where we established that the facility has been operating as a drop-in-centre (providing meals for school children before and after school) for a year already and they wanted to expand their services to providing home-based care services to sick people in the area. After introducing and explaining the purpose of our visit to the office staff, the manager, Bonolo, took us through the facility, starting with the kitchen and dining area where meals are cooked and served, to the sanitary facilities used by both the school children and staff members. She later took us around the yard

where we noticed two municipal refuse bins for collecting general waste generated at the facility. Throughout the visit, Joseph assisted Bongi to complete the checklist (for food premises) which they had brought from the office. Since the kitchen was compliant, Bongi and Joseph arranged for a separate training session for the kitchen staff.

After going through the whole yard, we thanked the manager and went back to the office where Joseph helped Bongi to prepare inspection reports using information on the checklist. A report supporting the establishment of the facility was prepared and submitted to the Town Planning section 'without conditions' which, by implication, meant that there were no conditions directing how the facility should manage healthcare risk waste. The following Monday, in the weekly meeting, Bongi reported that she supported the application for a community home-based care facility and that she had issued certificates of compliance. On the report that she submitted to her supervisor, she indicated that the facility was compliant.

During the visit, it became evident that the facility was treated more as a food preparation premises than a facility providing healthcare services. The environmental health practitioners did not even enquire how the facility was going to deal with healthcare risk waste.

4.4 TENSIONS AND CONTRADICTIONS WITHIN THE ENVIRONMENTAL HEALTH SERVICES ACTIVITY SYSTEM

As discussed in Section 2.8.2, contradictions in activity systems are described as imbalances caused by deviations from standard scripts and are regarded as the motive force of change and development within and between activity systems. The four levels of contradictions discussed in Section 2.8.2 were all identified within the environmental health activity system. These included:

- Primary contradictions, which occur within a single element of an activity system;
- Secondary contradictions, occurring between two elements of a single activity system;
- Tertiary contradictions which arise when the object of a more developed activity is introduced into the central activity system; and
- Quaternary contradictions between central activity and its neighbouring activity systems.

4.4.1 Primary contradictions

The most significant example of a primary contradiction involved the **rules** of the environmental health services activity system. Current rules on healthcare risk waste management policies did

not sufficiently regulate how environmental health practitioners should participate towards meeting the object, resulting in drawing on different and sometimes conflicting policies in order to make decisions on the outcome of their inspections and creating multiple standards and inconsistencies. For example, some environmental health practitioners referred to nursing home by-laws or accommodation establishment by-laws to evaluate community home-based care facilities (Sections 4.3).

4.4.2 Secondary contradictions

Four sets of secondary contradictions were noted within the Environmental Health Services activity system. Firstly, contradictions were noted between **rules and the object**. For instance, current legislation is not applicable to community home-based care facilities. The Gauteng Healthcare Risk Waste Regulations (SA, 2004a), West Rand District Municipality: Municipal Health Services by-laws (WRDM, 2011) and the South African National Standard for Management of Healthcare Waste (SANS, 2011) require healthcare risk waste to be stored and collected at places of generation until being collected by a registered transporter for final disposal. This is not feasible since the generation of healthcare risk waste is dependent on patients' needs and differs from one generation point to the other and from day to day (see Section 4.5.1). Environmental health practitioners breached a number of rules discussed in Section 4.2.6. For example, it became evident that during their inspections environmental health practitioners were not able to identify potential risks that come with operating community home-based care facilities. This meant that they were unable to apply precautionary measures to protect human health. Consequently, they could not communicate the risks to community health workers so as to prevent or control the impacts of healthcare risk waste on human and environmental health.

Another secondary contradiction was noted between the **mediating artefacts and the subjects**. That is, regulations and by-laws for healthcare risk waste management did not provide adequate (technical) knowledge for environmental health practitioners to effectively monitor home-based care facilities and advise compliance. As noted in Section 4.2.5, mediation in the form of healthcare risk waste training as well as field experience did not adequately prepare environmental health practitioners to deal with healthcare risk waste generated randomly at unknown sources.

Environmental health practitioners are required to work single-handedly in their areas and make independent decisions. Due to this 'rule', environmental health practitioners are expected to share knowledge regularly amongst themselves so that they have a common understanding of the context of community home-based care facilities and also so that they can implement their services

consistently and equitably. As noted in Section 4.3, it became evident that knowledge-sharing about how to manage healthcare risk waste generated by community home-based care facilities (a mediating process) was non-existent between environmental health practitioners both locally and at district level. As a result, environmental health practitioners (subjects) inconsistently issued compliance certificates without considering the risk (see Section 4.3).

Thirdly, contradictions were noted between the **subject and community** as there was little to no knowledge-sharing between environmental health practitioners (subjects) and waste inspectors (community) who were performing similar functions in the waste management value chain. I observed, for example, that waste inspectors were unable to provide information needed for the development of the minor healthcare risk waste generators' database, which resulted in an incomplete database that did not include community home-based care facilities as generators of healthcare risk waste. Since environmental health has functions cutting across different municipal departments, coordinated and collaborated effort by various stakeholders is vital in order to enhance achievement of the object of ensuring a safe and healthy environment and to share resources.

Lastly, contradictions were noted **between division of labour and the object.** As noted in Section 4.2.3, the waste inspectors had similar qualifications and a similar object to environmental health practitioners. This resulted in insufficient clarity on whether waste inspectors or environmental health practitioners were responsible for conducting inspections and raising awareness of accepted management of healthcare risk waste within community home-based care facilities.

4.4.3 Tertiary contradictions

As noted in Section 2.8.2, tertiary contradictions arise when the subjects face conflicting situations by adopting what is believed to be a newly advanced method for achieving the object. For example, when healthcare risk waste management was identified as problematic, new policies were developed and environmental health practitioners were trained to deal with the challenge. However, the policies and the training did not sufficiently develop environmental health practitioners' competencies to address the new challenges that came with the rapid emergence of community home-based care services. This resulted in healthcare risk waste management remaining a problem. The problem is further exacerbated by the adoption of the waste management hierarchy which increased in the number of people being exposed to inappropriately disposed healthcare risk waste. This requires environmental health practitioners to acquire more knowledge

and skills to appropriately reduce exposure to healthcare risk waste at all levels of the waste management process, and to protect communities from harm.

4.4.4 Quaternary contradictions

Quaternary contradictions occur when the subjects encounter changes to their activity that result in conflicts with adjacent activity systems (see Section 2.8.2). Due to limited knowledge on how community home-based care facilities generate and manage their healthcare risk waste, environmental health practitioners were not in a position to provide accurate and up-to-date information to the waste removal and disposal activity systems on possible risks associated with inappropriate healthcare risk waste management practices, consequently increasing the risk of infections for the waste pickers and community members exposed to the waste.

4.5 COMMUNITY HOME-BASED CARE SERVICES

In this section, I present data related to two community home-based care facilities. They are described here as activity systems, with a special focus on their actions in the activity system, the knowledge that they drew on, and their knowledge-sharing practices in relation to healthcare risk waste management.

4.5.1 Community home-based care as an activity system

4.5.1.1 Subjects and object of community home-based care activity system

As noted in Section 2.3, the **subjects** within the community home-based care activity system are community health workers. They are lay-workers, whose appointments are based not on the level of their schooling or previous education but on the basis that they are above eighteen years, unemployed, reside within the community to be served, indicate their interest in joining the programme, are willing to undergo training as required by the community home-based care facility, and live under pressure of poverty. Their **object** is to promote basic health or the delivery of basic health services within homes (SA, 2001). That is, they visit patients and their families in their homes to provide basic care, assist with cooking and cleaning, and accompany patients to health facilities. In addition to home visits, they provide necrotic wound care, oral hygiene; supervision of medication taking including TB, pain management; and follow-ups on chronic diseases (hypertension, psychiatric illness, disability conditions, diabetes etc.) (Ncama, 2005, p. 35). The desired outcome of their activity is improved quality life for patients.

4.5.1.2 Mediating artefacts in the community home-based care activity system

To provide quality home-based care services, community health workers move with the home-care bags containing dressings, soaps, disinfectants, incontinence underwear, disposable gloves, disposable nappies, and linen savers). The home-care bag is refilled every morning, before community health workers leave the office to prepare for the day's visits. To ensure proper management of home-care supplies, the supplies are always locked in a cupboard and are controlled by the coordinator.

Since most community health workers do not have a nursing background, they undergo basic training which prepares them for the job. However, it became evident that some community health workers were operating without this training. Rather, they learned from their peers who had already attended the training.

4.5.1.3 Community and division of labour in the community home-based care activity system

Community health workers work in teams of two under the supervision of the coordinator who further reports to the manager. Each team is allocated to ten households or patients (IHBC1, 2012). Community health workers report directly to the coordinator who is responsible not only to assign duties but also to ensure there is always adequate supply of home-care supplies. He/she procures supplies with funding from the Department of Health, and distributes the supplies to community health workers according to the number of patients they are visiting.

Working closely with community health workers are the health post workers, who conduct house-to-house visits to identify people in need of community home-based care services. Each health post worker is allocated to 150 households to perform her duties (IHBC1, 2012). Community home-based care facilities also receive patients from the local clinics and from community members who know about their services (IHBC1, 2012).

4.5.1.4 Rules of community home-based care activity system

It has been identified that although community health workers were able to identify and segregate healthcare risk waste, they were not aware of the risks associated with handling such waste and were managing the waste inappropriately through disposal in the municipal waste bin or through burning (IHBC1, 2012; IHBC2, 2012). The rule relating to management of healthcare risk waste is that all employees who work with healthcare risk waste must be trained in the correct identification, classification, segregation, containerisation and storage of waste and must be informed about the risks associated with handling healthcare risk waste (SANS, 2011).

According to the South African National Guidelines for Home-based and Community-based Care (SA, 2001), community home-based care facilities are expected to have written client safety and waste management protocols as well as infection control procedures to protect both employees and clients. However, I observed that they did not have such protocols, making it difficult for them to know about risks related to healthcare waste. For instance, the only available documents in their file related to the constitution of the facilities and the code of conduct for community health workers (OHC1, OHC2).

4.5.2 Case 1

Community home-based care Facility 1 is a non-governmental organisation (NGO) established in 2000. The facility is situated in Rietvallei's Extension 1 Township in the Mogale City municipal area which lies between the western borders of the Johannesburg Metropolitan Municipality and the northern border of Randfontein Local Municipality (see Figure 1.1). The establishment of Facility 1 was inspired by an HIV/AIDS door-to door awareness campaign conducted in 1999 for traditional healers in Mogale City Local Municipal area. Molly, the facility manager indicated that 'it was through this campaign that I was identified to attend an HIV/AIDS train-the-trainer course that was sponsored by Khomanani.[2] ' (IHBC1, 2012)

Between the years 2000 and 2002, the object of the facility was to offer training to traditional healers on management of HIV/AIDS. However, in 2004 the facility extended its object to providing home-based healthcare to HIV/AIDS-infected and affected people after obtaining funding from the national Department of Health. In an interview, the manager of Facility 1 explained that community health workers (CHWs) in this facility:

> … deal with bed-ridden and home-bound patients … they make sure that every morning they get help, if they need to be bathed, they go out to their respective homes and provide the service they require … With TB patients, they make sure that they take medication accurately, then directly observe them while they take the medicine. (IHBC1, 2012)

The manager further indicated that the highest number of bed-ridden patients the facility ever had was 'between eleven and twelve' (IHBC1, 2012).

In relation to providing healthcare services, Facility 1 has ten community health workers (CHWs) who have been appointed with a minimum of grade 12 and trained in various courses such as Basic

[2] The Khomanani Campaign is a government mass media and communications initiative that aims to reduce new HIV infections and increase treatment, care and support for those infected and affected by HIV and AIDS.

Home-based Care (69 days training), HIV/AIDS, Frail Care, Counselling, Health Post and Health Promotion Programmes by the Department of Health. Of the ten CHWs, only seven were trained in the Basic Home-based Care Programme. The manager cited staff turnover as the reason for not training all CHW, indicating that: "Some are new, some have left. Every year, three to five of my workers leave the organisation … they are hired by hospitals and other private companies" (IHBC1, 2012).

According to the manager, CHWs in Facility 1 are grouped in pairs to assist each other when providing services and for safety reasons. New recruits and less experienced CHWs are allocated the role of assisting experienced health workers so that they can learn from them until they are trained in the Basic Home-based Care Programme (IHBC1, 2012). CHWs are expected to keep records of all their patients and the services provided to them in their logbooks which they submit daily to the coordinator for record keeping and to assist the coordinator to compile a report.

Facility 1 receives its patients from the clinics, the community and from the Health Post Workers. Once a patient has been referred to the facility, the coordinator conducts a joint visit with CHWs to verify the condition of the patient before the patient can be registered to receive daily services. The facility also has other 70 community workers who implement different programmes (such as Isibindi, Health Post, Caring for Orphans and Vulnerable Children, support group for HIV/AIDS, and the Expanded Public Works Programme) under the Department of Health and the Department of Social Development. Working closely with CHWs are the Health Post community workers. Health Post community workers identify health problems and refer them to relevant service providers. Each Health Post community worker is allocated a maximum 150 households in which they conduct their house-to-house visits to identify health problems. The manager explained:

> The Health Post worker specifically works far away from the clinic; they identify health problems in the community. If they find a sick person, they refer him/her to the caregivers, if it is an emergency; they refer the patient directly to the clinic. By the time they arrive at the centre, the patient would have already been referred to the clinic, here at the centre they just give a report so that the caregivers can make a follow-up… Each health post is allocated 150 households to work with. (IHBC1, 2012)

Although CHWs in Facility 1 were knowledgeable about the healthcare risk waste they generated, they did not have much knowledge on how to manage it. During the interviews the manager said that 'what we knew is that after we have used the materials, we should dispose them in the refuse bin, we did not see the importance of keeping records of these waste' (IHBC1, 2012). Consequent

to this limited knowledge, there were no formal or established knowledge-sharing practices related to the management of healthcare risk waste by the Facility. According to the manager, CHWs in this facility meet on a monthly basis with management to share information and knowledge (IHBC1, 2012). It became evident during the observations that CHWs also learned from each other in particular on managing healthcare risk waste. For example, they all tied the healthcare risk waste in an ordinary shopping plastic bag and disposed in refuse bins.

As noted in Section 4.5.1.4 above, the only apparent rules regulating Facility 1's activity system were related to how CHWs should conduct themselves at work. For example, they are expected to arrive and leave on time (arrive at 08h00 and leave the office at 10h00 to visit clients and come back to the office at 14h30 to give feedback to coordinators). CHWs are also expected to respect one another and also to respect their clients (Doc 7). For example, my observations scheduled for the 19 July 2012 had to be postponed because of client's refusal to be bathed on cold days. Further rules were that CHWs should be able to maintain confidentiality between themselves and their clients (Doc 7). Other rules relating to conditions of employment were that CHWs should be part of the community which the facility is servicing and should be able to read and write and be willing to undergo any training the facility requires (SA, 2009b, p. 47).

To observe how healthcare risk waste is generated and managed, I accompanied two groups of CHWs to two houses where they attended to patients. The vignettes below is derived from the field observation (Box 4.1) and describes how these employees generated and managed their healthcare risk waste.

Box 4.2: Vignettes of Home-based care practices at Facility 1

Vignette 2

Following the interviews with the Manager, I accompanied four CHWs (Lebo, Noma, Pitso and Sbu) on 4 September 2012 to two RDP houses in the area where I observed how they performed their duties and how they generated and managed healthcare risk waste. The first house was in the care of two female CHWs, Noma [the main caregiver] and Lebo [the assistant]. Noma introduced us to Ntsoaki [the bedridden 25-year-old HIV/AIDS patient] and her mother who were in the house and indicated that I was observing how they were operating. Immediately after introductions, Lebo prepared bath water with the help of Ntsoaki's mother while Noma prepared Ntsoaki for the bath. Noma placed linen savers on the bed, undressed Ntsoaki and covered her with a towel so that she would not get cold. As it was a very hot day in Mogale City; Ntsoaki's mother had already opened the bedroom windows which Ntsoaki requested to be closed.

The two caregivers put on their surgical gloves and assisted each other to bath Ntsoaki. Ntsoaki had already developed bed sores on both hips. Noma used gauze to clean the sores, one side at a time and applied

antiseptic ointment and Lebo helped her to turn Ntsoaki from one side to the other. After the cleansing, Noma dressed Ntsoaki in clean clothes. Lebo removed the bath water for disposal in the flush toilet outside the house. On her way back she brought a glass of water, toothbrush and toothpaste for Ntsoaki to brush her teeth. After the bathing session, Noma requested a plastic shopping bag from Ntsoaki's mother and placed all soiled linen savers, nappy, surgical gloves and gauze in it. The caregivers then assisted Ntsoaki with her medication; during this process one pill fell on the floor and was disposed of in the plastic shopping bag as waste. The plastic shopping bag was tied up and disposed of in the municipal waste bin at the patient's house.

On our way to the next house Noma explained that she has been providing home healthcare services to Ntsoaki since August 2011 and that Ntsoaki was referred to their facility by her sister who also works there. Noma indicated that Ntsoaki's condition has improved a lot since she started working with her. She said that when they first worked with Ntsoaki, she was in such a bad condition that she could hardly talk; now she can talk and she can even sit on a chair, although not for long periods.

Vignette 3

The second house (also an RDP house) was under the care of two male CHWs, Pitso (the main caregiver) and Sbu (the assistant). Pitso explained that Refiloe (the 36-year-old female patient) was referred to them by a local clinic after a foot operation became septic. When we arrived at the house, Pitso introduced me to Refiloe's mother, who ushered us to the bedroom where Refiloe was lying on the bed. In the bedroom I was introduced to Refiloe as an observer. Pitso put on the surgical gloves, removed the sock from Refiloe's foot and inspected it while Sbu brought warm water for cleaning the wound. Pitso squeezed some pus out of the wound and cleaned it with warm water and antiseptic solution using gauze. After cleansing the wound, Pitso applied antiseptic ointment and put on new bandages.

While Pitso was busy cleaning the wound, Refiloe explained that she stepped on a nail while walking in the yard in March 2012; she indicated that she did not take the prick seriously, and applied methylated spirit and paraffin on the wound and went to work. It was only after a week that her foot reacted, becoming swollen. She then decided to go to the local clinic where she was referred to the hospital. At the hospital her foot was surgically opened from the big toe up to the midfoot to clean the affected area. Refiloe indicated that since being discharged from the hospital in April, she had been going to the clinic to dress the wound (for five months) without getting any better, but since she was referred to the caregivers in August she could see a lot of improvement (OHBC 1).

After completing the task, Sbu removed the water for disposal in the toilet outside the house and returned with a plastic shopping bag which was used to dispose the soiled gauze and gloves. The plastic bag was tied up and disposed of in the municipal waste bin at the patient's house on our way out (OHBC 1).

4.5.3 Case 2

Community home-based care Facility 2 is also an NGO, operating in Kagiso Extension 12, south-east of Krugersdorp town, on the western border of Johannesburg Metropolitan Municipality

(Jo'burg Metro). As a result of its geographical area, Facility 2 provides services to six areas that are both under the jurisdiction of Johannesburg Metropolitan Municipality and Mogale City Municipality, namely Kagiso extension 9, 12, 13, 14, Chief Mogale and Mnandini.

The establishment of Facility 2 was inspired by the Manager's personal experience of witnessing two children being arrested for stealing biscuits at a local supermarket. The facility started in 2005 as a drop-in centre, preparing meals for up to 510 children in the area. In 2010, the facility received funding from the Department of Health and extended its object from providing meals to providing home-based care services to HIV/AIDS-infected and chronic patients. The highest number of bed-ridden patients the facility ever had was 13; however, at the time of the interviews the facility had four patients (IHBC2, 2012).

Of the 23 CHWs appointed with a minimum qualification of Ancillary Nursing, seven CHWs had left the facility and been replaced by ones with only a Grade 12 pass. Over and above the Ancillary Nursing qualification, only four of the 23, including the manager, were trained in the basic home-based care programme offered by the Department of Health. To compensate for the limited knowledge on health issues, the facility appointed a part-time professional nurse who conducted initial consultations with all patients and advised on services required. The nurse further provided in-service training to CHWs on a monthly basis.

There are four groups of CHWs in Facility 2 working in different areas. For example, groups 1 and 2 consist of four pairs each, servicing the areas of Mnandini and Kagiso Extension12; group 3 consists of two pairs, servicing the area of Kagiso Extension 14 and the last group consists of one pair servicing Kagiso Extension 9 and 13 and Chief Mogale. Although Facility 2 also receives some patients from the nearby clinic, their process of identifying other patients differs from that of Facility 1 which uses health post workers to identify patients. For example, CHWs in this facility identify their own patients through house-to house visits. After the patients have been identified, the information is given to the coordinator who makes arrangements for the first visit with the nurse. The facility uses the nurse's report to guide the level of services to be provided to the patients.

According to the manager, CHWs report daily to the coordinator through submission of log books. The coordinator them compile a report which forms part of the facility's monthly report. Although the manager indicated that they meet weekly [CHWs] and monthly [CHWs and management] to "discuss all the challenges and experiences encountered during home visits" (IHBC2, 2012), she

acknowledged that they never discussed healthcare risk waste management issues. She was noted saying:

> We did not discuss the healthcare waste management, because we did not know about it… They [the Department of Health] did talk about the waste but they were talking about the needles. They said that if we dump needles anywhere, we should consider the fact that there are people who are living out of waste, who reclaim some articles from the waste dumps for further use … then if we dump the needles, those people can get injured … they never gave us any clue of what to do with our waste, because here we do not have needles, we only have gloves. (IHBC2, 2012)

As with Facility 1, the only evident rules were the code of conduct. For example, CHWs in this facility are expected to arrive at 8h00, have a morning prayer, refill their home-care bags and leave by 09h00; and to return to the facility at 12h00 to report their daily activities to the Coordinator. Those who have patients who need supper to be prepared are left to leave the facility after reporting to the Coordinator.

During the observations, the community health worker explained that when they arrived at a patient's house:

> We first have to identify hazards that could put the health of the patient in danger and deal with them, after we are satisfied that there are no hazards, we bath the patient. It is only after we have made sure that the patient has bathed, eaten and taken his/her medication that we can clean the house. The rule is that we should leave the patient's house in clean and healthy condition. (OHBC2, 2012)

As a security measure, the other rule is that only the coordinator should have the keys to the cupboard containing home-care bag supplies. It is also a rule that CHWs refill their home-care bag in the morning before they leave the office so as to ensure that they have everything they needed for the day. To monitor adequacy of supplies, supplies must be recorded when they are issued to CHWs.

To observe how CHWs in Facility 2 generated and managed healthcare risk waste, I accompanied the nurse and one community health worker to one of the houses where they performed their duties. Box 4.2 below is drawn from the file observation notes and provide a summary of what transpired during the field visit conducted on 28 August 2012.

Box 4.3: Vignette of home-based care practices in Facility 2

Vignette 4

Following the interview with the manager of community home-based care Facility 2, I accompanied Mpho (community health worker) and Monica (nurse) to another RDP house in Kagiso Extension 12, to observe how they provide services to patients and how they generate and manage healthcare risk waste. Monica explained that Tshepiso (a 42-year old female patient) had suffered from a stroke and is also living with HIV/AIDS. Tshepiso stays with her elderly mother who indicated that they live with her two children who both work during the day. Monica introduced me to both Tshepiso and her mother.

Tshepiso's mother helped Mpho to prepare water to bath the patient. Monica and Mpho undressed and covered Tshepiso with two towels, explaining every move to her. Thereafter, they put on their surgical gloves and nose masks. Monica took Tshepiso's blood pressure and body temperature and, after ensuring that blood pressure and body temperature were normal, she placed two linen savers on the bed, one below the head and the other one at the feet. She removed the soiled nappy, put it in the red plastic bag (as prescribed by SANS, 2011) which they had brought to the house, and cleaned the patient.

While Monica was dressing Tshepiso, Mpho removed the basin from the bedroom and brought a cup of clean warm water and an empty basin. Monica removed her gloves and put them in the red plastic bag; she put on new set of gloves and brushed Mpho's teeth. She rolled three gauze sheets on the tongue depressant, applied toothpaste on the gauze and cleaned the patent's mouth. The gauze, together with a tongue depressant, the gloves, linen savers and the masks were also disposed of in the red plastic bag which was later taken to the community home-based care facility for disposal. After completing their task, the nurse provided professional advice to the mother regarding taking care of the patient in order to prevent bed sores and on what meals should be given to improve the patient's strength.

During the site visits, it became evident that both the CHWs and family members knew what was expected of them. For example, immediately when they entered the workplace, the assistant CHWs went straight to the bathroom to collect cleansing water, while the main CHWs went straight to the bedroom to meet the patient. Family members also brought toiletries and clean clothes. The sequences of the events were conducted as if they were well-practised.

4.6 CURRENT KNOWLEDGE AND HEALTHCARE RISK WASTE MANAGEMENT PRACTICES WITHIN COMMUNITY HOME-BASED CARE SERVICES

From the data presented in Sections 4.5.2 and 4.5.3, it became evident that although community health workers knew and were able to identify healthcare risk waste from the other waste, they had limited knowledge on risks associated with the waste and did not know how to manage it. Hence, they managed it inappropriately through disposal in a municipal bin and through burning. These practices confirmed the manager's statement when she indicated that, in her understanding, healthcare risk waste "is the gloves and the cotton wools etc. … but we have not been taking any

notice, what we know is that after we have used materials, we should dispose them in the refuse bin" (IHBC1, 2012) and "they did talk about the waste but they were talking about the needles, they said that if we dump the needles anywhere, we should consider the fact that there are people who are living out of waste, who reclaim some articles from the waste dumps for further use" (IHBC2, 2012). Consequent to their limited knowledge, they did not have contingency plans to deal with exposure to healthcare risk waste.

4.7 TENSIONS AND CONTRADICTIONS RELATING TO KNOWLEDGE-SHARING PRACTICES WITHIN COMMUNITY HOME-BASED CARE SERVICES

Two secondary contradictions were noted within the community home-based care services activity system. The first contradiction was between the **mediating artefacts and objects.** As noted in Section 2.8.1, mediating artefacts may be manifested as language, visual representations, cultural means, procedures etc. In the context of community home-based care activity system, the mediating artefact includes training, language, procedures effective management of health care risk waste, and inspection reports from environmental health practitioners.

The object is described as the problem space at which the activity is directed (Section 2.8.1). In this regard, the object of the community home-based care activity system is proper management of healthcare risk waste. Data presented in Boxes 4.2 and 4.3 and in Section 4.6 revealed that there was inadequate mediation in the activity system for community health workers to be adequately informed and trained about the risks associated with handling and managing healthcare waste. This contributed to inappropriate healthcare risk waste management through practices such as disposing of waste in municipal waste bins or through burning.

The second contradictions were between the **rules and the object.** As noted in Section 2.8.1, rules are seen as organising relations between the subject and the community through collective tradition, rituals, norms and even values. Rules of the community home-based care activity system prescribe that community health workers are responsible for healthcare risk waste from the point of generation to its disposal in accordance with relevant legislation (SANS, 2011, p. 6). To enable this, facilities must ensure that all employees are relevantly and adequately trained to handle healthcare risk waste, including the development of client safety and waste management protocols and infection control procedures to protect both employees and clients. Case study data revealed that, due to limited training and limited knowledge (as described above), community health workers were not in a position to develop the required protocols and dispose of healthcare risk

waste appropriate from source to disposal. This directly compromised their ability to achieve the object of their activity system: the proper management of healthcare risk waste.

4.8 SYSTEMIC TENSIONS AND CONTRADICTIONS RELATED TO KNOWLEDGE-SHARING IN HEALTHCARE RISK WASTE MANAGEMENT IN MOGALE CITY

The preceding sections have described the healthcare risk waste management practices and associated knowledge and knowledge-sharing practices across two activity systems. In this section, I now look across the activity systems to highlight the main systemic tensions and contradictions affecting the effective management of healthcare risk waste in the municipal area.

As noted in Section 2.8.2, systemic tensions and contradictions arise when changes in the activity system under investigation [environmental health activity system] result in conflicts with adjacent activity systems. Boer et al. (2000) argue that activity systems do not exist in a vacuum, they interact with a network of other activity systems. They demonstrate that an activity system receives rules and tools from management activity system; it uses them to produce outcomes that are used for activities in other organizational settings. For example, the environmental health activity system receives rules and tools from the municipality (strategic plans and by-laws; and equipment) to develop an outcome of improved healthcare risk waste management practices. The outcome is then used by community home-based care facilities as their object.

As noted in Section 1.4, the emergence of community home-based care facilities in response to HIV/AIDS pandemic required environmental health practitioners to extend their services to these facilities. The tensions created by this change were such that the available legislation on healthcare risk waste management was unsuitable for the community home-based care context. For instance, it did not include community home-based care facilities as possible healthcare risk waste generators resulting in inconsistencies in the provision of environment health services. Data presented in Section 4.4 and 4.7 indicates that due to tensions and contradictions within the environmental health activity system, knowledge-sharing between and within environmental health, waste management and community home-based care activity systems was compromised.

4.9 CONCLUSION

This chapter's focus was on the data generated through document analysis, observations and interviews in order to understand tensions and contradictions related to knowledge and knowledge-sharing practices on healthcare risk waste management in the two activity systems of environmental health and community home-based care services. The following chapter describes the expansive learning process that I facilitated with various stakeholders in these activity systems through a series of Change Laboratory workshops over a period of twenty-seven months.

CHAPTER 5: PRESENTATION OF CHANGE LABORATORY PROCESS

5.1 CHANGE LABORATORY WORKSHOPS

In this chapter, I present findings from Phase Two of the data generation process which involved change laboratory workshops as described in Section 2.9. Data presented here reflects the teaching and learning processes evident during the change laboratory workshops, with a special emphasis on the role and circulation of knowledge in enhancing healthcare risk waste management in Mogale City local municipal area. The chapter also describes how the D-analysis approach was used to identify sequences of communicative actions relating to what had been established, what is yet to be established and how it is to be achieved.

5.1.1 Overview of change laboratory workshops

In all the workshops, I presented 'mirror data' (similar to the data presented here in Chapter Four) and facilitated the subsequent discussions with workshop participants. During the second and third workshops, I had additional support from one participant who volunteered to take photographs. The first two change laboratory workshops took on a stronger knowledge-sharing purpose than I had anticipated. This was in response to the health practitioners' limited knowledge about the context of environmental health and community home-based care activity systems. The change laboratory workshop approach was helpful in assisting participants to develop a common set of concepts and terminology so that they could engage more deeply with each other about healthcare risk waste management practices.

5.1.2 Change laboratory workshop 1 (DWR 1)

The first change laboratory workshop was conducted on 13 July 2012 in the Departmental Boardroom in Krugersdorp, South Africa. As described in Section 3.4.5.2, eight environmental health practitioners, including one student environmental health practitioner and one waste inspector, attended the workshop. I welcomed participants and introduced myself as a researcher investigating how their knowledge and knowledge-sharing practices influenced management of healthcare risk waste by community home-based care facilities. Thereafter, I requested participants to introduce themselves by stating their names, designation, areas they are working in and how long they had been in the field. The aim was to enable participants to recognise the value of experience and its relationship to knowledge and practices.

I explained that the purpose of the workshop was to provide a platform in which participants could analyse how their current work practices enable or constrain knowledge-sharing, particularly on

the management of healthcare risk waste by community home-based care facilities, and re-design their work practices to accommodate the identified challenges. I explained the change laboratory workshop process and assured participants that their participation was valuable in resolving identified challenges.

In order to prepare participants for the task, I started the presentation by providing background information on community home-based care facilities (what they are, what they do and how do they do what they are doing) as I had identified this knowledge gap in my first data generation phase. I explained, for instance, that community home-based care facilities were established as a response to the impacts of the HIV/AIDS pandemic on the limited health resources in South Africa and that they are run by non-government organisations or community-based organisations who visited patients in their homes to provide basic care needs such as cooking, cleaning, necrotic wound care, oral hygiene care, supervision of medication taking including for tuberculosis, pain management, and also accompanying patients to health facilities. Finally, participants were shown some pictures which I had obtained from the Internet on how community home-based care facilities disposed of their healthcare risk waste (through burning, and disposal in municipal waste bins).

With the aim of highlighting the workshop participants' relationship with community home-based care workers and management of healthcare risk waste, I reminded participants of legislation derived from the South African Constitution (SA, 1996) that seeks to assure all the country's residents of an environment that is not harmful to their health or well-being. Participants were further reminded about their roles as environmental health practitioners and waste inspectors in ensuring proper refuse storage, collection, transportation, handling and final disposal of waste, including medical waste and hazardous substances, and in ensuring prevention and abatement of any condition on any premises, which is likely to constitute a health hazard (SA, 2009a).

I then explained environmental health services as an activity system using Engeström's second generation triangle and I described the contradictions I had identified during the first data generation phase. This I used as mirror data which, as described in Section 2.10.2, is derived from the analysis of previous data generation processes and used as a stimulus for workshop discussions. The mirror data I presented are summarised as follows:

- Environmental health practitioners have limited knowledge of the forms and functions of community home-based care facilities;

- Current legislation on healthcare risk waste management does not accommodate community home-based care facilities;
- Environmental health practitioners were using multiple standards to provide services to community home-based care facilities; and
- Knowledge-sharing practices were very limited within and between environmental health practitioners and community health workers.

After observing the mirror data, participants identified limited knowledge of community home-based care facilities as the most important problem area that needed further investigation. The extract below in Box 5.1 shows how participants responded to the mirror data and how the D-analysis method was used to track the sequence of communicative actions. As described in Section 3.6.2, D-Analysis is an approach to analysis that focuses on the forms of social action accomplished through talk and text. It is designed to focus analytic attention on emergent distinctions raised by workshop participants and allows the researcher to examine the shift from the 'given' situation to the 'to-be-established' resolutions.

Box 5.1: Participants discussing mirror data

Transcript extract	**D-analysis**
Junior Practitioner 2: Well for me **I don't have much information** with these things [community home-based care facilities], I didn't know exactly what to do … because in most cases you go in there and … all workers are out and there is nothing much that you can do, so I did not know what to do.	**Diexis** - limited knowledge is nominated as a factor that affects knowledge-sharing
Senior Practitioner 4: **What is the difference between the community home-based care and the frail care**?	**Diexis** - requiring further clarity
Researcher**: A frail care facility is an establishment where sick people who have been discharged from hospitals are being looked after** … they stay there until they are able to stand on their own feet, **community home-based care facilities don't have people staying at the property**, they take care of people in their own homes, and patients don't stay at the premises.	**Delineation** - differentiating between frail care centres and community home-based care facilities
Senior Practitioner 4: They don't stay at the premises, and **then I'm being confused**.	**Deliberation** - clarifying the issue
Junior Practitioner 1: **Home-based care means: I'm given care at my home**. If we can just remember it in that manner then, as long as I'm being given medical attention at my home, I don't have to go to them, they come to my home … that is home-based care. Then the other care is centres where people are staying there and are being given attention while they are there. Whereas the ones that we are talking about today are home-based care, people will come to me.	**Delineation** - building common knowledge on what home and community-based health care is

Discussions as shown in Box 5.1 above moved between two surfaces (2 and 6) described in Section 2.10.3. In the first surface (surface 2: Ideas/Tools/ Present), discussions identified *limited knowledge* as an important factor affecting participants' knowledge-sharing practices. Discussions ended when participants *reached a common understanding* that community home-based care means providing healthcare services in patients' own homes (surface 6: Model/Vision/ Present).

To understand how participants ended up with limited knowledge on the forms and functions of community home-based care facilities, participants were requested to *identify historical changes* in their activity system. Box 5.2 below shows how discussions unfolded during the identification of the systemic roots that contributed to current practices.

Box 5.2: Modeling the past, present and future structure of the activity system and identifying contradictions

Senior Practitioner 2: Healthcare risk waste became an issue when management problems were identified in Government hospitals and clinics. We were then trained to monitor their compliance. The problem started with the introduction of community home-based care facilities. **They [community home-based care facilities] came about as a result of the HIV/AIDS** … to care for people who were infected by HIV/AIDS.	**Delineation** - elaborating on the evolution of home and community-based health facilities
Senior Practitioner 3: You must bear in mind that some of us received the training donkey years ago; **we should have received at least training on how to deal with such facilities**. This caught us off-guard; **we are used to conduct inspections at fixed healthcare facilities not on transit facilities that do not have a fixed place where they generate and manage healthcare risk waste**.	**Delineation** - elaborations on past practices
Junior Practitioner 2: This is what made it difficult because even our seniors could not assist us. Remember **we rely on the experience they have to attend to difficult situations, so we did what we thought was right**. The other problem is that **no one thought about community home-based care facilities as sources of nuisances.**	**Delineation** - further elaborations on past practices
Junior Practitioner 1: I think **most of the time we concentrated on formal healthcare facilities. Even our by-laws do not accommodate them [community home-based care facilities]**. Now that we know about possible health hazards community home-based health care facilities can generate, **we need to start looking at how best we can assist them in promoting the health of our communities**.	**Delineation** - elaborations on current practices
Senior Practitioner 2: This [unavailability of by-laws] also explains why we did not have a checklist … and why we used multiple standards to monitor these facilities.	**Delineation** - further elaborating on current practices

Junior Practitioner 1: I just want to commend Priscilla for even thinking of this topic because, honestly I had limited, limited information regarding the community home-based care. It's something that we don't really concentrate on as environmental health practitioners, so I would like to commend her for that and for thinking of this topic and opening us up to this other world that is so active in our community, **now the honour is upon us as ENVIRONMENTAL HEALTH PRACTITIONERs, now that we have recognised it, to take it up with our management it is our legislative requirement to monitor them, to help them comply if possible. How do we go forward from here**?	**Departure** - working on a consensus

Discussions in Box 5.2 moved between four surfaces (3, 4, 5, and 6) of the change laboratory process. In the first surface (surface 3: Mirror/ Past), participants *looked at historical changes* to their activity system and identified inappropriate healthcare risk waste management practices in formal healthcare institutions [including government institutions] as a trigger that initiated changes in their work activities. Although participants were adequately trained to deal with such institutions, the emergence of community home-based care facilities which generated healthcare risk waste from unknown sources were identified as the turning point. As the senior Practitioner 3 indicated, "it caught us off-guard" (surface 4: Ideas/ Tools/ Past). In trying to analyse the nature of the current phase of transformation of the activity (surface 5: Model/ Vision/ Past), participants indicated that they experienced challenges (lack of knowledge) that even their seniors could not assist them with.

In terms of the fourth surface (surface 6: Model/Vision/ Present), participants *acknowledged their new knowledge* regarding the forms and functions of community home-based care facilities and identified contradictions. Here, participants established that, due to their limited knowledge, they were not even in a position to contribute to the development of the current municipal health by-laws which presently do not accommodate community home-based care facilities.

The last surface (surface 7: Model/ Vision/ Future) was evident when participants used their new knowledge to overcome current challenges (see Junior Practitioner 1's last comment). Box 5.3 below shows how discussions around new plans of action were developed to overcome the problems.

Box 5.3: Modelling new solutions

Junior Practitioner 1: … as Environmental Health Practitioners, **we can engage more with the community home-based care facilities and community health workers and offer them sort of, training** so that it becomes a specification of their job, that when they see any environmental health deviation which might have an impact on patients, they can be able to address it while rendering their services.	**Diexis** - knowledge sharing is nominated as issue that needs further investigation
Senior Practitioner 3: But, **how many community home-based care facilities do we have**?	**Delineation** - seeking clarity on the number of facilities
Waste Inspector 1: **Firstly we are not aware of how many community home-based care facilities we have and we don't even have a relationship with them, they are not even aware of what is it that they have to do**, so what we need to do is that **we must have a database of all the facilities and have a relationship and raise awareness** and if there is a rapid growth of the community home-based care facilities, we will be able to control those that are coming up if we have a relationship with them. **Form a forum** where we can meet with them … we need to do it sooner and have a relationship with them, and decide on how we can help those facilities since they cannot afford healthcare waste service providers.	**Deliberation** -qualifying the clarification above **Departure** -suggesting possible solutions
Senior Practitioner 3: I think **we must start with the Department of Health where they are registered, to see which ones are registered**; from there we can check those that are illegal, meaning that they are not registered.	**Deliberation** - on the departure suggested above
Researcher: **In terms of the Gauteng Health Care Waste Regulation, minor generators are the responsibility of local municipalities**, which means that municipalities must have their forums where they are discussing issues relating to minor generators, we don't have to depend on provincial government.	**Deliberation** - providing further explanation on the role of municipality
Waste Inspector 1: **I don't even think that our management is aware that healthcare risk waste is our responsibility**. Serious, I don't think they know.	**Deliberation** - qualifying limited knowledge on the role of municipality
Junior Practitioner 1: I think … **the sooner we start playing an active role in this forum**, where we can educate, and see how best can we try to advise them and monitor them in terms of healthcare risk waste management and other environmental health issues, the better, because I have a feeling that we are sitting on a time bomb, that we are we are not even aware of.	**Departure** - qualifying the urgency of knowledge sharing

Deliberations in Box 5.3 above represent the Model/Vision/Future surface. On this surface, participants identified development of a database for community home-based care facilities and establishment of rapport by the establishing of a local healthcare risk waste management forum. The last comment by the Junior Practitioner 1 provided a departure to move forward and decide on tools to realise identified plans of action. Table 5.1 below shows how participants identified

and prioritised tools to help them realise their vision of improving knowledge-sharing within and between environmental health and community home-based care activity systems.

Table 5.1: Summary of outcomes of the Developmental Work Research Workshop 1

Outcomes **(what do we want to achieve)**	**Actions** **(how do we do it)**	**Resources** **(what kind of support do we need)**	**Time frame** **(when will we do it)**
Nomination of a coordinator for the development of healthcare risk waste management forum and database at local level	Ask for volunteers	Practitioners' commitment	July 2012
Develop a database of community home-based care facilities.	Consult with the province for current register	IT and management support	August 2012
Develop a checklist for assessing community home-based care facilities.	Review literature, consult specialists and management and read relevant legislation	Practitioners' commitment and management support	August 2012
Improve internal communications	Regular feedback meetings between the two sections and training. Regular meetings and training.	Management support	August 2012
Establish a local forum consisting of community home-based care facilities and Municipal Health Services practitioners	Invite members to a meeting and sell the idea	Management support	December 2012
Review by-laws	Write motivation letter to review by-laws and present community home-base care facility checklist to management	Management support	July 2013
Motivate for more personnel	Write motivation letter to management	Management support	July 2013

The waste inspector was finally nominated as a coordinator to oversee the development of the database and the establishment of the forum.

5.1.3 Change laboratory workshop 2 (DWR 2)

The second change laboratory workshop took place on 6 September 2012 in the Departmental Lapa.[3] In this workshop, eight environmental health practitioners, including the manager for the Municipal Health Services in Mogale City municipality and representatives from three community home-based care facilities attended the workshop. Of the eight environmental health practitioners in attendance, five had attended the first change laboratory workshop. As in the first workshop, I assumed the role of lead facilitator with additional support from a workshop participant who had agreed to take photographs.

The workshop was opened with a prayer by one of the community home-based care representatives. As in the first change laboratory workshop, I welcomed everyone, introduced myself as a researcher, outlined the purpose of the workshop, outlined the change laboratory process and requested participants introduce themselves stating their names, designation, areas they were working in and how long they had been in the field. Introducing each other provided a learning opportunity since some community home-based care representatives and environmental health practitioners were meeting each other for the first time. This constituted what Edwards (2011) referred to as 'learning to know who'.

As with the first workshop, I prepared participants for the task by describing the role of the municipality in ensuring a safe and healthy environment for its residents, and the role of environmental health practitioners in ensuring that the municipality realise its role of ensuring, among other things, that waste (including healthcare risk waste) is managed appropriately. I did this because as a researcher-interventionist, my role was to provide a conducive environment for participants to create new knowledge and new understanding on the impact of knowledge and knowledge-sharing practices on management of healthcare risk waste by community health workers in order to influence joint formation of new practices. My position in the organisation created dynamics in which I was both viewed as both an outsider and insider. As an outsider, I had to negotiate approval from everyone who participated in the study before taking any action. As an insider, I was viewed as someone who has access to confidential knowledge as a result participants felt at ease to share confidential knowledge with me since they regarded me as one of their own.

To achieve my role as a researcher-interventionist in this workshop, I decided not to use the concepts and language of Engeström's model of activity systems explicitly to explain the practices. This was to afford all participants an opportunity to find ways of describing and thinking about

[3] Lapa: a thatched roof structure commonly used as semi-open entertainment area.

their work and to participate in the deliberations despite their various level of education. I presented mirror data which consisted of information collected from the interviews, observations and document analysis and information from the first change laboratory workshop. As presented in change laboratory Workshop 1, the mirror data displayed the following challenges in the current activity:

- Environmental health practitioners have limited knowledge on the forms and functions of community home-based health care services;
- Community home-based health care services have limited knowledge on management of healthcare risk waste;
- Community home-based care facilities manage healthcare risk waste inappropriately;
- Knowledge-sharing practices were very limited within and between environmental health practitioners and community health workers.

The extract below in Box 5.4 shows how participants responded to the mirror data and how I used D-analysis to track the sequence of communicative actions. Discussions around the mirror data started at the point where participants confirmed their current healthcare risk waste management practices.

Box 5.4: Confirming inappropriate healthcare risk waste management practices and acknowledging limited knowledge

Community health worker 2: From my side, I must admit that we have been putting our healthcare risk waste in municipal bins. We thought that if we put it in a tied plastic bag, it will not be easy for people to access it, forgetting that there are other people who are further handling the waste at the dumping side.	**Delineation**: Inappropriate healthcare risk waste management qualified as an issue
Community health worker 1: We burned the waste every second day. We did not want to put the waste in municipal bins because sometimes the municipality does not collect the waste on time and when that happens we do not remove the bins from the street since we don't know when they will come. We thought burning the waste was the best solution since it did not expose anyone to risks of infections.	**Delineation**: Further elaborations on inappropriate management of healthcare risk waste
Junior practitioner 2: At least you tried what you thought was best.	
Community health worker 3: You must bear in mind that most of us [people managing community home-based health care facilities] have no formal qualification in health. We rely heavily on those who understand health better. Since they did not tell us about how to manage this waste, we did what we thought was best.	**Delineation**: Qualifying practices **Deliberation**: Deliberating on the source of the problem

Senior practitioner 2: I would like to assure you that even with us [environmental health practitioners], we have got a challenge; we never took notice of community home-based care services until such time that they approached our offices for health certificates. Even so, we did not know how to assess the facilities since we do not have any legislation governing how community home-based care services should manage healthcare risk waste. We were not even capable to inform our by-laws when they were developed some few years ago.	**Deliberation**: elaborating on the source of the problem
Community health worker 3: I think now that we know what is expected of us, we need to do the right thing. I've got a suggestion: what if the Municipality provides us with the bins in which we will dispose our healthcare risk waste and they come and collect it.	
Researcher: Like I indicated before, healthcare risk waste is not normal waste; it is supposed to be disposed of at a special waste disposal facility. Here in Mogale City, our landfill site is only licensed to accommodate general waste, not healthcare risk waste.	**Departure**: Suggesting possible solutions
	Delineation: Elaborating on the suggested solution
Community health worker 1: We must request assistance from the province, if they can provide us with the bins such as the ones used at the hospitals.	**Departure**: Suggesting another solution based on the clarity offered by the researcher
Researcher: Since you are not generating waste from one central point, the issues of transportation must be considered when we ask for assistance from the province. For instance, if they provide you with the bin, will you be able to carry it to all the households that you are servicing and how many bins will you require. We need to further look into the issues of transport before we go to the next step.	**Deixis**: Pointing out the need to consider transport if the suggestion of asking for containers is pursued **Departure**: Suggesting own transport
Community health worker 3: Maybe from the start … each organisation must be responsible for transporting their own waste.	
Researcher: You must also remember that the transport … must only be used for collecting that waste.	
Community health worker 2: That [transport] simply means that from now on it has to be our homework	**Delineation**: Elaborating on the type of transport

Deliberations in Box 5.4 moved between three surfaces (1, 2 and 7) of the change laboratory process. On the first surface (surface 1: Mirror/ Present), participants confirmed the mirror data by elaborating how they currently manage healthcare risk waste (through burning and disposal in the municipal waste bins). Participants then identified limited training as the main contributor to their current practices (surface 2: Mirror/ Past). As community health worker 3 indicated, "We rely

heavily on those who understand health better. Since they did not tell us about how to manage this waste, we did what we thought was best" (CLW 2, 2012). Lastly, participants discussed how they can improve current healthcare risk waste management practices [surface 7: Vision/ Model/ Future]. They indicated, "Now that we know what is expected of us, we need to do the right thing" (CLW 2, 2012). Since it became evident that their suggestions were not sufficient to resolve their challenges, they resorted to requesting assistance from the nearest clinics that have facilities to manage healthcare risk waste. Extracts in Box 5.5 below show how they deliberated the issue of approaching the clinics for assistance:

Box 5.5: Modelling new solutions

Senior practitioner 2: I think we should also consider approaching the clinics to request that healthcare risk waste be taken to them for final disposal.	**Deixis:** The need to approach the clinics for assistance was nominated as an issue for further discussion
Waste inspector 2: Regarding taking waste to the clinics, we need to consider two issues: first, the province is experiencing some problems with disposal facilities like their incinerators … the other thing … we need to have a meeting first with the clinics, or whoever is in charge of the clinics and find out if they can accommodate us.	**Deliberation:** Elaborating the move to approach clinics
Community health care worker 3: Is it possible that we [community home-based health care facilities] can do a special request with our nearest clinics … by ourselves; we must take our own medical waste through our own arrangements.	**Deliberation:** providing alternatives
Researcher: So are you saying you will go individually to the clinics that are nearer to your facility and request permission to bring your waste?	**Delineation:** Seeking clarity on the alternative
Community health care worker 3: Yes, I think so because the clinics do have the facilities, if we negotiate with them in a sense that when they collect at the clinic, then they can collect at our centres one way or another or we will take the waste to the clinic if maybe if we know the exact date when they come to collect.	**Deliberation:** Elaborating the move to approach clinics
Junior practitioner 1: I am not in support of the community home-based health care going directly to the clinics … from the Municipality's side, we can try to get a meeting with the higher authorities of the Department of Health.	**Deliberation:** Seeking further clarity on the suggestion of taking healthcare risk waste to the clinics
Waste inspector 2: Are we saying that in the meantime, while we are still waiting for the report to reach the provincial level, community home-based care facilities must just carry on with putting the healthcare risk waste in the general bin. So we are saying we are supporting the problem to grow?	**Delineation:** Seeking clarity
Researcher: I don't know … because we can't say they should take the waste to the clinics, but if the clinics don't have problems, then they can take it.	

	Delineation: Qualifying the enquiry
Community health care worker 1: Does it mean that the health care waste must be taken on a daily basis to the clinic?	**Delineation:** Seeking further clarity before taking a decision
Waste inspector 2: You can take it weekly, it depends on the volume … but the other thing, it will also depend on your storage where you store it, this is very sensitive subject.	**Delineation:** Qualifying the enquiry
Community health care worker 1: We need to have the safest way of doing it.	**Delineation** and building consensus
Researcher: So we agree that we will start by engaging the other departments, and then take it from there.	**Departure:** Qualifying the consensus above

Discussions presented above centred on the Idea/Tools/Future (surface 8). Participants discussed how they were going to actualise the decision about requesting assistance from the clinics (Box 5.4). The final decision from the workshop was that the municipality would engage the provincial Department of Health on behalf of community home-based care facilities. In the next Section 5.1.4, I summarise the third change laboratory workshop in which participants reflected on implementation of resolutions developed in the first two workshops.

5.1.4 Follow-up change laboratory workshop 3 (DWR 3)

The main purpose of the third change laboratory workshop was to evaluate the implementation of the resolutions made in the first two workshops and to identify challenges that needed further development. As noted in Section 3.4.5.1, the third change laboratory was conducted on the 28 November 2014 in the municipality's emergency services boardroom. Thirteen participants including eight environmental health practitioners, three community health workers and two waste inspectors attended the workshop. All participants had attended the previous workshop except for one newly employed environmental health practitioner and a waste inspector. The manager for Municipal Health Services from Mogale City Municipality was unable to attend the workshop due to other commitments. As with the previous two workshops, I assumed the role of presenting and facilitating discussions in the workshop. After opening with a prayer by one of the participants, I welcomed everyone and requested they introduce themselves. As with the first two workshops, I reminded participants about the change laboratory process, after which I presented resolutions from the previous workshops as mirror data:

- Development of a database of community home-based care facilities;

- Establishment of a forum between the Municipal Health Services section and community home-based care facilities;
- Development of a checklist for all community home-based care facilities;
- Improvement of internal communications between environmental health practitioners and waste inspectors;
- Request permission from the provincial Department of Health to take healthcare risk waste to the clinics;
- Request the district municipality to appoint more personnel; and
- Review healthcare risk waste management by-laws to accommodate community home-based care facilities.

Discussions in response to the mirror data started with feedback on the development of a data-base of community home-based care

Box 5.6: Feedback on development of database and establishment of a forum

Waste inspector 1: Our first task was to develop a database for community home-based care facilities. Thanks to community health workers who assisted us in locating some facilities, we managed to register 17 community home-based care facilities so far.	**Delineation**: Giving feedback on progress
Waste inspector 2: The list from the Department of Health also confirms what we have on our database.	**Delineation:** Adding on waste inspector 1's feedback
Waste inspector 1: Regarding the establishment of a forum, we decided to join the existing HIV/AIDS forum that is run by the Health and Social Department within the Municipality. Thanks again to community health workers who had mentioned the forum to us. We already have attended four meetings. Healthcare risk waste management is now a standing item in these meetings and we discuss challenges.	**Delineation:** Giving feedback on establishment of a forum
Community health care worker 3: We have been lucky because the HIV/AIDS coordinator agreed to our request to join forces, because we already had too many meetings [with the Department of Health and Department of Social Services at provincial level and with the Municipality]. This helped us a lot since we are saving on transport to come to the meetings.	**Delineation:** Appreciating how joint forces helped them to save resources
Waste inspector 1: I must say that joining the existing forum brought us good results since our challenges were taken to the Department of Health [by the HIV/AIDS coordinator] and access for community home-based care facilities to take their healthcare risk waste to the clinics has been granted.	**Delineation:** Pointing out how joining the existing forum fast tracked the process of taking healthcare risk waste to the clinics
Community health care worker 1: It helped us a lot, even though we still don't have acceptable containers, we are improvising. We bought small plastic bags to put the healthcare risk waste in immediately after	**Delineation:** Elaborating on new practices and identifying new problems

generation and we put them in a red plastic bag before we take it to the clinics. Community health care worker 3: We have just been lucky because we have not been generating a lot of waste; our staff only attend to one house before they take the waste to the clinic. However, the problem is that some houses are far away from the clinics, if it is raining it becomes difficult for our staff to move between patients' houses, the clinic and back to the office. Senior Practitioner 2: I must say that joining the forum has improved communications between us. We now know challenges faced by community home-based facilities in terms of managing their healthcare risk waste. We will use this information to inform the review of current legislation.	**Delineation:** Further identifying challenges **Departure:** Asserting that knowledge gained in this process will be used in the review of current legislation

Although discussions in Box 5.6 above were focused on responding to the mirror data and giving feedback on progress made with the database and forum, it became evident that other progress had been made in terms of improving internal communications within and between Municipal Health Services and community home-based care facilities, and requesting permission to take healthcare risk waste to the clinics. Participants' responses to the mirror data also indicated that they were able to identify other challenges that needed their attention (such as accessing suitable containers for healthcare risk waste, and the distance between the clinics and some of their healthcare generation points). Discussions were concluded by participants acknowledging new knowledge about healthcare risk waste management which they committed themselves to drawing on in future developments, most especially when the legislation comes under review.

Since the checklist was identified as one of the factors that contributed to environmental health practitioners using multiple standards, participants gave feedback on progress made. The extract in Box 5.7 below summarises how discussions unfolded.

Box 5.7: Feedback on the development of a checklist

Senior practitioner 2: We managed to develop the checklist and have discussed it with our manager at the District Municipality. Although he approved it in principle, he indicated that we can only use it for generating information and giving advice, but not for enforcement since community home-based care facilities are not included in our by-laws. Junior practitioner 2: I must say that for the first time in the four years that I have been here, I felt that I knew what I was doing when visiting these facilities.	**Delineation:** Giving feedback on progress made, and the scope of the checklist's influence **Delineation:** Elaborating on the checklist's role and significance in knowledge-sharing

Community health care worker 3: The checklist also helped us because we now know what is expected of us, we are even able to share the information with our staff members.	**Delineation:** Elaborating on how the checklist has assisted them
Waste Inspector 1: We also presented the checklist to our manager here at local level; he also agreed that it is a good tool to generate information and that we will use the information when we review the waste management by-laws.	**Deixis and Departure:** Providing feedback on other issues
Researcher: I think the good thing is that we have developed a tool to assist us to standardise our practices. Since we know procedures for developing and reviewing by-laws, we need to follow them.	**Delineation:** Elaborating on the implications for practitioners
Waste inspector 1: I agree with all that, but remember, we are also expected to know the quantity of healthcare risk waste generated in the municipal area when we develop municipal healthcare risk waste management plans. With other generators we can easily acquire the information from the certificates left by the transporters; now with community home-based care facilities, I think it will be advisable if we can request the clinics to weigh the waste so that we can have an indication of how much they generate.	**Departure:** Expanding on progress already made to apply to related practices

Discussions in Box 5.7 above indicate that the task of developing a checklist for inspections of community home-based care facilities was a success and practitioners felt it would assist them to generate necessary information. As the junior practitioner noted: "… for the first time… I felt that knew what I was doing when visiting these facilities". There was still a challenge that the quantity of healthcare risk waste generated by community home-based care facilities remains unknown since they do not have facilities to weigh their waste before submission to the clinics. In response, the workshop participants resolved that the existing checklist for the clinics should be updated to include information about the quantity of healthcare risk waste generated by community home-based care facilities. The extract in Box 5.8 below summarises how discussions around weighing of healthcare risk waste at the clinics unfolded.

Box 5.8: Modelling new solutions to identified contradictions

Community health care worker 3: I think that now that we have established a relationship with the clinics, we can ask them to **weigh** our waste.	**Delineation:** Elaborating on what can be done going forward
Junior practitioner 1: I do not think this is a good idea. I mean, since government premises are now our responsibility, we can include the quantity of healthcare risk waste generated by community home-based care facilities on our current checklist for assessing clinics, and we can ask them to give us their monthly weight.	**Deliberation:** Engaging critically with the potential of the point being discussed
Researcher: What normally happens when you take your waste to the clinics?	

Community health care worker 1: They have a register in which they register everyone who submits the waste. The register indicates the date on which waste was submitted and who brought it. They don't weigh the waste.	**Delineation:** Providing more clarity
Waste inspector 1: That is a good start, I think in future they must also give you proof that you have taken waste to them so that you also have proof for your records.	**Deliberation:** Identifying some consensus and considering future responses
Researcher: They don't give you anything to show that you have submitted the waste?	**Delineation:** Seeking clarity about waste
Community health care worker 2: No, they don't give us anything. This is true; we also need to prove that we are doing the right things.	**Delineation:** Qualifying the need to have proof
Senior practitioner 2: I agree with junior practitioner 1: we can include the weight of healthcare risk waste generated by community home-based care facilities on the clinics checklist. This will help us to differentiate generators.	**Departure:** Supporting a shift towards ensuring that healthcare risk waste generated by CHBC facilities is quantified
Community health care worker 1: Does that mean that every time when we submit waste they will measure it?	**Delineation:** Requiring further clarification
Waste inspector 2: It will depend on the clinics, what we require is monthly quantities.	**Delineation:** Elaborating on the frequency of weighting the waste
Senior practitioner 3: Then we must inform the clinics through the forum, to prepare them.	**Departure:** Elaborating how the clinics will be informed
Junior practitioner 2: Yes I think the forum has been our quickest link with the clinics since they are also represented. We will discuss it in the next forum meeting.	**Delineation:** Summarising the agreement
Researcher: So the agreement is that we will include the weight of healthcare risk waste generated by community home-based care facilities on the checklist for clinics and we will discuss it in the next forum meeting.	**Delineation:** Confirming the summary

A consensus was reached that the weight of healthcare risk waste generated by community home-based care facilities would be included in the clinic's checklist and that information would be collected monthly during routine inspections.

5.2 CONCLUSION

This chapter presented data from the three change laboratory workshops and has shown how D-analysis was used to track the forms of social action. It became evident that through the change laboratory workshops, participants were able to analyse their own practices, identify contradictions and come up with new ways of doing things. They were also able to evaluate new practices and collaboratively developed ways to improve them. In the following chapter, Chapter Six, I present findings based on data presented in Chapters Four and Five.

CHAPTER 6: RESEARCH FINDINGS

6.1 INTRODUCTION

This chapter presents findings in the form of analytical statements, based on data analysed and presented in the analytical memos, and presented in Chapters Four and Five. The findings here are discussed in relation to the theories and concepts outlined in Chapter Two, most especially regarding knowledge-sharing practices in expansive learning processes at work. These discussions aim to address the study's research question of how environmental health practitioners' knowledge and knowledge-sharing practices influence the management of healthcare risk waste practices in community home-based care settings in Mogale City Local Municipality, and how these knowledge-sharing practices might be developed and institutionalised.

This chapter is structured around four 'analytical statements' (Denzin & Lincoln, 1994) which respond to this study's objectives which are:

- To describe the knowledge base of Municipal Health Services officials regarding their roles and responsibilities in relation to healthcare risk waste management practices in community home-based care settings;
- To understand how knowledge is imparted, by whom, and how often it is shared;
- To understand the extent to which knowledge-sharing practices are systematised and institutionalised;
- To identify consequences of these knowledge-sharing practices on healthcare risk waste management practices by community home-based care facilities in Mogale City; and
- To identify how knowledge-sharing practices related to the healthcare risk waste management in the community home-based care setting in Mogale City Municipality can be improved.

The analytical statements presented and discussed here as research findings are as follows:

1. Knowledge about community home-based care facilities and their healthcare risk waste management practices was limited in the interacting activity systems of Mogale City Local Municipality.

2. Knowledge-sharing practices within and across healthcare risk waste management activity systems are reactive, restricted and unsystematic.

3. In combination, the limited knowledge and knowledge sharing practices contribute to haphazard and inappropriate healthcare risk waste management practices.

4. The institutionalisation of 'boundary crossing' has the potential to improve knowledge-sharing practices on healthcare risk waste management within and between activity systems.

6.2 ANALYTICAL STATEMENT 1: Knowledge about community home-based care facilities and their healthcare risk waste management practices was limited within Municipal Health Services in Mogale City local municipal area

Data in this study showed that little was known about the context of community home-based care facilities within environmental health services in Mogale City municipal area. Consequently, there was limited knowledge about how such facilities generated and managed their healthcare risk waste. Evidence illustrating this limited knowledge manifested as follows:

- Environmental health practitioners provided conflicting views about what community home-based care facilities are.
- Environmental health practitioners acknowledged openly that they had limited knowledge about the forms and function of community home-based care facilities.
- Even very experienced environmental health practitioners showed evidence of limited knowledge on the context of community home-based healthcare facilities.
- Environmental health practitioners were mostly unable to identify risks associated with the establishment of community home-based care facilities. Consequently they were felt ill-equipped to provide professional advice, apply the precautionary rule (noted in Section 4.2.6) and ensure that services were provided for the safe collection and treatment of healthcare risk waste by community home-based care facilities.
- Due to limited knowledge, environmental health practitioners were not able to contribute to the development of the West Rand District Municipality: Municipal Health Services by-laws. It would have been expected that after six years of enforcing the provincial regulations, they would be able to identify some gaps to be addressed in the local municipal by-laws.

- Environmental health practitioners were unable to develop the required checklist for the assessment of community home-based care facilities. As a result, environmental health practitioners used their own discretion to assess the facilities, a practice that resulted in disparities in the provision and monitoring of environmental health services.

- Waste inspectors who were tasked with developing a minor healthcare risk waste generators database were unaware that community home-based care facilities generated healthcare risk waste; hence the database did not include them.

- Limited knowledge-sharing on issues relating to healthcare risk waste occurred within and across the activity systems (see Sections 4.3 and 4.4).

This limited knowledge within environmental health services in the Mogale City municipal area meant that environmental health practitioners were unable to provide an adequate support service to community home-based care facilities. Evidence of such limited knowledge can be summarised as follows:

- Community health workers in both facilities had limited knowledge on how to manage healthcare risk waste regardless of their experience in providing services to sick people and the training they acquired. For example, despite Facility 2 appointing a professional nurse to advise on provision of palliative care including healthcare risk waste management, healthcare risk waste was found to be managed inappropriately through burning.

- Healthcare risk waste management issues were not discussed in any of the meetings. The facility manager acknowledged the limited knowledge and pointed that "we did not discuss it [healthcare waste], we did not know about it" (IHBC 1).

- Community home-based care representatives were unable to share professional knowledge in the change laboratory workshop due to their limited knowledge on the subject. Their focus was more on negotiating compliance with what environmental health practitioners required other than sharing knowledge that would inform new practices. For example, they were ready to provide their own transport to transport healthcare risk waste to the clinics without considering the risks associated with transporting such waste (Section 5.1.3).

Cumulatively, this summarised data reveals severe shortcomings in the core knowledge that underpins the development of foundational competences needed to effectively manage healthcare risk waste. As described in Section 2.6, foundational competence is the *demonstrated*

understanding of what a person does, and why and is thus crucial for effective environmental health management. Foundational competence is so-named because it provides the foundation for the development of the other two dimensions of applied competence: practical competence and reflexive competence. For example, the study's data revealed that, due to their limited knowledge of community home-based care facilities, participants in the first two change laboratory workshops were unable to contribute to the workshop objectives of analysing and transforming their current work practices (see Sections 5.1.2 and 5.1.3). Rather, their participation was mainly focused on the definitions and basic contextual information that I, as the facilitator, had presented at the start of the workshop merely as background.

It is not only in the Mogale City municipal area that limited knowledge is recognised as compromising professional practice. Research into the inter-professional work to prevent social exclusion in British schools (Edwards, Barnes, Plewis & Morris, 2006) reported how unqualified teaching assistants appointed to take the responsibility for their learners' welfare in and outside the school were unable to contribute to the development of new practices. The study showed that, due to the teaching assistants' lack of specialist knowledge, their capacity to carry out their work depended entirely on knowledge distributed by the social workers and teachers who worked with them. According to Edwards (2010), the teaching assistants lacked engagement with knowledge beyond their everyday situated understanding of the locality in which they worked. As such, their ability to contribute to developing child welfare practices or to participate meaningfully in their networks was limited.

The limited knowledge evident in the change laboratory workshops, and its apparent negative impact on the health practitioners' professional practices, reinforces Nowotny's (2003, cited in Edwards, 2010) important point that experts must extend their knowledge in order to build links, and integrate what they know with what others want or should know and do.

According to Edwards (2010), people's sense of purpose in their work and their drive to work in the ways that they do are shaped by the specialised or domain-specific knowledge embedded in their professional practices. She argued that knowledge is closely related to capacity for action, to which Carlile (2002) added that adequate capacity for action is not only about processing and transferring increasing amounts of knowledge, but *transforming knowledge to effectively deal with differences, dependencies and novelties*. This case study revealed that the very limited knowledge about: (i) the form and function of community home-based care facilities, (ii) the legislative requirements for suitable management of healthcare risk waste, and (iii) the roles and contributions

of various stakeholders across interrelated activity systems hindered effective waste management in community home-based care facilities. The limited knowledge also affected the nature of the practitioners' knowledge-sharing practices, which is the focus of the next discussion.

6.3 ANALYTICAL STATEMENT 2: Knowledge-sharing practices within and across healthcare risk waste management activity systems are reactive, restricted and unsystematic

As a consequence of the limited knowledge about community home-based care facilities and how they manage healthcare risk waste discussed in Section 6.2 above, knowledge-sharing *practices* were similarly found to be reactive, restricted and unsystematic. For instance, knowledge was shared only when there were applications for establishment of new community home-based care facilities (ISMO, 2012), or when "someone found something that is newly-promulgated" (IJMO, 2012), or when community home-based care facilities were due to renew their registrations (Section 4.2.3.4).

Data presented in Section 4.3 also revealed that knowledge-sharing relating to healthcare risk waste management was limited to individual activity systems. For instance, although the manager of the Municipal Health Services in Mogale City Municipality indicated that the database of healthcare risk waste minor generators was accessible to anyone, it became evident that environmental health practitioners did not know about or could not access the document. If they did, they could have provided their comments or helped to update the database and further strengthen knowledge-sharing practices. The study found no evidence of knowledge being shared between the environmental health services activity system and the two activity systems within the waste management section of Mogale City Municipality about the challenges and risks associated with waste generated through community home-based care facilities. If the waste collection and disposal sections had been alerted to the possibility of healthcare risk waste being dumped in municipal waste bins, they could have instituted precautionary measures to protect waste handlers (in particular, waste pickers and re-claimers) from risks.

The case study found that there were no systems in the workplaces to share such knowledge. For example, the supervisor at the landfill site confirmed that knowledge-sharing across activity systems was not commonly practised; he was noted saying: 'I only meet with people whom I work with and … even in management meetings, we do not discuss operations' (IMOL). Additionally, the Municipal Health Services manager held the view that institutionalising knowledge-sharing would detract from, rather than enhance, the core functioning of environmental health

practitioners. For example, he was noted saying: "on what basis [should they have knowledge-sharing across boundaries]? I don't think that it is necessary because … at operational level you do away with red tape" (IMOM, 2012).

The study further revealed that knowledge about healthcare risk waste management in general was acquired through different sources. These included knowledge gained during formal education, and knowledge gained through prior professional experience. For example, environmental health practitioners indicated that: '…because of the experience one has got in terms of visiting other accommodation establishments [residential care centres], … one is sort of implementing that experience … to community home-based care facilities' (ISMO, 2112), and: 'I had theoretical knowledge from university, we've been taught on how to identify and recognise potential hazards that may arise from the environment that may have an adverse health effect" (IJMO, 2012). One of the community home-based care facilities (Centre 2) had appointed a professional nurse to advice on healthcare risk waste management. However, it became evident that even this additional source of knowledge was inadequate since it was based on personal experience of the nurse who had worked at a hospital, which was incompatible with how community home-based care facilities operate.

Such knowledge sources seemed inadequate in response to the recent proliferation of community home-based care facilities; neither prior experience in working with home-based care facilities nor the curricula of university or college-based education ten or more years ago would provide the knowledge needed to meet the healthcare risk waste management demands that municipalities currently face. Additional knowledge needs to be acquired through the workplace, so as to bridge the gap for environmental health practitioners who have been in the field for many years.

The study found little evidence that interactions about healthcare risk waste management in community home-based care facilities were systematically documented in the relevant institutions. Although the subjects in the environmental health and community home-based healthcare activity systems indicated that they meet on a weekly or monthly basis, data presented in Sections 4.3 and 4.6 revealed that such meetings were poorly documented. Data presented in Section 4.2.5 also revealed that inspections of community home-based care facilities and their healthcare risk waste management practices were poorly reported. This prevented management from identifying gaps and shortcomings in the activity system.

Data also indicated that there were no established or formal channels in or across any of the activity systems to pro-actively source and disseminate information about healthcare risk waste

management. Such information was only shared on availability, and at the discretion of those who had access to it. For instance, the junior environmental health practitioner indicated that "those who have inside information disseminated it to those who have least information" (IJMO, 2012). This suggests that the quality and scope of knowledge-sharing practices in the activity systems is influenced by fairly random access to 'information'. It also points to underdeveloped practical competence required for effective knowledge-sharing. As described in Section 2.6, practical competence is the ability to *decide on appropriate action to follow and to perform the chosen practice* and is important in developing effective knowledge-sharing practices. Data presented above indicates that although there were attempts to share what is available, activity systems were not able to act on providing systems to support the development and sharing of knowledge and expertise to match their objects of activity. For example, the senior managers' questioning about the need to share knowledge across boundaries is an indication that knowledge-sharing has not been identified as a key issue that requires attention.

According to Boer, Baalen and Kumar (2002), activity systems are characterised by constant constructions and renegotiations due to dynamic conditions. Tasks are reassigned and divided, rules are bent and reinterpreted and new identities and roles evolve. Activity systems therefore require some interpretive flexibility and coordination between different versions of the object and other elements of the activity system. To achieve this coordination, knowledge has to be shared. They further argued that the more interdependent the activity systems are, the more likely their knowledge will be integrated and their knowledge-sharing practices will be active and responsive. Therefore, by implication, the restricted, reactive and rather unsystematic nature of the activity systems' knowledge-sharing practices suggests that the system's capacity to be responsive and dynamic was compromised.

This vital relationship between knowledge-sharing practices and effective professional practices was reported by Kerosuo (2003) out of a project on negotiated ways of networking between primary care and specialised hospital care in Helsinki. The project reveals how narrow and unsystematic knowledge-sharing practices compromised decisions to improve the conditions of patients with multiple chronic illnesses. The study shows how health practitioners providing healthcare services to these patients were unable to improve patients' conditions because services were dispersed over different parts of healthcare systems which appeared to be fragmented, causing overlaps, gaps and disturbances. Providing services for these patients became expensive because they drifted from one care giver to the next without anyone having an overview of their conditions and overall responsibility of care. A team was commissioned to conduct interventionist

research aimed at helping practitioners to develop their work in the hospital for children and adolescents. After the first phase, practitioners realised that the most pressing tensions in the activity system were between the hospital and local primary healthcare centres in the care of chronically ill patients. Together, they formulated a new notion of collaborative medical work called 'negotiated networking' and a tool called a 'care agreement' containing solutions to identified contradictions.

Another example which illustrates how narrow and unsystematic knowledge-sharing negatively influences decision making is the National Evaluation for Children's Funds' (Edwards et al., 2006). The study shows that the boards' commissioning of children's funds services in local authorities were deliberately not able to draw knowledge from practitioners at operational level because they did not recognise their accounts as immediately relevant to their strategic concerns. This indicates that sharing knowledge with people who are actually doing the job at ground roots level is important as they will reveal what really need to be addressed. In this regard, Edwards (2010) highlighted that as practitioners work on a problem, the problem worked back on them, confirming their interpretations and revealing unforeseen features. So, if practitioners work jointly on the object, the activity is expanded to reveal features for each actor (Edwards, 2010).

These two examples and this case study's findings align with Daniels' (2004b, p. 191) caution that "if knowledge-sharing practices remain tacit within practices, learning is likely to remain too general and abstract to capture emerging possibilities and new forms of learning". In this regard, Edwards (2010) stressed the importance of making explicit the knowledge generated in practices so that it can influence strategic planning. As Boreham (2004a) pointed out, limited capacity to overcome fragmentation may result in members of the organisation acting without regard for each other's professional needs, as was evidenced in this study with the delayed development of the healthcare risk waste minor generators data-base. Boreham (2004a) argued that to improve knowledge-sharing, employees need system level understanding of the work process in the organisation as a whole to enable them to understand how their own immediate tasks interconnect with operations carried out in other parts of the overall system. The expansive learning processes initiated through this study's developmental work research methodology appears to have made some positive contributions to the development of more integrated, interconnected understandings of the respective activity systems and their shared goal of effective management of healthcare risk waste.

6.4 ANALYTICAL STATEMENT 3: In combination, the limited knowledge and knowledge-sharing practices contribute to haphazard and inappropriate health care waste management practices

The study found that the limited foundational knowledge together with restricted and unsystematic knowledge-sharing practices (as discussed in Sections 6.2 and 6.3 above), resulted in healthcare risk waste being generally managed haphazardly and inappropriately. Evidence of these practices is as follows:

- Inappropriate handling and disposal of healthcare risk waste by community home-based care practitioners. Data presented in Sections 4.5.2 and 4.5.3 revealed that community home-based care facilities managed healthcare risk waste through disposal in municipal waste bins (Centre 1) and through burning (Centre 2).

- Inappropriate and haphazard waste salvaging practices within the waste removal and waste disposal activity systems within Mogale City Local Municipality. As described in Section 4.2.3, waste re-claimers in both activity systems were found to reclaim waste without proper protective gear. At the landfill site, waste re-claimers were haphazardly re-claiming waste under disposing trucks, increasing chances to acquire infections.

- Haphazard issuing of compliance certificates to community home-based care facilities by environmental health practitioners. Data presented in Section 4.3 and 4.4.2 revealed that in order to perform their duties, environmental health practitioners drew from different and sometimes conflicting legislation to make decisions on the outcome of their inspections. This resulted in multiple standards and inconsistencies as some facilities were issued with compliance certificates without considering how they managed their healthcare risk waste.

- Inability to share knowledge on healthcare risk waste effectively. As noted in Sections 4.3, 4.6 and 6.3, the study found that knowledge-sharing practices on healthcare risk waste management were insubstantial in both activity systems.

As noted in Section 2.4.3, similar inappropriate and haphazard healthcare risk waste management practices have previously been identified in Botswana (Kgang'ethe, 2008), where community health workers were burning and burying their healthcare risk waste. Similar to this study, such practices were also recognised as the consequence to lack of knowledge and training on healthcare risk waste management. This case study in the Mogale City municipal area revealed that the

abovementioned practices (of burning and disposing healthcare risk waste in municipal waste bins) were the result of environmental health services not keeping abreast with changes in its sector. This created risks and uncertainties which, according to Boreham (2004a), does not only undermine people's professional practices, but creates negative emotions such as anxiety and can cause practitioners to question their professional identity.

Edwards (2010) reminded us that it is impossible for human actions to be unmediated because we are cultural beings. It is therefore important for new professional activities to be carefully mediated and, where mediation is limited, new mediational means must be created. She noted that "... if knowledge in practices is to be seen to be of value beyond the place and moment, practitioners need to work not only on improving the practice, but on the tools that help them to make visible and work on the knowledge in use" (Edwards, 2010, p. 24). Her insights are of relevance to this study because they highlight the significance of improving mediation practices and mediating tools within and across the activity systems (for example, through clearer policy directives, information resources, networked learning opportunities and so on) in order to transform the currently haphazard and inappropriate healthcare risk waste management practices.

6.5 ANALYTICAL STATEMENT 4: The institutionalisation of 'boundary crossing' has the potential to improve knowledge-sharing practices in a healthcare waste management activity system

As described in Section 2.11, boundary crossing occurs when practitioners from diverse practices collaborate horizontally across professional boundaries to negotiate new working practices on a shared object. This case study found that institutionalising boundary crossing has indeed improved knowledge-sharing practices between environmental health practitioners, waste inspectors, and community health workers who previously did not share knowledge. Improvements in knowledge-sharing practices were noted in the following activities:

- The change laboratory workshops provided a platform through which practitioners met physically, some for the first time (Sections 5.1.2, 5.1.3 and 5.1.4), to reflect on their current practices and share core or specialist knowledge while at the same time ascertaining what others had to offer. For instance, as described in Section 2.10.3, they applauded the researcher for "opening us up to this other world that is so active in our community" (JP1 in CL1) and indicated that "now that [we] know, [we] need to do the right thing' (JP1 in CL 1 and CHW3 in CL2).

- As noted in Sections 5.1.2 and 5.1.3, participants were able to relate the mirror data to their own experiences. For example, after observing the mirror data they identified shortfalls within their activities. Practitioners reflected: "We are not aware of how many community home-based care facilities we have, we don't even have a relationship with them, and they [community health workers] are not even aware of what they have to do" (WI 1 in CL1) and: "We thought that if we put healthcare risk waste in a tied plastic bag, it will not be easy for people to access it, forgetting that there are other people who are handling the waste at the dumping site" (CHW1 in CL2).
- Data from Section 5.1.2 revealed that participants used the newly acquired knowledge to divide labour between environmental health practitioners and waste inspectors who have similar object and activities. For example, they agreed that environmental health practitioners (since they are the first contact with community health workers) would provide information to waste inspectors about the location of facilities, who would register them as minor healthcare risk waste generators. Thereafter, both parties would conduct joint inspections and raise awareness on healthcare risk waste management.
- It further became evident that the boundary crossing processes that were made possible by the change laboratory workshops allowed participants to make informed decisions about new practices. For instance, when staff of the community home-based care facilities realised the impact of healthcare waste on both human health and the natural environment and on the cost of managing healthcare risk waste, they were compelled to seek assistance from provincial government to take their waste to the clinics.

Activities outlined above represent a strong existence of collective competence. As described in Section 2.7, collective competence is *the capacity to construct a collective understanding of a challenging situation in the workplace*. Collective competence is guided by three principles of: *making sense of the events, developing and using collective knowledge base and developing sense of interdependency*. For example, relating the mirror data in their own experiences, and using the newly acquired knowledge to make decisions and divide labour amongst practitioners whose division of labour was previously unclear, is evidence of developing collective competence.

Boundary crossing is described as two-way interactions which cannot happen without participation of other parties (developing sense interdependency). It is noted that boundary crossing involves encountering differences, entering into territories in which participants are

unfamiliar, and to some extent unqualified to realise a hybrid situation (Section 2.11). These differences and unfamiliar territories give boundary crossing the potential to improve knowledge-sharing practices.

The boundary crossing process also indicates the development of reflexive competence, described as *the ability to connect performance and decision making to the underlying understanding, and to adapt to change or unforeseen circumstances* (Section 2.6). For example, through the change laboratory workshops, practitioners were able to reflect on their current practices, identify contradictions, develop visions of new practices and experiment to realise the new visions (Section 2.10). Virkkunen and Newnham (2013) argue that "the change laboratory method is not aimed at producing just an intellectual solution or changes in practices, but also at *building up practitioners' collaborative transformative agencies and motivations* based on new understanding of the idea of the activity and a new perspective of its future development" (p. 10, my emphasis).

As Daniels et al. (2007) have argued, the concept of boundary crossing offers the potential for workers from different professional backgrounds to collaborate and generate new professional practices. Similarly, Akkerman and Bakker (2011), highlighted that boundary crossing represents potential value for communication and collaboration. This study has similarly shown that boundary crossing can provide possibilities for participation and collaboration across different activity systems and different sites and enable practitioners to negotiate responsibilities, evidenced, for example, in the division of labour between environmental health practitioners and waste inspectors.

6.6 CONCLUSION

Through the use of four analytical statements aligned with the study's objectives, this chapter has discussed the data previously presented in Chapters Four and Five. The chapter has highlighted the limitations of knowledge and knowledge-sharing practices related to healthcare risk waste in the context of community home-based care facilities in the Mogale City municipal area. Evidence from the case study makes clear links between this limited knowledge and several shortcomings in the effective management of the waste generated by these facilities. The discussions have reflected on similarities with other CHAT-based and organisational learning studies that have also recognised the close relationship between knowledge and professional practice. The chapter concluded on a more positive note, recognising the value of the change laboratory workshops and the expansive learning processes they supported, in helping environmental health practitioners to

establish common knowledge and cross the boundaries of traditional knowledge in their workplaces. In the next – and final – chapter, I present some concluding insights and critical reflections as well as make recommendations to my colleagues and fellow citizens in the Mogale City municipal area regarding our shared common object of effective management of healthcare risk waste.

CHAPTER 7: CONCLUSIONS AND RECOMMENDATIONS

7.1 INTRODUCTION

In the previous chapters (Four, Five and Six), I described and analysed data generated during Phases One and Two of my data generation process so as to address my research questions. In this closing chapter, I begin by summarising the research process. Thereafter, I address the study's overarching research questions and make recommendations based on the study's findings.

7.2 MY ROLE AS A RESEARCHER-INTERVENTIONIST IN THE STUDY

My role as a researcher-interventionist assumed that of a:

- Change agent: As an interventionist researcher, I connected practitioners with ideas for change through mirroring their current knowledge and knowledge-sharing practices. For example, the outcomes of the change laboratory method which is based on the theory of expansive learning were not pre-determined by me as a researcher or management. The outcomes were designed by the practitioners themselves as they worked out expansive solutions to contradictions in their activity systems. Boxes 5.2, 5.5 and 5.8 indicate how practitioners designed and experimented with new solutions (Sections 5.1.2, 5.1.3 and 5.1.4).

- Facilitator: Throughout the three change laboratory workshops, I presented the mirror data and facilitated the workshop to maintain focus and ensure full participation since I relied on practitioners' participation to generate more data and influence new decisions (Section 5.1.1).

- Organiser: I collected and managed all the data generated throughout the study, wrote letters for negotiating access to research sited, transcribed recordings and developed new sets of mirror data ready for the following change laboratory session. I also booked the venues and ensured that invitation to attend the change-laboratory workshops were developed and delivered (Sections, 3.3, 3.4 and 3.5).

- Prober: Because of my professional background in healthcare risk waste management, I knew what was needed to answer my research questions. I was able to ask relevant questions and I personally conducted all the interviews and observations.

- Boundary broker: As noted in Section 2.11, brokers are defined as members of multiple communities who are able to make effective connections between those communities and make coordination possible by opening up new possibilities for learning and exchange. As an insider environmental health practitioner, I possessed confidential professional information on management of healthcare risk waste. I clearly understood the current problems and how they came about. As a result I was able to redirect environmental health practitioners' understandings of the context of community home-based care facilities. Data presented in Box 5.2 (Junior Practitioner 1's last comment) is an indication that environmental health practitioners moved from the unknown to the known. As an insider boundary broker, I also felt at risk of not belonging – either as an environmental health practitioner or as management (Section 5.1.3).

- Translator: Because of my understanding on the terminologies of healthcare risk waste management, I translated the information for community health workers in their own language and assisted them to develop a language that assisted them to participate in the change laboratory workshops. For example, in the second change laboratory workshop, I changed the manner in which in introduced the process in order to accommodate a community health worker, that is, I decided not to use Engeström's model of activity system so as to accommodate everyone's entry point in the learning process (Section 5.1.3).

Because of my position in the municipality, I knew everyone on a personal-professional level. This influenced how I chose my research participants. Internally, I requested environmental health practitioners to volunteer as research participants. To avoid complaints of being biased, I complemented my primary methods of conducting interviews and observations by including change laboratory workshops which aimed to involve everyone. At community home-based care facility level, I communicated with all the facilities and worked with the ones which were available.

7.3 ADDRESSING THE RESEARCH QUESTIONS

As introduced in Chapter One, the research process has been guided by research questions and has sought to answer these questions as comprehensively as possible. The two interlinked research questions were:

> (a) How do the knowledge-sharing practices of environmental health practitioners in Mogale City Municipality influence healthcare risk waste management practices in community home-based care settings and;

(b) How might these knowledge-sharing practices be developed and institutionalised?

To answer these questions, the research aimed to address the following objectives:

- To describe municipal officials' knowledge bases regarding their roles and responsibilities in relation to community home-based care's healthcare risk waste management practices;
- To describe associated knowledge-sharing practices (i.e. how this knowledge is imparted, by whom, in what forms, and how often?);
- To understand the extent to which these knowledge-sharing practices are systematised and institutionalised;
- To identify consequences of these knowledge-sharing practices on healthcare risk waste management practices by community home-based care facilities in Mogale City; and
- To identify how knowledge-sharing practices related to healthcare risk waste management in the community home-based care setting in Mogale City municipality can be improved.

These objectives were addressed in Chapters Four and Five which looked at Municipal Health Services and their activity systems, community home-based care facilities and the developmental work research methodology in the form of three change laboratory workshops.

The study has established that the relative newness of community home-based care facilities in South Africa in the early 1980s, and their socially significant yet unsystematic efforts to deal with the HIV/AIDS pandemic, have resulted in them being a 'blind spot' in the more established environmental health services sector. Through these facilities, community health workers provide services to isolated or low-income families who are unable to access formal health services. Their services centre on preventing diseases and minimising the impact of existing diseases. Inevitably, this involves the generation of healthcare risk waste which has the potential to spread diseases and infection.

Environmental health practitioners, who work within municipal structures, are mandated to monitor these community home-based care facilities for compliance with their object of promoting health and preventing diseases. They also enforce legislation relating to management of healthcare risk waste. Although environmental health practitioners knew their general roles and responsibilities very well, the study revealed that their knowledge on the forms and context of

community home-based care facilities and on how they manage their healthcare risk waste was very limited. Due to this limited knowledge, they were unable to, for example, identify community home-based care facilities as minor generators of healthcare risk waste; inform the development of healthcare risk waste management policies locally and provincially; conduct risk analysis in these facilities; or disseminate accurate and updated information on environmental health risks associated with management of healthcare risk waste to community health workers.

The case study data indicated that knowledge-sharing practices in healthcare risk waste management activity systems were reactive, restricted and unsystematic. Knowledge relating to healthcare risk waste management was acquired from a range of sources including formal studies and prior professional experience. The study found that knowledge was shared only when and if it was available and did not extend beyond individual activity systems. This resulted in a narrow knowledge focus, specific to one context. The study further found that there were no systems available to share knowledge effectively or explicitly within and between activity systems: minutes were poorly documented, healthcare risk waste management practices were poorly reported, resulting in management not being able to identify what needed to be addressed. Further, there were no established channels in or across activity systems for knowledge-sharing.

Evidently as a consequence of these inadequate knowledge-sharing practices, healthcare risk waste management practices by community home-based care facilities were seen to be haphazard and sometimes inappropriate. Within the environmental health activity system, limited knowledge-sharing resulted in unstandardised provision of services to community home-based care facilities, that is, environmental health practitioners used their own discretion when conducting inspections. They did not have a checklist for use with all inspections. Consequently they commonly issued compliance certificates without considering how healthcare risk waste was managed.

Amidst these challenges, the study found that the change laboratory workshops enabled boundary crossing that provided fertile ground for all the activity systems involved in healthcare risk waste management to share their core knowledge relating to their 'who', 'how', 'what', 'why' and 'when' practices, and to identify differences between their practices. The following section's recommendations aim to build on the momentum achieved through these change laboratory workshops, and respond to the second part of this study's research question: 'How might these knowledge-sharing practices be developed and institutionalised?'

7.4 RECOMMENDATIONS

Promoting health and preventing diseases requires practitioners to labour with the necessary knowledge and competencies, but much work needs to be done to make this possible and institutionally sustainable. Drawing on the case data and relevant literature, the study makes the following recommendations:

1. **Workplace learning opportunities in environmental health service settings should be revised regularly to focus on new priorities and to develop reflexive practitioners**. Training programmes should focus on enabling and sustaining reflexive engagement with everyday challenges and on developing applied competence which involves the integration of foundational, practical and reflexive competencies.

2. Due to the multi-sectoral nature of environmental health services, **boundary crossing should be institutionalised at service delivery level as a framework to improve knowledge-sharing** within and between Municipal Health Services and environmental management departments in both municipalities. It has been noted, for instance, that some environmental health functions, such as waste management and air quality, are located within the environmental management departments in both district and local municipalities. Institutionalising boundary crossing will not only improve interdependency between members of different departments and municipalities but will also enhance collective competence among them. As Schön (2010) argued, if government is to learn to solve new public problems, it must also learn to create the systems for doing so and to discard the structure and mechanisms grown up around old problems. He explained:

   > The need is not merely to cope with a particular set of new problems, or to discard the organisational vestiges of a particular form of governmental activity which happen to be particularly cumbersome. It is to design and bring into being the institutional processes through which new problems can continually be confronted and old structures continually discarded. (Schön, 2010, p. 6)

3. **The District Municipality should consider reviewing its current by-laws to incorporate community home-based care facilities.** This will not only improve services towards these facilities, but will make it possible for environmental health practitioners to develop a checklist for inspections of community home-based care facilities, thereby resulting in standardisation of services.

4. **The District Municipality should invest in improving its environmental health reporting so as to inform strategic plans.** Environmental health reports are potentially significant mediating tools in the environmental health services activity system and, if they contain updated and valid statistics, they can contribute to developing the foundational competence of environmental health practitioners. For example, if environmental health services reports were to be included in the integrated development plan (IDP) roadshows conducted by the local municipality for its communities, knowledge about community home-based care facilities, and healthcare risk waste could be shared more widely.

5. **The District and Local Municipalities should institutionalise structures and processes for environmental health practitioners to network, share knowledge and experience, and collaboratively solve problems with other partners**. This study has shown the need for (and benefits of) networked learning spaces such as change laboratory workshops for practitioners to question, innovate, clarify and develop the object of their interrelated activity systems.

7.5 CONCLUSION

In my opening chapter, I highlighted my motivation to carry out this study which was based on my background as an environmental health practitioner who has been in the field for many years. This enabled me to develop my research questions into the ones that have guided this case study. Using Municipal Health Services and community home-based care facilities as case studies, I have been able to examine how environmental health practitioners' knowledge-sharing practices influence the management of healthcare risk waste by community home-based care practitioners.

The study found that, due to limited technical knowledge on the forms and functions of community home-based care facilities, environmental health practitioners' knowledge-sharing practices were reactive, restrictive and unsystematic. Consequently, management of healthcare risk waste by community home-based care practitioners in the two facilities sampled in this study was found to be non-compliant with legislation and posed human and environmental health risks. In carrying out this study, I came to understand and appreciate the importance of up-to-date, contextually relevant knowledge and effective knowledge-sharing practices for all relevant role-players, but

most especially environmental health practitioners and community health workers, in managing healthcare risk waste in environmentally and socially responsible ways.

The study has recognised that improved knowledge and knowledge-sharing practices are essential for the development of environmental health practitioners' applied and collective competence needed for effective healthcare risk waste management at the municipal level. Institutionalising boundary crossing through change laboratory workshops provided a much-needed and important platform to discuss and interact with practitioners in the same field and also provided participants with representational tools to analyse disturbances and to construct new solutions.

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APPENDICES

APPENDIX A: Letter requesting permission to conduct a study within community home-based care setting

P O Box 4143
Witbeeck
1719
16 February 2011

Dear Sir/Madam

REQUEST FOR PERMISSION TO CONDUCT RESESRCH

I am a Master's student registered at Rhodes University in the Environmental Learning Research Centre who requests permission to conduct research at your facility.

The purpose of my research is to investigate how professional knowledge related to the healthcare waste management learning, that is necessary for the development of working knowledge and skills is produced, distributed and institutionalized within and between the home-based care facilities and Mogale City Local Municipality.

The aim of the study is to look at the status quo and identify gaps between the two systems in order to recommend sustainable working solutions.

The information obtained in this study will be used anonymously to protect the integrity of the organizations.

I hope my request will be considered.

Yours faithfully

_____

Mapula Priscilla Masilela
Cell number: [redacted]

APPENDIX B: Agreement between the researcher and community home-based care managers

LETTER OF AGREEMENT

This agreement is made between the researcher and the Home-based Care Facility on the research about how knowledge is being shared and created between and within the Municipality and the Home-based care facilities. The research is not about evaluating the practices, rather to identify how knowledge sharing relations can be strengthened.

The two parties mutually agree on the following:

1. The home-based care facility consent to be the subject of the research.
2. The researcher will respect individual organizational ethics.
3. The researcher will ensure that all the participants understand the nature and the purpose of the research.
4. The researcher will respect the democratic freedom of choice.
5. The researcher will be truthful in the data collection process and will not critique any practices.
6. The researcher will ensure confidentiality of participants, identities and comments.
7. The participants will give consent to the use of any audio and visual aids that will be used.
8. If photos are taken, the participant's faces will not be captured.
9. The researcher will allow each participant to review their interviews and interpretation before analyzing the data.
10. The participants will provide truthful and adequate information known to them.

SIGNATURES

_____ _____

Researcher Date

_____ _____

Home-based care Manager Date

APPENDIX C: Letter to executive manager: Integrated Environmental Management Department

Priscilla!
Let's discuss, in principle (supported).
I would only want to engage with you and your manager where you will highlight time needed, especially during working hours as I would not want this to consume your working hours and that of your other colleagues. But like I said in my opening remarks, your request is supported in principle.
Copy to Dominic!!!

P O Box 4143

WITBEECK

24 April 2012

The Executive Manager

Integrated Environmental Management

Mogale City Municipality

2012/05/03.

Dear Madam

REQUEST FOR PERMISSION TO CONDUCT A RESEARCH

I am a Masters Student registered with Rhodes University, persuing an Environmental education Degree.

My area of interest is on knowledge sharing within and between activity systems of the Municipality (Municipal Health Services) and the Home-based Care organisations, particularly on issues related to the management of Health care Waste.

The research process will compose of two stages of which stage 1 will include interviews and observations of key official such as the Environmental Health Practitioners, Waste Inspectors and General workers at the land-fill site. Stage 2 will include intervention workshops, where the other home-based Care facilities and municipal officials who did not participate in stage 1, will have feedback about the first stage and comment further in order to have a way forward regarding the issues that would have been identified in stage 1.

The intervention workshops will be in a form of meetings, firstly with the municipal officials identified above, secondly with the home-based care facilities who already have a forum in the health portfolio, headed by the MMC Health: Clr E Mathe. Lastly with both the municipal officials and the home-based care facilities.

Based on the above, I therefore request permission to conduct the research within the department (DIEM), permission to sit in the Home-based care forum that is in the health portfolio and conduct a workshop for home-based care and municipal officials.

I hope my request will be accepted

Yours faithfully

MP Masilela

APPENDIX D: Interview questions

MANAGER: MUNICIPAL HEALTH SERVICES

1. Describe how new knowledge relating to Home-based Care (Community Home-based Care Facilities) is being created and distributed. What is the culture in your organization regarding knowledge sharing?
2. What systems do you have in place regarding knowledge sharing and distribution? And how effective are they?
3. Do you have any legislation relating to Community Home-Based Care Facilities?
4. What are the barriers in knowledge sharing systems?
5. How can the systems be improved and by whom?
6. How is the communication between the local Municipality and the Community Home-Based Care Facilities industry established and effectively maintained?

OFFICIAL (two officials, one of which is newly employed will be interviewed)

1. Do you know your role as an official within the home-based care setting?
2. Do you know of any policy/legislation relating to the home-based facilities?
3. How did you know about all these? From whom? How often do you share this knowledge? What is your organizational culture regarding knowledge sharing?
4. What are the impacts of lack of awareness regarding your relations with the home-based care industry? How does it affect your practices?
5. How do you compare the knowledge sharing and distribution systems now and five years back?
6. How can the knowledge sharing and distribution systems be improved?

OFFICIAL (Landfill site)

1. What are your experiences and challenges relating to healthcare risk waste?
2. What systems do you have in place regarding the management if this wastes? How effective are they?
3. Does the available system enable you to trace the sources of the HCW? If so what is being done to ensure that the waste does not come back to the landfill site?
4. How do you share knowledge with other municipal officials? Is this effective?
5. How can the systems be improved?

HOME-BASED CARE GIVERS

1. How do you manage healthcare risk waste in your organization?
2. How did you know about the waste management? By whom, how often is the knowledge being shared?
3. How is knowledge being shared within your organization?
4. Do you have any policies regarding healthcare risk waste management?
5. If policies and guidelines have been used, how effective are they, can they be adapted or revises to the present circumstances?
6. What are the relations between your organization and the local municipality?

APPENDIX E: Transcribed interview

INTERVIEW: JUNIOR EHP

Interviewer: Morning Mr. EHP, I'm Priscilla Masilela, I'm a student at Rhodes University, I am conducting a study regarding knowledge sharing between the municipality and the home-based care specifically when dealing with healthcare risk waste management issues. So I am going to ask you some questions, and I will require to give me as much information as you can and be as specific as you can when answering these questions, my first question that I'll ask you is that, how long have you been working as an Environmental Health Practitioner, and how long have you been working in this organization-Mogale city Municipality?

Interviewee: Ok, I have been an Environmental Health Practitioner for four years now and I have been with Mogale city for a year and approximately two months.

Interviewer: **Do you know your role as an EHP on how you can deal with Home-based care centers**.

Interviewee: Well, yes I think when it comes to my role as an EHP, I do know my role when working with home-based care centers; err, basically looking at the nine municipal health functions, it's one of the surveillance of premises. Basically when we look at the key point that talks about the surveillance of the premises, I think that's where the focus should be on, when it comes to looking at the Community Home-Based Care Facilities and places of healthcare facilities. Err, basically when we go out to, should I elaborate more on these, basically when we go out to a Community Home-Based Care Facilities you should look at certain things. For instance in this current municipality that we are working in, we are working for, we've got a guidelines or supposedly by-laws that were promulgated in 2011, so when we look at places of care, we look at, chapter 14 of the by-law, we look at the waiting rooms or the wards to put it right, yah, we look at the kitchen, waste management, we look at healthcare risk waste management, and, err, we look at, in different rooms for instance the bedrooms or places where they sleep, we look at ventilation, the room itself how big it is, we probably measure the room and probably say how many beds should be put in that room err, yah, that's basically that.

Interviewer: T**he senior EHP indicated that each Environmental Health Practitioner have their own areas in which to perform their duties, which area are you allocated to**?

Interviewee: I am working kagiso.

Interviewer: **Do you have Community Home-Based Care Facilities in kagiso**?

Interviewee: At the moment I don't have anything.

Interviewer: **You don't have**?

Interviewee: No, well they are not places of care they don't offer 14 hour provision, it's more like day in facility, whereby the elderly come and they probably given food and they exercise and then after that they go to their respective homes.

Interviewer: **So you have never done an inspection at a Community Home-Based Care Facility**?

Interviewee: Well to my previous knowledge and experience, I have, when the Community Home-Based Care Facilities were still at Provincial Department of Health, we used to work a lot with them.

Interviewer: **What were you looking at when conducting inspections**?

Interviewee: Well we like I said, we were looking at the facility itself, for instance if the number of people that the place can accommodated, err, their daily routine activities, like how they care for the frail and for the elderly people, so yah, that was that and unfortunately with my experience it was not for long because at the end of the day they were taken out of the province and given over to the local authority.

Interviewer: **How do you make sure that you assess community home-based care facilities in similar manner if every EHP is working individually?**

Interviewee: Well normally use checklist for all our inspections; however with community home-based care facilities we do not have any. Because checklists are based on by-laws, we don't even have by-laws relating to

community home-based care facilities. When conducting inspections I use my previous experience while I was at the Province.

Interviewer: **You mentioned the by-laws do you have any other set of legislation that you are using when dealing with the COMMUNITY HOME-BASED CARE FACILITIES centers?**

Interviewee: Well, there is a lot of legislation, for instance we are using the Regulation R918, which fall under the National Health Act, err, basically R918 talks about the general hygiene for food premises where people are being fed, actually. So basically it means that food is being prepared for them, all of that. So basically what we do when we look at the R918 we get certain requirements that are stipulated in the regulation, for instance, the food preparation area talks about and is also addressing food handlers and staff and how food should be kept and stored under, err, refrigeration facilities, it talks about temperature control of the fridge and, yah, so forth. And we've got another regulation that can also be looked into is the National building Regulation that talk about the general structure and how it should be constructed, cross ventilation and all that.

Interviewer: **How did you know about all this, did you go to school or when you started working was there any induction that was given to you?**

Interviewee: Well. At primarily I had theoretical knowledge, err when you study the course, Environmental health, you are capacitated with as much information as possible, so basically environmental health just does not look at the environment but also look at how the environment affect health, so you will be able to, we've been taught on how to identify and recognize potential hazards that may arise from the environment that may have an adverse health effect, so yah, primarily, err, theoretical knowledge and obviously the knowledge was converted into practice whereby we went out to do experiential training, so yah…

Interviewer: **When you started working for the municipality, was there anyone who told how to do things, or what happened**?

Interviewee: When we started working here, yah, we were supposedly chaperoned and given the overview of what we need to do, and then our work… it was more like induction sort of.

Interviewer: **What is your organizational culture regarding sharing of knowledge**?

Interviewee: Well, with sharing of knowledge we're trying to capacitate each other with as much info as we possible, for instance, we would be normally send out to workshops whereby certain issues will be discussed, for instance I remember last year we did a workshop on chemical safety whereas most of us had idea on how to tackle industries that deals with hazardous and chemical substances, so information must be shared and those that had inside information disseminated the info to those who had least info , but the beauty of it is that general info is there throughout, everybody have almost more or less the same knowledge and those that have more insight do share with others.

Interviewer: **How do you share knowledge within your section and other departments**?

Interviewee: err, well, we normally have meetings every Friday, then information is shared, legislation is discussed, policies are discussed. If somebody finds out new policy or if somebody finds something that's newly promulgated, they share it with other colleagues. With sharing information with other departments, we do it on request of other departments

Interviewer: **What could you regard as the impacts of lack of awareness regarding the relations with COMMUNITY HOME-BASED CARE FACILITIES?**

Interviewee: Well with, when it comes to lack of awareness and lack of insight, it results in the facilities probably not being properly managed, when they would do their own things at their own time, for instance when we certificate we get certain things, like for example, medical waste, if these people are not consciountised on how to handle and store medical waste it will ultimately lead or end up in our municipal refuse whereby it will ultimately be thrown or discarded off to our landfill site. And when you look at medical waste it's normally hazardous substances, we've got needles, and we've got your, your tissues, human tissues, we've got so many things that you can come across. So at the end of the day if these people are not trained, if these people are not consciountised, and are not made aware of how they need to run their facilities, a lot of things will just result everywhere, like for instance, medical waste could probably land up in somebody's backyard which is not allowed, and then the way their food is being prepared, we could have casualties, for instance, if people, food handlers and staff are not properly trained and are not properly kept up to date on what they need to do, they are not taught on five keys to safe food handling and

safe food processing, people will end up being sick, for instance people will just cook, and they wouldn't know on how to serve the food and how to probably distribute the food, how to store the food, and so forth, and so on, at the end of the day, these people need to be aware of what they are doing, they need to be err, err be coucientised basically on how to run their facilities, for instance we don't want the people that are in those places of care, we obviously know that most of them are vulnerable, immune-compromised or frail people, so at the end of the day we don't want those people to be sick , if they are supposed to be cared for, at the end of the day it is very, very crucial that these people that runs these places are being ,made aware of what they need to do.

Interviewer: **How does the lack of awareness affect your work as an EHP**?

Interviewee: it affects my work basically because at the end of the day I'm there to educate, to capacitate the community at large, basically we work as facilitators, we work as educators, and we work as promoters, and yah, so lack of awareness does result in an adverse effect on my work, it somehow degenerate and degrade my work because at the end of the day I'm there to teach people that are not aware of things that they need to do and of the things that they are not aware of.

Interviewer: **ok, err, do you have any knowledge sharing systems in your organization, if they are there how do you think that you should improve**

Interviewee: well, we would normally have short seminars; those seminars will be the platforms where information is being shared and knowledge is being distributed, at the end of the day on how to improve them will be, have them more often because they are not as often as we would like to have, so at the end of the day that's how personally I think they should be improved, on a frequent basis, that would result in more information management.

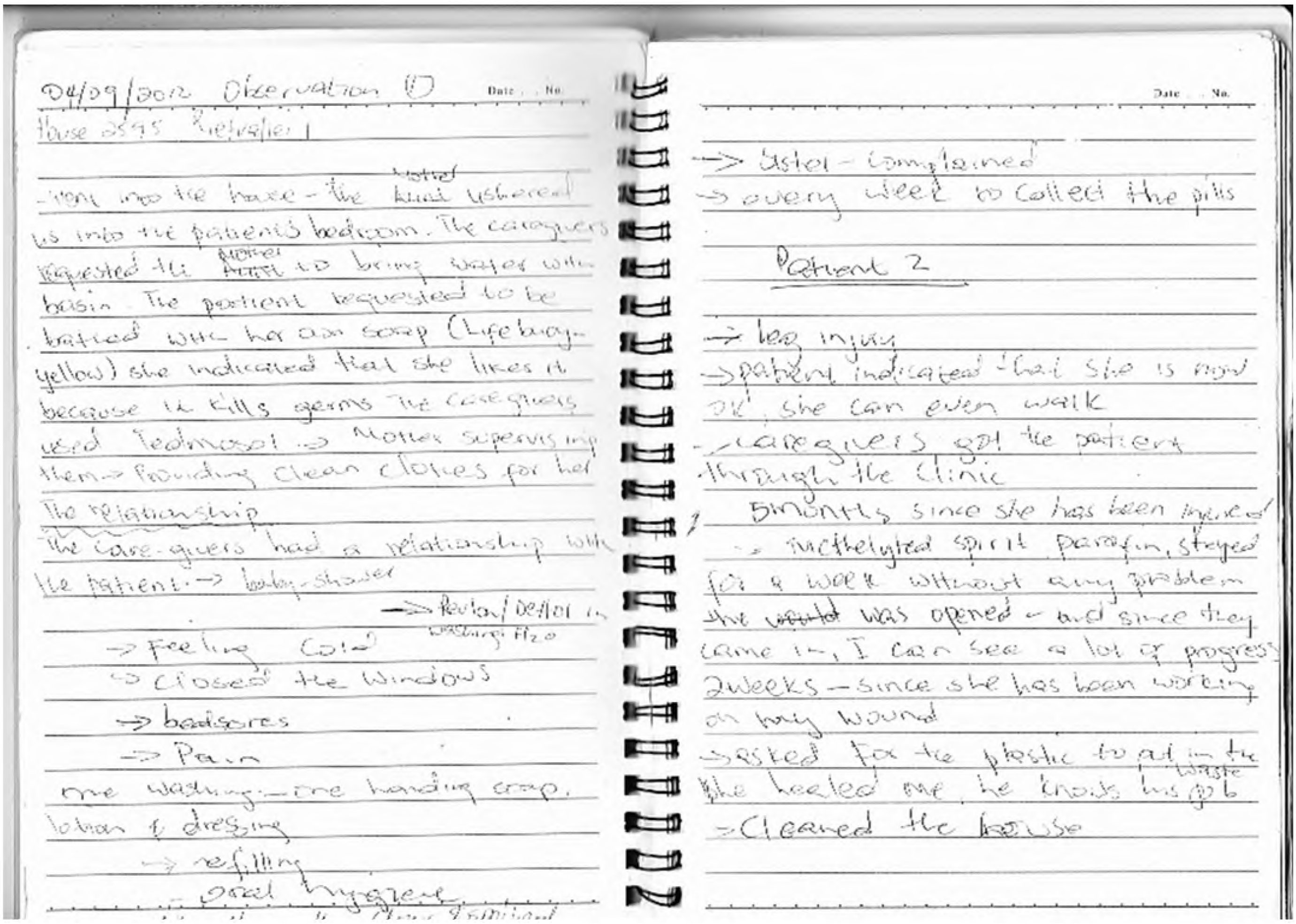
Interviewer: **The senior EHP indicated that you normally discuss the challenges that you experience while assessing community home-based care facilities in your meetings, can you share with us what kind of challenges do you normally discuss in your meetings**?

Interviewee: When it comes to challenges that we normally discuss, you find that the place is obviously there functional and probably is not compliant, so when it comes to enforcement of the policies and the by-laws, it is a bit of a difficult situation because at the end of the day the place is there already, and if it is non-compliant, people can't be thrown out, and we don't have a legal framework where we can enforce them to say that these people have, the facility need to shut down and people need to be removed as the place is not compliant, at the end of the day the main challenge will be law enforcement when it comes to places of care, so we can't prosecute or penalize that facility.

Interviewer: **Ok, the senior EHP mentioned something about your organization not having a by-law that is specific to the COMMUNITY HOME-BASED CARE FACILITIES centres; do you also see that as a challenge**?

Interviewee: It is a challenge, because now we are looking at the home-based care facilities, and now we are using the places, nursing homes, so we are trying to incorporate two thing that are not the same but now we're trying to work, we're striving to reach the outcome which is primarily supervision…so it is a challenge, we need to have a specific guideline that will cover such places.

APPENDIX F: Observation notes


04/09/2012 Observation (1) Date No.
House 2595 Rietvallei 1

- Went into the house - the sister (aunt) ushered us into the patient's bedroom. The caregivers requested the mother to bring water with basin. The patient requested to be bathed with her own soap (Lifebuoy - yellow) she indicated that she likes it because it kills germs. The caregivers used Tedmosol -> Mother supervising them -> Providing clean clothes for her

The relationship
The care-givers had a relationship with the patient -> baby-shower

-> Revlon/Dettol in washing H_2O

-> Feeling Cold
-> Closed the Windows
-> bedsores
-> Pain
One washing - one handing soap, lotion & dressing
-> refilling
- oral hygiene

Date No.

-> Sister - complained
-> every week to collect the pills

Patient 2

-> leg injury
-> patient indicated that she is now OK, she can even walk
- caregivers got the patient through the clinic
5 months since she has been injured
-> methelyted spirit paraffin, stayed for a week without any problem
the wound was opened - and since they came in, I can see a lot of progress
2 weeks - since she has been working on my wound
-> asked for the plastic to put in the waste
She healed me, he knows his job
-> Cleaned the house

APPENDIX G: Phase 1A analysis according to elements of activity system

INTERVIEW: HBC 2

Interviewer: Can you give me the background of you home-based care facility.

Interviewee: We started in 2005, but we started as a drop-in –center, only for HIV/AIDS children, orphans and vulnerable children. We later in 2007 decided to convert the center into a home-based care since the parents of the children we were assisting here did not have any help anywhere since were not yet under health. We applied for the funding from the health department. However we were only funded in 2010 by the health department. Through this funding at least we are now able to trace defaulters and we can also DOT TB patients. We try to help the community the way we can help them, our challenge is that the waste that we are generating like the gloves, and so forth, we don't know where to put them, but the Nurse suggested that it will be better if we get the red plastic bag and put the waste inside and seal it before disposing it.

Interviewer: What do you use to seal the plastic bag?

Interviewee: We use this thing, a cable tier, we don't put it in the municipal bin, and we burn it in the veld. This is because we are afraid that if sometimes the municipality did not come on time to collect the waste, the children always gain access to the waste and they start playing with it.

Interviewer: What inspired you to start the drop-in-center?

Interviewee: I can still remember the day; it was on Wednesday, the 15th February 2005. I was just after I was retrenched from my work. I went to the supermarket to buy some groceries. At the supermarket; I found two children in school uniform crying. When I asked what was happening, the Security guard told me that the kids were arrested for stealing biscuits. I asked the kids where they were staying and they said they were staying in Kagiso extension 14, in the area where I was staying. I asked management about what was going to happen to the kids and they said that the parents of the kids must come and pay for the stuff. I did not mind paying for the stuff, I did just that, they made me pay R27, 00 for the biscuits worth 99c. When the kids were released, I realised that they did not steal because they were naughty but were hungry; as a result I accompanied them to their homes, to see the conditions at the homes. When I arrived at one of the kids's home, I found out that the child's mother passed on five days ago and the child was staying with an elderly granny. With the second child, I found that the parents were divorced and the child was affected because of that. I was deeply touched by those kid's conditions. From that day on, I decided to cook for the orphans. Even if it meant that I will cook for the two families identified, it would mean something to them.

I started working with one granny who is still working with us to prepare food for the kids. By that time we were operating at my house, I did not even know what the constitution was; I just cooked in the dark. Then I met a lady in Kagiso who was also cooking for the kids, she offered some advice on how to register my organization and to acquire some funding from the government.

I was doing that out of passion as a result I did not mind if I was funded by the government or not. What made me happy was to see those kids happy. They were like my own kids. I went every day to their school to check on them and to give them lunch boxes.

The whole of 2005/6 I was relying on sponsors there and there until I decided to make a constitution for my organization. To do that, I was helped by some lady from Magaliesburg. Then I managed to apply for funding.

In 2007 the government wrote an acknowledgement letter, promising to include my organization in their budget for 2008. I was funded by the Department Of Social Development in 2008. I was still operating from my house and I was using my back rooms to prepare food for the kids.

By that time I already had twenty seven volunteers and five hundred and ten children whom I was feeding. The area councilor offered his assistance by writing a letter to the municipality, requesting for a site to operate at since I had quite a number of kids to feed.

The council offered me this land. It was used as an illegal dumping site before. After acquiring the land I realized that I still had challenges. I did not have resources, big pots, finances to build a structure where I was going to prepare the meals and do my administration, because the budget that I had was only for psycho-social support and for paying volunteers and not for building.

In 2010, I entered a competition at one of the clothing shops for building materials. I remember, on the last day of the world cup I received an sms stating that I have won the competition.

I went to the nearest building material shop and showed them the letter that stated that I can use R29, 000 worth of building materials. I managed to buy some concrete slabs and we requested some other guy to draw a plan for three offices, store room, dining room and a big kitchen for us.

Interviewer: How many volunteers did you have when you started?

Interviewee: It was myself, my husband and another lady who passed on, though my husband was working, he would help to prepare the meals in the mornings when he worked night shift. We were three.

Interviewer: When did you receive funding from the Health Department?

Interviewee: In 2010 I received funding from the Department of Health, with that I have managed to appoint twenty three HIV/AIDS volunteers and all in all I had fifty volunteers.

Interviewer: What qualification did your Community Health Workers have when you appointed them?

Interviewee: The first group of twenty three Community Health Workers had an ancillary nursing course; how we recruited them was that some of them brought their CV to the Centre and sometimes we would put advertisements on lamp posts on the street and at the clinic on the notice boards. Seven of them left the facility for greener pastures and were replaced with the ones who only had matric, they were later sent for ancillary courses at one of the FET colleges and basic home-base care courses by the Department of Health.

Interviewer: What were the criteria for their appointment?

Interviewee: We appointed people who reside in the area we are servicing so that should there be any emergency, then the care worker can be called for assistance.

Interviewer: How do you recruit Community Health Workers?

Interviewee: Some bring their CV 's to the facility and sometimes we put adverts on lamp posts to invite candidates to apply for positions.

Interviewer: When you started operating here did you have any health background?

Interviewee: No, I did not have any health background, but I have attended the sixty nine days training that is being offered by the department of health. Because of my limited background on nursing, the facility has appointed a Nurse to advise us on matters that require professional attention. Although the Nurse has got a schedule of how she visits our facility, she is always on call, if there is any matter that needs her attention we call her. The Nurse checks the vitals [blood pressure and temperature] of all patients (bedridden) and advises us on how to treat the patient.

Interviewer: When do you require the assistance of a Nurse?

Interviewee: Our patients have been grouped in three categories: category three being those who are bedridden, category two being those who are on and off [one day they are well and the other day they are very sick] and category 1 are those who take chronic medication including TB patients. The Nurse is required for all category three patients.

Interviewer: How many of your care-workers have attended that training?

Interviewee: Over and above the ancillary nursing course the Community Health Workers had, Four, including myself have received that training and I have five who are now on training on the health post course.

Interviewer: Which areas are you servicing?

Interviewee: We are servicing Mnandini, Chief Mogale, and Kagiso extention 9, 12, 13 and 14.

Interviewer: How do Community Health Workers share the job?

Interviewee: There is an Administrator, who captures all information and keeps records of all patients, and one Coordinator, who supervises Community Health Workers. Community Health Workers works in pairs and each pair

has been allocated an area to work in. For example we have four groups of Community Health Workers in Mnandini and three in Kagiso x12, and one group in kagiso x14, x9, x13 and Chief Mogale. Community health workers report daily to the Coordinator who gives the information to the Administrator for compilation.

Interviewer: How do you get patients?

Interviewee: We get our patients through doing house-to –house visits. The clinic and the Hospital also send us a list of people who default on treatment so that we can monitor them. After identifying the patients, we give the information to the Coordination who jointly conducts the first visit before giving us a go ahead.

Interviewer: How does you normal day look like?

Interviewee: We arrive at 8h00 in the morning, sign in on the attendance register, thereafter we collectively have a morning prayer. After the Morning Prayer we consult with the Coordinator to refill the home-care bag so that it is ready for the visit. The Coordinator records all the items that she gives to us so that she can be able to monitor the stock. After we have refilled our bags we go out to do our home visits. Between 12h00 and 13h00 we all come back to the Centre for lunch. After lunch we report to the coordinator. Those who still have patients who need to have their supper prepared will go bag to prepare supper for those patients and come back the following day.

Interviewer: What rules are there regarding how you should do your work?

Interviewee: The rule is that we should maintain confidentiality between ourselves and our clients. Also, when we arrive at the patient's house, we first have to identify all hazards that could put the health of the patient in danger and deal with them, after we are satisfied that there are no hazards, and then we can bath the patient. It is only after we have made sure that the patient has bathed, eaten and taken his/her medication that we can now clean the house. The rule is that we should leave the patient's house in a clean and healthy condition.re no longer hazards, we should bath the patient

Interviewer: How do you interact with Mogale city Municipality?

Interviewee: Before, I did not have much communication with them. But on the 18th of October, the Mayor was here, he was invited by the Brewery because we are also being sponsored by the Brewery. From that visit we were requested to report to the municipality.

Interviewer: Who are you reporting to, at the municipality?

Interviewee: I don't know the person we are reporting to, they said we should report everything, our challenges, drop-in-center and the home-based care so that they can have a database of how many children and patients do we have, but we don't know the right person whom we should go to.

Interviewer: So, you are keeping the records but you don't know who to give the information to?

Interviewee: We don't know where the information should go to because with Social Development every month we are reporting, even at the Health Department every month we are reporting, but we don't know since with the other two the reports goes together, even for Mogale City they must go together, but we don't know the right person.

Interviewer: When I started with the interviews, I indicated that Mogale City Municipality has got the responsibility of ensuring that your health care waste is disposed of in a proper manner and also to assist you with developing your organization on the health side, have you ever had any interaction with the health officials from Mogale city?

Interviewee: They came here, the first time they were here it was tough, and we did not meet their requirements at all. Remember the presentation in Randfontein about requirements for drop in centres?

Interviewer: Ok, did you first know about the Municipality at that meeting?

Interviewee: No, the inspector was already here by that time we went to the meeting. The Social Department required us to have a health certificate, as a result of that I approached the Mogale health to come and conduct an inspection so that we can get a health certificate. That was when they told me that I did not qualify to get one since my facility was not complying with their requirements. It was true because things were not up to standard, we did not even have windows. The inspector gave me a list of requirements to comply with.

I opened an account at a furniture shop to procure some of the stuff that were mentioned in that report. Now the place looks good, you can even see that in the kitchen.

Interviewer: Do you have any educational materials that you use with regard to the management of health care waste?

Interviewee: No we don't have any educational materials.

Interviewer: Have you even been trained on how to manage health care waste?

Interviewee: No, I have not been trained on how to manage health care waste.

Interviewer: On the sixty nine days training that you have attended, did they not mention anything about how to manage your health care waste?

Interviewee: They did talk about the waste but they were talking about the needles, they said that if we dump the needles anywhere, we should consider the fact that there are people who are living out of waste, who reclaim some articles from the waste dumps for further use. Then if we dump the needles, those people can get injured, which is not right.

Interviewer: What advice did they give you regarding the management of health care waste?

Interviewee: They never gave us any clue of what to do with the waste, because here we do not have needles, we only have gloves because some of them the care workers have got something like a kit, which they go along with to the patients and if the patient have got bed sores they clean them.

Interviewer: What was the highest number of the bed-ridden patients you had during this year?

Interviewee: We had thirteen bed ridden patients, in one month, in June. This is because during the cold months the CD4 count goes down.

Interviewer: Does it mean that the waste that you are generating in the field you bring it back here?

Interviewee: Yes, wastes like nappies, linen savers, gloves, and dressings, we put them in a red plastic bag and we burn it.

Interviewer: You are being funded by the Health Department and the Social Development Department, are you servicing the schools around?

Interviewee: Yes, even the Art & Culture Department for our extra mural activities. The kids are from all the areas, they come in the morning for breakfast and after school. We've got care givers who are responsible to take bread and juice to the schools. It is like I have adopted the whole school where I have identified those two kids. We are also providing meals to three more other schools in the area.

Interviewer: How often do you burn the waste?

Interviewee: We burn them every second day, on Tuesdays, Thursdays and Friday since we cannot leave the waste over the weekend.

Interviewer: What programmes are being offered at this facility?

Interviewee: We've got drum majorettes, assistance with homework, talk show, two support groups, one for the care givers and the one for people living with HIV/AIDS. With the one for the care givers, they have it once a week, we are the first ones to come up with this so that they can share their personal experiences without the interference of the management and then we have a briefing session once a month, I am also part of the briefing session. This is where we discuss all the challenges and experiences encountered during the home visits.

Interviewer: I would like to believe that since you did not know about the health care waste management, you did not discuss about it.

Interviewee: Yes, we did not discuss the health care waste management, because we we did not know about it.

APPENDIX H: Analytical memo for Phase 1a data analysis

Theme: elements of activity system

Category	Comment	source
Subjects	I have been an Environmental Health Practitioner for four years now and I have been with Mogale city for a year and approximately two months.	IJMO
	I've, I would say I have got ±31 years working as an EHP. I have worked with the home-based care facilities for ± 15 years	ISMO
	Environmental Health Practitioner (EHP) offer environmental health services	IMOM
	I'm working here as a supervisor: landfill site. Actually I've, been here from 2003,	IMOL
	I managed to appoint ten Community Health Workers. I had 10 women who helped me to motivate this community. The expanded public works programme started, they gave me eleven Community Health Workers and I had 21 Community Health Workers who were working specifically with patients.	IHBC1
	In 2010, with that I have managed to have twenty three HIV/AIDS volunteers. We appointed people who reside in the area we are servicing so that should there be any emergency, then the care worker can be called for assistance. They do house-to –house visits to identify patients. I already had twenty seven volunteers. The first group of twenty three Community Health Workers had an ancillary nursing course… Seven of them left the facility for greener pastures and were replaced with the ones who only had matric. They were later sent for ancillary courses at one of the FET colleges and basic home-base care courses by the Department of Health. We appointed people who reside in the area we are servicing so that should there be any emergency, then the care worker can be called for assistance. No, I did not have any health background [when I started operating a community home-based care facility], but I have attended the sixty nine days training that is being offered by the department of health. Because of my limited background on nursing. We arrive at 8h00 in the morning, sign in on the attendance register, thereafter we collectively have a morning prayer. After the Morning Prayer we consult with the Coordinator to refill the home-care bag so that it is ready for the visit. The Coordinator records all the items that she gives to us so that she can be able to monitor the stock. After we have refilled our bags we go out to do our home visits. Between 12h00 and 13h00 we all come back to the Centre for lunch. After lunch we report to the coordinator. Those who still have patients who need to have their supper prepared will go bag to prepare supper for those patients and come back the following day	IHBC2
Community	Like your Nutrition, like your Social Development, like your Town Planning Section, look, all relevant stakeholders that needs to be taking part in this. The building inspector as well have to go out there and make comments in terms of the requirements of the structure. the facility is dealing with people who are very sick	ISMO
	Municipal health services is ranging from Environmental Health(EH), then of course I want to mention waste because it forms part of the bulk of the activities, that is part of the environmental health and the landfill management, is part of waste management that I will mention because it forms part of our main activities. Waste inspectors … monitoring and giving support to, to waste management in particular. In waste will be the people in charge as well as the general workers, supervisors, drivers. Those are the people who are involved. Pest control officers, they form part of that. if we look at our machinery, trucks, err, we minimise handling by the general workers, so they just push the trolley, the wheelie bin towards the truck and the truck hooks it	IMOM
	I'm working here as a supervisor: landfill site. Actually I've, been here from 2003… Mogale city absorbed us from that previous company in 2007…at the landfill site we are dealing with waste disposal, everything that's coming from the community that's what we are working with. I oversee the operations, from the weight bridge end up at the work phase, everything that is happening onsite, I must see whether everything is running ok, yes, the complains that is coming from outside we also attend them. Here at the landfill site we are working with waste. It comes from different areas around Mogale City. Here we take all kinds of waste except medical waste, general waste, everything we take here.	IMOL
	Mostly it is the Department of Health that is offering the trainings. The clinic sister selected me amongst the others to go to university of Pretoria to go and study more about this disease and help the orphans who are infected and affected by the disease. The councilor borrowed us this place. University of Pretoria. The social development funded for orphans and vulnerable children. The health post specifically works far away from the clinic, they identify health problems in the community, if they find a sick person, they refer him/her to the community Health Worker, if it is an emergency, the refer the patient directly to the clinic, by the time they arrive at the center, the patient would have already been referred to the clinic, here at the center they just give a report so that the caregivers can make a follow-up.They also deal with patients who are not able to go to the clinics, they link the clinic and the	IHBC1

	patients who are unable to collect treatment. They check vital signs, children under five, and pregnant women. With pregnant women they check the pre and post natal and they check the umbilical cords of the babies if they are healing well. They are also checking the chronic, if they are taking their medication accurately and if they are able to go to the clinics to collect treatment, if they can't, then the health post collect the medication for them. So they work away from the clinic and each health is allocated 150 households to work with. We also have coordinators. The support group is generating income, they are doing hand works, beadwork, crafts and they do home visits twice a week because they have to go and identify people who are living with HIV/AIDS who do not have hope at all, so that they may encourage them that 'you see me, I was like you and now I am have a job, so you can do it' you can stand up and be like me, so come to our center and join the support group so that you will get people who will support you and share the difficulties. Isibindi is a total care of the orphan, they are doing total care of an orphan, they don't have time to start and to finish, even if the family , let me say if the child /children are living with sick people, maybe sick mother or father and they don't have someone who is looking after them even if in the morning to make breakfast and to check if they are right to go to school, they are clean and whatever, this Isibindi programme, this carers of Isibindi, they go as early as half past five or six, they should be there to help the child, to bath the child andf make sure that the shoes are clean, uniform is clean,the child has eaten breakfast and goes to school like any other child. Even if atfter school, the Isibindi carers should go back to that place again to wash the child's uniform, to teach the child how to clean, how to cook, how to do home activities like life skills. The Department of Health is the one that is mostly supporting us on the training and the majority of my caregivers exit the organization through health, because now I have got 10-12 of the Community Health Workers who have left since January last year [2011], they have been placed at the hospitals because of this training, so the ones who have been trained from the Health Post will also be absorbed by the government, they will no longer receive their pay from the facility. So this year they have provided us with ten more Health Post, they are working in Kroomdraai. In fact all the Health Posts in the West rand are part of this facility; they are getting paid from this center. For orphans and vulnerable children, I have ten volunteers, EPWP: eleven, Isibindi: six, support group: eighteen and carers from social: ten. All in all I have seventy two field workers and eight administrative staff including the ones in the kitchen. All in all I have eighty four workers. The 18 that are in the support group were once bed-ridden; they became better after we offered our services. They are part of us; we have got coordinators for health, expanded public works programme, health posts and the one for the orphans. Yes, four coordinators.	
	The area councilor offered his assistance by writing a letter to the municipality, requesting for a site to operate at since I had quite a number of kids to feed. There is an administrator, who captures all information and keeps records of all patients, one coordinator, supervising Community Health Workers. The clinic and the Hospital also send us a list of people who default on treatment so that we can monitor them. After identifying the patients, we give the information to the coordination who jointly conducts the first visit before giving us a go ahead The facility has appointed a Nurse to advise us on matters that require professional attention. Although the Nurse has got a schedule of how she visits our facility, she is always on call, if there is any matter that needs her attention we call her.	IHBC2
Mediating artifacts/Tools	Well to my previous knowledge and experience, I have [worked with Home-based care facilities], when the HBC were still at Provincial Department of Health, we used to work a lot with them. Primarily I had theoretical knowledge, err when you study the course, Environmental health, you are capacitated with as much information as possible, so basically environmental health just does not look at the environment but also look at how the environment affect health, so you will be able to, we've been taught on how to identify and recognize potential hazards that may arise from the environment that may have an adverse health effect, so yah, primarily, err, theoretical knowledge and obviously the knowledge was converted into practice whereby we went out to do experiential training. When we started working here, yah, we were supposedly chaperoned and given the overview of what we need to do, and then our work... it was more like induction sort of. With sharing of knowledge we're trying to capacitate each other with as much info as we possible, for instance, we would be normally send out to workshops whereby certain issues will be discussed, for instance I remember last year we did a workshop on chemical safety whereas most of us had idea on how to tackle industries that deals with hazardous and chemical substances, so information must be shared and those that had inside information disseminated the info to those who had least info , but the beauty of it is that general info is there throughout, everybody have almost more or less the same knowledge and those that have more insight do share with others. We would normally have short seminars; those seminars will be the platforms where information is being shared and knowledge is being distributed, at the end of the day on how to improve them will be, have them more often because they are not as often as we would like to have, so at the end of the day that's how personally I think they should be improved, on a frequent basis, that would result in more information management. We normally have meetings every Friday, supposedly then information is shared legislation will be discussed, policies will be discussed. If somebody finds out new policy or if somebody finds something that's newly promulgated we discuss it and share it with other colleagues.	IJMO

	We've got by-laws that were promulgated in 2011. There is a lot of legislation, for instance we are using the Regulation R918, which fall under the National Health Act… And we've got another regulation… the National building Regulation that talk about the general structure and how it should be constructed, cross ventilation and all that.	
	Legislation here, will be our R918 one, and then the Health… National Building Regulation. We have by-laws that are dealing with nursing homes, one, we have got by-laws that are dealing with the homes for the aged and we have got by-laws that are dealing with accommodation establishment… we've got by-laws that are dealing with health care risk waste. Nobody told me about the how but because of the experience one has got in terms of, you know, visiting other accommodation establishment, so that now one is taking that information from the accommodation establishments, and one is sort of implementing that information to the community home-based care facilities; do you see what I'm saying, so nobody is like, we never went to any school to say that now we build in this, at school. No we never went to school. we share this as and when there is an application to start with and we also share this during our weekly meeting whereby we discuss our, the challenge we come across in terms of the HBC facilities, and of course, err, yah, I think that is it. The culture of sharing information is through one, through meetings, neh, through workshops, right, and through in-service training, yah, that's how we share information and of course at some stage if there are meetings, the very same HBC people say maybe, they want us to come in to give information pertaining to our role. In terms of the by-laws, we have by-laws that are dealing with nursing homes, one, we have got by-laws that are dealing with the homes for the aged and we have got by-laws that are dealing with accommodation establishment so that now then we as EHP's, we are, and then at the same time we've got by-laws that are dealing with health care risk waste.	ISMO
	We do not have legislation in our municipality relating to the health care waste management… Remember, there is a Provincial, Regulations; as such we are duly covered. No we do not have policies or standard operating procedures on how to deal with medical waste. If we look at our machinery, trucks, err, we minimise handling by the general workers, so they just push the trolley, the wheelie bin towards the truck and the truck hooks it. last year when we took it, we singled it out as one of the that we would have liked to do in our SDBIP (service delivery budget implementation plans), it meant that we elevated it, otherwise it was just going to be one of these that we deal with from time to time, so we made sure that every quarter we reported about it, get evidence of what was done and so forth, then there were of course interactions about what was done.	IMOM
	These containers [containers housing the facility] were at the crèche, but they were not being used, they were left by the contractors who once worked here, I don't know what. This site was a dumping site; it was so miserable, full of dirt, so I had to hire a tractor to clean all this place so that we can use it. Yah, so we removed the containers from that side to this side. HIV/AIDS and TB training. They [Department of Health] help me with funding for dry dispensary and for the paying of staff so that people may be encouraged to work with the communities. The social development funded for orphans and vulnerable children. First thing HIV/AIDS training, 69 days training. Seven out of ten were trained on the 69 days training but for the HIV/AIDS all of them have been trained. And then they were also trained for the health post, now I have five who are in training, meaning that I will be having thirteen who are trained on the Health Post programme. If I combine the Community Health Workers and the Health Post, I have 31 health carers all in all. It is the 69 days, Health Post, Frail Care Training, Counseling, and Health Promoters Training. It depends if the patient is totally bed bound and cannot help himself, we have to take, when we go there, take along some pampers, then after bathing him/her, we put on a clean one. We do not have the Programme, I think the first day when you arrive here as a caregiver, you know what is expected of you, through your contract and our job description is also stipulating what you should do. So every day, we normally share information every day during lunch time and if there is anything new that we don't know, we share it, in the morning session we have to be informed about new things. We have got monthly meetings and an annual meeting at the end of the year. Each Community Health Worker has got their books where they are recording their patients, when they do their home–visits, they record everything from the condition of the patients to what they did. I [the manager] sign them every three months, but if I have got time, I sign them on a monthly, but if I have got too much work to do I sign them in three months. I do the evaluation and monitoring and sign. If one of the caregivers book has got problems, I write my comments in the book, so that they can pick up, if it is well done I write well done, if it is excellent I write excellent. When we do door-to-door campaign we need to pass the information and we teach them about sexually transmitted infections (STI), it is like every quarter we do have a door-to-door campaign. In the first quarter we do a campaign about STI, second quarter, HIV/AIDS, third quarter, cancer and the fourth quarter we do TB. We have got a health calendar that we use to do our campaigns. But what we are focusing at is because when I first applied for this organization it was based in HIV/AIDS, the main focus of this organization is on HIV/AIDS and TB. Because TB is related to HIV/AIDS, even though it can be healed on HIV positive patients. The government does not have posters for caregivers, the ones they have are the ones for HIVV/AIDS, cancer, teenage pregnancies, the ones that they normally have at the clinics, but for Community Health Workers, no they don't have them yet, maybe they haven't had the idea of making them for us.	IHBC1

	Workers go along with home care kit that has got hygienic products such as dettol, soap etc., they also take along pampers [disposable nappies].	
	The council offered me this land. It was used as an illegal dumping site before. We applied for the funding from the Health Department. However we were only funded in 2010 …through this funding at least we are now able to trace defaulters and we can also DOT TB patients. There was this nurse who suggested that it will be better if we get the red plastic bag and put the waste inside and seal it before disposing it. We use this thing, a cable tier, we don't put it in the municipal bin, and we burn it in the veld. This is because we are afraid that if sometimes the municipality did not come on time to collect the waste, the children always gain access to the waste and they start playing with it. Then I met a lady in Kagiso who was also cooking for the kids, she offered some advice on how to register my organization and to acquire some funding from the government. I was helped by some lady from Magaliesburg. I was relying on sponsors. No, **I did not have any health background, but I have attended the sixty nine days training** that is being offered by the department of health. Over and above the ancillary nursing course the Community Health Workers had, Four, including myself and I have **five who have been trained** on the health post course. The ones who only had matric, they were later sent for ancillary courses at one of the FET colleges and basic home-base care courses by the Department of Health. We get our patients through doing house-to –house visits. They came here, the first time they were here it was tough, and we did not meet their requirements at all. Remember the presentation in Randfontein about requirements for drop in centres. The Social Department required us to have a health certificate. , as a result of that I approached the Mogale health to come and conduct an inspection so that we can get a health certificate. That was when they told me that I did not qualify to get one since my facility was not complying with their requirements. The inspector gave me a list of requirements to comply with. I opened an account at a furniture shop to procure some of the stuff that were mentioned in that report. Now the place looks good, you can even see that in the kitchen. No we don't have any educational materials. No, I have not been trained on how to manage health care waste. They did talk about the waste but they were talking about the needles, they said that if we dump the needles anywhere, we should consider the fact that there are people who are living out of waste, who reclaim some articles from the waste dumps for further use. Then if we dump the needles, those people can get injured, which is not right. They never gave us any clue of what to do with the waste, because here we do not have needles, we only have gloves because some of them the care workers have got something like a kit, which they go along with to the patients and if the patient have got bed sores they clean them. We are being funded by the Health Department and the Social Development Department and the Art & Culture Department We burn them every second day, on Tuesdays, Thursdays and Friday since we cannot leave the waste over the weekend Yes, we did not discuss the health care waste management, because we we did not know about it.	IHBC2
Rules	EHP was, we were not in the picture of this HBC facilities, right, we were totally not in the picture, as a result you know even if we were but it would be a drop in the ocean, if ever we were in the picture. But because now, now the demand is such that we have to be involved on a regularly basis. Sort of something like, what we call it a day to day, sort of a day to day thing, because you know, err, because of the dynamic changes that are taking place , we find ourselves constantly involved with HBC as compared to five years before.	ISMO
	We have got the security down there, we have got almost four to six security guards, if they find you with that material we suspend you onsite for certain amount of weeks, you must remember this people they are almost working for themselves, every day they are supposed to have the money, so if we give you a week without the money, so that there is something that you can't take food so easily	IMOL
	You can't do home visits alone especially if you are a female caregiver.	IHBC1
	The rule is that we should maintain confidentiality between ourselves and our clients. Also, when we arrive at the patient's house, we first have to identify all hazards that could put the health of the patient in danger and deal with them, after we are satisfied that there are no hazards, and then we can bath the patient. It is only after we have made sure that the patient has bathed, eaten and taken his/her medication that we can now clean the house. The rule is that we should leave the patient's house in a clean and healthy condition.re no longer hazards, we should bath the patient. We appointed people who reside in the area we are servicing so that should there be any emergency, then the care worker can be called for assistance. Yes, wastes like nappies, linen savers, gloves, and dressings, we put them in a red plastic bag and we burn it.	IHBC2
Division of labor	Each and every Environmental Health Practitioner has got their own area …I am working kagiso.	IJMO
	In our section, unfortunately the work is not divided, why I say so is because you know, as an EHP I am required to do everything that pertains to the work of the EHP, in other words we are not sort of specializing hat is now maybe one EHP dealing with vector control, the other EHP dealing with the burial of the dead, the other one dealing with food safety, so every inspector or every EHP is doing everything according to the scope of profession	ISMO

	We are servicing Swaneville as a whole; we are the only organization that is being funded by the Health Department. The whole of Swaneville is ours that is why they have also given us the Health Post because they have realized that the area is too big for ten Community Health Workers, and then they added the Health Post. The **Health Post** specifically works far away from the clinic, they identify health problems in the community, if they find a sick person, they refer him/her to the caregivers, if it is an emergency, the refer the patient directly to the clinic, by the time they arrive at the center, the patient would have already been referred to the clinic, here at the center they just give a report so that the caregivers can make a follow-up.They also deal with patients who are not able to go to the clinics, they link the clinic and the patients who are unable to collect treatment. They check vital signs, children under five, and pregnant women. With pregnant women they check the pre and post natal and they check the umbilical cords of the babies if they are healing well. They are also checking the chronic, if they are taking their medication accurately and if they are able to go to the clinics to collect treatment, if they can't, then the health post collect the medication for them. So they work away from the clinic and each health is allocated 150 households to work with. In each group we have got two Community Health Workers who assist each other, for example, if we've got a heavy weight patient, one care- giver cannot be able to lift him alone, so we need two to assist each other and for safety again. Another thing is that we are doing this for safety. Our coordinator is the one who is keeping the records. The caregivers report to the coordinator at the end of each day if they have identified new patients and the coordinator go out with them to verify if the patient is bed ridden or not before they can put his name in the register of those who require a daily service. Each Community Health Worker has got their books where they are recording their patients, when they do their home–visits, they record everything from the condition of the patients to what they did. I [the manager] sign them every three months, but if I have got time, I sign them on a monthly, but if I have got too much work to do I sign them in three months. I do the evaluation and monitoring and sign. If one of the caregivers book has got problems, I write my comments in the book, so that they can pick up, if it is well done I write well done, if it is excellent I write excellent. The **support group** is generating income, they are doing hand works, beadwork, crafts and they do home visits twice a week because they have to go and identify people who are living with HIV/AIDS who do not have hope at all, so that they may encourage them that 'you see me, I was like you and now I am have a job, so you can do it' you can stand up and be like me, so come to our center and join the support group so that you will get people who will support you and share the difficulties They [**Carers from Social Services**] identify the orphans who are under the grannies, to help them with homework, doing different activities during and after school, teaching them how to read, if they have problems with vital documents, they help them with that. So they work away from the clinic and each health is allocated 150 households to work with. **Isibindi** is a total care of the orphan, they are doing total care of an orphan, they don't have time to start and to finish, even if the family , let me say if the child /children are living with sick people, maybe sick mother or father and they don't have someone who is looking after them even if in the morning to make breakfast and to check if they are right to go to school, they are clean and whatever, this Isibindi programme, this carers of Isibindi, they go as early as half past five or six, they should be there to help the child, to bath the child andf make sure that the shoes are clean, uniform is clean,the child has eaten breakfast and goes to school like any other child. Even if atfter school, the Isibindi carers should go back to that place again to wash the child's uniform, to teach the child how to clean, how to cook, how to do home activities like life skills. They [**EPW**] are also working with orphans and vulnerable children (OVC), they do home visits for OVC, they can also go to the school and negotiate school fees if the parents cannot afford to pay school fees, if the children don't have uniform, they should identify them and come back to report so that we can give the children the uniform. We help each other, since we've got four programs, because we are working with orphans and vulnerable children and with people with HIV/AIDS, it is something that we do on a daily basis, so anywhere we can get people who require our help, for the fact that the community recognizes us they are also able to refer people to us, it is easy for the community members to refer people to us since they know what we are doing, sometimes we identify patients when we are doing home visits and neighbors also inform us about people who needs our help and also during door-to- door campaign we identify people who needs our help. We also get referrals from the clinic.	IHBC1
	There is an administrator, who captures all information and keeps records of all patients, one coordinator, supervising community health workers and Community Health Workers who works in pairs and each pair has been allocated an area to work in. for example there are four groups in Mnandini and Kagiso x12, two groups in kagiso x14 and one group in kagiso x9 and 13. Community health workers report daily to the coordinator who gives the information to the administrator for compilation. Community health workers do door-to–door visits to identify patients in their allocated areas and report them to the Coordinator who verifies the patient before a service can be provided. The Nurse checks the vitals [blood pressure and temperature] of all patients (bedridden) and advises us on how to treat the patient. The Nurse is required for all category three patients. We've got two support groups, one for the care givers and the one for people living with HIV/AIDS. With the one for the care givers, they have it once a week, we are the first ones to come up with this so that they can share their personal experiences without the interference of the management and then we have a briefing session once a month, I am also part of the briefing session. This is where we discuss all the challenges and experiences encountered during the home visits.	IHBC2

Objects	I'm there to educate, to capacitate the community at large, basically we work as facilitators, we work as educators, and we work as promoters, and yah, we're striving to reach the outcome which is primarily supervision.	IJMO
	In terms of safety to start with, I need to look at the structure, then structurally, whether the premises comply structurally.	ISMO
	The purpose of [Waste Inspectors] was to ensure that they are aware that their waste does not join the, err, general mainstream of waste of the municipality... to advise them accordingly, those who were not using the accredited service providers. It had been the provincial health facilities that are your hospitals in our area, the clinics, private clinics, the private hospitals; they also went to the pharmacies, the mortuaries. Medical waste generators in the area.	IMOM
	During that time I was selected to be a coordinator for the West Rand. I was assigned by Khomanani, because the training was from Khomanani, to make workshops for six consecutive days, but I decided to do the workshops in three months. Community Health Workers deal with bed-ridden and home-bound patients as well as TB patients, they DOT, people. They make sure that they take medication accurately, the directly observe them while they take their medicine. ... bed bound or bed ridden, are those who cannot get out of the bed. So Community Health Workers. They make sure that every morning these people gets help, if they need to be bathed, they go out to their respective homes and provide service patients require. When we find a patient with bed-sores, we bath them, allow them to dry, then we gently apply the sulf, allow it to dry before we dress the patient. Yes we bath them, clean for them, do their laundry; and we also change their night clothes and make sure that they are always clean. I was teaching them physiology and anatomy, teaching them to take vital signs, so that at least they should be in a higher standard and operate like professionals and for them to know that they should measure, handle and store the muti in a hygienic manner, protected from all the contaminations. **They [CHW] deal with bed-ridden and home-bound patients as well as TB patients, they DOT, people. They make sure that take take medication accurately, the directly observe them while you take the medicine.** **if we have more bed-ridden patients, it is normally between eleven and twelve, we never had twenty bed-ridden**	IHBC1
	We started as a drop-in –center, only for HIV/AIDS children, orphans and vulnerable children. We later in 2007 decided to convert the center into a home-based care since the parents of the children we were assisting here did not have any help anywhere since were not yet under health. We use this thing, a cable tier, we don't put it in the municipal bin, and we burn it in the veld. This is because we are afraid that if sometimes the municipality did not come on time to collect the waste, the children always gain access to the waste and they start playing with it. We had thirteen bed ridden patients, in one month, in June. This is because during the cold months the CD4 count goes down. Our patients have been grouped in three categories: category three being those who are bedridden, category two being those who are on and off [one day they are well and the other day they are very sick] and category 1 are those who take chronic medication including TB patients.	IHBC2
contradictions	So lack of awareness does result in an adverse effect on my work, it somehow degenerate and degrade my work because at the end of the day I'm there to teach people that are not aware of things that they need to do and of the things that they are not aware of. when it comes to lack of awareness and lack of insight, it results in the facilities probably not being properly managed, when they would do their own at their own time, for instance when we certificate we get certain things, like for example, medical waste, if these people are not councientised on how to handle and store medical waste it will ultimately lead or end up in our municipal refuse whereby it will ultimately be thrown or discarded off to our landfill site. Like for instance, medical waste could probably land up in somebody's backyard which is not allowed, and then the way their food is being prepared, we could have casualties, for instance, if people, food handlers and staff are not properly trained and are not properly kept up to date on what they need to do. They are not taught on five keys to safe food handling and safe food processing, people will end up being sick, for instance people will just cook, and they wouldn't know on how to serve the food and how to probably distribute the food, how to store the food, and so forth, and so on, at the end of the day, these people need to be aware of what they are doing You find that the place is obviously there functional and probably is not compliant, so when it comes to enforcement of the policies and the by-laws, it is a bit of a difficult situation because at the end of the day the place is there already, and if it is non-compliant, people can't be thrown out, and we don't have a legal framework where we can enforce them to say that these people have, the facility need to shut down and people need to be removed as the place is not compliant, at the end of the day the main challenge will be law enforcement when it comes to places of care, so we can't prosecute or penalize that facility. It is a challenge, because now we are looking at the home-based care facilities, and now we are using the places, err, nursing homes, so we are trying to incorporate two thing that are not the same but now we're trying to work, we're striving to reach the outcome which is primarily supervision...so it is a challenge, we need to have a specific guideline that will cover such places.	IJMO

	So that now we as EHP's we need to look at all these by-laws and then try and find out exactly. what is common in all of that, when we look at the nursing homes, your home for the aged, something that is common is that on each of these, one, they need to have a health certificate, so now if the they need to a health certificate. First and foremost community home-based care facilities came about as a result of HIV & AIDS, neh, so as a result EHP's were previously concentrating on management of healthcare risk waste from public and private health institutions, with the emergence of HIV & AIDS, we have to deal with healthcare risk wastes from community home-based care facilities, which are not generated in one fixed property, but from different houses throughout the townships. The regulations that we have are those dealing with the nursing homes and homes for the aged, not exactly with community home-based care facilities, so that why now it's like we are taking bits there, bit there, just to bring out something sort of concrete for our situation. It will be non-compliance to the health requirements. Because once **there is no sharing of information** then, it means people will be ignorant as a result they won't know exactly what is expected of them if as and when they intend opening up the HBC, right, one, or if they are running the HBC, they wouldn't really know what is expected of them, what must they do should they, say for argument sake if maybe they come across an environmental Health problem, then because there was no sharing of information with the EHP, then, they won't be knowing exactly what is expected of them in order to overcome that particular problem that they are having.	ISMO
	The Nurse suggested that it will be better if we get the red plastic bag and put the waste inside and seal it before disposing it. We use this thing, a cable tier, we don't put it in the municipal bin, and we burn it in the veld. Yes, wastes like nappies, linen savers, gloves, and dressings, we put them in a red plastic bag and we burn it. We burn them every second day, on Tuesdays, Thursdays and Friday since we cannot leave the waste over the weekend.	IHBC2
	Those kinds of things [dead babies] will always get to the landfill, this is, err, they will end up at the landfill.	IMOM

APPENDIX I: Phase 1B analysis according to research questions

1B IJMO

INTERVIEW: JUNIOR ENVIRONMENTAL HEALTH PRACTITIONER

Interviewer: Morning Mr. Environmental Health Practitioner, I'm Priscilla Masilela, I'm a student at Rhodes University, I am conducting a study regarding knowledge sharing between the municipality and the home-based care specifically when dealing with health care waste management issues. So I am going to ask you some questions, and I will require to give me as much information as you can and be as specific as you can when answering these questions, my first question that I'll ask you is that, how long have you been working as an Environmental Health Practitioner, and how long have you been working in this organization-Mogale city Municipality?

Interviewee: Ok, I have been an Environmental Health Practitioner for four years now and I have been with Mogale city for a year and approximately two months.

Interviewer: Ok, and then, do you know your role as an Environmental Health Practitioner on how you can deal with Home-based care centers.

Interviewee: Well, yes I think when it comes to my role as an Environmental Health Practitioner, I do know my role when working with home-based care centers; err, basically looking at the nine municipal health functions, it's one of the surveillance of premises. Err, basically when we go out we look at certain things. For instance in this current municipality that we are working in, we've got by-laws that were promulgated in 2011, when we look at places of care, we look at, supposedly nursing homes, Chapter 14 of the by-law, we look primarily at the places where, the accommodation facilities, maybe the waiting rooms or the wards to put it right, yah, we look at the kitchen, you look at the waste management, we look at the health care waste management, and, err, we look at, in different rooms for instance the bedrooms or places where they sleep, we look at ventilation, the room itself how big it is, we probably measure the room and probably say how many beds should be put in that room err, yah, that's basically that.

Interviewer: Ok, like, err; the other senior Environmental Health Practitioner mentioned that each and every Environmental Health Practitioner has got their own area, which area are you covering?

Interviewee: I am working kagiso.

Interviewer: Kagiso, ok, do you have Home-Based Care Facilities centers in kagiso?

Interviewee: At the moment I don't have anything.

Interviewer: You don't have?

Interviewee: No, well it is not places of care they don't offer 24 hour provision, it's more like day in facility, whereby the elderly come and they probably given food and they exercise and then after that they go to their respective homes.

Interviewer: So you have never done an inspection at a Home-based Care Facilities?

Interviewee: Well to my previous knowledge and experience, I have, when the home-based care facilities were still at Provincial Department of Health, we used to work a lot with them.

Interviewer: So, what were you looking at?

Interviewee: Well we like I said, we were looking at the facility itself, for instance if the number of people that the place can accommodated, err, their daily routine activities, like how they care for the frail and for the elderly people, so yah, that was that and unfortunately with my experience it was not for long because at the end of the day they were taken out of the province and given over to the local authority

Interviewer: And then, like you mentioned the by-laws do you have any other set of legislation that you are using when dealing with the Home-Based Care Facilities centres?

Interviewee: Well, there is a lot of legislation, for instance we are using the Regulation R918, which fall under the National Health Act, err, basically R918 talks about the general hygiene for food premises where people are being fed, actually. So basically it means that food is being prepared for them, all of that. So basically what we do when we look at the R918 we get certain requirements that are stipulated in the regulation, for instance, the food preparation area talks about and is also addressing food handlers and staff and how food should be kept and stored under, err, refrigeration facilities, it talks about temperature control of the fridge and, yah, so forth. And we've got another regulation that can also be looked into is the National building Regulation that talk about the general structure and how it should be constructed, cross ventilation and all that.

Interviewer: Ok and how did you know about all this, did you go to school or when you started working was there any induction that was given to you?

Interviewee: Well. Primarily I had theoretical knowledge, err when you study the course, Environmental health, you are capacitated with as much information as possible, so basically environmental health just does not look at the environment but also look at how the environment affect health, so you will be able to, we've been taught on how to identify and recognize potential hazards that may arise from the environment that may have an adverse health effect, so yah, primarily, err, theoretical knowledge and obviously the knowledge was converted into practice whereby we went out to do experiential training, so yah…

Interviewer: So, but when you started working for the municipality, was there anyone who told how to do things, or what happened?

Interviewee: When we started working here, yah, we were supposedly chaperoned and given the overview of what we need to do, and then our work… it was more like induction sort of. Yah.

Interviewer: err, what is your organizational culture regarding sharing of knowledge?

Interviewee: Well, with sharing of knowledge we're trying to capacitate each other with as much info as we possible, for instance, we would be normally send out to workshops whereby certain issues will be discussed, for instance I remember last year we did a workshop on chemical safety whereas most of us had idea on how to tackle industries that deals with hazardous and chemical substances, so information must be shared and those that had inside information disseminated the info to those who had least info , but the beauty of it is that general info is there throughout, everybody have almost more or less the same knowledge and those that have more insight do share with others.

Interviewer: How do you share?

Interviewee: err, well, we normally have meetings every Friday, supposedly then information is shared legislation will be discussed, policies will be discussed. If somebody finds out new policy or if somebody finds something that's newly promulgated they will discuss it and share it with other colleagues

Interviewer: What are the impacts of lack of awareness regarding the relation with Home-Based Care Facilities?

Interviewee: Well with, when it comes to lack of awareness and lack of insight, it results in the facilities probably not being properly managed, when they would do their own at their own time, for instance when we certificate we get certain things, like for example, medical waste, if these people are not councientised on how to handle and store medical waste it will ultimately lead or end up in our municipal refuse whereby it will ultimately be thrown or discarded off to our landfill site. And when you look at medical waste it's normally hazardous substances, we've got needles, and we've got your, your tissues, human tissues, we've got so many things that you can come across. So at the end of the day if these people are not trained, if these people are not councientised, and are not made aware of how they need to run their facilities, a lot of things will just result everywhere, like for instance, medical waste could probably land up in somebody's backyard which is not allowed, and then the way their food is being prepared, we could have casualties, for instance, if people, food handlers and staff are not properly trained and are not properly kept up to date on what they need to do, they are not taught on five keys to safe food handling and safe food processing, people will end up being sick, for instance people will just cook, and they wouldn't know on how to serve the food and how to probably distribute the food, how to store the food, and so forth, and so on, at the end of the day, these people need to be aware of what they are doing, they need to be err, err be coucientised basically on how to run their facilities, for instance we don't want the people that are in those places of care, we obviously know that most of them are vulnerable, immune-compromised or frail people, so at the end of the day we don't want those people to be sick , if they are supposed to be cared for, at the end of the day it is very, very crucial that these people that runs these places are being ,made aware of what they need to do.

Interviewer: Ok and how does that affect your work, how does the lack of awareness affect your work as an Environmental Health Practitioner?

Interviewee: it affects my work basically because at the end of the day I'm there to educate, to capacitate the community at large, basically we work as facilitators, we work as educators, and we work as promoters, and yah, so lack of awareness does result in an adverse effect on my work, it somehow degenerate and degrade my work because at the end of the day I'm there to teach people that are not aware of things that they need to do and of the things that they are not aware of.

Interviewer: ok, err, do you have any knowledge sharing systems in your organization, if they are there how do you think that you should improve

Interviewee: well, we would normally have short seminars; those seminars will be the platforms where information is being shared and knowledge is being distributed, at the end of the day on how to improve them will be, have them more often because they are not as often as we would like to have, so at the end of the day that's how personally I think they should be improved, on a frequent basis, that would result in more information management.

Interviewer: the other senior official mentioned that in your meetings you normally discuss the challenges that you experience while you doing the Home-Based Care Facilities inspections, can you share with us what kind of challenges do you normally discuss in your meetings?

Interviewee: When it comes to challenges that we normally discuss, you find that the place is obviously there functional and probably is not compliant, so when it comes to enforcement of the policies and the by-laws, it is a bit of a difficult situation because at the end of the day the place is there already, and if it is non-compliant, people can't be thrown out, and we don't have a legal framework where we can enforce them to say that these people have, the facility need to shut down and people need to be removed as the place is not compliant, at the end of the day the main challenge will be law enforcement when it comes to places of care, so we can't prosecute or penalize that facility.

Ok, the senior Environmental Health Practitioner mentioned something about your organization not having a by-law that is specific to the Home-Based Care Facilities centers; do you also see that as a challenge?

Interviewee: It is a challenge, because now we are looking at the home-based care facilities, and now we are using by-laws for nursing homes, so we are trying to incorporate two thing that are not the same but now we're trying to work, we're striving to reach the outcome which is primarily supervision…so it is a

APPENDIX J: Analytical memo for Phase 1B data analysis

ANALYTIC MEMO 1B

PHASE 1B CATEGORIES

THEME 1: MUNICIPAL OFFICIALS' KNOWLEDGE BASES REGARDING THEIR ROLES AND RESPONSIBILITIES IN RELATION TO COMMUNITY HOME-BASED CARE WORKER'S HEALTHCARE RISK WASTE MANAGEMENT PRACTICES

- What do they know about health care waste management
- What do they know about community home-based care services /environmental health services
- The roles and responsibilities in relation to health care waste management

THEME 2: KNOWLEDGE SHARING PRACTICES

- How knowledge is imparted
- Frequency of knowledge sharing

THEME 3: THE EXTENT TO WHICH KNOWLEDGE-SHARING PRACTICES ARE SYSTEMATISED AND INSTITUTIONALISED

- What are the practices

THEME 4: CONSEQUENCES OF KNOWLEDGE-SHARING PRACTICES ON HEALTHCARE RISK WASTE MANAGEMENT PRACTICES BY COMMUNITY HOME-BASED CARE FACILITIES

THEME 5: THEME 5: RELATION WITH EACH OTHER

THEME 6: SYSTEMICTENSIONS AND CONTRADICTIONS INFLUENCING KNOWLEDGE-SHARING PRACTICES

THEME 1: MUNICIPAL OFFICIALS' KNOWLEDGE BASES REGARDING THEIR ROLES AND RESPONSIBILITIES IN RELATION TO COMMUNITY HOME-BASED CARE WORKER'S HEALTHCARE RISK WASTE MANAGEMENT PRACTICES

what do they know about health care waste management	It's normally hazardous substances, **we've got needles… human tissues**, we've got so many things that you can come across. **.. if these people are not trained**, if these people are not councientised, and are not made aware of how they need to run their facilities… **medical waste could probably land up in somebody's backyard which is not allowed.**	IJMO
	In terms of safety to start with, I need to look at the structure, then structurally, whether the premises comply structurally, now when we talk about structurally we mean, ventilation, cross ventilation, lighting and that the structure is of approved building plans and things like that. And then from there you come into accommodation, right, how are the people accommodated, are they accommodated in such a way that there is no overcrowding, you know, in other words we need to ensure that there is no overcrowding because of should there be overcrowding, then we have infectious diseases that they can catch up. And then we need to see to it that they have enough ablution facilities, do they have Potable water, that's of outmost importance, portable water and ablution facilities, and then, do they have refuse removal system, right, I think roughly that is it, those will be my concerns, definitely those will be my concern.	ISMO
	The **provincial health facilities that are your hospitals…the clinics, private clinics, the private hospitals …pharmacies, the mortuaries [are the generators who must get accredited service providers].**	IMOM
	We used to find medical waste, it was coming from the hospital, but at the moment I have never found any medical waste since we engaged with that organization. I never had healthcare waste in the domestic trucks, this is because the waste comes in compacted and will never know where it comes from since they collect in big areas, yah, is difficult on that one	IMOL

	No, that is why I am saying, w**hen the wastes from the households arrive here, they are already mixed up..** you find lot of things, yah, even the babies, so in the compactors **you can't estimate what you will find**, even the hand grenades, ammunition, you find a lot of things in the compactor, yes, but now you can't establish where is coming from because compactor it takes lot of the streets and cleaning there, so you can't have clarity where actually is coming from. So that one from the hospital was easy because it comes in the skip containers. When the re-claimers open the plastic bags and find medical waste they inform us. We never received such a case [whereby one of the re-claimers has been pricked by any injection] **I don't know the difference**, but **actually it's a waste**, but now coming to anything that's medically that is we refer it, but waste, we can clarify the waste. [disposing panado medicine bottle in the general waste] is part of medical waste because anytime can someone can take it that thing	
	It is the gloves and the cotton wools etc... **what we knew is that after we have used the materials, we should dispose them in the refuse bin, we did not see the importance of keeping records of these waste.**	IHBC1
	Our challenge is that the waste that we are generating like the gloves, and so forth, we don't know where to put them. **Wastes like nappies, linen savers, gloves, and dressings**, we put them in a red plastic bag and we burn it. **We did not discuss the health care waste management, because we did not know about it**. They did talk about the waste but they were talking about the needles, they said that if we dump the needles anywhere, we should consider the fact that there are people who are living out of waste, who reclaim some articles from the waste dumps for further use. Then if we dump the needles, those people can get injured, which is not right. They never gave us any clue of what to do with the waste, because here we do not have needles, we only have gloves because some of them the care workers have got something like a home-care kit, which they go along with to the patients and if the patient have got bed sores they clean them.	IHBC2
What do they know about each other	It's one of the surveillance of premises. At the moment I don't have anything. well it is not places of care they don't offer 24 hour provision, it's more like day in facility, whereby the elderly come and they probably given food and they exercise and then after that they go to their respective homes. We were looking at the facility itself, for instance if the number of people that the place can accommodated, err, their daily routine activities, like how they care for the frail and for the elderly people, so yah, that was that and unfortunately with my experience it was not for long because at the end of the day they were taken out of the province and given over to the local authority At the moment I don't have anything.	IJMO
	such people they, err, they'd be people that are handling gloves you know some gauze and thing like that so now these things should be such that they are properly disposed so that at the end of the day they mustn't land at our landfill site. is something that is sort of a center and then if it is a center, we have people who are now getting out to provide the services to the people that need services, if ever there are people that are on the premises, they can be maybe a few, but otherwise normally how it works is that there are people, the caregivers go out to meet the people that are affected, so there's no transportation of food.	ISMO
	We relate to them in the sense that, since we are also running a drop-in-center, we are required to have the food handling certificate and the health certificate, so we had to go to them to get help of those certificates.	
Knowledge of roles and responsibilities in relations to healthcare waste management	Ensuring the proper storage, treatment, collection, transportation, handling and disposal of medical waste and hazardous waste;	Doc
	As the EHP we look in terms of the size of the facility, we look in terms of the ventilation, whether has it got the proper ventilation, we need to have rooms that are properly cleaned rooms that are properly disinfected, people, the caregivers, ensure that the caregivers are also protected, themselves in terms of they do wear their gloves, they do wear masks and things like that.	ISMO
	To register all the generators, **establish a database for them**, which I think we have completed doing. The purpose of that was **to ensure that they are aware that their waste does not join the, err, general mainstream of waste of the municipality. to advise them accordingly**, those who were not using the accredited service providers.	IMOM
		IMOL
	Exactly [I trained them on] HIV/AIDS and TB, so that they can have an understanding because they were just healing people not knowing that, especially the symptoms of TB. They deal with bed-ridden and home-bound patients as well as TB patients, they DOT, people. They make sure that they take medication accurately; they directly observe them while thet take the medicine.	IHBC1
	The waste that we are generated like the gloves, and so forth, we didn't know where to put them, but there was this nurse who suggested that it will be better if we get the red plastic bag and put the waste inside and seal it before disposing it.	IHBC2

THEME 2: KNOWLEDGE SHARING PRACTICES

Category	Comment	Source
How is knowledge imparted, and by whom?	Well to my **previous knowledge and experience**, I have, when the home-based care facilities were still at Provincial Department of Health, we used to work a lot with them. Primarily **I had theoretical knowledge**, err when you study the course, Environmental health, you are capacitated with as much information as possible, so basically environmental health just does not look at the environment but also look at how the environment affect health, so you will be able to, **we've been taught on how to identify and recognize potential hazards that may arise from the environment that may have an adverse health effect**, so yah, primarily, err, theoretical knowledge and obviously the knowledge was converted into practice whereby we went out to do experiential training, so yah… When we started working here, yah, **we were supposedly chaperoned and given the overview of what we need to do, and then our work… it was more like induction sort o**f with sharing of knowledge **we're trying to capacitate each** other with as much information as possible, for instance, **we would be normally send out to workshops** whereby certain issues will be discussed… so information must be shared and **those that had inside information disseminated the info to those who had least info,** but the beauty of it is that general info is there throughout, **everybody have almost more or less the same knowledge and those that have more insight do share with others.** **We normally have meetings every Friday**, supposedly then information is shared legislation will be discussed, policies will be discussed. **If somebody finds out new policy or if somebody finds something that's newly promulgated they will discuss it and share it with other colleagues.** Well, **we would normally have short seminars**; those seminars will be the platforms where information is being shared and knowledge is being distributed,	IJMO
	No there's nobody, nobody told me about the how but because of the experience one has got in terms of, you know, visiting other accommodation establishment, so that now one is taking that information from the accommodation establishments, and one is sort of implementing that information to the HBC; do you see what I'm saying, so nobody is like, we never went to any school to say that now we build in this, at school. No we never went to school. The culture of sharing information is through one, through meetings, neh, through workshops, right, and through in-service training, yah, that's how we share information and of course at some stage if there are meetings, the very same HBC people say maybe, they want us to come in to give information pertaining to our role. I think this can be improved through regular meetings, through regular workshops, through err, you know, meetings, through what we call, through trainings and also involvement other stakeholders like your Nutrition, like your Social Development,	ISMO
	I think the information will always be on the database, but you can access the data that they have compiled.	IMOM
	We engage the, our staff in the meetings. But because we've got spotters, like the re-claimers we engage them in the meetings so that if they see something like injections and blood and whatever, something that is coming from the hospitals they must tell the spotters, the spotters will stop the operation in that particular place so that we inform our people to come and see and take over on that to remove it. [to identify where the bins comes from] we ask the drivers where the bin comes from. That one is a challenge, [sharing knowledge Environmental Health Practitioners and the Waste Officers] yah, for us because there is no meetings that's being done, if I have got a meeting I have got meeting with people I am working with, if there is management meeting we discussing budgets, we can't even discuss what's happening at the landfill site, yah, we don't have meetings where we are engaging the other officials. No [we do not have systems regarding sharing of knowledge between the landfill site, waste collection and the other officials within the department] that is why I was saying communication in our department is something that is not happening, coming to the laws, by-laws of Mogale city somewhere somehow is supposed to be done and so if something is in writing it is easy for us to implement it, so that we don't have anything in place, yes, so you come into knowledge you share it, but there is nothing in writing. No [there are no records] we just share anything, with experience or sometimes you read in the internet, if you see that thing can be done or is working you share it with your staff. I can say we have got the systems even though it is not in writing, because when we are in a meeting with these people who are working down here, I am able to explain to them that if they find things that are not supposed to be there, dead babies and so on, that procedurally what it is that they must do. We discuss that in the meetings. I think we must sit down and discuss so that everybody must have access to that information. Let's have policies in place. The communication that is the thing that will make life easier to us, that is the thing, there is no communication in Mogale City The landfill monitoring committee is still running its only that it is not frequent, since we are starting with the new specialist, he is busy organising that committee to be together. [new employees] we induct them, we tell them what they are supposed to do, what we expect from them, yah, whether we accommodate you, you must know, that is the landfill site you must be the rainy season you must be there, if it is hot you must be there, if it is dusty you must be	IMOL

	there, so you must accommodate whatever, if you say no, I will accommodate that we will accommodate you.	
	The department of health, the clinic sister selected me amongst the others to go to university of Pretoria to go and study more about this disease and help the orphans who are infected and affected by the disease. the training was from Khomanani. I did the training to train the traditional healers in Khotso House in Johannesburg. The Department of Health is the one that is mostly supporting us on the training. Community Health Workers received training on HIV/AIDS, 69 days training… they were also trained for the Health Post… Health Post programme… Frail Care Training, Counseling, and Health Promoters Training. We keep the records of our patients, we've got a book where we record the patients; our coordinator is the one who is keeping the records. The caregivers report to the coordinator at the end of each day if they have identified new patients and the coordinator go out with them to verify if the patient is bed ridden or not before they can put his name in the register of those who require a daily service. Actually, we do not have the Programme, I think the first day when you arrive here as a caregiver, you know what is expected of you, through your contract and our job description is also stipulating what you should do. the government does not have posters for caregivers, the ones they have are the ones for HIVV/AIDS, cancer, teenage pregnancies, the ones that they normally have at the clinics, but for Community Health Workers, no they don't have them yet, maybe they haven't had the idea of making them for us.	IHBC1
	I met a lady in Kagiso who… offered some advice on how to register my organization and to acquire some funding from the government. To make a constitution for my organization… I was helped by some lady from Magaliesburg. The first group of twenty three Community Health Workers had an ancillary nursing course; Seven of them left the facility for greener pastures and were replaced with the ones who only had matric, they were later sent for ancillary courses at one of the FET colleges and basic home-base care courses by the Department of Health. I did not have any health background, but I have attended the sixty nine days training that is being offered by the department of health. Because of my limited background on nursing, the facility has appointed a Nurse to advise us on matters that require professional attention. The Nurse suggested that it will be better if we get the red plastic bag and put the waste inside and seal it before disposing it. Over and above the ancillary nursing course the Community Health Workers had, Four, including myself have received that training and I have five who are now on training on the health post course. No we don't have any educational materials. No, I have not been trained on how to manage health care waste. They did talk about the waste but they were talking about the needles, they said that if we dump the needles anywhere, we should consider the fact that there are people who are living out of waste, who reclaim some articles from the waste dumps for further use. Then if we dump the needles, those people can get injured, which is not right. They never gave us any clue of what to do with the waste, because here we do not have needles, we only have gloves because some of them the care workers have got something like a kit, which they go along with to the patients and if the patient have got bed sores they clean them.	IHBC2
Frequency of sharing knowledge	We normally have **meetings every Friday.** **If somebody finds out new policy or if somebody finds something that's newly promulgated they will discuss it and share it with other colleagues.**	IJMO
	We share this as and when there is an application to start with and we also share this during our weekly meeting whereby we discuss our, the challenge we come across in terms of the HBC facilities, and of course, err, yah, I think that is it.	ISMO
	No, I'm saying, yes [**there hasn't been much information sharing**] with regard to medical waste nothing has been done, not much has been done, there is something that we are now doing but we haven't done much, but we when it comes to information sharing, oh….. Because we, like for example, when they were busy with the capturing of this, err, medical waste generators in the area, we were sharing , you know, also with them what is the observations, err, they were saying you know, what comes up now is that some of these people are not even aware that they are supposed to register and get the service providers for their waste, some of them were saying, no, they are taking their waste to the hospital, but how we are sure about that. So I'm not too sure about what knowledge is. **Information It is available will always be on the database**, but you can access the data that they have compiled. On what basis [must we have any platform whereby they are sitting together and discuss operational issues relating to health care waste management] because I indicated that when we were busy constructing this database we were interacting. Yah, remember that for example, that **as we were coming across problems associated with this [healthcare waste], we would raise it**.	IMOM

	If we are discussing operational, it cannot be formal at the operational level... Obviously I don't think that it is necessary because, I mean at operational level... at operational level, remember, when we spoke about the red tape in the department of health, **at operational level you do away with red tape.** Induction isn't it that, **that person will be inducted** that this is how you are going to handle your portfolio.	
	We have monthly meetings whereby we share whatever we supposed to share, **if there is any conflict we share it in a meeting**, that's what is happening, or **even one to one you can come to the office so that we talk if there's anything to discuss.** **Every week we have a meeting with the re-claimers**, in those meetings they discuss their experiences and where we can help them. The reclaimers, every Wednesdays they do have the meetings, yah, so**, if there is anything they will tell me that they have got a meeting that day and so they request to be part of the meeting, to be part of the meeting,** I will attend the meeting, if there's anything, but if they don't need me they will tell me, no that is only general there's nothing sensitive that we discuss on that meeting, but I will send the security to be part of the meeting to get the report.	IMOL
	So **every day, we normally share information every day during lunch time and if there is anything new that we don't know, we share it, in the morning session we have to be informed about new things**. **We have got monthly meetings and an annual meeting at the end of the year**. **Each Community Health Worker has got their books where they are recording their patients, when they do their home–visits, they record everything from the condition of the patients to what they did. I [the manager] sign them every three months, but if I have got time, I sign them on a monthly, but if I have got too much work to do I sign them in three months.** I do the evaluation and monitoring and sign. If one of the caregivers book has got problems, **I write my comments in the book, so that they can pick up,** if it is well done I write well done, if it is excellent I write excellent. Exactly [I do get feedback on a daily basis], we also have coordinators	IHBC1
	We have **two support groups**, one for the care givers and the one for people living with HIV/AIDS. With the one for the care givers**, they have it once a week**, we are the first ones to come up with this so that they can share their personal experiences without the interference of the management and then **we have a briefing session once a month**, I am also part of the briefing session. This is where we discuss all the challenges and experiences encountered during the home visits.	IHBC2

THEME 3: THE EXTENT TO WHICH KNOWLEDGE-SHARING PRACTICES ARE SYSTEMATISED AND INSTITUTIONALISED

Comment		Source
What are the practices	when we look at places of care, we look at, supposedly nursing homes...we look primarily at the places where, the accommodation facilities, maybe the waiting rooms or the wards to put it right, yah, we look at the kitchen, you look at the waste management, we look at the health care waste management, and, err, we look at, in different rooms for instance the bedrooms or places where they sleep, we look at ventilation, the room itself how big it is, we probably measure the room and probably say how many beds should be put in that room err, yah, that's basically that. We are using the Regulation R918, which fall under the National Health Act, err, basically R918 talks about the general hygiene for food premises where people are being fed, actually. we look at the R918 we get certain requirements that are stipulated in the regulation, for instance, the food preparation area talks about and is also addressing food handlers and staff and how food should be kept and stored under, err, refrigeration facilities, it talks about temperature control of the fridge and, yah, so forth. And we've got another regulation that can also be looked into is the National building Regulation that talk about the general structure and how it should be constructed, cross ventilation and all that	IJMO
	It means that therefore that we as EHP's we need to go out there and do the inspection and then find out exactly whether are there any conditions that can affect the inhabitants in terms of their health in that case now, so that now if the premises are such that they are compliant, then we issue the health certificate for the premises, and at the same time we need to ensure that their health care waste is properly disposed of. As an EHP I am required to do everything that pertains to the work of the EHP, in other words we are not sort of specializing that is now maybe one EHP dealing with vector control, the other EHP dealing with the burial of the dead, the other one dealing with food safety, so every inspector or every EHP is dealing with the core factor of the EHP that is waste management. But because now, now the demand is such that we have to be involved on a regularly basis. Sort of something like, what we call it a day to day, sort of a day to day thing, because you know, err, because of the dynamic changes that are taking place , we find ourselves constantly involved with HBC as compared to five years before	ISMO
	We did not do anything relating healthcare waste with home-based care facilities. If we look at our machinery, the trucks, we minimise handling by the general workers, so they just push the trolley, the wheelie bin towards the truck and the truck hooks it.	IMOM
	You know things like that [identifying whether medical waste is not coming to the landfill site] is small things, the quantities are small and so sometimes re-claimers they find this, yah, we can try to engage the customer if he is coming with something like that, that we don't allow this things on	IMOL

	site, yes, but now the bigger ones like batteries that is not supposed onsite to be that one on the spot we say we don't take this. We capture everything that is coming and everything that goes out, for a recycling purpose, yah, so at the end of the month I submit a report to the top management, to tell them they say that there is a waste what what what, they send the repot there, the quantities of how much are we receiving and how much waste are we taking away for recycling.	
	The Nurse suggested that it will be better if we get the red plastic bag and put the waste inside and seal it before disposing it. We use…a cable tier to tie the bag. We don't put it in the municipal bin, but we burn it in the veld. This is because we are afraid that if sometimes the municipality did not come on time to collect the waste, the children always gain access to the waste and they start playing with it. We burn them every second day, on Tuesdays, Thursdays and Friday since we cannot leave the waste over the weekend. The rule is that we should maintain confidentiality between ourselves and our clients. Also, when we arrive at the patient's house, we first have to identify all hazards that could put the health of the patient in danger and deal with them, after we are satisfied that there are no hazards, and then we can bath the patient. It is only after we have made sure that the patient has bathed, eaten and taken his/her medication that we can now clean the house. The rule is that we should leave the patient's house in a clean and healthy condition.re no longer hazards, we should bath the patients. Yes, wastes like nappies, linen savers, gloves, and dressings, we put them in a red plastic bag and we burn it. We burn them every second day, on Tuesdays, Thursdays and Friday since we cannot leave the waste over the weekend.	IHBC2
	We deal with bed bound and home bound, the bed bound or bed ridden, are those who cannot get out of the bed. So we make sure that every morning these people gets help, if they need to be bathed, we go out to their respective homes and provide the service they require, Community Health Workers go along with home care kit that has got hygienic products such as dettol, soap etc., they also take along the pampers [disposable nappies]. It depends if the patient is totally bed bound and cannot help himself, we have to take, when we go there, take along some pampers, then after bathing him/her, we put on a clean one. We dispose them in the refuse bin. In each group we have got two Community Health Workers who assist each other, for example, if we've got a heavy weight patient, one care- giver cannot be able to lift him alone, so we need two to assist each other and for safety again. Another thing is that we are doing this for safety; this is the township here, do you understand, so we go out in pairs in order to assist each other and for safety reasons. You can't do home visits alone especially if you are a female caregiver. When we find a patient with bed-sores, we bath them, allow them to dry, then we gently apply the sulf, allow it to dry before we dress the patient. We refer them [Diabetic Patients] to the clinic because we cannot do anything about them, they must focus on their treatment, their diet and exercise. So there is no much that this organization can do with the diabetic patients. They must depend on the clinics and hospitals. Yes, when we do door-to-door campaign we need to pass the information and we teach them about sexually transmitted infections (STI), it is like every quarter we do have a door-to-door campaign. In the first quarter we do a campaign about STI, second quarter, HIV/AIDS, third quarter, cancer and the fourth quarter we do TB. We have got a health calendar that we use to do our campaigns. But what we are focusing at is because when I first applied for this organization it was based in HIV/AIDS, the main focus of this organization is on HIV/AIDS and TB. Because TB is related to HIV/AIDS, even though it can be healed on HIV positive patients.	IHBC1

THEME 4: CONSEQUENCES OF KNOWLEDGE SHARING PRACTICES ON MANAGEMENT OF HEALTHCARE RISK WASTE BY HOME-BASED CARE FACILITIES

Comment	Source
lack of awareness does result in an adverse effect on my work, it somehow degenerate and degrade my work because at the end of the day I'm there to teach people that are not aware of things that they need to do and of the things that they are not aware of. when it comes to lack of awareness and lack of insight, it results in the facilities probably not being properly managed, when they would do their own at their own time, …like for example, medical waste, if these people are not councientised on how to handle and store medical waste it will ultimately lead or end up in our municipal refuse whereby it will ultimately be thrown or discarded off to our landfill site…And when you look at medical waste it's normally hazardous substances, we've got needles, and we've got your, your tissues, human tissues, we've got so many things that you can come across. So at the end of the day if these people are not trained, if these people are not councientised, and are not made aware of how they need to run their facilities, a lot of things will just result everywhere, like for instance, medical waste could probably land up in somebody's backyard which is not allowed	IJMO
the first one I would say will be the disposal of the HCW, that will be the main one because, once there is no proper disposal of the HCW, then like I said that will land up into our the land fill site, that's point number one, point number two will be that if there's no proper communication, then, should there be any, just an ordinary blockage on the premises, the caregivers won't be in a position or won't be able to address that because, I mean, they need to, that need to be reported to the relevant department to attend to, but now if that is not properly done that will lead to further, err, further contamination or further infection because there will be fly infestation thus now affecting the people inside ,you know, and , err, furthermore, the other point will be in terms of the cleanliness of the premises, once the premises are not properly cleaned that also will result in you know, them further fit on the premises	ISMO

because of there will be flies, there will be rodents, there will be mosquitoes and those vectors are the vectors that carry the germs. It will be non- compliance to the health requirements. Because once there is no sharing of information then, it means people will be ignorant as a result they won't know exactly what is expected of them if as and when they intend opening up the HBC, right, one, or if they are running the HBC, they wouldn't really know what is expected of them, what must they do should they, say for argument sake if maybe they come across an environmental Health problem, then because there was no sharing of information with the EHP, then, they won't be knowing exactly what is expected of them in order to overcome that particular problem that they are having. In one way or the other it does because as an EHP, one is being looked as a person who is not doing his job properly, a person who does not communicate with the community, a person who does not engage him/herself with the community, you know, in problems relating to HBC, you know, yah.	
But that means that we have to define much, much better than this. Even the role that person would have to define that. That currently we are having the database, what we want to do is that you will take this forward by, maybe just make sure the 5% that have not been registered is all registered and then, err, let's also widen the net in this way. Let's make sure that we know exactly the situation of the landfill where they are, or the facilities where they are taking their medical waste because we just know that they are taking their medical waste to…, but we are not too sure how is the situation there and so on and so forth, whether, because it might happen that we have a license now for Luipardsvlei landfill site, that you can dump in there, but you may find that the situation has changed, from time to time we need to get the records about that facility maybe from GDARD to see if they are still complying to the requirements. yah [we need to know what the others are doing so that we can support them, when we encounter issues that they are dealing with them we can bring them forward to their attention] Yah, I agree [we need to have a platform whereby we discuss issues, we know what the other is doing so that we can support and help each other]. Yes, I agree [we can improve by having the platform where we can discuss issues like that]	IMOM
But the challenge is that if you tell a person that this is not supposed to be in the bin, where do we direct the people to take them. That's where another Environmental Health section must come in so because we report it, the supervisor will report it that in number what what, we do have a problem of this and that, can you go and engage this people and tell them if they have got this material where it is supposed to go	IMOL
We did not discuss the health care waste management, because we we did not know about it.	IHBC2

THEME 5: RELATION WITH EACH OTHER

COMMENT	SOURCE
Before, I did not have much communication with them. But on the 18th of October, the Mayor was here, he was invited by the Brewery because we are also being sponsored by the Brewery. From that visit we were requested to report to the municipality. I don't know the person we are reporting to, they said we should report everything, our challenges, drop-in-center and the home-based care so that they can have a database of how many children and patients do we have, but we don't know the right person whom we should go to. We don't know where the information should go to because with Social Development every month we are reporting, even at the Health Department every month we are reporting, but we don't know since with the other two the reports goes together, even for Mogale City they must go together, but we don't know the right person. They [Environmental Health Practitioners] came here, the first time they were here it was tough, and we did not meet their requirements at all. Remember the presentation in Randfontein about requirements for drop in centres? No, the inspector was already here by that time we went to the meeting. The Social Department required us to have a health certificate, as a result of that I approached the Mogale health to come and conduct an inspection so that we can get a health certificate. That was when they told me that I did not qualify to get one since my facility was not complying with their requirements. It was true because things were not up to standard, we did not even have windows. The inspector gave me a list of requirements to comply with.	IHBC2

THEME 6: TENSION AND CONTRADICTIONS INFLUENCING KNOWLEDGE SHARING PRACTICES

contradictions	Comments	Source
Primary: occur within one element of a single activity system	It is a challenge, because now we are looking at the home-based care facilities, and now we are using by-laws for nursing homes, so we are trying to incorporate two thing that are not the same but now we're trying to work, we're striving to reach the outcome which is primarily supervision…so it is a challenge, we need to have a specific guideline that will cover such places. You find that the place is obviously there functional and probably is not compliant, so when it comes to enforcement of the policies and the by-laws, it is a bit of a difficult situation because at the end of the day the place is there already, and if it is non-compliant, people can't be thrown out, and we don't have a legal framework where we can enforce them to say that these people have, the facility need to shut down and people need to be removed as the place is not compliant, at the end of the day the main challenge will be law enforcement when it comes to places of care, so we can't prosecute or penalize that facility.	IJMO

	The first challenge that we discuss about, was that, err, first and foremost the HBC facilities were the facilities that came about as a result of the spread of the HIV & AIDS, neh, so as a result at that time the EHP's were not quite, shall I say, not quite exactly involved, they were then involved at a stage, after it was then discovered that now, you know there is this waste that is being generated through these facilities and at the same time, you know, their premises should be such that they comply with our regulation so that now the challenge we had was that the, we did not have regulations that were dealing specifically with the HBC facilities, the regulation that we have are the regulations that deal with the nursing homes, with the homes for the aged, not exactly, so that now it's like we are taking bits there, bit there, just to bring out something sort of concrete for our situation. That's what I can say.	ISMO
	We first have to identify all hazards that could put the health of the patient in danger and deal with them. We burn them every second day, on Tuesdays, Thursdays and Friday since we cannot leave the waste over the weekend.	IHBC2
Secondary: happen between the elements of the activity system	There is no sharing of information	ISMO
	you find that the place is obviously there functional and probably is not compliant, so when it comes to enforcement of the policies and the by-laws, it is a bit of a difficult situation because at the end of the day the place is there already, and if it is non-compliant, people can't be thrown out, and we don't have a legal framework where we can enforce them to say that these people have, the facility need to shut down and people need to be removed as the place is not compliant, at the end of the day the main challenge will be law enforcement when it comes to places of care, so we can't prosecute or penalize that facility.	IJMO
	Subjects/community: the manager does not see the importance of sharing knowledge especiaaly at operational level, he sees this as ' red tape'	IMOM
	Rules/object: Mogalecity they don't have the responsibility on that people there.	IMOL
	The government does not have posters for caregivers, the ones they have are the ones for HIVV/AIDS, cancer, teenage pregnancies, the ones that they normally have at the clinics, but for Community Health Workers, no they don't have them yet, maybe they haven't had the idea of making them for us. we have not been taking any notice, what we knew is that after we have used the materials, we should dispose them in the refuse bin, we did not see the importance of keeping records of these waste.	IHBC1
	Subject /objects: They never gave us any clue of what to do with the waste, because here we do not have needles, we only have gloves because some of them the care workers have got something like a home-care kit, which they go along with to the patients and if the patient have got bed sores they clean them. They did talk about the waste but they were talking about the needles, they said that if we dump the needles anywhere, we should consider the fact that there are people who are living out of waste, who reclaim some articles from the waste dumps for further use. Then if we dump the needles, those people can get injured, which is not right. Yes, we did not discuss the health care waste management, because we we did not know about it.	IHBC2
Tertiary : arise when the object of a more developed activity is introduced into the central activity system	First and foremost the HBC facilities were the facilities that came about as a result of the spread of the HIV & AIDS, neh, so as a result at that time the EHP's were not quite, shall I say, not quite exactly involved. As EHP's we to look at all these by-laws and then try and find out exactly, what is common in all of that, when we look at the nursing homes, your home for the aged, something that is common is that on each of these, one, they need to have a health certificate, so now if the they need to a health certificate	ISMO
Quatenary: occur between central activity and its neighbouring activity systems	That one is a challenge, yah, for us because there is no meetings that's being done, if I have got a meeting I have got meeting with people I am working with, except if there is management meeting we discussing the something budgets, we can't even discuss what's happening at the landfill site, yah, we don't have meetings where we are engaging the other officials. Obviously I don't think that it is necessary because, I mean at operational level… you do away with red tape. We relate to them in the sense that, since we are also running a drop-in-center, we are required to have the food handling certificate and the health certificate, so we had to go to them to get help of those certificates. I don't know the person we are reporting to, they said we should report everything, our challenges, drop-in-center and the home-based care so that they can have a database of how many children and patients do we have, but we don't know the right person whom we should go to.	IMOL IMOM IHBC1 IHBC2

APPENDIX K: Attendance register

Mogale City Local Municipality

MINUTE

ATTENDANCE REGISTER: DEVELOPMENTAL WORK RESEARCH BETWEEN MUNICIPAL HELATH OFFICIALS AND HOME BASED CARE MANAGERS. 06 SEPTEMBER 2012: CORONATION PARK LAPA

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APPENDIX L: Change laboratory 2 transcript

DWR: MUNICIPAL OFFICIALS AND CHBC MANAGERS

R: Morning everyone, welcome to our workshop, err i think we should start by introducing ourselves, before I give the purpose of workshop. Err when you introduce yourself, you must say your name, the organisation that you come from and how long has the organisation been in operation, there is also an attendance register that you have to fill in, so we will start here.

JO2: I'm an Environmental Health Practitioner here in Mogale City (MCLM).

JO1: I'm .., Environmental Health Practitioner, here at MCLM …..for three years now, I'm covering Noordheuwel, Kenmare, Rangeview, Siverfield, and Yah, that's all.

WI2: ……Waste inspector, specialising in waste management here in MCLM, I've been in MCLM for five years now. I'm covering the north part of MCLM

SO1: ….I've been four years in MCLM.

SO6: I'm doing Krugersdorp North, Dan Pienaarville, Rnat n Dal, Hmm, yah! ….too long, fifteen years

SO5: … I' m also an EHP here at MCLM, my area is Hekpoort, and then Luipaardsvlei, Olivanna, this bottom side, I'm currently, my 20th year at the time.

SO2: … I'm an EHP from MCLM, err, my area that I'm covering is kagiso1, Lewisham, err, Breunanda, some,and err Magalies, the rural area in Magalies, Ga-Mogale, Zeekoeiehoek, all those , New Thorndale, err, I've been here this is my 31st year.

HBC4: ….project manager from Facilkity 3 situated in Kagiso 1, we are rendering our service within Kagiso 1 and all the surrounding areas. We've been there since 2005.

HBC3: … I come from Facility 2 Centre, we cover x 12, 14, Vlaakfontein and kagiso1, Kagiso 2 I mean.

HBC1: I'm a project manager from Facility 4, err the organisation started in 2004 up to now, my name is MMP.

PM: For the sake of our colleagues we will mix the languages. Feel free to use any language that you are comfortable with. I am Priscilla Masilela, working in Mogale City Local Municipality, but I'm a student at Rhodes University, doing a Masters course in Environmental Education. I'm investigating knowledge-sharing practices between Environmental Health Practitioners and Community Health Workers on Healthcare risk waste management.

The purpose of this workshop, is to provide a platform where both parties can meet and discuss how their knowledge-sharing impact on management of healthcare risk waste by Community Health Workers. I went out to some of the HBC centres to get information on what they are doing, and went out to my colleagues and interviewed them so that I can get information on what they are doing, so after I have gathered all the information. I have identified some contradictions between what we are doing and what is expected of us to do so, so today , I'm going to show you those contradictions as mirror data and from there we need to share our experiences with my findings. As a Municipality we are governed by legislation, we've got by-laws, Regulations, we've got Acts, which we must make sure that we as a Municipality and the community complies to them, so today I am going to need your participation, because whatever that will come out from this workshop, we are going to take it forward, since it will be something that we want to see in the future, both Municipal officials and community health workers, we need to have a platform whereby we establish a common understanding. I will start by explaining the process I undertook when I did the observations and interviews and the others.

When I did my research I used this triangle [referring to slide 3], I looked at the tools, which are policies, letters of agreement that you have at your HBC centre and policies that the municipality is having and then I identified gaps.

I looked at the subjects, subjects are people who are performing the work, I also went out to the HBC centres and observed how they are doing their work, I looked at the tools. And then I also looked at the rules, the Municipality has got rules in terms of by-laws, you have got rules in terms of your policies in your organisations. These blue things [pointing to the slide 3 of the presentation] are contradictions. What is not being done accordingly.

Then I looked at the community, the community who also have an interest on the object. From there I looked at the how labour is being divided between the subjects and the community. While at the same time I was also looking for the contradictions. The objects are what the organisations is working on,

In the next slide, I defined the CHBC, according to the WHO 2002. This defines what you are doing on a daily basis.

HCB3: I have got a suggestion, with regard to the bins, for the fact that we don't know how much waste we are generating, what if the municipality can provide us with the bins where we will dispose our health care waste and they come and collect it.

R: like I have indicated before, the health care waste is not a normal waste, it is supposed to be disposed of at a special waste disposal facility, and here at Mogale city our landfill site is only licensed to accommodate general waste, not health care waste. And I also indicated that the provincial department of health is the only one who has got facilities for health care waste. This means that as the house what we are discussing today, we must take it to the province to request permission for their intervention.

HBC1: What I realise is that, like you have said that we must request assistance from the province, if they can provide us with the bins such as the ones used at the hospitals, it can save us a lot.

R: Since you are not generating waste from one central facility, the issues of transportation must be considered when we go and ask for assistance from the province, and if they have provided you with the bin, will you be able to carry it to all the households that you are servicing, how may bins will you require. We need to further look into the transportation issues before we go to the next step.

SO1: … I think the workshop and the presentation itself raise important issues around home based care and I think maybe we need also to take into account, the historic perspective of the home based care centres and so forth, to exactly understand the kind of waste because any human activity can generate waste, in my office I will generate waste, but we need to see what is it that I do in the office for you to understand the kind and quantity of waste I will generate. Because if you look at the kind of waste that they are generating, it must also differ from one home based care to the other and find that the quantities also differ from one facility to the other. And yes, indeed because we are dealing with a lot of them, then collectively they create a problem, when at one stage, if it is, maybe if we had only one in the entire Kagiso. Yes we are living in the world that is not perfect, there are always contaminations, there is always pollution and so on and so forth, but if the natural methods are able to deal with the amount of contamination we say yes it is at the level that is acceptable, if you understand what I'm saying. Because they are many of them and we foresee that we will continue to have more of them because of the critical service they provide to the community that more of them will be needed etc. we therefore need to understand exactly the kind of waste because I also see excreta as, being part of the most important kind of waste, be it vomitus, err, makaka [faeces] being part of that, of which if you come to these legislation, it may not talk about human excreta, it may talk about tissues etc. but not necessarily human waste, then for you might have to deal with them in a particular way, like I'm saying, it raises important issues.

Now coming to those areas that you, have indicated in the presentation, perhaps we need to zoom in and look at what we can do, I see it this way, as well that perhaps, yes indeed we need to understand the operations, what is it that they are doing for us to for us to collectively have guidelines, yes I think we should start with the guidelines, that should then inform the, err, perhaps now the legislative framework that you spoke about under the constitution to say , ok, maybe we should come up with the by-laws that would then regulate also the municipalities to provide that kind of a service to say yes the municipality will provide err, HBC1 mentioned some kinds of containers that can be prescribed, that is are the kind of containers which the municipality will provide or they will have to produce

to ensure that, you know, they will have to contain this kind of waste. How do we then move on to the level of transportation, looking at the economic dynamics, are they financially strong enough to carry all those kind of costs, etc. then that would be my contribution.

HBC 4: I would also suggest, maybe if possible 'cause now it seems as if it's going to have a hiccup coming to consulting with the province in terms of transportation for waste, you know how government is, so I am thinking that as much as we we've got NGO's who are dealing with some other issues based on social and other health issues, Is it possible maybe to mobilise all ……individuals , who can deal strictly with transportation, support them in terms of complying with all the requirements needed for being licensed for transporting waste

R: I think that can also be looked at because this is not something that will happen overnight, we need to go through a chain, and it is something that is new to all of us.

SO1: you see, the proposal, if you say it will have some kind of economic benefits, definitely I wouldn't mind to leave my job and go into that, so basically I'm simply saying we got to look at economic benefits because the world is driven so much by economics that everything you do, you need to balance, so basically, that is why with waste we saw those people going into the dustbin because the dustbin has got some economic benefit to them, because by salvaging, going into that they might het two or three bottles or plastics that they might sell. So; lets come back again to what kind of waste we generate at the centres, can they be of any economic value, makaka [faeces] that we generate, can we sell them to someone as manure?

R: I think the challenge will be that of the number of patients that they are servicing, sometimes they service only one patient in a month, sometimes they've got fifteen, it differ from month to month, so if you are saying you are going to be doing that compost in big, it won't be cost-effective, so I think the transport that the lady is referring to was the transport to collect from the centres to the clinics on a daily basis. I think that was what she was referring to.

HBC4: Maybe from the start, …. each organisation must be responsible for transporting their own waste for starters, remember, so in a long run we will be able to negotiate in terms of funding for such.

R: But you must also remember that the transport that the person is using must not be used as a passenger transport, it must only be used for collecting that waste, and so if we say we are going to contract a person from the township, that person, you will find that he only has got one car, and he is using that car as a family car, so immediately when we say that that person is going to transport the health care waste, then it will mean that he will no longer use that car as a family car.

HBC4: Yah, that simply means that from now on it has to be our homework.

R: That is why I was saying that we need to come to this space [pointing to the boundary space in slide 19]

SO2: My input here will be, I think SO1, has alluded into that… First and foremost, they need to identify exactly what is their waste, ok, they know, now that they know what their waste is, then I think form there it will be then from the side of the municipality, that the municipality should then in one way or another for the interim, because already they know the kind of waste that they are generating, then the municipality should in the interim provide some means of helping them, so that now if we say to them at least you do have something to put in your refuse, then you need to have that in place, where they can put their refuse, then the third point will be the issue of transporting that waste to the landfill site for it to be disposed, sorry to the nearest clinic, for it to be disposed, that will be my input. So now that they do know their waste then we as the municipality, then we need to sort of come up with some means of saying, provide with some means, like the lady was saying that perhaps the province provide them with some containers, so if that …ever that is not possible, perhaps the council would then say, because you have been issued with the 240L bins, then perhaps you should use other bins specifically so that now you must not mix the two types of waste, so this one should be placed on its container alone and the other general waste should be placed alone so that now these two must not be mixed, because the tendency is at some stage or another the two are gonna be ,mixed and that is what we don't want.

WI2: Regarding taking waste from the HBC to the clinics, we need to consider two issues: first, the province is experiencing some problems with disposal facilities like their incinerators, they have to gather the waste for certain periods, before they can transport it to wherever, I think it is in Klerksdorp, the other thing, before we take the waste to the clinics, we need to have a meeting first with the clinics, or whoever is in charge of the clinics and find out if they can accommodate us. Otherwise if they can accommodate us, in the meantime, before we come up with the issue of whoever is going to be given the tender of transporting the waste, we can still use temporary methods, like putting, have a strict either sharp container, or cooler bag….

HBC4: Does it mean that the health care waste must be taken on a daily basis to the clinic?

WI2: We can take it weekly, it depend on the volume of the waste, but the other thing, it will also depend on your storage where do you store it, because it is a very sensitive subject

R: I think the outcome of the study will also be shared with the department of health. I have written a letter to them, I have discussed the matter with them and they are just awaiting the outcome of the results. So taking the waste to the clinics is not a problem, but it has to be a decision that is being taken up there, not by the individual clinics. That is why this report is going to maybe open some doors for all the other home-based care centres to be able to have some means and from there, then we also look into the issue of transportation, maybe they can buy some bicycles so that the facilities can take the waste to the clinics on a daily basis.so we are not saying you should take it to the clinic now, we are still busy with negotiating about this thing. This report will be taken to the provincial government and the provincial government will discuss with all the head of departments who will cascade the message down to the clinics and we will get feedback from there. I don't think that this will this will be the last meeting that we are having, maybe I will ask the provincial department of health to join the forum meeting that you normally have with them, so that when you have your forum meeting then we can ask for a slot so that we can discuss this medical waste, because it is affecting everyone.

WI2: Are we saying that in the meantime, while we are still waiting for the report to reach the provincial level, the home-based care facilities must just carry on with putting the health care waste in the general bin, so we are saying we are supporting the problem to grow.

R: I don't know what we are saying, because now we can't say they should take them to the clinics, but if the nearest clinic does not have a problem, then they can take them to the clinic, but the issue of transport?

HBC4: Temporarily, whilst in the process, is it possible that maybe for us as NGO's, to maybe do a special request with our nearest clinics, for us, by ourselves, we must take our own medical waste through our own arrangements, whilst you are still busy doing it for them, because remember within this document that you have given us there is provision and there is six to eight stipulation of laws that we need to comply with, so we need to have the safest way of doing it.

R: So what you are saying now is that you will individually go to the clinic that is nearer to your facility and then request permission from them?

HBC4: Yes, I think so because the clinics do have the facilities, if we negotiate with them in a sense that the day when they come to collect at the clinic , then they can always come and collect at our centres one way or another or we will take the waste to the clinic if maybe if we know the exact date when they come to collect.

JO1: I think we are struck between a hard place and a rock, right now because as much as the activity itself is not safe for everyone involved, with regard to taking the medical waste to the clinics, I am of the opinion that it is a high authority decision and I am not in support of the home-based care going directly to the clinics, because we have to take into account that medical waste collection and storage is a built activity, meaning the Gauteng Department of Health have a contract with certain service providers of whom they are paying, then the Gauteng department of health being built for the service providers to provide the service, now if we are just saying, hey, here are the home-based care, take their waste as well, so I am of the opinion that this should be dealt with at a very high level, maybe for starters, from the municipality's side, we can try to get a meeting with the higher authorities of the department of health and tell them that this is our challenge now, and this is what we are having, even before the report to the

authorities, because as much as we know that is a problem that the waste is generated on a regular basis, but let's take those issues actually into consideration. To say that the clinics is being managed by a manager who is employed by the municipality or the province. So I don't think that they will be in a position to make decisions, because that waste when it is being collected it is measured, they are billed according to the volumes of waste they have created within that facility. That's why I'm saying we are struck between a hard place and a rock, because, yes, we need the service, but there are just a lot of procedures that we need to follow before we can say, let's just go there and say we want you to provide us with the service, because there are financial implications, so I think it is a decision that should be made up there.

HBC4: And then the storage facility as well, I think WI2 has indicated the question of storing the medical waste…

R: I think the issue of storing it will become a challenge to the organisations like the home based care centres because they are small organisations, they don't generate much waste, and if it means that they must have a special space for storing their health care waste, it will be another challenge, so we would rather have them take the waste to the nearest clinic on a daily basis where they are having proper storage, because the storage must be locked, it must be a place which is locked on a regulb ar basis, which is being ventilated so that the waste will not ferment, so it will be an extra burden to the home-based care centres. If we are saying they should store their waste, but I think I will write a report to my manager so that he can take it to the executive manager so that the municipality can start discussing issues around health care waste management.

SO2: Whilst JO1 was talking, I agreed to what she said, but at the same time we do have a problem at hand, so rather than, this is my take here, rather than the home-based care people going directly to the clinics, at least if it must be someone from the municipality, because we are aware that there is this problem and then perhaps maybe one of our, maybe, so for argument sake, they go to the clinic or the management there, just to inform them that look, we have got this problem, though we are quite aware that it is a problem that needs thorough engagement, but then in the meantime, will it not be possible for the clinics to accommodate the home-based care facilities, because like you are saying, they are not generating much waste…but at least let them be accommodated, so rather than them going directly, let it come directly from us as the municipality.

JO1: May I just ask, which department is funding these centres?

HBC1: Two departments: department of health and social development.

JO1: because I'm thinking, if we can engage social development, us from the health side, these are what we have identified and indicate that this is an urgent matter; it is a problem because now it is so difficult for us as officials to say go back and put it in the black bins knowing that it is wrong and we are putting so many lives at risk. So I was just thinking, maybe…..if we were to engage with the social development and the Gauteng health as soon as possible to say what can we do in the mean time because we have this urgent issue, before you know, because there will be who will get pricked, and whatever, and it may result in all sort of suing….. and we don't want to get there. Now that we have identified the problem without having any, obviously there are health risks that people have dealt with that we are not even aware of, but before the problem escalates, maybe we had to engage with them to say what we can do now, because we can't tell them to continue with the activity.

HBC4: I'm very happy to hear that one, consultation with the social development and hoping that it won't only be in terms of the environment and hoping that it will be continuous because there is a lot of issues that are clashing with social development and the health and the municipality.

SO6: I just want to know, at the clinics, how do they store it, its not in the red bin, the red bins is only for needles?

R: The red bin is for the needles and then the other waste is placed in the red plastic bags.

SO6: Sometimes you get the box.

JO1: But with the liner, the sharps container and the box with the red liner.

SO6: And the yellow one is for what?

WI2: The yellow bucket, it depend on the contractor that they are using, sometimes it is red, sometimes yellow, but it will be labelled sharp container.

SO6: But, can't the HBC people get the box, can't they for now use the box for so long and if the box is full, who is picking up the refuse, the service provider, and then they pay him?

R: Showed the pictures of the containers on a poster

WI2: No, they don't have money.

R: For now they don't have anyone who is collecting the waste, at the clinic they do have a service provider.

SO6: So they can't afford to pay, if they get the box, they can't afford to pay the service provider?

JO1: Hence I think the involvement with the social development. We will be able to tell them what is happening, maybe they will be able to reach a memorandum of understanding with Gauteng health to help with the collection and transportation of waste if they are aware that this is a major problem on our side.

SO5: All I want to say is that for them to take it to the clinic is more of a problem because we don't want it on the road, it must stay there and be collected there, so it becomes a lot risky if they take it from there-to-there, so it must be stired there and collected there.

R; So the suggestion is that we have a meeting between the municipality, department of health and the department of social development and then discuss the issues around minor health care waste generators and we will come back to the forum and give feedback.

SO2: Just off the tangent, ….we as EHP's we must be in the lookout for all our private doctors in the townships, because even if they do have the know-how to dispose the health care waste, but there are others who have got a tendency of taking this things and dumping it anywhere and as a result we are now going to say this are ordinary home based care facilities, whereas it is the doctors. So now we as the EHP's we need to be on the lookout on that as well

R: So we agree that we will start by engaging the other departments, and then take it from there.