

Eco-Programming at Deer Lodge Pursuing Solid
Waste Best Practice in a Health Care Centre

By

Glenn King, BMR (OT)

A Thesis submitted to the Faculty of Graduate
Studies of The University of Manitoba
In partial fulfillment of the requirements of the
degree of

MASTER OF ENVIRONMENT

Department of Environment and Geography
University of Manitoba
Winnipeg

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FACULTY OF GRADUATE STUDIES

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Abstract: Worldwide healthcare produces millions of tons of solid waste annually. This study used a mixed methodology to determine the status of waste management at a long-term care health and rehabilitation centre-Deer Lodge Centre, Winnipeg, Manitoba, Canada. Quantitative: The centre was divided into zones and a one-day waste audit was undertaken on each of these zones. Qualitative: Nine staff members were interviewed to determine their opinions on present waste management performance. They were also asked to provide recommendations to improve recycling and reduce waste. Finally, the author utilized a Participatory Action model as he feels strongly that solid waste/environmental practices at Deer Lodge could be strengthened. A Green Team environmental committee was developed to address solid waste issues- Reduce/Reuse/Recycle.

The findings of the waste audit indicated that only less than 7% of solid waste is being sent for recycling. Recycling bins in place for many years were simply being placed in the general refuse. Incontinence briefs (diapers) make up the largest component of the waste at 28%. Diapers are presently not recyclable in this market area.

Recommendations included staff education, improved labelling of bins, and dedicated environmental waste oversight. The author is Glenn King.

Acknowledgements

I gratefully acknowledge the valuable assistance of Deer Lodge Centre with recognition to Real Cloutier, Rick Rogers, and Senior Management. To my Occupational Therapy colleagues, I offer appreciation. To Suzanne Joyal and Lenore Moreland I am grateful for your tolerating my deep green eccentric eccentricities. And to the members of our original Green Team, a huge thank you! Monique Liarakos, Andrew Waterman, Christine Warkentin-Brown, Sylvia Ptashnik, Jan Guinn, Andrea Firth, Patricia Major, Richard Lacousiere, and Alex Zebrun. Monique thank you for proofreading my thesis and for your support.

I would like to send a very special thank-you to my advisor and role model, Dr. Shirley Thompson- University of Manitoba. Shirley has always presented herself with much enthusiasm for what she is teaching and has always been available for questions. My committee members are greatly valued for their feedback on this thesis: Dr Mary Benbow-University of Manitoba and Ken Friesen from Earth Bound Environmental.

Thank you also to Rathan Bonam for his assistance with my statistical work, to Chris Gensiorek from housekeeping for providing information on housekeeping procedures and with gathering waste for the waste audit. Thank you also to Carol Manthey and Faye Luptak for providing plastic pails for separating and weighing materials from the waste audit. Joan Gordon offered helpful insights into grammatical structure. Thank-you to Brent Broughton and Cathy Luptak for waste sort preparation and data verification.

I am indebted to the following Librarians for their most helpful assistance with my literature and thesis questions: Tanya Gottschalk, Angela Osterreicher, Laurie Blanchard, Diana Stojanovic-Lewis, Pamela Southam, and Cheryle Martineau. Aubrey Heminger is thanked for the use of the chapel office for the staff interviews.

The education provided by the Clayton M Riddell Faculty of Environment, Earth and Resources and the Natural Resources Institute at the University of Manitoba has proved valuable. I also recognize the financial contribution made by the *Waste Reduction and Pollution Prevention* (WRAPP) Fund from Manitoba Conservation – thank-you for your support. Thank you to UMREG (University of Manitoba Recycling and Environmental Group) for the use of the portable scale.

Finally to my wife Cathy for her unwavering love and support have provided me with that boost of affirmation that galvanized me to remain steadfast in my goal.

CHAPTER 1- INTRODUCTION

1.1 Background

“On average, most healthcare facilities are doing less than they should in the areas of source reduction and recycling, and will likely do so until mandated by law. The main reasons for this are ever-tightening healthcare budgets, limited staffing, and the cost of operating recycling programs compared to the cost of general solid waste disposal....”(Paul and Strout, 1997 page 26-29)

The management of hospital waste has become a burgeoning problem not only in Canada but worldwide (Health Care Without Harm, October 2002). Hospitals produce large quantities of a wide variety of solid and hazardous wastes. Included in this list is waste unique to healthcare, such as medical grade plastics (phalates) in catheter and oxygen tubing and bags, and needle sticks. Furthermore, in order to support hundreds of inpatients, residents, staff and visitors massive amounts of solid waste including food scraps, paper towels, drink containers, office papers and others are produced. In recognition of this dilemma, organisations such as Healthcare without Harm strive to change the way that healthcare is provided (Healthcare without Harm, 2006).

Hospitals are centres for caring, and for the curing of disease and healing of injuries. However, hospitals and health centres also have throughputs (chemicals/toxic wastes, emissions, solid waste etc.), which have only recently been examined with regards to impacts on the health and environment within and outside the healthcare facility. In recent times healthcare focus has shifted from the medical model to embrace more preventative and holistic wellness models (Romanow, 2002). Wellness and health promotion not only encompasses medicine but also proper housing, nutrition, fitness, social services, recreational activities, etc (Birse and Working Group, 1998; World Health Organization, 1986), and environmental factors. Environmental factors can be

broadly defined to include tobacco, diet, pollution, occupation, etc, are recognized as the cause of 60-90% of cancers (Doll and Peto, 1981; Doll, 1998)

Proportion of cancer deaths caused by different environmental factors

Causes	Percent 1981(US)*	Percent 1998(UK)**
Tobacco	25-40	29-31
Diet	10-70	20-50
Medicines	0.3-1.5	<1
Infection: parasites, bacteria, viruses	10 best estimate	10-20
Ionizing and UV light	2-4	5-7
Occupation	2-8	2-4
Pollution: air, water, food	<1-5	1-5
Physical inactivity		1-2

Sources: Doll and Peto, 1981^{*}; Doll, 1998.

The healthcare system and its facilities should be an integral component of fostering a healthy environment for healthy people by promoting wellness, considering environmental health impacts of its operations and not by only treating the ill. If hospitals and health centres want to be at the cutting edge of healthcare they need to deal with the root cause of many diseases, that being environmental factors, and lead by example, as good stewards. They need to develop and promote illness prevention strategies, wellness programs, ergonomics, stress management, etc, as well as environmental management systems that include waste reduction (Canadian Centre for Policy Alternatives, 2006).

Hospitals use large amounts of disposable and/or toxic material and energy. These materials use supplies, consume energy for heating and lighting and create chemical/toxic materials, the latter requiring disposal as hazardous waste (Townsend and Cheeseman, 2005). These materials should be reviewed from a functional perspective (i.e., are they doing the required job) as well as for their long term environmental, economic and health/social impact. The hypothesis that sound environmental practices are also cost

effective requires further study as it applies to healthcare. This discourse attempts to explore the issue of sound environmental practice in the context of healthcare.

Sustainability is the term many people use today to describe the balance that many companies, governments and institutions attempt to find between economic, social and environmental spheres. Discussions of sustainability focuses prominently on health service provision or infrastructure and economics, sometimes overlooking the environmental impact of healthcare services and infrastructure. It is increasingly expected that governments and healthcare administrators need to find greater efficiencies in the provision of service, while maintaining the same or improving standards of care (Romanow, 2002). As a result of scientific and financial investments there is no doubt that industry related to the development and delivery of healthcare services and technology has been of great benefit in saving lives, curing disease and improving the quality of life (Pacific Health Summit, 2006).

Sustainable environmental management focuses on the long-term integrity of the environment so that it may be preserved for generations to come. As a result of environmental crises such as oil spills, global warming and desertification, governments, businesses and institutions are becoming increasingly cognisant of their impact on the natural and human made environments. Some institutions are reactive while others are proactive.

Many forward thinking organisations have determined that investment in the environment today has economic rewards in the short, medium and/or long term time scales. Motivating staff to turn off light switches in unoccupied rooms or throwing a soft drink container in the proper waste box through environmental education that inspires

participation or, alternatively, mandates from management can result, when multiplied by the effort of many staff, in significantly reduced electrical bills, waste bills and income from metal scrap recycling. St. Mary's General Hospital in Kitchener, Ontario implemented an environmental management system that complied with the international standard ISO 14001 and found many benefits, which will be considered in the literature review section. (Ayra, et al., 2005).

A life cycle, or 'cradle to grave' analysis has not been conducted to assess many of the technological/industrial processes in terms of cumulative impact on the health of the environment (United Nations Environmental Programme, 2003). Life cycle analysis of the processes in healthcare, but also in many areas (i.e. petroleum or automobile industries). In much the same way there are inefficient uses of resources and waste occurrences demonstrated in the health care sector. This discourse will seek to examine efficiencies in healthcare's environmental stewardship by looking at solid waste at Deer Lodge Centre (Deer Lodge)

In an atmosphere of fiscal restraint many businesses, governments or institutions are reluctant to implement up-front capital expenditures even if they result in long-term environmental and economic betterment. The Ontario Hospital Association's (OHA) Capital Investment Working Group (2003 p. 2) noted that the "continued failure to plan for and make the necessary strategic investments required to support the health care system in the longer term will only intensify the current culture of short-term crisis management that prevails within the health care system". The current capital planning methods in "hospitals most clearly demonstrate the implications of being caught in a 'trap' of day-to-day crisis management"(O.H.A., 2003).

1.2 Purpose Statement:

The purpose of this study is to examine the solid waste impacts of a healthcare facility, Deer Lodge Centre (Deer Lodge) in Winnipeg, Manitoba, and to provide recommendations to Deer Lodge which will have long-term environmental, social and economic benefits, based on best management practices. Secondly, the intent of this study is to understand staff member's knowledge of and opinions surrounding waste management and recycling at Deer Lodge.

1.3 Objectives

The purpose of this research is addressed through the objectives as follows:

1. To determine the present amount and types of solid waste produced at Deer Lodge over specified periods of time.
2. To understand staff knowledge, general attitudes and ideas surrounding waste management and recycling activities at Deer Lodge.
3. To make recommendations to reduce the amount of solid waste produced at Deer Lodge, which will ultimately result in multiple sustainable benefits such as reducing greenhouse gas emissions.
4. To develop a strategy to formalise communication among Deer Lodge stakeholders: staff, residents, Administration and Managers; and to provide incentives and motivation to protect the environment, including waste issues.

1.4 Limitations of Project:

The scope of this project was restricted to the Deer Lodge Centre located at 2109 Portage Avenue, Winnipeg, Manitoba, Canada. No other Winnipeg Regional Health

Authority properties were studied, although another hospital with environmental programming was toured with the green committee for a comparison in operations. The focus of this study was on municipal solid waste. This study did not focus on hazardous, industrial, pharmaceutical, biological, or construction and demolition wastes. However, small amounts of some of these wastes were noted in the refuse waste streams. The waste sort occurred in the winter months of 2007, as such, no yard waste was included in this assessment. Therefore these wastes must be considered for overall quantities and composition of the entire waste output. The author undertook the predominant portion of the waste sort alone, which limited the length of the collection period.

1.5 Study Site: Deer Lodge Centre

The author is employed by Deer Lodge Centre and thus it was practical to undertake the master's thesis at the workplace. Furthermore, with 22 years of experience in healthcare the author has witnessed the large quantities of solid waste produced by hospitals and health centres. Improved waste reduction programs are necessary and therefore another reason for selection of this site.

According to the definition of different types of hospitals Manitoba Centre considers Deer Lodge for Health Policy (nd) a long-term care facility . Today, Deer Lodge is not a hospital and does not have operations such as emergency, surgery or chemotherapy etc. Deer Lodge started exclusively as a veteran's hospital in 1916 and has evolved over time.

Deer Lodge Centre is a progressive 431 bed long term care (486 beds at the time of the audit) and rehabilitation facility providing a variety of in-patient, out-patient and outreach programs to the community. Deer Lodge Centre serves adults with complex needs who require rehabilitation and specialized care for long-term

health concerns...One hundred and fifty five personal care beds are maintained exclusively for veterans. Deer Lodge has become the third largest rehabilitation and long term care facility in Manitoba” (Deer Lodge Centre, 2008).

Health centres such as Deer Lodge produce diverse types of waste. Deer Lodge is a 24 hour-365 day operation primarily devoted as a geriatric residence for Winnipeggers and Manitobans.’ (Deer Lodge Centre, 2008).

CHAPTER 2: REVIEW OF RELATED LITERATURE

The author has identified the following four areas in prior research as significant for this literature review: 1) critique of the medical model versus the ecosystem health model; 2) sustainable development; 3) landfill issues and, 4) healthcare environmental programs and issues in Green Hospitals/Green Team.

A synopsis of the medical model background is pertinent to this study, as the health system's evolution in the developed world has resulted in many positive contributions to society but also negative consequences, particularly in regards to the environment. Predominantly, as a result of the medical model's narrow definition of health, the impact of modern medical technology on the environment has been ignored.

This research focuses upon healthcare's impacts on the environment caused by medical solid waste. Healthcare solid waste problems are germane in the context of exponential global population growth and solid waste crises amplified by other segments of society. Landfill issues directly present arguments for the problems with unabated waste dumping.

Both ecosystem health and sustainable development are considered relevant to this research. These emerging paradigms present the foundation for Deer Lodge Centre, and the Winnipeg Regional Health Authority, under which the Centre operates, and ultimately Manitoba Health and Health Canada's accountability to expand environmental health programming in healthcare. Finally, Green Hospitals, Green Teams and Programs elucidate on developments in healthcare environmental issues, protection and programming.

2.1 Medical Model vs. Ecosystem Health

2.1.1. History and Development of the Medical Model

That the medical model does not consider environmental issues has implications for waste management, environmental health and other environmental impacts of hospital operations. Healthcare in this country and around the world had humble and rudimentary beginnings in sanitation. The modern medical model with its emphasis on pathology and focus on disease has evolved since the time of the European Reformation. At that time, less religious control allowed fundamentally more freedom of thought. A less spiritual and mystic view of human health and a more scientific understanding of the workings of the universe were born. Human health discoveries by direct observations, such as the workings of the circulation of the blood and human anatomy, contributed to a mechanistic medical model (Hewa and Hethrington, 1995).

With health's focus on the components of the human body, a de-emphasis on the importance and contribution of the human mind, environment and psychology occurred over time (Engel, 1977). The body was seen more as a piece of machinery. Subsequently, the Germ Theory and others contemplated health at a cellular and organ level. After identifying diseased parts, surgery or medications eradicated the pathology. As a result of this evolutionary process, today, in first world medicine there is significant in-depth technology for diagnosis and treatment, complex surgery and an immense pharmaceutical industry to deal with disease. Technology and discoveries of medicine and society over the last two hundred years has contributed vastly to our knowledge and treatment of human health. The average life expectancy increased substantially during the last century

in developed countries (United Nations Population Fund, 2008). Public health's focus on environment was important for this change but was seen as a realm outside of hospitals.

2.1.2 Medical Model in Present Day

The medical community, environmentalists, mental health workers, poverty activists and NGOs have identified health problems that high tech surgery or expensive pharmaceuticals alone cannot cure or prevent (Alonso, 2004). Issues from a socio-economic, environmental or psychological background influence health such as lack of finances to be able to afford to live away from noisy/threatening neighbourhoods, poor air quality from mould or fumes, or worry and stress. Socio-economic and environmental issues often do not warrant a review process, investigation or attention in the general practitioner's office or hospital (Alonso, 2004). Issues of time, the narrow focus of the medical model and the substantial promotion of pharmaceuticals appear to result in this approach.

2.1.3 Economic Pressure on the Health Care System Pits Treatment against Environment

Poll after poll indicates that healthcare is the number one concern of Canadians (Canadian Broadcasting Corporation, 2006). Canada's provision of healthcare is ranked by the World Health Organisation (WHO) as one of the best in the world (WHO, 2000). Medicare is the unofficial name for Canada's universal publicly funded health insurance system, which promises free medical treatment for all Canadians. Canada is a wealthy and developed nation, and as a member of the G-8 group of countries has the funds to provide a public Medicare system. As such, Canadians expect the availability and quality

of service to be satisfactory and seamless (Romanow, 2002). Through technological development and perpetuated by public expectations, the scope and quantity of healthcare services provided to Canadians has increased over time. Ever increasing healthcare costs, which are not related to prevention of disease, are an ongoing concern for the Canadian and provincial governments as well as healthcare administrators (Brimacombe, Antunes and McIntyre, 2006), as these costs make up a substantial amount of government expenditures. As a result of pressures on government to cut taxes, it is contingent on politicians and administrators to contain costs while attempting to maintain or even expand levels of service.

Furthermore, in developed countries with the reduction of many types of diseases (such as infectious diseases), the prevalence of chronic diseases (lung disease and cancer) has moved to the fore in causes of death. The medical model does not adequately address the root causes or present a unified or coherent answer or plan to alleviate the potential environmental and social causation of these modern diseases. (Hess, 2004)

2.2 Ecosystem Health

The last half of the 20th century has seen the development of new models of healthcare, called the Ecosystem Health model. An ecosystem is the interactive realm of plants, animals, micro organisms and the inert environment of the land, water, and air and includes humans (Rapport et al, 1999). Ecosystems include all regions of the Earth from pristine natural areas ten kilometres below the sea to the largest urban areas. The model of Ecosystem Health encompasses a holistic view of human health, equally recognizing

the influence of the community, economy and the environment and the need to maintain their resiliency (Rapport et al, 1999):

The world is subject to the influences of many complex factors that can either undermine or promote the health of all living beings and that cannot be understood or controlled by a medical approach alone, however sophisticated it may be.

Because of the complexity of the relationships between living and inert components of the ecosystem, the simple observation of cause and effect consequences in these hierarchical, interlocking systems generally proved insufficient to provide a proper picture of the impact of human intervention on both the health of the ecosystem and the human beings who inhabit it (De Plaen and Kilelu, 2004, EcoHealth, page 9)

As a consequence of some of the many destructive industrial activities of the ‘developed’ world (e.g., Union Carbide leak in Bhopal and radiation leak in Chernobyl), this model has gained more saliency. These incidents of wide spread pollution had severe, quantifiable and both immediate (e.g., death, blindness) and long-term (e.g., cancer, dementia) impacts on humans and the environment. However, there are many slow and insidious examples of environmental degradation to our air, land, water and habitats. These include quantities of human waste from diapers (incontinence briefs) used in hospitals and long-term facilities and medical grade plastics that end up in every expanding community landfill sites. Low-level releases of pollutants accumulate and also impact on human health. (Health Care Without Harm, 2008)

The ecosystem health model requires interdisciplinary contributions as a result of the complex interactions between living and inert components in our environment. However, direct cause and effect relationships are often difficult to ascertain due to the complexity of these interactions (U.S., E.P.A., 2007). The relationship between human health and the resiliency of the environment and the impact of industrialization and

population growth is not well understood. A limitation of this model is that it is in its' infancy stage compared to others such as the biomedical model. This could be considered a substantial limitation, as many people do not agree with the need to curtail uncontrolled industrial, technological and human development (Rapport et al., 1999).

“The precautionary approach / precautionary principle is distinctive within science-based risk management. It recognizes that the absence of full scientific certainty shall not be used as a reason to postpone decisions when faced with the threat of serious or irreversible harm” (UN, 1992: Annex I, 15th principle). Organizations such as Health Care Without Harm understand the enormous amount of resources used and waste produced in healthcare and the cumulative effect on the environment. It's mission is: ‘To transform the health care industry worldwide, without compromising patient safety or care, so that it is ecologically sustainable and no longer a source of harm to public health and the environment’ (Health Care Without Harm, 2006).

Modern medicine relies heavily on the bounty of nature that medical research has uncovered, providing life saving and disease fighting medicines. There are numerous examples such as, erythromycin (antibiotic) from soil microbes, ASA (aspirin-for pain) from the willow tree and Digitalis (cardiac conditions) from foxglove plant. Unfortunately, habitat clearing and degradation is resulting in the extinction of plant, animal and microbial life, and thus the loss of potential sources of new healthcare treatments (Chivian, 2001). Healthcare ironically contributes to these losses through its toxic waste, resource depletion and resultant environmental degradation. Ecosystem health maintains a more holistic view of the contributions of global biospheres. Although

significant advances have been made in Ecosystem Health since its inception in the 1980s the knowledge base has understandably preceded practical applications (Wilcox, 2001).

2.3 Sustainable Development

High rates of population growth and over consumption has led to resource deficiencies, particularly for the poor. The global population has mushroomed during the twentieth century from 2 billion to over 6.5 billion (UN, 2005). Prominent scientists and environmentalists are warning of impending catastrophes such as global warming and water shortages results of over consumption and environmental degradation (United Nations Framework Convention on Climate Change, 2006). Although, there is a segment of the medical community that is aware and are championing these issues, many are not.

Fava, 2002 refers to: Malmö Declaration, First Global Ministerial Environment Forum (2000):

We have at our disposal the human and material resources to achieve sustainable development, not as an abstract concept but as a concrete reality. Our efforts must be linked to the development of cleaner and more resource efficient technologies for a life cycle economy.

Fava, 2002 refers to Klaus Toepfer, Executive Director, (United Nations Environment Programme, 2000):

Consumers are increasingly interested in the world behind the product they buy. Life cycle thinking implies that everyone in the whole chain of a product's life cycle, from cradle to grave, has a responsibility and a role to play, taking into account all the relevant external effects. The impacts of all life cycle stages need to be considered comprehensively when taking informed decisions on production and consumption patterns, policies and management strategies

The term sustainable development came into wide usage after the 1987 World Commission on Environment and Development (also known as the Brundtland Commission). The Commission defined sustainable development as “development that

meets the needs of the present without compromising the ability of future generations to meet their own needs” (World Commission, 1987). However, this definition left much room for interpretation.

How do we define acceptable levels of industrial, technological and human population (growth) development today and the level of environmental degradation that is acceptable to not only those alive today but also to generations unborn? There has been much debate from the various factions including environmental groups, businesses and government. This debate will go on far into the future. However, Payne identifies the growing importance of the public’s collective responsibilities. *Sustainable Development: the Ethics Support the Economics* crystallizes a growing societal view.

‘The long-term consequence of the activities of all publics is an environment that is either habitable or one that is not. That being the case, each public separately and all publics collectively have a responsibility towards the environment and each other to better understand sustainable development and to strive to achieve meaningful progress towards its attainment. Thus, the ethical issue in sustainable development is the basic issue of life versus death; if business and all other publics do not begin practicing the tenets of sustainable development, life as it currently exists will be extinct’ (Payne, 2001).

2.4 Green Healthcare Movements Achieving Best Practice

Thousands of health care facilities produce millions of kilograms of solid waste every year (Anon., In Joint Commission Perspectives, 2000). Healthcare facilities not only produce large amounts of waste but also produce a diversity of waste (Ayra et al., 2005). Waste ranges from office paper, packaging and food to specialized medical waste including toxic and bio-hazardous, human tissue and medical implements (Jameton and Pierce, 2001).

The healthcare industry is considered a major source of mercury to the environment (Health Care Without Harm, 2006). Mercury is utilized in healthcare in

equipment switches, thermometers and also in laboratory tests. Mercury has been proven to be a potent neurotoxin (University of Calgary-Medical School, 2005). Incidents in Minimata Bay, Japan and at Wabigoon English River, Ontario have become known to signify tragic episodes where whole communities experience the effects of mercury poisoning (Gardner, 2006; Parks and Hamilton, 1987). Heyer et al. (2004) demonstrated that exposure to low levels of mercury by dental employees contributes to increased levels of depression. The serious waste problem of mercury and other waste in healthcare has been acknowledged in the United States. The organization Hospitals for a Healthy Environment (H2E) is a result of a memorandum of understanding between the American Hospital Association (AHA) and the Environmental Protection Agency (EPA) signed in 1998 (Zimmer, 2001). The mandate of the H2E is to reduce toxic pollutants and the overall amount of waste produced in hospitals. “The AHA recognizes that community health is key, and they also recognize that hospitals have been responsible for polluting mercury dioxins into the air and water of the communities they serve...it’s quite contrary to the basic concept of health care.” reports Catherine Zimmer from H2E Environmental Leadership council (Zimmer, 2001; p. 33).

2.5 The Greening of Hospitals and Healthcare

Research into the overall management of healthcare (medical) waste has been done predominantly outside of Canada. Tudor et al. (2005) note that research in countries such as the United States of America (Health Care Without Harm, 2001; Lee et al., 2004) and India (Patil and Shekdar, 2001). Studies have been undertaken more readily in countries where regulations have been enacted and landfill expenses are high. The focus

has been largely on the infectious nature of medical waste, which can be a possible source of cross contamination to patients, staff and visitors (Henry and Heinke, 1996; Gerwig, 2001; Askarin et al., 2004). However, the focus of this study at Deer Lodge is on domestic wastes generated in a health centre setting, not on medical/infectious wastes. Nevertheless, it is noted that appropriately presorting and segregating medical or infectious waste has significant impact on reducing contamination into domestic stock and vice versa, thus maintaining higher rates of recycling and re-use and decreasing infection control costs (Office of Technical Assessment, 1990).

The International Organization for Standardization (ISO)-Environmental Management System (EMS) 14001 has set standards for assisting companies and institutions in making incremental improvements over time. Standards can assist an organization to be more efficient, improve economic performance, and safeguard consumers and the environment amongst other benefits. The ISO-EMS 14,001 specifically applies to environmental issues. By pursuing best practice, organisations assess all aspects of hospital/health centre operations, and environmental impacts are determined and continuous improvements are pursued through ongoing goal setting and retargeting. Many organizations, corporations and businesses have obtained ISO 14,001 certification. The benefits of certification include: improving public image through the demonstration of environmental/corporate concern, abiding by regulations and laws, preventing fines and being proactive (ISO, 2008). Certification can also be used as a staff recruitment information, as numbers of employees want to work in environmentally responsible workplaces.

St Mary's General Hospital, Kitchener Ontario, in 2001 became the second hospital in North America to obtain International Standards Organization 14001 Environmental Management System (EMS) designation. St. Mary's has extensively embraced environmental protection including but not limited to landscape management, removal of herbicides and pesticides, energy conservation due to renovations, new construction and staff awareness programming. (Canadian Centre for Pollution Prevention, 2008). Staff are encouraged to reduce transportation emissions and parking staff demands by carpooling and reduced fares on transit. St. Mary's developed its' first environmental policy which was approved by the Board of Trustee in 2000. As a result of environmental initiatives, decrease in waste fees accounted for a \$4,700 reduction in biomedical disposal costs in 1999 and a reduction of \$9,000 from 1998. The hospital has endorsed a mercury free program and has reduced biomedical solid waste going to landfill, by 25% compared to before this program (1998) (Canadian Centre for Pollution Prevention, 2008). To achieve the EMS St. Mary's hired an Environmental Coordinator.

Dartmouth General Hospital now considers their 'waste' a resource and has initiated many new waste recovery programs without increasing costs (Moulton, 2002). In 1994 the hospital became involved in recovering food by providing it to the local food bank; in 2001, 2400 kilograms of food went to the food bank. In that same year (2001) it implemented complete paper and beverage recycling programs. In 1999, they became involved in composting of organic materials. Each department has organic bins, which in turn are emptied into a cart on the main floor. Green Waste Company switches full cart collection bins with empty ones and the composting is processed offsite. Similar to other best practice centres this author has reviewed, Dartmouth Hospital has determined that

staff education and awareness results in the most participation. The hospital has also made linkages with other government programs in order to facilitate their programs. They requested funding from the Nova Scotia government solid waste resource management organization and obtained funds for carts and other equipment (Waste Management Guide, 2003).

In the United Kingdom, a study of 16 hospitals took place in 2006. The audits primarily focused on proper storage of clinical waste and concluded that waste segregation was deficient and that storage carts were in poor condition. Each hospital incurred at least one surprise visit. The overall conclusions of the study were that housekeeping; safety and hygiene standards were of sub-standard performance. More than 50% of the hospitals had noted overfilled clinical waste carts. One reason for overflowing clinical waste was the improper disposal of packaging waste into those containers (Blenkharn, 2007).

A duty of care (accountability) in the UK is placed on those responsible for clinical waste management. Nevertheless, there has only ever been one prosecution. Which occurred after media coverage of poor storage of waste led to examination of these processes (Blenkharn, 2007). This article reports that although there are pending standards for containment and storage of waste that they are discretionary and not mandatory. Primary attention of the providers and users of healthcare services is focused on direct patient care service i.e. frontline nursing/diagnostics. Support services including housekeeping are often overlooked. Blenkharn (2007) concludes that financial issues alone are not to blame as one year after the first study minimal change occurred.

As a result of the old infrastructure present in many of the UK's hospitals proper segregation and storage of waste was not feasible. According to Blenkarn (2007), this implicates hospital management for long-term neglect in planning of infrastructure and equipment. Solutions to waste management are complex and impeded by lack of infrastructure options. One recommendation was the reduction of packaging waste from the wards prior to transport to those areas. In that way staff will not inadvertently/purposely dispose of these materials incorrectly in clinical waste containers (Blenkarn, 2007).

In spite of the serious problems that exist from hospital generated pollution and wasted resources, coupled with a general increase in awareness of these issues, complacency about environmental issues among many healthcare workers persists. Psychological explanations and intervention for indifference to greening hospitals is explained by Topf (2005: p.3).

'Although most healthcare professionals may agree that environmental activism is important, getting there is an obvious challenge...Gifford (1999) labelled societal indifference to hazards and over consumption as environmental numbness...a collective lack of awareness about environmental destructiveness and the responsibility to prevent this.'

Topf (2005) notes the environmental contradictions of health and harm in hospitals at the micro and macro level. Hospitals and healthcare technology heal people yet harm the environment through pollution, in turn contributing to environmental problems. Topf (2005) discusses both the contribution of individual and group psychological issues in apathy to green participation. Denial and delaying decision-making surrounding greening activities affects staff involvement and limits employees' sense of control over their working environment. Inaction alleviates one's sense of lack

of control i.e. an individual may feel my contribution alone won't help, therefore I won't bother.

Since hospitals and health centres can employ hundreds of staff, group psychological factors also affect certain staff member's involvement. Staff may assume that another staff person i.e. housekeeping will deal with placing waste in the proper container thus resulting in decreased participation. Groupthink is also reported as a potential source of hesitation amongst staff. A person with an environmental solution may stay silent as he/she believe falsely that the silence of others represents lack of receptiveness with those expressing environmental concern.

Topf (2005) concludes that the issues surrounding environmental problems in healthcare are complicated and that over-crowded hospitals, vacant nursing positions and patient diversions to other hospitals confound participation. She recommends as a conceptual model the following as a means to impact environmental improvements in healthcare:

- 1) Mandatory environmental programming: In the U.S. she theorizes that environmental initiatives may be delayed in order to maximize profits. Mandatory legislation would understandably foster environmental involvement. She further adds that these mandatory requirements put certain individuals (hospital/ administration) in a state of mental instability, one conflicting with the other (requirement versus apathy). As a result of the obligatory requirements a sense of mental stability then returns to the individual. She gives as an example of the Environmental Protection Agency's legislation to implement the phase out of incineration within five years. Topf notes that individual

hospitals can also implement mandatory environmental programming through their own policies and procedures.

2) Elimination of institutional obstacles to environmental involvement: It is recommended that individual staff and group indifference can be overcome through sessions and dialogue which explains the rationale behind the numbness to participate and also the nature of environmental problems faced in hospitals.

3) Practical education sessions on water and energy conservation, and proper waste segregation. To increase awareness of environmental health care organizations by providing website information to staff.

Topf (2005) believes that these practices will ultimately lead to less environmental numbness, pro-green behaviour and movement towards sustainability.

The National Health Service in Cornwall, United Kingdom formulated a ten-year plan to manage healthcare waste produced in that district. The authors noted little previous research had been done in the UK. They cite Health Care Without Harm's findings that initiating a health waste management plan could potentially reduce waste processing fees, by between 40 and 70% (Tudor et al., 2005).

Attitudes towards healthcare waste changed during the 1990s in the UK. Seven primary reasons for this change were noted to be (Tudor et al., 2005):

1) Loss of Crown Immunity, as of 1990, the government would be held responsible for proper segregation

2) The requirement of duty of care for facilities that produce waste, and thus verifying appropriate handling and processing of their wastes.

- 3) Increasingly stringent laws surrounding waste limited the types of waste going to the landfill i.e. less organic waste allowed.
- 4) Community apprehension about 'super bugs' that are highly resistant bacteria and the resultant scrutiny regarding hygiene and waste.
- 5) News reports exposed inappropriately processed healthcare wastes.
- 6) The National Government embraced sustainable development, which includes provisions and targets for the Department of Health.
- 7) Finally, the increased expense of waste disposal due to the termination of multiple incinerators, and the resultant surge in tipping fees.

The Cornwall district undertook waste audits from 72 healthcare sites including different levels of hospitals and health centres. The study reviewed documentation of wastes processed and expenses. Waste audits were undertaken from clinical and domestic contents. Approximately 10% of the waste was audited over a two-week time frame. As a result, waste streams were prioritized in order to put a plan in effect. The audit demonstrated that other than organics from the kitchen/restaurants and shipping and maintenance wastes from the property services and shipping departments, all other wastes were from no specific source. In other words, diverse types of wastes came from most other departments (Tudor, et al., 2005).

In order to prioritize actions on the waste stream, the following three measures were used and scored out of 100.

- 1) Environmental benefits (reduced use of resources, toxicity and landfill loading)
- 2) Expenses related to land filling

3) Feasibility- the ease and expediency of which an intervention could be implemented and brought on line (Tudor, et al., 2005). As a result of the audit and prioritizing, clinical waste was deemed Priority 1 status due to the notable quantity, higher costs and stand-alone process/transport. Other materials noteworthy for potential reuse/recycle were bulky waste, office paper, newspaper, organics and e-waste (Tudor et al., 2005).

As a result of this evaluation, the three recommendations to formulate a ten year plan include: '1) To improve its organizational structure, which currently does not effectively cater to the overall waste management needs of all its sites. This included development of a waste team to educate and develop programmes. 2) To improve working relationships between the number of geographically separate and widespread sites in this health region. In facilitating closer working relationships recommendations were made for a central team and also linkages between important departments, adjoining centres, and government sites and the private sector; and 3) To reduce the current concentration on disposal and incineration of waste, in favour of holistic approaches to whole life assessment of resources use. At the largest hospital audited "A" they found that 41% of waste was landfilled, whereas, it was reported that 50-60% of waste countrywide was reported to be land filled. At hospital "A", 32% is incinerated, and 22% of waste is being recycled. Over the whole county of Cornwall recycling varied at sites from 0 to 60%. The largest quantities of waste materials represented in the domestic waste stream were: mixed paper, organics, and plastics. Clinical waste is the most expensive to process, followed by mixed paper and plastic. Twenty six percent of domestic waste going to the landfill could be diverted. To do this, a database of the

amount of waste, types of streams and expenses was considered a necessary initial action prior to programming and waste reduction and reuse. Precise documentation was a requirement for determining trends and also for identifying disused equipment that could be provided to other jurisdictions or sold. Procurement was also pointed out as necessary to review in order to reduce packaging waste, buying locally, and considering supplier of origin's responsibility for waste collection (Tudor et al., 2005).

According to Zimmer and McKinley (2007) the primary stimulus for reducing pollution in hospitals is the focus on staff and patient health. Additionally, hazardous waste legislation and expenses play a role in the rationale for hospitals initiating pollution control programmes. Even though community health protection is often in a hospital's mission statement, there is less impetus to direct attention to this area. Furthermore, most organizational leaders do not have an awareness of the costs and benefits of pollution prevention. 'CEOs generally do not link their own facility's waste to human health, although this is important to healthcare's mission. Employees often want to improve environmental performance. These pollution prevention related activities can assist with staff satisfaction and retention.'(Zimmer and McKinley, 2007)

2.6 Waste Audits

To determine the types and amounts of waste materials in an institution, a waste audit is an important step towards initiating a waste reduction programme. The results of the audit provide a snapshot of how the waste management system at the centre is presently operating. It can identify areas of concern and provide information about the effectiveness of the present policies, procedures and infrastructure in place. In addition, it provides a valuable baseline of data for future evaluations of the waste management

system. In many jurisdictions, as waste regulations and acts expand to become more stringent and the requirement for mandatory recycling continues, baseline waste audits are fundamental for implementing waste management reduction strategies (Waste Reduction Manual for Hospitals and Health Care Facilities, 1996). Only through the evaluation and data provided by a waste audit can comparisons over periods of time be determined and the success of implemented programmes known (Waste Management Guide, 2003).

There are various types of waste audit formats noted in the literature. The type of waste sampling protocol depends on such factors as amount of personnel, time available for undertaking the waste sort, size of organization to be audited, and variability of organizational operations. Waste audits can vary from visual assessment to lengthy and personnel intensive sampling categories (Waste Audit Users Manual, 1996). According to Resource Recovery Fund Board of Nova Scotia a waste audit:

[is] a *visual estimate approach* to assessing your waste stream. It is based on what is commonly called the "eyeball" method of estimation and uses **volume** rather than weight as the unit of measurement. In other words, visual approximation of waste volume is used instead of weigh scales. The goal is to produce reasonable estimates of your waste stream and the amount of material available for source reduction, re-use, recycling and composting initiatives. This approach has the advantage of limiting the cost and the commitment of employee time (The Visual Estimate Assessment Guide, nd).

In regards to quantity of total waste the most accurate representation occurs when waste is continuously weighed with each and every collection. North Carolina made this law in 1991 (Weston, 1992).

The Seven Oaks General Hospital and Wellness Institute Solid Waste Audit and Waste Reduction Study from May 2005 by Ken Friesen of earthbound environmental used a seven-day sampling at Seven Oaks General Hospital to extrapolate yearly

estimates. The sampling technique utilized playing dice, where samples were drawn down to ten-kilogram sample sizes. Earthbound staff identified samples from each zone, weighing each to provide information on the total weight through extrapolation (Friesen, 2005).

2.7 Environmental Regulation

An overview of government environmental regulation for waste was undertaken for Manitoba (Guide to Environmental Legislation, 2004). The regulations and acts are noted and summarized in APPENDIX A. This is not an exhaustive list and there may be other acts or regulations that are relevant to waste programming at Deer Lodge.

2.8 Waste Impacts

There are many negative impacts of waste including: negative community impacts and space requirements of landfills; leachate, transportation of waste needing large amounts of infrastructure and energy, production of landfill gas as waste decomposes and loss of reusable resources (Saffron et al, 2003). Toxicity of the waste is a significant concern from hospitals, industrial, commercial, agricultural or even domestic sources; contaminating land, water and other waste stock.

2.8.1 Landfills

Globally, landfill space availability has been cited as one of the major concerns in the landfill debate. The issue of space in less populous areas such as Manitoba does not seem to pose such a pressing concern as in the larger metropolises of Toronto or New York (Parizeau, 2006). However, 'not in my backyard' is a frequent theme when new landfill

sites are proposed, planned and implemented. Members of a community voice opposition when a municipality or city proposed to place a landfill in or adjacent to residential areas in many instances. Vigorous opposition occurred when the city of Winnipeg proposed and passed the BFI Rosser Landfill site in 1995 (Garlich, 2001).

Landfill sites have a limited life expectancy. With expanding urban communities and the decommissioning of old landfill sites, the search for new sites becomes even harder (Griffiths et al., 2002). Opposition to landfill site opening is often strong and this is happening throughout the 'developed' world.

2.8.2 Toxins and Leachate

Ground and surface water pollution adjacent to landfill sites is possible from various contaminants (Donahoe, 2003). Computers and electronics equipment are an important part of healthcare technology, however there is no formalized all encompassing recycling program for e-waste (electronic waste) in Manitoba (EPSC, 2006). Obsolete and discarded electronics in Manitoba predominantly end up in landfill sites (Dykman, 2005). E-waste is an increasingly problematic solid waste issue (Thorpe, 2006).

Discarded plastic wastes fabricated with polyvinylchloride (PVCs) contain chlorine or when incinerated produce dioxins. Dioxins are known carcinogenic agents. Furthermore, plastic products such as PVC medical gloves, tubing and catheter bags leach waste products such as toxic stabilizers and plasticizers (phthalates) after they breakdown (Health Care Without Harm, April, 2006). Presence of these contaminants in ground water is a health risk to humans through use of well water services and in surface water to wildlife such as fish and birds (USGS, 2006). Recent studies have found that

phthalates have been detected in human mother's milk and these chemicals have been passed onto their newborn infants. Animal studies demonstrate deformation of genitalia as a result of exposure to phthalates (Borch, J., 2004). The conclusions indicating that human testis may be susceptible to contact with this chemical exposure during infant development.

Groundwater is at high risk for contamination according to the US Geological Survey (2006):

Because water is such an excellent solvent it can contain lots of dissolved chemicals. And since ground water moves through rocks and subsurface soil, it has a lot of opportunity to dissolve substances as it moves. Even though the ground is an excellent mechanism for filtering out particulate matter, such as leaves, soil, and bugs, dissolved chemicals and gases can still occur in large enough concentrations in ground water to cause problems (USGS, 2006-website).

Florescent lamp bulbs with energy saving design are valuable for hospitals at reducing energy utilization and therefore reducing expenditures on lighting. However, florescent lamps contain mercury, a known nerve toxin, as noted earlier in this chapter. Nevertheless, recycling of florescent lamps is available in Winnipeg. The author is aware that Home Depot hardware store presently takes back old lamps for recycling. Recycling reduces the amount of mercury that ends up in the landfill and environment (Health Care Without Harm, December 2002).

Pharmaceuticals are another common element in hospitals that you don't want going into the general waste: 'Because of the extraordinary complexity of both exposure and outcome, toxicologists usually are forced to look at cause-effect issues 'out of context', to consider exposure solely as a function of a single toxicantthe overall picture is complicated not just by the large universe of potential toxicants to which an

organism is normally exposed but a host of other variables...’ (Daughton, C., 2003, page 758). Studies of United States streams indicate that 80% of these watercourses contain human and veterinary drugs (including antibiotics and hormones), fire retardants, insecticides and plasticizers (Buxton and Kolpin, 2002). According to studies in the Experimental Lakes District of Ontario, Canada, purposeful introduction of hormones (estrogen) into the aquatic environment by scientists to study environmental impacts resulted in abnormalities in the minnow population post exposure (Environmental Protection Agency, 2007). However, though adverse environmental damage may be occurring through pharmaceutical and personal care waste, definitive evidence of human health impacts is not yet confirmed (EPA, 2008) (Stockholm University, National Corporation of Swedish Pharmacies and Stockholm County Council, 2008)

CHAPTER 3 METHODOLOGY:

The author used a mixed methodology approach for this study including quantitative, qualitative and participatory action approaches. The utilization of quantitative and qualitative methodologies allowed this author to employ triangulation techniques to support the purposes of the study. According to Jick, 1979 page 604. “triangulation rests on the assumption that the weakness in a single method will be compensated by the strengths of another method.”

Underlying the mixed methodology, the author feels strongly about facilitating environmental awareness and sustainable development at Deer Lodge Centre, thus the utilization of the Participatory Action Research model. According to Robson (2002) *improvement* and *involvement* are central to action research. Lewin, (1946) described action research as a way of learning about organizations through trying to change them.

Is Deer Lodge presently recycling a majority of its waste? What is the level of involvement with segregation in recycling and re-use by staff at Deer Lodge? Through a quantitative study, a waste audit, and qualitative study that include staff interviews and participatory action research, the waste management performance of Deer Lodge will be explored. In Creswell, Greene et al., (1994) page 175, provides reasons for combining methodologies in a single study:

- Triangulation in the classic sense of seeking convergence of results...
- Complimentary, in that overlapping and different facets of a phenomenon may emerge (e.g., peeling the layers of an onion)...
- Developmentally, wherein the first method is used sequentially to help inform the second method expansion, wherein the mixed methods add scope and breadth to the study.

The author obtained permission from Real Cloutier Chief Operating Officer, Rick Rogers Director of Facility Management, the Senior Management team to undertake this thesis and the waste audit, interviews and formation of the Green Team. Ethical approval was required from both Deer Lodge Centre and the University of Manitoba. Approval was obtained from Deer Lodge Centre in September 2006 and from the Human Subject Research Ethics Protocol Submissions (Ft. Garry Campus) in October 2006. (Ethics/Deer Lodge approvals in appendix)

The four methods applied in this study were:

1. Site inspection
2. Waste audit
3. Interviews
4. Participatory research and formation of a green team.

3.1. SITE INSPECTION

A paper audit of existing information and observation of hospital operations that generate waste were undertaken as part of the study to better understand material flows from 2007 to mid 2008. Photographs and statistics were obtained. The Green Team Committee, which was formed as a result of this study, also participated in a tour.

3.2. WASTE AUDIT

Alex Zebrum Manager of Housekeeping and Material Management assisted with organizing his staff to assist with the waste audit. Space was provided in the Facilities

Management Building basement to undertake the waste sort. Deer Lodge Housekeeping provided tables, gowns, gloves, disinfectant and other supplies. The University of Manitoba UMREG recycling committee provided the weigh scale used for the waste audit. The measurements were provided in grams. The scale used for the audit of waste destined for landfill was a portable FW-100K floor model, and was calibrated, as reported by the -Avery Weigh-Tronix Company reporting within normal limits. For the audit of paper and cardboard the floor scale model IQ PLUS 355 from Superior Technologies was used in the Deer Lodge shipping/receiving department (see picture of floor scale with toter and shredded paper on page 54).

3.2.1 SOLID WASTE STREAM AUDIT

As Deer Lodge provides resident and patient care 24 hours, 365 days a year; the ward activities were considered continuous, with little variability from day to day, in designing the waste audit sampling strategy to sample for one 24 hour period but considering the three separate waste pickups. The housekeepers collected, as per usual, at approximately 8 am, noon and 2:30pm but provided the black garbage bags for the audit. These three pickups (one 24 hour period) were audited for each of the 12 zones of the centre in the basement of the Facilities Management Building. During the waste audit, the author wore a hospital gown, rubber gloves and facemask.

Waste was sorted into 46 plastic pails. The collection pails had previously been weighed and their gross weight was subtracted from the sorted waste to give the net weight of each material. These were noted on the weight audit form, which was adapted from the University of Manitoba Recycling and Environmental Group (UMREG), to suit the needs of a health centre waste audit. The original audit form consisted of 34 materials

for waste sort purposes, including the major categories of paper, polycoat, steel, aluminum, glass, plastics, compostable, hazardous, construction and demolition, batteries and mixed. (However, hazardous and construction and demolition waste is not included in this study). Additional material categories were added as a result of significant findings during the sort or if an obviously reusable item by accident or deliberately ended up in the refuse. The following materials/products were added as separate collection categories: paper towels, diapers/incontinent products, rubber gloves, tissue, boxboard, laundry/linen, medical waste, food containers, unused food, paper cups and plates, utensils/reusable dishes, orthotic medical waste. The annual waste composition was extrapolated for each material by multiplying by 365. Weighed materials were taken to the compactor for disposal and the tables, pails, and area was cleaned with disinfectant spray.

The centre was broken up into twelve functional areas and levels for separate waste auditing, namely:

1. Administration Building: including offices from Senior Management, Human Resources, Personal Care programs, various offices, Dental lab, Collaborative research centre, Library and Finance;
2. Rehab and Main Floor ('Main Street'): including Rehab departments (occupational, physiotherapy, speech, and diagnostic services), day hospital, medical records and some other smaller offices.
3. Second Floor: including patient care wards 2 East and 2 West and conference rooms, chapel and 6 offices.

4. Third Floor: including patient care wards 3 East and resident care ward T3/Special Care Unit.
5. Fourth Floor: including resident care areas 4 East and 4 West and Tower 4.
6. Fifth Floor: including resident care areas 5 East and 5 West and Tower 5
7. Sixth Floor: including resident care areas 6 East and West and Tower 6.
8. Seventh Floor: including resident care areas 7 East and West and Tower 7 and small staff lounge/gym.
9. Facility Management: includes offices and shops in the Facility Management building.
10. Cafeteria: includes trays and waste collected from patrons of the cafeteria.
11. Pharmacy: includes solid waste collected from the pharmacy department.
12. Recycle Bins: includes material collected in Blue Box recycle bins on the main floor ('Main Street') and in front of the resident bar 'Chad's'

NOTE: Because the audit took place during the winter months (grass, leaves, plants) were not included in the audit process.

3.3 INTERVIEWS

3.3.1 ABOUT QUALITATIVE RESEARCH

'The intent of qualitative research is to understand a particular social situation, event, role, group, or interaction' (Creswell, J. 1994, Ch. 9, page 147 quoted Locke, Spirduso, & Silverman, 1987). This entails immersion in the everyday life of the setting chosen for the study; the author enters the informant's world and through ongoing interaction, seeks the informant's perspective and meanings.

Finlay and Ballinger (2006) further states that not only does the author enter the informant's world but that 'the author is a central figure who influences the collection, selection and interpretation of data and that our prior experience and understandings effect how we construct what we see. Qualitative authors recognise that our behaviour, and our relationships with our participants, have an impact on our participants' responses, and hence the findings we obtain. Finlay and Ballinger refer to Willig: There are ongoing arguments about the role of the author and it can range from neutral to involved (Finlay and Ballinger. 2006, page 21)

3.3.2 RESEARCH PHILOSOPHY

As noted in the introduction, the medical model has been critical in healing the injured and certain infectious diseases. However the author notes the serious limitations in regards to prevention of disease, and the correlation between environmental degradation and the causation of chronic disease and human suffering.

The author strongly believes in the need to reduce the use of products unnecessarily, to re-use items where possible instead of disposal, to increase recycling and purchase environmentally friendly products at Deer Lodge Centre. As a result of the strong convictions of the author for environmental protection and the undertaking of this thesis a *participatory action research* approach was undertaken.

Staff Interviews: The author sent a one-page bulletin both in the hospital newsletter and to every ward and department for posting. In response, nine staff members contacted the author and were interviewed. The interested participant signed a consent form prior to the commencement of the interview. At nine interviews, the responses became repetitive in nature and thus it was felt the author had attained saturation point.

Furthermore, with a high level of promotion of this study in the Centre newsletter and bulletins to departments and notice boards no further volunteers came forward.

Open-ended interviews were chosen over facility wide and lengthy surveys as hospitals can often be overexposed to survey formatted research. The interviews focused on two essential questions in regards to waste management at Deer Lodge Centre. Firstly, what are the perceptions of individual staff members regarding the present waste management system at Deer Lodge? Secondly, what recommendations does the staff member have for future improvements? In addition to these two main questions, the author wanted to gain insight into the interviewees waste recycling activities as well as his/her level of commitment.

The interviews involved asking nine staff members thirteen open-ended questions and ten closed ended questions in the interview session (Refer to page 66). The structured interviews occurred between the months of July and Sept, 2007 and were tape-recorded. The author received prior approval from Aubrey Hemminger, Manager of Pastoral Care to use the office attached to the chapel for interview purposes. (Hemminger, A., 2007) Staff included areas such as nursing, nurse specialist, nurse manager, clerical staff, departmental manager, therapist and pastoral care staff. The author transcribed the data, reviewing content and noting key quotes. The data was then grouped or coded into major themes representing congruent and divergent trains of thought. Data from interviews: Strauss and Corbin (Basics of Qualitative Research) describe open coding as the process of breaking down, examining, comparing, conceptualizing and categorizing data (Strauss and Corbin, 1990).

3.4. PARTICIPATORY ACTION OF A GREEN TEAM

Rick Rogers, Facility Management Director, put forward the idea of a Green Team (Environmental Committee), when the author met with him to request thesis project approval at Deer Lodge. The author felt that this was an opportunity to lead a process of environmental management and progressive solid waste programming at Deer Lodge. Quantitative (waste audit) and qualitative (staff interviews) studies preceded the formulation and development of the Green Team. The author obtained permission from the senior management team to develop and chair a committee (the 'Green Team') to review and make recommendations for solid waste management and other environmental concerns at Deer Lodge (Cloutier, R., 2007).

The next step was to identify key stakeholders to include on the committee. The literature identifies key areas for inclusion in a hospital/health centre based environmental committee. Nursing, facility management, administration, kitchen, infection control, the purchasing agent, and other areas were identified. The author placed bulletins in the Deer Lodge newsletter, to each department; program and rented spaces to recruit committee members (see appendix/Green Team Poster). Presently there are nine members on the Green Team Committee.

As emphasized by Deer Lodge's Chief Operating Officer, Real Cloutier, large committees are typically less effective. The committee would be 40+ members if every area of Deer Lodge and other on-site agencies/business were included on the committee. However, the author wanted to have communication with every department or program. Therefore each department, ward or program was requested to identify a representative. Each 'rep' would be crucial in reflecting individual voices, concerns and issues back to

the main committee and provide a conduit for the main committee to disseminate information back to the local working group.

These representatives are part of an informal network that is intended to communicate with their working department regarding waste issues, concerns, infrastructures, and processes. The representatives then in turn pass the information onto the Green Team. The Green Team communicates to the representatives for their dissemination of pertinent info (educational, procedural, new programs etc.) An introduction meeting with all reps and committee members is to be planned to establish rapport and communication linkages between the committee and reps that don't know each other yet.

Informal personal communications were also undertaken with several staff members during the period of this thesis in regards to the status of the present program, areas for improvement and other comments. Also, tours and exchanges with other hospitals were undertaken to see best practices and how representative this hospital was to others.

CHAPTER 4 FINDINGS

Quantitative Findings

4.1 Site Inspection/Audit

A review of paper documentation on waste generation, policies and procedures provided no previous waste audits for comparison and trend purposes. There was also a lack of reference to recycling, reusability, green purchasing or waste prevention

4.1.1 Policies and Procedures:

The author reviewed the policy manuals of the Facility Management and Housekeeping offices and found no references to Deer Lodge recycling programs or goal setting on any environmental health issue. No linkage with provincial or federal acts or regulations was noted in the policy manuals of either area.

4.2 Infection Control Issues

Residents living at Deer Lodge Centre, just as any healthcare facility, are faced with the reality of communicable infectious diseases. Organisms that affect the community at large (such as antibiotic resistant organisms and gastroenteritis outbreaks) also congregate among the vulnerable elderly that call the Centre home. Methicillin-resistant *Staphylococcus aureus* (MRSA) is a bacterium responsible for difficult-to-treat infections in humans, and is one of many resistant bacteria in Deer Lodge. Additionally, flu outbreaks have occurred recently within the centre. (The last flu outbreak known to this author in August 2008, on the 3rd floor.) Inevitably, congregations of unhealthy persons open up the possibility of spreading these ‘super bugs’ by primarily less than optimum hand washing by residents, staff and visitors. As this is a long-term care setting

and often the final home for many of these geriatric residents, these persons are not quarantined, as perhaps the lay-public would believe. And those persons carrying these bacteria go to activities, the cafeteria and move throughout the centre. The nursing staff and the infection control practitioner attempt to limit the spread of these bugs with the challenges as noted. Many of the residents present have compromised systems due to other disease processes.

As a result of these resistant bacteria, personal and ward hygiene is important to contain the spread. Frequent cleaning, utilization of paper towels, gloves, gowns, and masks have increased the production of solid waste.

4.3 Recycling Bins

Many bins are not labelled or if labelling of bins is present, it is not consistent on many paper bins. Staff, residents and visitors are unsure of what materials are allowed or disallowed in the bins. According to one housekeeper 'you would be surprised at what ends up in the paper recycling' (Anon., 2008). The author has observed contamination in the paper recycling bins. Confidential materials have also been observed in the non-confidential paper recycling bins. This was not quantified for the purposes of this study, however, the material was moved into the confidential waste containers

4.4 Diapers (Incontinence Briefs)

In Winnipeg two waste treatment plants treat human waste that leaves our toilets. Human urine and feces in diapers from incontinent children and geriatric residents at Deer Lodge, other health centres and the community go the landfill and are not treated. Presently there are no services available for recycling or treating diapers in the Winnipeg Region (Friesen, K., 2008).

4.5 Dishes, Cutlery and Linens

There are reusable dishes, cutlery and linens that are ending up in the waste stream prematurely, and should be diverted back to facility usage. An awareness and education program is required.

4.6 Orthotic Waste

The author determined that a large quantity of used casting and molding materials are ending up in the waste stream via Deer Lodge housekeeping. During the course of this study alternative or recycling uses for these materials were not investigated. However, further study of this issue is listed in the recommendations.

4.7 Wastes Generated:

Waste products are reflective of the type of services and activities that occur in the many different areas. Four hundred eighty six people live or are inpatients at Deer Lodge with approximately 800 employees to provide health services and other services. Incontinence products, organic matter, paper and cardboard and plastics are expected to dominate the waste stream. Waste generated through personal care for the Centre's residents as diapers, hand cleaner dispensers, medication containers, individual food wrappers, disposable meal containers, paper-towels, gloves and newspapers, etc. are included. Other areas of the hospital include a day hospital, library, cafeteria, and dozens of offices, facility management, stores, kitchen, laundry, rehab, information technology, health records, X-ray, lab, rented spaces, dental office and other areas.

Refuse collected by housekeeping is placed into a compactor purchased by Deer Lodge through Waste Management Company-who describe themselves as:

'Waste Management of Canada is the leading provider of comprehensive waste management services, offering advanced residential, commercial and industrial

collection, recycling and disposal services throughout Canada.

The company employs 3,400 people at 116 operating locations in 9 provinces, servicing over 4.5 million residential customers and 170,000 industrial and commercial customers. Waste Management of Canada owns and/or operates 20 recycling recovery facilities and 18 landfills.

A subsidiary of Waste Management Inc., headquartered in Houston, Texas, we are backed by the knowledge, experience, and resources of North America's largest environmental services organization. Together, Waste Management's 52,000 employees serve approximately 25 million residential and 2 million commercial throughout Canada, the United States, and Puerto Rico.⁷
(Waste Management, 2008)

These compacted materials end up in the Landfill operated by the City of Winnipeg.

4.8 Non-Confidential Paper

Non-confidential paper products are collected by Deer Lodge staff and retrieved by Waste Management, as well as the old corrugated cardboard (OCC). There exists very little labelling on blue bins indicating what materials/paper are included (and excluded) in recycling. Other than the introduction of the confidential paper collection system, no educational sessions or bulletins have been observed to educate new staff or remind existing staff. Furthermore, apparent contaminants were found in the blue paper bins by the author and housekeeper. The author has had difficulty obtaining timely and accurate information from one vendor, Waste Management, on the types of paper included and on the impact of contaminated loads.

4.9 Confidential Paper and Confidential Non-Paper Waste

Wards and departments have locked bins for confidential paper, as shown below. These bins and collection services have been provided by Phoenix recycling, with the

first pick-up in March 2007 (Lane, L., 2008). This recycling program coincided with the completion of the solid waste audit by this author.



Non-paper items include medication blister packs, pharmacy information, ID bracelets, and CDs/DVDs with confidential information. Phoenix provides monthly collection for the paper and non-paper confidential materials. At pick-up time Phoenix staff empties the 11 centrally located bins. Whereas, Deer Lodge housekeeping staff empty the peripherally placed bins (14) throughout the centre and it is stored in a secured room in shipping/receiving. (Lane, L., 2008) Phoenix reports that they have provided Deer Lodge a written guarantee that all collected paper is shredded the same day as pickup. At Phoenix, it is then commingled with other paper, baled and sent to paper mills. The mill hydro-pulps the paper and eventually it is recycled to become products such as toilet paper and envelopes. (Thorney, 2008)

4.10 Beverage Containers Waste

Deer Lodge has had blue bins stationed on the first, second and 8th floors for beverage containers including glass, plastic and aluminium. Surprisingly, these materials have been dumped into the compactor and sent to the landfill (up to December 2007). There are also presently in place, collection bins for tin tube feed cans on four wards and containers for glass bottles. However, these materials were also being dumped in the compactor and taken to the landfill. According to one housekeeper this has been occurring for at least ten years (Anon, 2007).

The author enquired into the rationale for the ongoing source separation and collection yet the continuing dumping for many years. The author heard different accounts of past inconsistent collection by the external agencies. One staff member stated that pick up was by a single staff member who dumped them. Another stated that the Shriner's collected the recycled materials at one point but that the collection was inconsistent and discontinued but not the source separation. The housekeeping manager reported the reason these materials are not now diverted to recycling is there is no market for these materials (Zebrun, A., 2008). At least certain members of Senior Management had not been aware that the beverage recycling bins were not being recycled (Cloutier, R., 2007). When they learned of this in December 2007, they instructed that the bins on the main and second floors for beverage containers be pulled until such time as a vendor and process to recycle these materials could be put in place. (Cloutier, R., 2007)

4.11 Refuse

Refuse is collected by Housekeeping from each resident/ patient room, employee's offices, wards and other rooms and placed in a holding room on each floor. Other areas of the hospital, such as administration have a collection cart in the basement by the administration elevator. The collection housekeeper makes rounds three times per day, throughout the centre and empties the holding rooms or interim holding carts with a large wheeled cart. These refuse wastes are taken to the compactor for disposal (Gensiorek, C., 2007).

4.12 Non-Confidential Paper

Paper is collected in blue bins near computers, copiers, in offices and on wards. These are sometimes labelled but with inconsistent or make shift labels or often not all.



Poorly labelled recycling bins

The collection housekeeper transports a 96-gallon toter cart to each ward, department, office or area and empties the paper waste into the wheeled toter. The paper waste has been noted to have contaminants such as aluminium cans, plastic and various other non-paper materials in the lot.

4.13 Cardboard

Cardboard primarily from stores/shipping receiving and the kitchen is collected in a large wheeled bin in the basement hallway between the kitchen and stores. Many of the boxes are broken down and flattened but some are not. One staff member from shipping receiving/stores reports they are very consistent at breaking down boxes (Franchi, C., 2008). Many of the unflattened boxes were observed to have food product titles on them. Cardboard is emptied from the intermediate collection bins approximately once per day. Outside the building there is a 6-yard Waste Management bin provided that is filled with some unflattened boxes. These unflattened boxes fill the volume of the collection bin quicker than would occur had all the boxes been flattened, as shown in the photo on page 56. The result is the bin becoming filled more quickly than with just flattened boxes and thus more frequent collection.

It has been observed that cardboard from departments other than stores or the kitchen may be placed in black refuse bags by housekeeping staff and sent to the compactor. Single cardboard boxes have been observed being thrown directly into the refuse compactor alongside the black refuse bags and not in the cardboard bin. The cardboard collection bin is only approximately 10 metres away. Paper and cardboard is collected by Waste Management in the 6-yard bin and toters as indicated. The cardboard and paper are then sent and subcontracted to Metro Waste (Patz, C., 2008).

4.14 Electronic Waste (E-Waste)

Discarded and obsolete computers and other electronic equipment have been sent to an Electronic waste recycler--Syrotech in Winnipeg Manitoba. (Rogers, 2007) (Note that Syrotech does not have the WRHA contract for e-waste as of June 2008). Computers and other obsolete electronic waste were collected in an unused area of the Centre and held until sufficient quantities resulted. Syrotech Industries is called approximately yearly to collect the electronic waste depending on quantities, but did not have a weight or computer estimate of how much. The Syrotech driver also indicated he was neither aware nor concerned with numbers of these obsolete products. The author observed a five-ton truck being used to haul the electronic waste to Syrotech and which was piled two computers deep. A contract between Syrotech and other WRHA facilities existed. (Terminated in June 2008). Syrotech is located in Winnipeg.

Syrotech Industries is the largest and most trusted Canadian recycler of used office furniture, computer and electronic equipment. We market new and used computer desks, file cabinets, office dividers, computers, computer parts, peripherals and lots of other miscellaneous electronic stuff like TVs, DVD Players, VCRs, Stereos, and small appliances. We fully support all that we sell with our technical support..

At Syrotech Industries we obtain our used furniture, computers and peripherals from Government, Banks, and large business. They buy only the best and look after it until they upgrade. All of our equipment is brought in, stripped, tested and re-furbished before we offer it for sale.

We also accept your used and unwanted computer or electric equipment for recycling. No matter what the condition of the item, everything that is brought into Syrotech Industries is sorted and sent to the proper facilities to be recycled. Help minimize the disposal of computer and electric equipment into local landfills. Bring your used equipment to Syrotech Industries Ltd. (Syrotech, 2007)

Tom Syrota reports that the WRHA through Syrotech has diverted **1.3 million** kilograms of electronic waste from the landfill by sending our old E-waste for recycling. Syrotech sends their waste for recycling to Sims in Brampton, Ontario, Noranda in Quebec and PC

in Vancouver. They verify that they process and destroy confidential information that they handle (Syrota, T., 2008). However, florescent lamps are reportedly dumped into the general refuse according to members of the maintenance department (Anon, 2008)

4.15 Food Disposal

There are presently no composting programs at Deer Lodge. Food for residents, visitors, and staff enter the waste stream from various sources. The cafeteria is available for residents, visitors, and staff and any organic waste left on trays is primarily black bagged for landfill disposal. Secondly, food from trays used to serve to residents on the wards is garburated into the municipal sewer or cleaned off and black bagged destined for the landfill. Thirdly, the meals carts are returned to the Regional Distribution facility once they leave Deer Lodge (Warkentin-Brown, 2007).

4.16 Waste Audit: Quantitative Findings

It was reported earlier that for waste sort purposes Deer Lodge was divided into 12 functional/housekeeping zones. The three samples for collection day for each area were totaled and extrapolated to provide the yearly estimates for total waste produced. (See Table Below).

Table 1: Findings of waste audit for each area of Deer Lodge Centre

		AREAS												
		Admin	Cafe	Facility Mgt	Rehab Main St.	Pharmacy	2 nd Floor (Inpatient Rehab other)	3 rd floor Special Care /Inpt Rehab	4 th Floor PCH/Chro	5 th Floor PCH/Chronic	6 th Floor PCH/Chronic	7 th Floor PCH/Chronic	Recyclable Bins	Food Trays

kilograms	301,919	33,668	12,030	1,413	6,705	3,697	16,348	26,773	35,204	35,640	36,077	36,949	25,495	31,919
tonnes Metric	302 T	34	12	1	7	4	16	27	35	36	36	37	25	32
otal Generated All areas														

The author estimated that 302 metric tonnes of refuse waste per year is sent to the city landfill via the compactor as delivered by Waste Management. However, Waste Management records as provided by the housekeeping supervisor indicate that 443 tonnes per year were sent to the landfill (Zebrun, 2007).

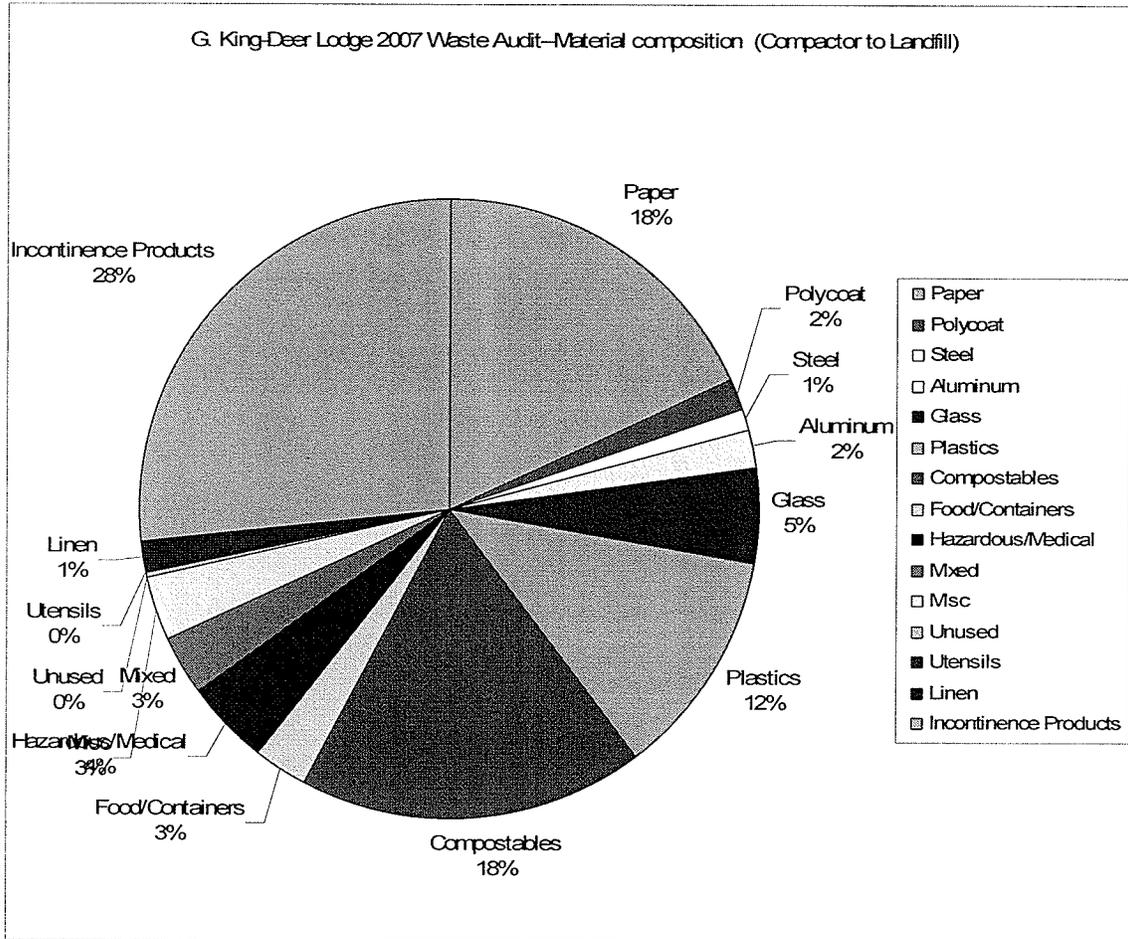
Table 2: Amount of wastes estimated, comparing by two methods in 2007

Amount charged by Disposal company (tonnes)	Estimated by waste audit (tonnes)	Difference (Tonnes)
443.	301.	132.

There is a 19.75% differential between these two figures. Several possible reasons exist for this difference. Firstly, the research audit took place in the winter and organic yard waste and grass clippings were not included in the analysis. Deer Lodge has extensive grounds for lawn and garden maintenance. Furthermore, departments have been observed to throw old and broken furniture, antiquated or broken rehab equipment (not worthy of donation) and items from intermittent departmental cleanups directly into the compactor and not in or with daily refuse bins. These materials were not included in the author's samples.

4.16.1 Waste Stream Composition:

Figure 1: Waste audit composition for Deer Lodge, Winnipeg



From the materials analyzed by the author’s audit; incontinence products such as diapers and pads represent the largest component, at 28% of the refuse waste stream going to the landfill is diapers and pads. The next largest material groups are: paper 18% and compostables (organics) 18% (Table above) demonstrates the breakdown of the materials.

4.16.2 Other Waste Streams Audits (Reported Non-Landfilled):

Data regarding the weight of non-confidential waste paper and cardboard is not presently provided by Waste Management Company. Payment for non-confidential

paper collection as reported by Alex Zebrun Housekeeping Manager is by number of pickups not weight (Zebrun, 2007). And thus the weight of the non-confidential paper is not being recorded. After six weeks and four phone calls to Waste Management to get any data on paper and cardboard amounts, the author was told amounts were estimated and that there would be an additional ongoing fee if Deer Lodge required future permanent data including weights of the paper and or cardboard (Patz, C., 2008). Waste Management reports that the company subcontracts out paper and cardboard recycling to Metro Waste. Metro Waste declined a site visit by the author on behalf of Deer Lodge to inspect their recycling facilities citing safety issues (Langois, 2008). In contrast a competitor, IPI allows full access tours and inspections to its' City of Winnipeg recycling plant.

As a result the author undertook an audit of paper and cardboard collected over a one-week period.

4.16.3 Non-Confidential Paper

Non-confidential paper was collected in 96 gallon wheeled toters (See the picture of wheeled toter-next page). The paper bins are located throughout the Centre and picked up once per week by the collection housekeeper (Gensiorek, C., 2007). The author understands that housekeeping may make more frequent collection then previously due to quantities in bins.



Non-confidential paper toters

Toters are stored in the basement waiting once per week pickup. The author audited a one-week collection of paper. The seven toter bins audited were weighed on the shipping receiving floor scale, gross weight including the toter and paper inclusive. The full weight was subtracted from the container weight to give the amount of the non-confidential paperweight in kilograms for that particular bin.

It appeared that some shredded paper was also set aside with the non-confidential paper that would be collected by Waste Management (See picture page 55: Toter with shredded paper on weigh scale). The non-confidential paper one-week total was extrapolated to provide a yearly estimate for non-confidential paper amount: **11,043.90** kilograms per year (**11 Tonnes**).



Toter with shredded paper on scale

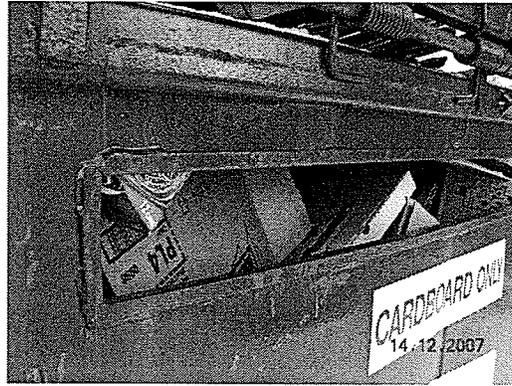
4.16.4 Cardboard

Corrugated cardboard is collected in the basement in a hallway between the stores and the kitchen; two of the largest Deer Lodge departments to open the boxes. Some of the boxes were flattened and others were not. See Picture: Basement cardboard collection area NOT folded boxes)



Basement cardboard collection area NOT folded boxes

This is reflected in the contents of the external Waste Management bin, which takes volume with unflattened boxes. See picture following: Unfolded cardboard external bin.



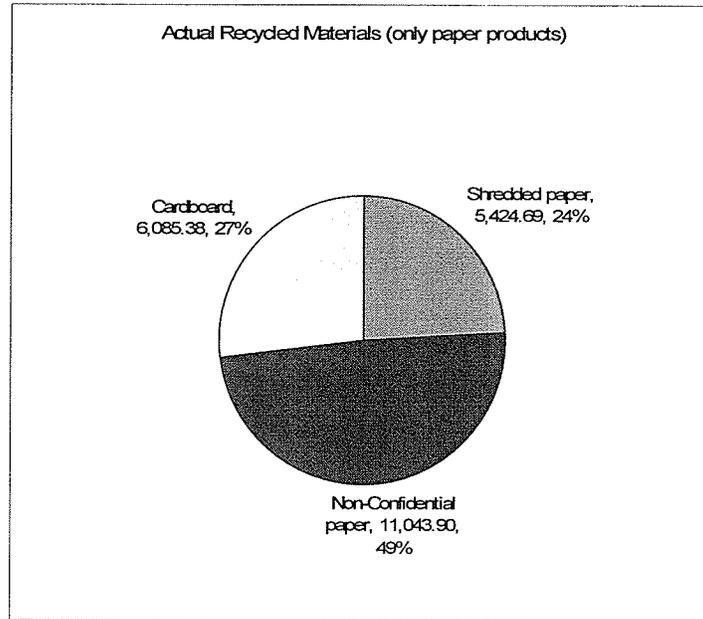
Unfolded cardboard external bin

The author audited a one-week sampling of cardboard. The collected cardboard is held in the Waste Management bin. (See Picture Above) It is estimated that **6085 Kilograms (6.085 Tonnes)** is sent for recycling by Waste Management.

Cafeteria paper napkins: Christine Warkentin-Brown (Green Team) undertook a pseudo-audit of all napkins left on the cafeteria tables (as able) and collected **2.7 Kilos** over a 2 week period. This extrapolates to a yearly estimate of **70 kilos** of unused napkins that are wasted (cost of the unused product) and must be put into the refuse for to hygiene reasons.

4.17 Actual Recycled Materials

Recycled materials including confidential (shredded) paper, non-confidential paper and cardboard is estimated to be **22,553 Kilograms (22.5 Tonnes)** per year.



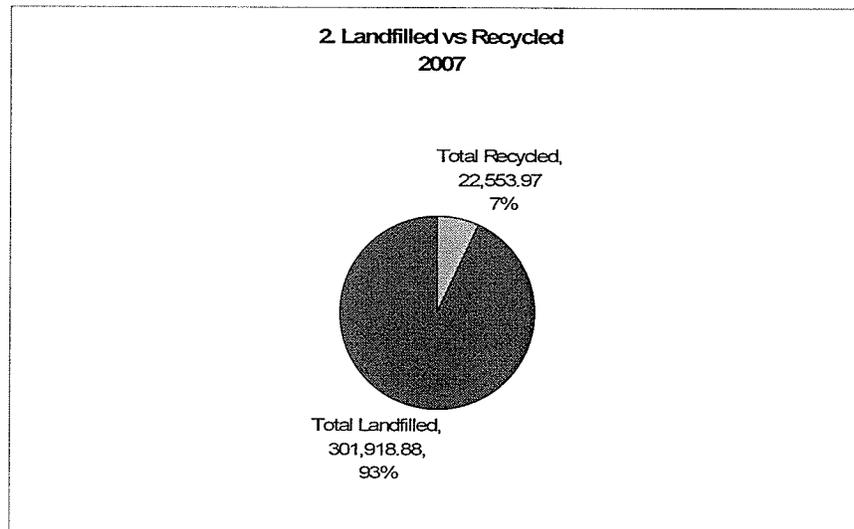
Of the materials that are reported recycled non-confidential paper makes up **49%** (11 Tonnes) of the weight, followed by cardboard at **27%** (6 Tonnes) and lastly confidential (shredded) paper at **24%** (5.4 Tonnes) per year. Note that the author was informed that a dispute occurred between Deer Lodge and Waste Management and they refused to take extra paper that had accumulated due to a housecleaning purge (Anon., 2007)

1. Actual Recycled Materials		
Material	2007 Data (Kgs)	Tonnes
Shredded paper	5,424.69	5.42
Non-Confidential paper	11,043.90	11.04
Cardboard	6,085.38	6.09
Total Recycled	22,553.97	22.55
Total Landfilled	301,918.88	301.92

2. Landfilled vs Recycled

Comparing the estimated total of actually recycled materials (**22 T**) to the total of non-recycled refuse waste (**301 T**) it is determined that 93% is land filled. Conversely,

Deer Lodge is achieving only 7% diversion rate. The actual net diversion rate is expected to be less than 7% as other waste streams i.e. yard waste were not included in this audit. All of the diverted materials are paper products. (E-waste and old rehab equipment diverted has not been methodically quantified.)



4.18 Potentially Recyclable Materials

In spite of the recycling infrastructure (blue boxes) in place for beverage containers, aluminium, plastic and glass are ending up in the landfill via the compactor. These materials are potentially divertible from the landfill. Diversion from the landfill has the opportunity for economic and environmental (i.e. resource/emission/landfill) benefits to Deer Lodge and the greater community. Data from the waste audit for aluminium beverage containers indicate that **5762 Kilograms (5.7 Tonnes)** of waste is being sent to landfill. Of those **4927 Kilos** were being collected in recycle containers and believed by those using them to be sent to be recycled? If they were in fact recycled *this would* represent a diversion rate of 85%. In fact **aluminium** diversion rate is presently **0%**. If

Deer Lodge received economic benefit from the aluminium collected, at 2007 rates, this would total ~\$3000. Diversion rate for **plastics** of all kinds and **glass** is also **0%**. Besides the potential income from metal (aluminium), the requirement for reduced refuse/landfill services (decreased utilization of the compactor) by expanded recycling materials and quantities (resulting in decreased weight to landfill and decreased collection frequency) over time should result in lowered negotiated refuse collection costs. Furthermore, with the price of metals skyrocketing i.e. aluminium, this can be used as a bargaining tool to include other less valuable commodities/materials in the collection by waste/recycling vendors (Friesen, 2005).

4.19 Divertible Waste from Landfill

4.19.1 Recyclable:

Review of the data provides information on the potential for further diversion from the landfill. Of the waste now going to landfill the waste audit provided information that much more material can be diverted from general refuse. Yearly estimates from the waste audit: Plastic beverage containers #1--Beverage **1869** Kilograms, **1.9** Tonnes, #1 other **331** kilograms (.33 Tonnes), plastic containers (#2 liquid (i.e. milk); **379** Kilograms (**3.8** Tonnes); #6 polystyrene (other) **3213** Kilograms, **3.2** Tonnes) and glass bottles (depending on local market conditions) and as discussed earlier aluminium cans. Other materials that could be recycled include polycoat **5672** Kilograms **5.7** Tonnes (milk and juice containers), metal/tin **3460** Kilograms (**3.5** Tonnes) (tube feed/food) cans

4.18.2 Paper Products

The waste sort data indicates that cardboard, office paper, coloured paper, and

newspaper are also ending up in the regular refuse containers and to the landfill in spite of the present recycling program. Yearly estimates are as follows (white office paper: **1866** Kilograms (**1.8** Tonnes); coloured paper **292** Kilograms (**.3** Tonnes); Cardboard **7850** Kilograms (**7.8** Tonnes), Newsprint **5378** Kilograms (**5.3** Tonnes) and boxboard (**5269** Kilograms (**5.3** Tonnes). Printer cartridges were found in the general refuse and programs are in place to recycle these products. (From Lexmark, Canon or purchased from Grand and Toy only)

4.19 Reusable Items Found In Refuse:

4.19.1 Linen:

During the course of the waste sort the author found soiled linen in the refuse. The linen appeared in good condition other than the soiling. Nursing staff performs resident and patient personal care hygiene and it is presumed that while cleaning and changing diapers that these items are thrown in the refuse with the disposable diapers. Yearly estimates indicate that **4659** Kilos (4.7 Tonnes) of reusable linen is going to the landfill. (Note that most of this linen is wet and soiled from resident hygiene and therefore cannot be equated to the equivalent quantity of linen supplies if dry). Deer Lodge pays for this by needing to replace the linen and secondly, the bulky weight of sopping wet linen adds to the costs of weight and contributes to compactor space being sent to the landfill inadvertently.

4.19.2 DISHES

Reusable cutlery, cups and plates were also found in the refuse, estimated at **548** Kilos (**.55** Tonnes) over the year. Note certain of the dishes may have had cracks or chips not easily distinguished at the time of the waste sort due to food residue.

4.19.3 UNOPENED FOOD*

Residents and patients are provided with a dearth of individual serving food items in particular, including, juice boxes, yogurt, nutritional supplement drinks, condiments such as sugar, salt, ketchup and jam packages and others. It is estimated that **8057** kilograms (**8** Tonnes) of unused food including container weight is thrown into the refuse. Of the 8 tonnes, **5.2** tonnes is from unused individual serving packets. (This includes the weight of the food/beverage and the container) The cafeteria is also well stocked with individual serving condiments, which contributes to the waste and costs of unused food.

It was noteworthy that the fourth (T4/L4 wards) and fifth floors (T5/L5 wards) personal and chronic care wards registered the highest amount of unused food waste. The **fourth floor** is estimated to waste **1849** Kilograms (**1.85** Tonnes) and the **fifth floor** with **1421** Kilograms (**1.4** Tonnes) yearly. Of these amounts approximately 2/3rds is unused food such as uneaten oranges etc. *(Note: unused food items returning from resident and patient contact is unable to be re-distributed to other persons due to the potential for cross contamination.) If the item has not been touched i.e. declined prior to the nurse or aide giving it to the resident the item or the item is cleanable i.e. plastic pudding cup, it could be potentially redistributed. (Liarakos, M., 2008)

4.19.4 OTHER ITEMS FOUND IN REFUSE

Pharmaceuticals in the form of pills were found during the course of the waste audit from the wards and pharmacy departments, eleven pills were found in total. The medication types were not determined except one pill identified as Erythromycin (Antibiotic). Extrapolating over a 365-day period (11 X 365) equates to 4015 per year from one Winnipeg health centre, transported to the landfill.

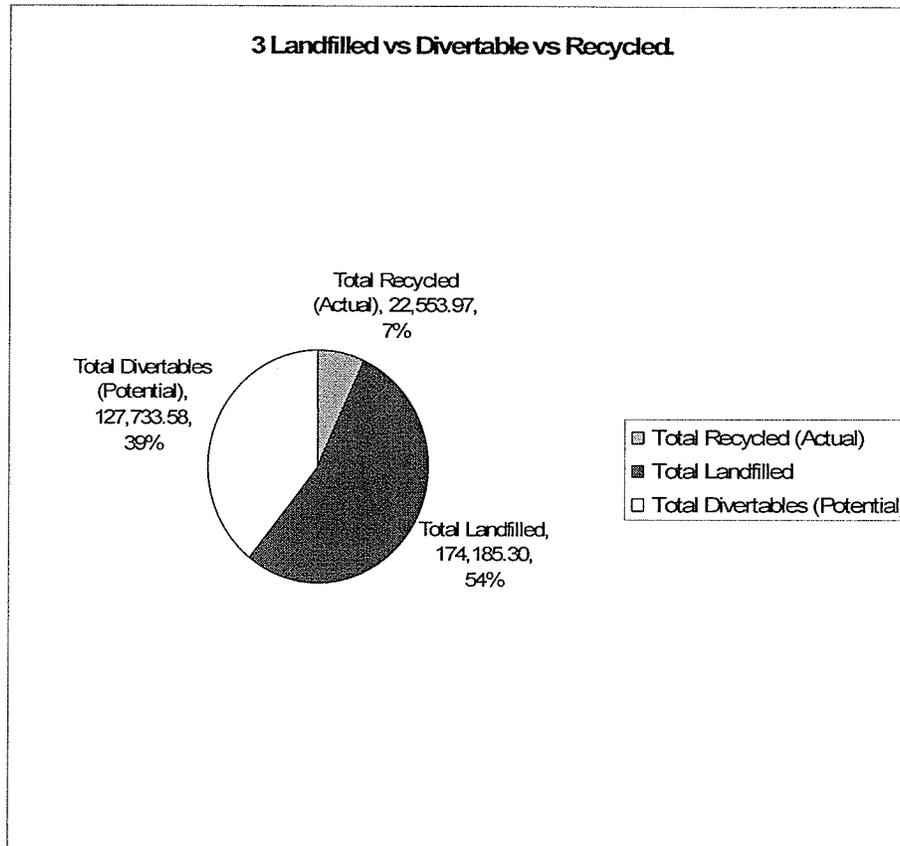
The author also found completely operational hole punch, pencil sharpeners, and a calculator during the waste audit (during a one day audit).

4.20 COMPOSTABLE

As a large residential institution with 486 residents/inpatients, approximately 800 staff, day programs and many family visitors it is understood that Deer Lodge would handle large quantities of food. Meals are provided to residents/inpatients via food service trays from offsite, bulk meal carts and also via the kitchen/cafeteria. The cafeteria is also available to staff and visitors. For meals, food is also brought into Deer Lodge by staff and resident's families. Data from the waste sort extrapolate to equate **56,176 Kilos (56 Tonnes)** of organic matter going to landfill at present. The cafeteria understandably stood out with the most organic waste produced, the resident wards also had significant amounts.

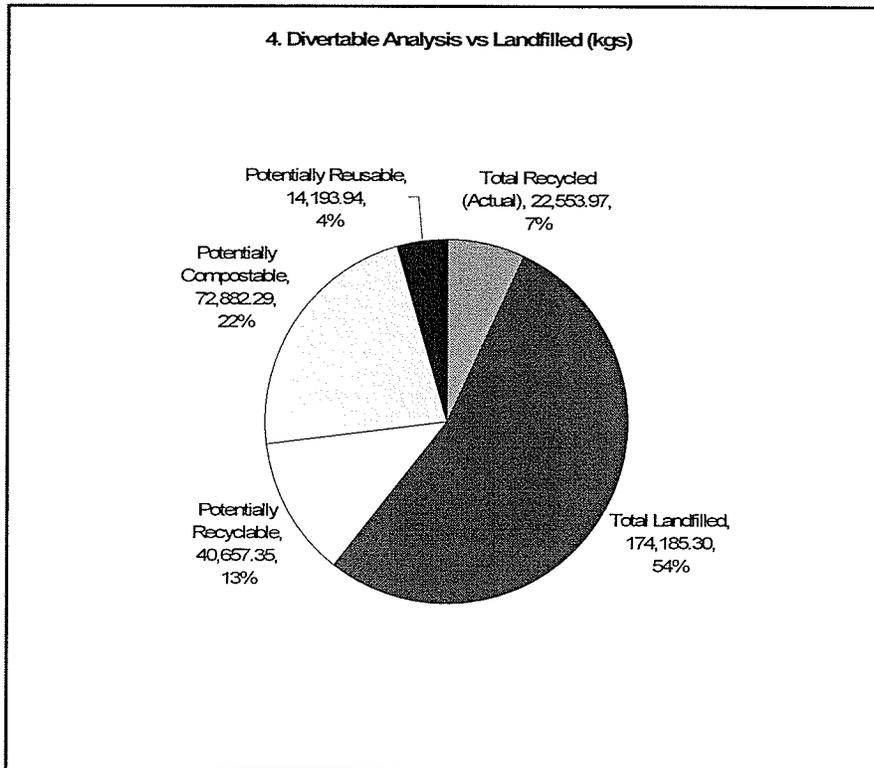
Paper towels are also compostable and this amounts to a yearly estimate of **16,706 Kilograms (16 Tonnes)**. Potentially compostable waste equals to **72 tonnes (56 T foods+16 T paper towel waste)**. This does not count the food in the unused category and

the (un-audited) summer yard waste. It is probably not feasible to un-wrap unused food for composting. However, an effort should be made to reduce the amount of wasted food.



Land filled waste compared to diverted and recycled

Thus, analysis of the waste data indicates that a further **39%** or **127 Tonnes** of waste could be diverted from the landfill and the associated economic and environmental costs. Broken down further, of the 39%, 22% is potentially compostable, 13% is potentially recyclable and 4% is potentially re-usable.



Divertible waste versus land filled.

4.21 NON-RECYCLABLE MATERIALS

4.21.1 DIAPERS

Of the waste destined for landfill, incontinence products such as diapers and pads compose **28%** or an estimated **83,066 Kilograms (83 Tonnes)** per year. Presently, there are no recycling facilities for these incontinence or infant diapers in Winnipeg at this time.

4.21.2 ORTHOTIC WASTE

Anderson house produces orthotic waste. Noted was a prominent amount of very dense/heavy cast like materials used for body mouldings. An estimated yearly **11,512 (11 Tonnes annually)** kilograms is sent to landfill.

4.21.2 TISSUE PAPER

Tissue and toilet paper (not flushed) are estimated to compose **10,972 Kilograms 11 Tonnes** yearly. Due to the nature of the utilization of these products containing human body fluids and the bleached nature of the paper the paper, it is not a compost ready material.

4.22 PER CAPITA WASTE PRODUCTION

Per capita figures are used to determine weight of waste produced per person employed at or attending a facility (student) over a specific period of time i.e. one day, week, or year. Numerous and varied programs and activities occur at Deer Lodge: inpatient, resident, day hospital, agency, clinics (Orthotic, Dental, Audiology, Movement Disorder, other) and transient persons (visitors, families, students (nursing and many other), day vendors (jewellery, books, Watkins etc), and conference attendees. The author has concern that in a facility such as Deer Lodge the use of per capita information alone utilizing staff only per capita data, overlooks all the impacts by the other occupants (residents and patients) and incursions by the other public/students/clinics noted above. These people contribute to the waste stream at Deer Lodge. However, due to the transitory nature of their attendance at a multitude of venues and timings throughout the day it was not feasible to study/audit these populations. Thus, it is considered by the

author that per capita figures using staff alone would be weighted heavily per staff person with waste generated by other users.

4.23 LIQUIDS IN THE WASTE AUDIT

For purposes of this study, liquids in linen and other residual moisture was not separated out due to the issues of labour intensity, and risk of exposure to infectious pathogens. Residual and full soda/juices in beverage containers, water and other liquids in linen and other materials will increase the weight of that particular sorted material. Nevertheless the total weights (material and liquid) are tallied in waste removal charges.

QUALITATIVE RESEARCH

4.3 INTERVIEW QUESTIONS AND FINDINGS:

- *Positions: Nine staff persons were interviewed in total. Two were clerical, the rest considered professional positions- including nursing, managers, specialists, and paraprofessional. Eight being women and one man and only one non-professional worker (ward clerk) volunteered. Other areas such as Dietary, Housekeeping or Maintenance department staff did not volunteer for interviews.*
- *Of those interviewed the average length of time working at Deer Lodge was 8 years.*
- *Question: What is recycling? Five of the interviewees stated it was reusing the materials. One interviewee stated 'Reduce the amount of imprint we have not only garbage but also try to reuse, recycle, and reduce'. Other responses were: 'extend the lifecycle of containers'/'protection for the environment'/taking waste and*

breakdown to component parts to make another product such as plastic pop bottles to become another product or same product.’

- *What are the benefits to recycling?* Six of nine interviewees reported benefits for the environment by recycling such as reduced deforestation, less energy usage. Less waste being sent to the landfill was also noted. ‘Reuse things therefore not having to produce new things each time. There is huge amount of room for that’.
- *What are the drawbacks to recycling (as the participant)?* Time required to undertake the recycling (3), effort/labour intensiveness to rinse containers etc (2), concern was also raised about whether materials actually get recycled as assumed. People not following through and having contamination in the recycling. People not wanting to make the effort so make it as easy as possible to recycle.
- *Do you recycle in your home?* All nine of the interviewees stated they recycle in their home. One person reported that they don’t always recycle every material.
- *Why or why do you not recycle in the home?* Comments included ‘it feels good not putting out lots of garbage’, ‘a dichotomy recycling at home and not at work’, for the earth and environment was reported (6), responsible or right thing to do (3), less landfill/garbage (3), for children/grandchildren (3).
- *Name materials recyclable through the home recycling program:* Each interviewee could identify at least 4 recyclable materials. The most identified was 8 materials by one interviewee. Paper was the most identified recycled material followed by plastic (7), cardboard (5), glass (5) and tin (5).
- *Do you recycle at work?* ‘I wish there was more opportunity to do that’ was one comment. Seven persons reported yes they do recycle at work. 2 reported yes-

sometimes. To their surprise, 3 persons report they thought they were recycling but had heard a rumor from the housekeeper that all the recycling is being dumped. Two persons were quite concerned to find out that the supposed recycling materials are being dumped into the general refuse. Interviewee: 'I just discovered that we don't recycle here, from the person who picks up the recycling that it just goes to the garbage, which is quite appalling. Horrible...really bothered me-my office is high paper volume'. The second person stated she thought it was 'terrible that we are pretending we recycle here and we really don't.

- *Why or why do you not recycle at work?* Essentially the same reasons as why they recycle at home--to protect the environment-less trees being used, to decrease the use of the landfill, and just to do the right thing. Lower environmental and costs to purchase
- *What materials are recyclable at work?* Seven staff identified paper as recycled at work. Interviewees also identified aluminum, plastic and glass and tube feed cans as being recycled (but in-fact they actually get put in with the general refuse.) Toner cartridges reported (1).
- *Do you know where your work recycling materials end up, once they leave the hospital?* Five interviewees stated that they did not know where the materials end up. Two stated that they were not sure. Rumour that some of the paper is not recycled and is dumped. And two stated that it goes in the garbage since they were aware that the blue box contents were going to the landfill. One manager reported after that the paper goes to Phoenix Recycling Company.

- *Do you require incentives to recycle?* Five persons said they *did not* need incentives; 'the right thing to do'. Four persons stated that they *did* need incentives, comments included: 'Financial-like: geothermal (cheaper in the long term); two persons reported their incentive was that the materials actually get recycled. And one: 'my children'.
- *Does convenience make a difference to you recycling?* Eight responses were that convenience of receptacles is important. Three responses were that it is important at work and especially for pop cans.
- *Are there enough bins in work department?* Four persons stated that YES there were enough bins in the dept. (note three of these have their own office). Five persons responded NO.
- *Are there enough bins in the Centre?* 6 persons said no. One person worked in a segregated part of the centre with an outside agency and she didn't seem as aware of the rest or the main parts of the centre. One person not sure how to answer as she knew recycle bin contents not going to be recycled anyways
- *Where more recycling bins could be placed?* Responses: 'Every unit'--'should be bright colours to stand out'; 'cafeteria, eating places, lounges, gym (paper towels), bathroom (for paper towels), in kitchen (lounge), conference rooms, Chad's bars, dining rooms-for resident food tray services, cafeteria, patient rooms (one bin for 3 or 4 patients), could have a day where bins are out/picked up more home like atmosphere. Dirty Laundry/Refuse room on wards and at nursing stations for non-confidential paper.

- *What else could be recycled at Deer Lodge?* Responses: ‘Everything that is going into bins now! Other comments: paper, paper plates and other products, pop cans, sterile dressing trays/empty saline bottles, medication cups, tube feed cans, organics, juice and ‘boost’ tetra packs, 60cc flushing syringes, old towels for rags, computers
- *Are there opportunities to use fewer products or make less waste?* ‘We need to look at the whole Centre wide system we do not have a good recycling program here. Donated newspapers are often observed being read only by staff! Could meds come in bigger bottles or does this increase med errors?’ Query and comments by Nurse Manager. ‘Too much photocopying: Staff print everything and read once and then shelf, need disincentives to over printing--should be given individual accounts for photocopying; also we make too many copies for meetings. We need disincentives to overprint’ ----- Clean dressing trays and using too large of a bottle of saline water. Further it was reported that ‘nursing ordering of supplies is out of control’--‘brought in by Friday and gone by Monday-wondering if hoarding is going on or other wards are pilfering?’ Infection control requires we use single use products but we can recycle the trays. ‘Less disposables in cafeteria’ Paper plates, forks and spoons, ask for glass plates, real bowls and cutlery; individual serving packages add up to a lot of waste. ---Ward nursing staff automatically hand out new towels/face clothes even if the present ones haven’t been used and it adds up and gets thrown in the laundry. Volunteer shop could use donated bags--refillable pens--compost cafeteria waste.

- *What can we do to eliminate (reduce) waste?* Increase staff awareness, education on how much waste is generated, increase availability of bins, more control on ward stock/less stock piling, double sided copying, real plates and cutlery for staff lunches (2), make it harder to choose plastic.
- *What is the most wasted product you come across?* Paper (6)-only single sided, nurses over order forms, forms change and we throw out old forms, nurses make mistakes printing, donated newspapers. Plastic containers, paper cups, cutlery, Styrofoam.
- *What can we do to increase recycling?* Bins everywhere-increase **convenience** especially for nurses, **redesigning containers** for those who don't want to make the effort, increased **promotion**- encourage to throw in bins not garbage-better **labelling, disincentives** for overusing products, pointing out not to use too many paper towels in gym, increased **education** (especially for clerks), education on how much waste is produced i.e. visual evidence this is exactly what the kitchen produces, in cafeteria, education on what IS and what IS NOT recyclable (2): 'Choose steel cutlery', your (Glenn King) project will help, encourage patients/residents to recycle newspapers, people need to **self examine** what they can do, **putting our heads together**-unit by unit streamline it-individualize program, what is the kitchen doing?--newspaper bins overflow-they are not big enough, information from **Conservation Manitoba** on main street(Deer Lodge 1st floor) where (people) staff exposed to this info, refillable pens-volunteers could put refills in.

- *Other thoughts?* ‘I grew up in a research camp and you would see ducks with pop rings stuck around their mouths and they couldn’t eat and they’d die. And see wildlife habitat decimated and see animals coming into the research camp because of the forest being cut down for lumbar and paper. This has had a strong influence on me, so if I can do a small thing to help.’ ‘Don’t use Styrofoam, (promote) energy efficiency, ground maintenance with less mechanization, consider transport shuttles into work’, ‘bins fill quick so should be emptied more frequently’, ‘reduce supplies on the ward’, ‘regular pick-up of recyclables’, ‘sounds exciting, let’s see if Deer Lodge steps up to the challenge’, ‘it’s a disgrace that we aren’t recycling...let’s get at it’, ‘old printers go to the ALS garage sale, bound documents with spines go to a sheltered workshop (to remove spines and recycle)’

4.4 GREEN TEAM

4.4.1 TERMS OF REFERENCE

The committee drafted terms of reference (see appendix) in February 2008. They were forwarded to senior management team for their approval. Senior management approval occurred in March 2008. (Ptashnik, S., 2008)

4.4.2 INITIATIVES

With a mandate to assess, review and investigate waste management concerns the committee first set out to re-introduce beverage container recycling. Prior to this senior management was informed by this author that the contents of these bins were not actually being sent for recycling. Therefore, the bins were removed as the appearance of them in public areas gave a false impression. The staff, residents and family members began

expressing their concern about the lack of facilities for this type of recycling. In this way, the committee became aware that there was a keen interest to recycle at Deer Lodge.

The committee has facilitated implementation of waste recycling/reduction initiatives.

1) The committee identified a charitable organization to pick up the aluminium and plastic bottles, with proceeds going to healthcare for ill children. The committee has worked out with the housekeeping and facility management departments to finalize the storage room and procedures for the internal collection of these materials.

2) The Green Team has also recently identified used cooking oil as a material for recycling. Bio-Diesel Manitoba has agreed to collect this material previously dumped into the refuse compactor for recycling.

3) Used batteries (rechargeable and others) are to be reviewed for centre-wide recycling programming (not undertaken at this time).

4) An education program re: the amounts of paper napkins wasted when staff grab handfuls and leave on the table after eating is in place.

It is the author's (Green Team Committee Chair) hope that this committee and Deer Lodge Centre consider several recommendations discussed in this thesis for implementation. Many members of the Green Team are eager to participate in expanding our environmental awareness and programming at Deer Lodge. However, there are persons involved with this process that behave in a manner that conveys apathy for environmental initiatives.

CHAPTER 5 DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 SITE INSPECTION:

A review of Deer Lodge documentation on waste generation, policies and procedures provided no previous waste audits for comparison and trend purposes. There was also a lack of reference to recycling; reusability, green purchasing or waste prevention. Deer Lodge does not presently have a comprehensive waste management policy. Deer Lodge and the community would benefit environmentally, socially and economically from such a policy. The primary focus of end-of-life materials management at Deer Lodge appears to be on refuse going to the landfill. Infection control requires that items provided to, or used in care of patients/residents be considered infectious under Routine Practices policy, including packaged and unopened food. The need to discard these potentially contaminated items such as food (cannot be given to other residents) demonstrates the need for increased efficiency in product distribution and usage to reduce wastage (as feasible) or at least a review of this process (Liarakos, M, 2008). That does not negate the potential to compost unused food or scraps.

5.2 WASTE AUDIT

This study represents the first waste audit and staff interviews surrounding waste issues at Deer Lodge. Deer Lodge is presently diverting only 7% of its waste from the landfill, which consists primarily of paper and cardboard. Deer Lodge can be commended for becoming involved in re-using old rehab and medical equipment such as hospital beds, walkers, and wheelchairs etc. by sending them to the non-profit organization, Hope International (Orom, K., 2007). In addition, Deer Lodge contributes to the recycling or

reuse of computers through Syrotech with other WRHA facilities. At this time, computers and old rehab equipment are not factored into the recycling percentages as numbers or weights have not officially been quantified for purposes of an environmental management/waste audit system. There is presently no organics or composting program at Deer Lodge or throughout the Winnipeg Regional Health Authority and no organized or regional approach to removing old equipment such as furniture and office equipment (excluding E-waste).

There has been the façade of recycling of plastic, aluminium and glass. For a number of years the centre has had blue recycling bins in place for beverage containers (aluminium, plastic and glass) and devoted bins for tin tube feed cans and glass on chronic care wards. However, these items have not been sent for recycling but disposed of in general waste stream destined for landfill. Many staff and family members of residents expressed surprise; anger and dismay regarding this point to this author. Many feel deceived by this façade. Nevertheless, the author is unaware of any time that there was not a market for at least aluminium; however the lack of actual recycling at Deer Lodge despite the segregation has been reported due to non-existent markets and inconsistent collection. (Zebrun, 2007) Other health centres and hospitals in the same region have successfully recycled aluminium, plastic and other materials within the means of their budgets, although a number of other health care centres (e.g., St. Boniface) do not recycle all regular domestic waste (Gagro, T., 2008). There appears to be limited attention paid to recycling or waste management sustainability, coupled with a lack of clear labelling to indicate what content can be recycled when an attempt at environmentally sustainable practices has been made, and a lack of education and

information sharing regarding contributions to sustainable environmental practices. Even the non-confidential bins that presently exist for paper do not have clear labels indicating what types of materials/paper are included and excluded.

There have been no sessions or bulletins clarifying included/excluded materials, processes or staff involvement (other than for confidential paper). Cardboard in the small outdoor bin is inefficiently filled with a certain number of boxes not broken down. This leads to more pickups than would be required had all the boxes been flat. This we can assume ultimately leads to higher costs for Deer Lodge and more transportation emissions. Deer Lodge Centre has a unique opportunity to examine its current environmental sustainability practices, and learn from the areas that are lacking in an effort to move toward cost effective waste removal, greener/sustainable, safer healthcare in the future.

5.3 STAFF INTERVIEWS.

All respondents had a sense that recycling is conserving or reusing discarded items/ material to utilize in the production of other manufactured goods. The benefits thus are for the environment and for their offspring/future generations by preserving resources or reducing pollution.

Time and effort were noted to be necessary to recycle by some and it would be expected that for those with less environmental diligence, they would find this more of an issue. This reinforces the need for education, convenience and incentives.

The interviewees participate in recycling residentially and to some extent in the workplace. Confusion (and doubt) about what the Centre recycles was a common theme

in the interviews borne out of the knowledge that beverage container recycling had not been occurring despite the appearance of a recycling program, to this author's knowledge. Information regarding how and where the recycled materials (paper) ends up is not known to these interviewees or other staff in the Centre.

The interviewees all provided interesting insights into materials that could be recycled and ideas to improve the present process. This reinforces the usefulness of soliciting the opinion's and recommendations of the Centre employees.

The author did not include at this time the feedback (interviews) of residents, patients, visitors and families. (Families have sought this author out as Chair of the Green Team to express their views.) As an element of sustainable development and full stakeholder involvement, these groups should be considered in further evaluation.

CHAPTER 6 CONCLUSION AND RECOMMENDATIONS

Healthcare has benefited from technology. Unforeseen with the advent of this technology, the availability of disposable products the nature of modern healthcare and society, is the exponential production of solid waste and its side effects of environmental toxicity, increasing supply costs, landfill loading, and emissions contribution.

Conservation not only makes environmental sense but also economic sense. The author, interviewees and Green Team have identified areas of wasted product use and recycling opportunities. Lack of involvement in presently available recycling programs not only loses the energy/resource potential but also results in greater terminal costs of land filling materials that could otherwise be processed more efficiently.

Present knowledge of the human causes of environmental degradation has manifested in the emerging models of both Ecosystem Health and Sustainable Development. It is the author's belief that institutions need to begin to examine these paradigms and incorporate these tenants into their foundations of practice. Healthcare providers along with other government, corporate and community constituents need to consider the short and long-term costs, beyond economic benefits. That materials such as pharmaceuticals and mercury (florescent lamps) end up in hospital waste with the impacts on human and environmental health as noted in this documentation, reinforces the saliency in healthcare of adopting the Ecosystem Health and Sustainability models into their practice of care.

Is it not cost effective to divert cooking oil from landfill knowing that cooking oil from health care facilities seeps out of cracked plastic pails in the city landfill and is

transported from the water table to rivers and ultimately to Lake Winnipeg in a province that is focused on the lake's cleanup? Does a felonious recycling program not affect public opinion and staff morale? If healthcare's business is to reduce or eliminate the effects of disease, should it not also be cognisant of the environmental dis-ease and the negative effects that healthcare itself has on the planet?

The author's waste audit demonstrates that Deer Lodge can reduce the amount of material it diverts to landfill. The potential benefits are substantial. Expanded re-use and recycling limits the amount of virgin resources needed to manufacture goods. Efficient re-use internally or external donations visibly gives further life to functional items and keeps them from the landfill.

At less than seven percent diversion rate there is substantial room to increase reduction, recycling, and reuse initiatives. The information provided by the staff interviewees and informal contacts during the course of this study point out that Deer Lodge can expand its environmental waste management program. Furthermore, there is an eagerness among staff and patient/resident families to do so.

According to staff interviewees, Deer Lodge presently appears to be using a reactive or rear view mirror approach in regards to the majority of the waste produced by the centre. Certainly, the fact that tons of beverage containers could have been recycled for many years when a low key or yearly investigation would have revealed there are vendors that take these materials is disappointing to staff and visitors. Definitely and minimally the aluminium is highly sought after. Furthermore, in spite of its' pro-environmental commercials the present vendor, (Waste Management) does not appear to

be actively engaging Deer Lodge to increase its' recycling base versus that which is landfilled.

A staff education programme is fundamental to changing behaviours be it routine hand washing, reduced use of materials or primary source separation. A number of the staff seem to be desensitized or unaware of how we each amplify the waste burden. As noted staff grabbing handfuls of napkins, condiments or paper towels they don't use or need. The data surrounding this study, facts on environmental degradation, and introduced waste procedures should be made available to those who are producing waste at Deer Lodge, which is everyone.

Environmental assessment should become an integral part of all product, infrastructure and programming introduction and evaluations at Deer Lodge. It should be built in at the onset of all planning activities. This is the backbone of sustainable development. Enactment of the Sustainable Development act mandates provincial institutions to participate. By changing institutional structures now to reflect this fact, the capacity to be proactive is enhanced. Development of the Green Team is a positive initiative in this regard. Nevertheless, with the breadth of solid waste and other environmental issues concerning healthcare institutions Deer Lodge would benefit from comprehensive and continuous monitoring of solid waste and other environmental issues. Members of the Green Team are responsible for their primary roles and involvement on the committee is understandably secondary. In spite of the fact that the knowledge base of the environmental field has only recently emerged, a number of serious and potentially litigious issues have arisen as far as individual and, corporate/institutional responsibility

are concerned. Cohesive oversight is essential not only for such areas as health and safety and infection control but also environmental protection through dedicated time.

It is recommended that Deer Lodge consider initiation of an environmental management program, in order to pursue comprehensive and continuous environmental improvement. Environmental impacts including waste management issues should be prioritized and baseline data on a number of environmental parameters set with continual goal setting and re-evaluation. In regards to waste management parameters complete accounting of all outgoing waste streams (not just the ones audited in this study) is crucial to setting improvement strategies.

Improved signage and labelling of recycling bins should result in decreased contamination in recycling bins and increased percentages of recyclables diverted from the general refuse. The Green Team is presently investigating expanded availability of recycling bins at the department level (not just main areas). Furthermore, certain less efficient practices are resulting ultimately in increased Deer Lodge costs, needless energy consumption and resultant environmental effects (increased emissions). Example: as discussed-- if Deer Lodge flattened (ALL) cardboard boxes, this equates to expanded container space. If more material is packed into each container with the same amount of material produced, less frequent vendor collection should be required. More space equals more volume of material versus air. If a process of education or mandatory flattening ensued Deer Lodge should be able to negotiate less frequent Waste Management pickups and therefore reduced cost. Nevertheless, verification is only possible by regular audits and monitoring.

A culture of auditing in addition to a culture of environmental stewardship is necessary to lessen the burden healthcare places on the environment and to lessen the economic impact that healthcare's waste production incurs. A disease such as diabetes does not heal by consuming excess sugar, just as the environment will not heal by excessive landfill diversion. It has been clearly demonstrated that the health of the environment **directly** impacts the health of those who live in it; this fact behoves Deer Lodge Centre, and all healthcare institutions, to consider this delicate balance in any type of healthcare planning and management.

RECOMMENDATIONS:

1. To increase education of staff, residents/patients and visitors to materials included and excluded in current recycling programs through the Green Team representatives, forums, bulletins, newsletter inclusions etc. In particular staff should be educated that every person produces waste and thus should not expect that housekeeping will cleanup after or flatten every box and pull pop bottles out of the trash
2. To provide clearer labelling in regards to placement of confidential information.
3. To improve labelling of all recycling bins to increase the clarity of included and excluded materials.
4. To recommend the creation of a working group amongst all pertinent health centres and WRHA to share knowledge and reduce inefficiencies.

5. The working group should consider WRHA procurement and waste management policies/guidelines as they coordinate services where economies of scale present themselves.
6. The working group should examine lifecycle issues of products and services in regards to sustainability factors (healthcare, social, economic and environmental factors) i.e. recycled content. (For example: diapers representing the largest component of the waste stream with their environmental impacts--explore recycled materials/less detrimental materials)
7. To convene a forum and workshop for all WRHA site facilities in order to facilitate exchange of information, create networking possibilities; provide educational sessions and build enthusiasm for environmental protection and resource conservation. (With assistance from Thesis Advisor).
8. To require waste removal vendors to provide verification of the steps and intermediary steps and the ultimate use of recycled materials for Deer Lodge and Public information.
9. To provide information to staff, management, administration, residents, patients and visitors re: the termination of recycling/waste materials emanating from Deer Lodge.
10. To undertake annual waste audits to indicate improvements in diversion from the refuse stream and landfill and to quantify absolute amounts of waste and trends thereof.

11. To include other waste audit categories in particular yard waste, hazardous, pharmaceutical, discarded rehab and medical waste, e-waste, construction and demolition waste
12. To recommend an Environmental Management System either ISO14001 or a similar type EMS to accurately track all waste leaving the centre and to methodically develop plans for improvement (short, medium and long term goals) with yearly re-evaluations.
13. All materials that are purged during infrequent department cleanups from all areas whether, consumable product waste or discarded and stored hardware (furniture/old maintenance medical and rehab equipment and materials) be quantified by weight, amount, and type.
14. That all departments contact the Green Team when yearly housecleaning operations occurs in order to quantify and provide recommendations on the best means to process these materials.
15. To recommend enrolment in Hospitals for a Healthy Environment, Canadian Coalition for Green Health Care and Health Care Without Harm.
16. To recommend that Deer Lodge Senior Management attend courses/conferences on environmental cost accounting/sustainable development.
17. To expand information gathering to include voluntary feedback from residents, patients, visitors and families thru forums, one on one contacts and letters (from those interested in doing so.)
18. To recommend the inclusion of environmental provisions in the Mission Statement of Deer Lodge Centre.

19. To reduce wasted paper, costs and removal, apply to the 'do not call list' for all fax machines, so they are not the recipients of junk and unsolicited advertising.
20. To inform staff about the findings of this thesis as an educational tool. For example, about the loss of usable cutlery or linen or cutlery into the refuse.
21. To recommend a review of contracts with renters of private spaces in Deer Lodge, in regards to covering waste removal fees accurately to reflect refuse tonnage.
22. To recommend alternative uses/recycling potential of excess/used casting materials.
23. To investigate where feasible other recommendations provided by the interviewees not listed in this recommendation plan.
24. To recommend review of food provision applications for residents and patients in order to be less wasteful (possible alternatives: more efficient menu planning, food banks, or composting, where possible.)
25. Recommend review of pharmaceutical disposal and awareness of pharmaceutical handling.
26. Recommend review of florescent lamp collection and disposal.
27. Green Team and Senior Management consider a baler or compactor for recycling materials.
28. Green Team to lead a Deer Lodge Forum of pertinent departments nursing, kitchen, maintenance, residents/families etc. to improve communication, explore efficiencies, alternatives where feasible/hygienic to disposables

- 29.** To recommend that reusable supplies i.e. calculators, hole punch etc be offered to the Deer Lodge used item seller 'Second Debut' or other reclaimers of used items (Salvation Army, Value Village).
- 30.** To create an Environmental Officer Position to oversee environmental issues and communicate with staff, managers, administration, residents, and visitors and other facilities/WRHA.

Appendix

<http://web2.gov.mb.ca/laws/regs/index.php>

THE WASTE REDUCTION AND PREVENTION ACT

(C.C.S.M. c. W40) <http://web2.gov.mb.ca/laws/r-egs/pdf/w040-039.95.pdf>

The purpose of this act is to reduce waste through the promotion of recycling activities. A 2 cent levy is placed on each beverage container sold retail to consumers. The funds from this levy are utilized for recycling programming including research, salaries, and the appropriate disposal of wastes (promote recycling)

THE CONTAMINATED SITES REMEDIATION ACT

(CCSM. C205) (1996)

Owners or persons in charge are accountable for the clean-up of contaminated sites if the contamination occurred at a time of their responsibility. Certain issues determining remediation orders are human health risk, future use of the site, proximity to residential or public access activities.

THE DANGEROUS GOODS HANDLING AND TRANSPORTATION ACT

(CCSM-D12) (Registered July 1987)

The act calls attention to standards for handling licensable dangerous goods, disposal of hazardous wastes, and response to environmental accidents. Used oil should be disposed of at licensed facilities. Substances may be considered dangerous due to toxicity, ignitability, severity of risk of infection and other factors.

THE SUSTAINABLE DEVELOPMENT ACT

(C.C.S.M. c. S270) Sustainability Guidelines for Local Governments, School Divisions, Colleges and Regional Health Authorities Regulation assented June 28th, 1997.

<http://web2.gov.mb.ca/laws/regs/pdf/s270-004.04.pdf>

The act states that the articles pertained therein are guidelines alone and that any one provision is not meant to take priority over any other. The public service organizations should regard environmental, economic, health and social well-being factors at the time when it is evaluating programs. Furthermore, sustainable development will also be encouraged with private business.



DEER LODGE CENTRE

Making lives better

Research Project Summary

Code: Deer Lodge-202

Subject areas: Waste management, hospital operations, recycling

Title	"Solid waste management in a health care facility—pursuit of best practice at Deer Lodge Centre"
Overview	Solid waste in landfill sites has been noted to be a sources of water pollution, land depletion and emissions to the atmosphere. Furthermore, tipping, hauling and other waste costs are increasing in many facilities and impacting budgets. Reducing waste and recycling (environmental awareness) has also been noted to foster staff morale in facilities that embrace these activities.
Objectives	To examine the solid waste impacts of one healthcare facility and to provide recommendations to Deer Lodge, which will have long-term environmental, social and economic benefits, based on best management practices.
Principal Investigator	Glenn King (graduate student) Dr Shirley Thompson, advisor, Rick Rogers Property Services Mgr. (resource)
Affiliation	University of Manitoba, Faculty of Environment, Earth, and Resources
Location	Deer Lodge Centre
Subject area	Waste management
Methodology	Waste Audits, staff interviews and forum, literature review
Project timelines	Six months
Potential benefit	Findings may contribute to new best practices in hospital waste management that have less impact on the environment and are more economical.
Status	In progress
Publications	Thesis project towards Masters of Environment
Last summary update	February 2007



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APPROVAL CERTIFICATE

20 October 2006

TO: **Glenn King** (Advisor S. Thompson)
Principal Investigator

FROM: **Wayne Taylor, Chair**
Joint-Faculty Research Ethics Board (JFREB)

Re: **Protocol #J2006:102**
"Solid Waste Management in a Health Care Facility - Pursuit of Best Practice at Deer Lodge Centre"

Please be advised that your above-referenced protocol has received human ethics approval by the **Joint-Faculty Research Ethics Board**, which is organized and operates according to the Tri-Council Policy Statement. This approval is valid for one year only.

Any significant changes of the protocol and/or informed consent form should be reported to the Human Ethics Secretariat in advance of implementation of such changes.

Please note:

- if you have funds pending human ethics approval, the auditor requires that you submit a copy of this Approval Certificate to Kathryn Bartmanovich, Research Grants & Contract Services (fax 261-0325), including the Sponsor name, before your account can be opened.
- if you have received multi-year funding for this research, responsibility lies with you to apply for and obtain Renewal Approval at the expiry of the initial one-year approval; otherwise the account will be locked.

Bringing Research to Life

GREEN TEAM

TERMS OF REFERENCE

PURPOSE:

- *To create a working environment where we are conscious of our day-to-day impact on the environment and progressively work to minimize that impact. We will do this by raising employee awareness of the consequences of our actions, promoting the implementation of positive environmental stewardship initiatives and by encouraging employee involvement and recognition.*
- To discuss, institute, evaluate and modify (if required) measures necessary for reducing the unnecessary use of products, to increase the prevalence of recycling waste products and to promote the use of products with less toxic or environmentally detrimental materials and with more recycled content (post consumer material). And where possible to reuse products at Deer Lodge or in other settings.
- To study Centre-associated waste issues and receive and review data pertinent to this committee.
- To assess costs associated with recycling and waste programs including services, equipment, signage etc.
- To promote a proactive approach to waste and packaging minimization and recycling, and material reuse.
- To educate staff, residents, visitors on up-to-date facility waste and recycling initiatives.
- To develop recycling procedures and standards and evaluate and revise on a continuing basis.
- To communicate with vendors in regards to environmental initiatives, programs, info gathering, economics and provide feedback on Deer Lodge preferences.
- To review and advise on other environmental issues as requested and approved by Senior Management or as deemed suitable by this committee (example no idling zones).

ORGANIZATION:

- **Responsibility Lines**
 - The Green Team Committee is a standing Committee of Deer Lodge Centre and is responsible to the Senior Management.
 - All reports and recommendations of the Committee shall be submitted to the Senior Management for information, adoption, and/or action/distribution

- **Composition**

The Committee shall consist of the following or their delegate:

- Chairperson with knowledge and interest in Environmental Issues.
- Infection Control Practitioner
- Nursing Services Representatives
- Housekeeping Services Representative
- Dietary Services Representative
- Senior Management Representative
- Facility Management Representative
- Tennant Representative(s)
- Other individuals from within or without the Centre who, because of specialized knowledge and/or experience, can contribute to the function of the Committee may be invited to attend its meetings.

Facility Wide Contact Network: In addition to the Green Team Committee, each Deer Lodge department or service will provide a contact or representative who does not attend the Green Team Committee meetings, but rather is a liaison who will provide valuable information to the committee in regards to environmental issues, areas for improvement and feedback on implemented programs. The contact is more informal via brief face to face, phone or written messages. Contacts may be invited to attend a meeting if issues warrant.

- **Meetings**

- Meetings of the Committee will be held monthly or as determined by the committee and/or chairperson.
- Minutes of all meetings will be kept and maintained by the current Chairperson.
- An Agenda will be prepared for each meeting and distributed to members at least seven (7) days before the meeting.
- Decisions of this committee will be made by consensus. If consensus cannot be reached simple voting rules shall apply. Voting by abstentia is permitted through the Chairperson

FUNCTIONS:

- **Advisory**

- The Committee makes recommendations to staff, managers, departments and senior management in regards to the reduction, reuse, and recycling of products, materials and waste respectively, where appropriate.
- The Committee can be requested to link or provide information to other health institutions or other agencies in regards to the purposes and objectives of this committee.
- Advice from the committee may be sought for environmental issues other than waste related.

- **Education**
 - The Committee recommends or assists in the formulation of signs, programs and procedures designed to inform and educate in regards to the mandate of this committee.
 - Serves in an advisory capacity with respect to education of Centre staff and administration in matters pertaining to waste reduction, recycling, material re-use and environmental awareness.
- **Research**
 - Supports such research as may yield data that would be useful in waste minimization programs or projects.
 - Reviews and contributes to the development of policies that pertain to the waste minimization in the Centre.
- **Terms of References**
 - The Terms of References shall be reviewed annually.

STAFF VOLUNTEERS FOR STUDY WANTED

Subject: **waste management** at Deer Lodge Centre

Required: staff from various departments to participate in a 20-30 minute one on one interview. Your views on recycling and waste handling (management) are sought. All information is confidential.

For what purpose:

For completion of Glenn King's master thesis. (Glenn works as an occupational therapist in long-term care at Deer Lodge.)

Other benefits are to potentially improve future waste disposal practices at Deer Lodge.

Departments sought: nursing, administration and nursing management, housekeeping, kitchen, office workers, diagnostic services, property services, Purchasing/material mgt/shipping receiving

Views are sought not only from persons who regularly recycle but also especially those who don't or don't give much thought to where our garbage goes.

Interview: 20 to 30 minutes only, at Deer Lodge.

When: Time to be set up by Glenn King for a mutually convenient time 837-1301 (2235)

Voluntary: You may withdraw at any time before or during the interview, or decline to answer any questions.

Uncle Green wants you!!



Questions:

- 1) Do you pick up litter off the street?
- 2) Do you know and admire the man in the above right picture?
- 3) Do you use your recycle bin at home?
- 4) Do you care what kind of world we leave for our children or grandchildren?
- 5) Are you concerned about the garbage we produce at Deer Lodge?

If you answered yes to any of these questions or are concerned about other environmental issues then you may want to volunteer for the

DEER LODGE GREEN TEAM! What is this you may ask?

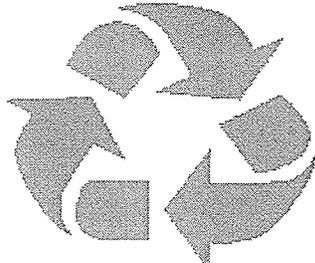
Deer Lodge Management is supportive of the formation of a committee by Glenn King, OT Long-term care to review and make recommendations in regards to the impacts of Solid Waste (otherwise known as garbage and recycling) at this center.

I am looking for staff that are enthusiastic, concerned and want to bring ideas forward so we can use the 3 Rs in our workplace. **REDUCE REUSE AND RECYCLE.**

Particular members from nursing, housekeeping, property services, kitchen, secretarial, management, information services and other. The size of the committee will be set so as to be effective. However, even if you don't serve on the Green Team we need dept. reps to be a liaison to report issues from your department to the Green Team and convey information back to your dept from the Green Team.

For more information contact Glenn King, ext 2235. or gking@deerlodge.mb.ca

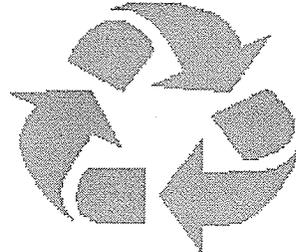
Plastic
ONLY (NO GLASS)



Recycling



Aluminum
ONLY - NO Glass



Recycling

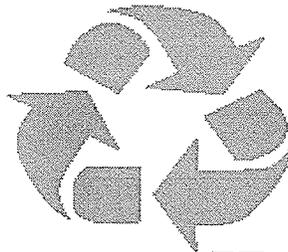


**Your
Trash
goes
Here!**



**Tube Feed
Cans Only**

NO GLASS



Recycling





Memo to: Staff, Residents, Patients and Visitors

Deer Lodge has a newly formed Environmental Committee, the **Deer Lodge Green Team**. Its mandate is to review environmental issues at Deer Lodge Centre in particular, those pertaining to solid waste. Our goal for the Centre is to:

- Create a working and living environment where we are aware of our day-to-day impact on the planet and work to minimize that impact.
- To promote reducing the unnecessary use of products, to increase recycling and where possible to reuse products.
- To promote the use of products with less toxic or environmentally harmful materials that also have more recycled content (post consumer material).
- To educate staff, residents, and visitors on up-to-date facility waste and recycling initiatives.
- To develop recycling procedures and standards which we will evaluate and revise on a continuing basis.
- To empower our staff and residents/patients to make lives better by preserving and improving the condition of our environment.

Your Green Team consists of members from areas all over the Centre. If your area does not have a rep (informal role) and you are interested or have environmental questions, please call one of our members. (we will focus on waste issues -to start)

-----We are reviewing beverage container recycling issues right now.

MEMBERS

GREEN TEAM CHAIR GLENN KING - (OT) 837-1301 (2235)

CHRISTINE BROWN-WARKENTIN (KITCHEN) 837-1301 (2903)

ANDREA FIRTH (1 RENTED SPACES REP) 889-8525, ext. 225

JAN GUINN-RN (LA NURSING) 831-2520

RICHARD LACOUSIERE (FACILITY MGT)

MONIQUE LIARAKOS (INFECTION CONTROL) 831-2121

PATRICIA MAJOR (T4 NURSE MANAGER) 837-1301

SYLVIA PTASHNIK (ADMINISTRATION) 831-2108

ROSIE SIKORA (VOLUNTEER/RECREATION) 831-2541

ANDREW WATERMAN (HCA-T3) 831-2555

ALEX ZEBRUM (MATERIALS MGT) 837-1301, ext. 2374

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