



Hospital Waste Management in the Philippines

Two Case Studies in Metro Manila

Case-Study Report

Special Waste Fractions: Hospital Waste

Rolando T. Soncuya
Loida B. Matias
Danilo G. Lapid

September 1997

The logo for WASTE (advisers on urban environment and development) features the word 'WASTE' in a bold, dark green font. The 'S' is stylized with a yellow diamond shape. Below the word, the text 'advisers on urban environment and development' is written in a smaller, dark green font.	Nieuwehaven 201 2801 CW Gouda The Netherlands	fax: +31 182 550313 e-mail: office@waste.nl website: http://www.waste.nl
--	---	---

Copyrights

The research for this publication received financing from the Netherlands Development Assistance (NED A), Ministry of Foreign Affairs. Citation is encouraged. Short excerpts may be translated and/or reproduced without prior permission, on the condition that the source is indicated. For translation and/or reproduction in whole WASTE should be notified in advance.

Responsibility for the contents and for the opinions expressed rests solely with the authors; publication does not constitute an endorsement by WASTE or the financier.

Code: CS-hosp phi-I

PREFACE

This study has been done in the framework of UWEP, the Urban Waste Expertise Programme, a six-year programme -1995-2001 - of research and project execution in the field of urban waste management in the south. UWEP aims at:

- generating knowledge on community and small and micro enterprise involvement in waste management
- developing and mobilizing south expertise on urban waste issues

The Urban Waste Expertise Programme covers a range of topics related to waste management in the context of the urban environment in the south - solid waste collection and transfer, waste minimization, recycling of various waste fractions, resource recovery and liquid waste treatment.

Waste management and its various stakeholders now form a rapidly growing area of interest. The role played by small and microenterprises and communities, however, is still much neglected. UWEP aims to generate, analyse, document and customize the information that is gathered during research and pilot projects, in order to enhance the expertise of the UWEP target groups, ultimately aiming at an improved integrated sustainable waste management system. This will in the long run lead to an improved environment, create more employment and offer improved urban services for everyone.

One of the UWEP research topics was hospital waste and the possibilities of responsible reuse by involving small enterprises. This report, "Hospital Waste Management in the Philippines - Two Case Studies in Metro Manila", reflects the results of a case-study research done by Rolando T. Soncuya, Loida B. Matias and Danilo G. Lapid, commissioned by WASTE, the executing agency of the UWEP programme. Similar researches on the topic of hospital waste management were undertaken in Colombia, Pakistan and Vietnam. By publishing these case-study reports, we explicitly aim at divulging the data gathered during the researches. UWEP sees this report as one of the ways of focusing attention on small and microenterprises, community involvement and their invaluable role in urban waste management.

Hopefully this publication helps you to form a picture of the role the various stakeholders play in urban waste management. More information and an overview of the other UWEP reports and books can be obtained from WASTE.

The *UWEP Case-study Report* series are published informally by WASTE. In order that the information contained in them can be presented with the least possible delay, the typescript has not been prepared in accordance with the procedures normally adhered to. WASTE accepts no responsibility for errors.

*Arnold van de Klundert, UWEP research
coordinator and UWEP director
WASTE advisers on urban environment and
development
Gouda, April 1998*

TABLE OF CONTENTS

PREFACE	3
TABLE OF CONTENTS	4
LIST OF ABBREVIATIONS	7
DEFINITION OF TERMS	8
CHAPTER 1 INTRODUCTION	9
1.1 BACKGROUND OF THE STUDY	9
1.2 PURPOSE OF THE STUDY	9
1.3 METHODOLOGY AND LIMITATIONS	10
1.4 CONTENT OF THE REPORT	11
1.5 REVIEW OF LITERATURE	11
1.5.1 Classification of Hospital Waste	11
1.5.2 Current Situation in Metro Manila	12
1.5.3 Laws and Policies on Hospital Waste	13
1.5.4 Management of Hospital Wastes	15
CHAPTER 2 CASE STUDY 1 - CAPITOL MEDICAL CENTER INC	18
2.1 GENERAL BACKGROUND	18
2.2 OFFICIAL HOSPITAL WASTE MANAGEMENT SYSTEM	19
2.2.1 Segregation	19
2.2.2 Collection	20
2.2.3 Enforcement	20
2.3 ACTUAL WASTE MANAGEMENT PRACTICE	20
2.3.1 Segregation	20
2.3.2 Storage	21
2.3.3 Collection	22
2.3.4 Incinerator	23
2.3.5 Reuse and Recycling	23
CHAPTER 3 EAST AVENUE MEDICAL CENTER	25
3.1 GENERAL BACKGROUND	25
3.2 OFFICIAL HOSPITAL WASTE MANAGEMENT SYSTEM	26
3.2.1 Segregation	26
3.2.2 Collection	26
3.2.3 Disposal	27
3.2.4 Enforcement	27
3.3 ACTUAL WASTE MANAGEMENT PRACTICE	27
3.3.1 Segregation	27
3.3.2 Storage	28
3.3.3 Collection	29

3.3.4	Reuse/Recycling	29
3.3.5	Disposal.....	30
CHAPTER 4	SMALL AND MICRO ENTERPRISES (SMES)	31
4.1	INTERMEDIATE HANDLERS	31
4.1.1	Clarita's Junkshop	31
4.1.2	Cbrisma Enterprises and Mallari Trading.....	32
4.1.3	Mameng's Junkshop	33
4.1.4	Cunanan Enterprises	34
4.1.5	Carpel Trading	34
4.1.6	Green Ground Enterprise	35
4.1.7	Prime Commercial	36
4.2	ANALYSIS.....	36
4.2.1	Overview	36
4.2.2	Motivations	37
4.2.3	Recycling Activities.....	38
4.2.4	People Involved	38
4.2.5	Issues.....	39
CHAPTER 5	RECOMMENDATIONS.....	41
5.1	HOSPITAL WASTE MANAGEMENT.....	41
5.1.1	Additional Financial resources	41
5.1.2	Mandatory Incineration for toxic and hazardous Waste	41
5.1.3	Single Enforcement and Monitoring Agency	42
5.1.4	Legalized Sale of recyclables.....	42
5.2	SMALL AND MICRO ENTERPRISES (SMEs)	42
REFERENCES	44
ANNEX 1	THE LOCATION OF THE STUDIED MEDICAL CENTERS IN MANILA.....	45
ANNEX 2	LAWS AND POLICIES ON SOLID WASTE MANAGEMENT	46
1.0	National	46
1.1	Standard	46
1.2	Enforcement and Implementation	46
1.3	Source of Enforcement anil Legislative Power	46
2.0	Local.....	47
3.0	Proposed Legislative Measures	47
3.1	Approach.....	47
3.2	Enforcement.....	47
ANNEX 3	REGULATING THE MANAGEMENT, COLLECTION AND DISPOSAL OF HOSPITAL WASTE AND THOSE OF SIMILAR INSTITUTIONS IN METROPOLITAN MANILA	49

ANNEX 4	CAPITOL MEDICAL CENTER WASTE MATERIALS FLOW	59
ANNEX 5	EAST AVENUE MEDICAL CENTER	60
ANNEX 6	EAST AVENUE MEDICAL CENTER WASTE MATERIALS FLOW	61
ANNEX 7	MATERIALS WASTE FLOW IN METRO MANILA	62
ANNEX 8	COMPARISON OF THE HOSPITAL WASTE MANAGEMENT SYSTEM	64

LIST OF ABBREVIATIONS

BMS	- Bureau of Medical Services
BLR	- Bureau of Licensing and Regulations
CMC	- Capitol Medical Center
DOH	- Department of Health
DENR	- Department of Environment and Natural Resources
EAIMC	- East Avenue Medical Center
ESC	- Environmental Sanitation Center
GSIS	- Government Service Insurance System
HOC	- Health Operations Center
ICC	- Infectious Control Committee
IWIMI	- Integrated Waste and Management Incorporated
LGU	- Local Government Unit
LOI	- Letter of Instruction
MMDA	- Metro Manila Development Authority
MM A	- Metro Manila Authority
MSW	- Municipal Solid Waste
NCR	- National Capital Region
PD	- Presidential Decree
PRRP	- Pasig River Rehabilitation Program
RA	- Republic Act
SME	- Small and Micro-Enterprise
SWM	- Solid Waste Management
THW	- Toxic and Hazardous Waste
UWEP	- Urban Waste Expertise Program

DEFINITION OF TERMS

Barangay - The smallest political unit in the Philippines

Bodega - A storage area for recyclable

Generalist - This is a junkshop who buys many types of recyclable. This generalist usually sells the materials to the specialist.

Pakyawan - **It** is a contractual arrangement wherein a certain task is undertaken for a specific amount. The person who will do the task is treated as a contractor and not as an employee.

Palero - A person who segregate recyclable materials from the rest of the garbage. This person usually is on top of the garbage truck catching the garbage containers from the rest of the crew.

Payatas - A name of a barangay in Quezon City where the dumpsite is located. This is the area where many junkshops are located

Specialist - This is a junkshop who specializes on one or two materials. Usually, I the junkshop has more capital and assests such as trucks for pick-up and delivery of recyclable materials than a generalist.

Tanod - A barangay peace officer

CHAPTER 1 INTRODUCTION

1.1 BACKGROUND OF THE STUDY

This study was designed to understand and document the waste management practices especially for toxic and hazardous waste in the health care sector. Specifically, it contains two case studies of tertiary hospitals in Metro Manila. These case studies were undertaken for the purpose of identifying the materials waste flow of recyclable materials from the hospitals through intermediate handlers and to small and microenterprises that recycle these toxic and hazardous hospital wastes.

This study is part of the Urban Waste Expertise Programme (UWEP) initiated by WASTE and funded by the Netherlands Directorate General of International Cooperation.

UWEP is a six-year programme (1995-2001) with the purpose of generating employment in waste handling through small and micro-enterprises (SMEs), and improving the environmental conditions of low-income communities. Through its course, the programme aims to develop local expertise by means of research and pilot projects, and to disseminate documented knowledge and technology as far as waste management is concerned.

Furthermore, the programme aims to promote waste policies that will integrate small and micro-enterprises in the existing waste management systems through regional meetings and policy conferences with local authorities and development organizations. UWEP is implemented mainly in three regions, namely, Latin America, West Africa and South West Asia.

1.2 PURPOSE OF THE STUDY

This study aims to document, by case study method, the waste management practices in two hospital institutions, from in-house management to collection and disposal. Specifically, the study has:

- ◆ Documented in-house waste management practices and policies with regards to system of waste segregation, storage, collection, transport and disposal;
- ◆ Documented the waste flow, reuse and recycling of infectious and toxic hospital waste from the hospital through intermediate handlers and finally to the disposal site(s);
- ◆ Presented the existing municipal, city and national ordinances and laws affecting hospital waste and compare them to actual practices;
- ◆ Proposed recommendations on how to improve hospital waste management in relation to two issues. (1) the minimization if not elimination of human and environmental contamination and (2) the promotion of small and micro enterprises (SMEs) engaged in the reuse and recycling of hospital waste

The study includes various details about the waste management system within the hospitals, the waste flow from the hospitals to the final disposal sites and the SMEs, their organization and other characteristics.

Specifically the study includes three major topics namely, the hospital waste management system, the hospital waste flow and the small and micro-enterprises involved in hospital waste management.

The topic on the hospital waste system includes the identification of responsible hospital units or departments in-charge of solid waste management (SWM) and details of their tasks and duties and their actual performance in terms of waste segregation, storage, collection methods, transport and disposal arrangements and treatment (in-house) facilities. It discusses the actual roles, tasks, responsibilities and activities of hospital personnel and their linkages or relationships with non-hospital persons or entities involved in the disposition of waste.

The topic on waste flow discusses the various stages of waste management, formal or informal from the hospital through the intermediate handlers to final disposal. It discusses the role of the formal and informal collection systems and the estimated volume of hospital waste by types or components as well as the types of hospital waste and/or equipment being reused or recycled. The topic on small and micro-enterprises discusses the organizational structure and legal status of these entities, a description of the people involved, a description of their recycling activities and their pollution impact as well as their motivations in starting their businesses and their present problems.

1.3 METHODOLOGY AND LIMITATIONS

Gathering of data for the two case studies involved actual field visits to the Capitol Medical Center, a private hospital, and the East Avenue Medical Center, a government hospital. A research assistant was hired to interview key informants and retrieve hospital data. Special emphasis was given on interviews with the hospital workers who were actually involved in solid waste management. Interviews were conducted using openended questions.

These two hospitals may or may not represent the majority of tertiary hospitals in Metro Manila in terms of hospital waste management practices. The main selection criterion in the case studies is centered on the question which two hospitals are best suited to have the most or substantial information based on the aims and scope of the study.

The case studies considered a government and a private hospital because of the perception that government hospitals are less inclined to handle waste in the proper manner prescribed by the authorities due to the lack of funds to pay for special treatment of hospital waste. This perception gives rise to the hypothesis that government and private hospitals differ significantly in methods and policy in terms of hospital waste management.

The hospital interviews resulted in additional information regarding the identities of intermediate handlers and reusers and recyclers who buy or retrieve hospital waste. Interviews were also conducted with the intermediate handlers and reusers and recyclers. Unobtrusive observations were also conducted within the premises of these handlers and reusers and recyclers to verify the information given during the interviews.

Secondary data were obtained from some of the government agencies who supervise or monitor the hospitals. These are in the form of hospital policies regarding solid waste. Past studies were also tapped to provide additional information regarding solid waste management. However, there is a scarcity of printed materials regarding solid waste management in hospitals. In particular, there is no documentation of any reuse or recycling activity regarding toxic or infectious hospital waste.

1.4 CONTENT OF THE REPORT

This report contains five sections. The first section contains the background, purposes, methodology and limitation, contents and review of literature. The second section discusses the first case study, the Capitol Medical Center. The third section discusses the second case study, the East Avenue Medical Center. The fourth section describes the intermediate handlers and small and micro-enterprises involved in the reuse and recycling of hospital waste. The fifth section presents the analysis and recommendations of the study.

1.5 REVIEW OF LITERATURE

Health care wastes are in the form of solid and liquid wastes generated in the diagnosis, treatment or immunization of human beings or animals; in medical research; or in production of vaccines or other substances produced from living organisms. They are commonly generated by hospitals, medical or research laboratories, clinics, offices of physicians and dentists, veterinarians, long term-care facilities (for example, nursing homes) and funeral homes.

These wastes represent a relatively small portion of the total solid waste stream, and are simple to identify, to separate, and to treat properly. Hospital wastes include sharps (for example hypodermic syringes, glass slide, and scalpels), human or animal tissue or excretion, medical products (including swabs and dressings), etc.

1.5.1 *Classification of Hospital Waste*

The following classifications of waste were adopted by the Department of Health (Environmental Health Service) and promulgated as guidelines (Manual on Hospital Waste Management) for all hospitals and other health care facilities.

1. Pathological wastes consist of tissues, organs, body parts, human fetuses and animal carcasses; and most blood and body fluids.
2. Infectious waste contains pathogens in sufficient concentration or quantity that exposure to it could result in disease. This category includes cultures and stock of infectious agents from laboratory work, waste from surgery and autopsies on patients with infectious diseases, waste from infected patients in isolation wards, waste that has been in contact with infected patients undergoing hemodialysis (e.g. dialysis equipment such as tubing and filters, disposable towels, gowns and aprons, gloves and laboratory coats) and waste that has been in contact with animals inoculated with an infectious agent or suffering from an infectious disease.
3. Sharps include needles, syringes, scalpels, saws, blades, broken glass, nails and other items that could cause a cut or puncture.
4. Pharmaceutical wastes include pharmaceutical products, drugs, and chemical that have been returned from wards, have been spilled, are outdated or contaminated, or are to be discarded because they are no longer required.
5. Radioactive wastes include solid, liquid, and gaseous waste contaminated with radionuclides generated from vitro analysis of body tissues and fluids, in vivo body organ imaging and tumor localization, and therapeutic procedures.
6. Chemical wastes comprise discarded, solid, liquid, and gaseous chemicals, for example from diagnostic and experimental work, and cleaning, housekeeping and disinfecting procedures. Chemical waste may be hazardous or non-hazardous. For the purpose of

choosing the most appropriate waste handling method, hazardous chemical waste is considered to be waste when it is:

- toxic
- corrosive (acid of pH<2.0 and bases of pH>12.0)
- flammable -reactive (explosive, waster reactive, shock sensitive)
- genotoxic (carcinogenic, mutagenic, teratogenic or otherwise capable of genetic material), for example cytotoxic drugs.

These hazardous wastes can affect the environment in different ways. An individual can experience multiple exposures through the food, air, and drinking water.

The effect on general population can mainly be through:

- ◆ Chronic exposure, when individuals are exposed over a prolonged time to small amounts of substances in ground water, the food chain, and the air; or
- ◆ Acute exposure: when individuals are exposed for a shorter period to larger amounts. This is mainly to be from occupational exposure, when waste handlers come into contact with significant volumes of infectious waste and any reaction products.

1.5.2 Current Situation in Metro Manila

General Information

Metro Manila (Appendix 1) or the National Capital Region (NCR) with a total land area of 636 sq.km is comprised of 9 Cities (Manila, Caloocan, Quezon, Pasay, Mandaiuyong, Makati, Pasig, Muntinlupa, and Marikina) and 8 Municipalities (Las Pinas, Paranaque, Malabon, Navotas, Pateros, San Juan, Taguig and Valenzuela). These 17 political entities with a total population of about 8.5 million inhabitants, are managed by their respective local government units (LGUs) Over 40% of the 1990 population are in Quezon City and Manila. Data indicated that in 1990, the rate of growth of population in Metro Manila was about 2.4% although estimated rates of growth (or decline) in population varied from each LGU.

Medical Facilities

The Metro Manila area contains 162 hospitals in the primary, secondary and tertiary care categories, as well as about 360 health centers. According to Department of Health (DOH) Administrative Order No 68-A, series of 1989, hospitals are categorized according to service capabilities offered:

- a. Primary Hospital — equipped with the service capabilities needed to support licensed physicians rendering services in medicine, pediatrics, obstetrics, and minor surgery.

In the NCR, there are 33 primary hospitals license in 1990 with an implemented bed capacity of 449. According to DOH, the 1990 average occupancy rate of primary hospitals in the NCR was 64%.

- b. Secondary Hospital — equipped with the service capabilities needed to support licensed physicians rendering services in the field of medicine, pediatrics, obstetrics and gynecology, general surgery and other ancillary services.

There are 59 secondary hospitals in the NCR with a total implemented bed capacity of 2,311 as of 1990. This represents 8.6% of the region's total bed capacity. The average occupancy rate of secondary hospitals in the NCR was 54% as of 1990.

- c. Tertiary Hospital — is fully departmentalized and equipped with the service capabilities needed to support certified medical specialists and other licensed physicians rendering services in the field of medicine, pediatrics, obstetrics and gynecology, surgery and their sub-specialties and ancillary services.

There are 69 licensed tertiary hospitals in the NCR as of 1990 with an implemented bed capacity of 24,056 representing 90% of the regions' total bed capacity. The average occupancy rate of tertiary hospitals during 1990 was approximately 44%.

1.5.3 Laws and Policies on Hospital Waste

Hospital waste is primarily regulated by three (3) laws, namely, the Metropolitan Manila Authority (MMA) Ordinance No. 16, Hospital Licensure Law (Republic Act No. 4226) and The toxic Substances and Hazardous and Nuclear Waste Control Act of 1990 (Republic Act No. 6969) Other pertinent laws are shown in Appendix 2.

Metropolitan Manila Authority Ordinance No. 16

This ordinance (Appendix 3) was passed in 1991 by the Metropolitan Manila Council (now called as Metro Manila Development Authority), a political body covering Metro Manila. The objectives of ordinance are to (1) prevent hospital acquired infection; (2) environmental protection; (3) protection of hospital personnel and visitors, garbage collectors, scavengers and the community at large.

The ordinance classifies hospital waste and prescribes the use of a color coding of waste bags to identify the types of wastes. It provides for the standard storage procedures and the alternative disposal system such as incinerator system, enclosed burning pit, ground pits and the sewage disposal system for hospital waste

It also provides that all hospitals shall be required to earmark specific amount necessary for the implementation of the ordinance. It further provides for the payment of a special garbage fee for hospital waste and the penalties in cases of violation of the ordinance. The implementing agency is the Health Operation Center of MM A.

The highlight of this ordinance is the provision obliging all hospitals in Metro Manila to use four (4) types of trash bags for easy identification of waste. These are the following; (1) black trash bag for non-infectious dry waste; (2) green trash bags for non-infectious wet waste; (3) yellow trash bags for dry and wet chemical and other potentially infectious waste, pathological waste, chemical waste and sharps contained in puncturedproof containers covered with solution of lime; and (4) orange trash bags with trefoil sign for radioactive waste that will be stored in the hospital until rendered as inactive and/or disposed in accordance with the prescribed rules and regulations of the Philippine Nuclear Research Institute.

Hospital Licensure Law (Republic Act No. 4226)

The authority to license all hospitals in the Philippines is vested under Hospital Licensure Law dated January 15, 1955 to the Bureau of Medical Services (BMS) of the Department of Health (DOH). Upon the reorganization of DOH, this authority is now under the Bureau of Licensing and Regulations that took over the function from the defunct BMS. Under this law, hospitals are categorized as government or private hospitals. However, the BLR through Administrative Order (AO) No. 68-A series of 1989 further classified hospitals into the following; 1. Government or private hospitals 2. General or special hospital 3. Primary, secondary or tertiary hospitals according to the service capabilities offered 4. Training or non-training hospitals

In addition, the Administrative Order covers also the revised rules and regulations governing the registration, licensure and operation of hospitals in the Philippines. It specifies the needed physical facilities of a hospital for solid waste management such as the physical plant, hospital equipment and maintenance of these physical facilities.

Toxic and Hazardous and Nuclear Wastes Control Act of 1990

This law covers the importation, manufacture, processing, handling, storage, transportation, sale, distribution, use and disposal of all unregulated chemical substances and mixtures in the Philippines. It also covers the entry, even in transit, as well the storage and disposal of hazardous and nuclear wastes into the country for whatever purposes Under this law, pathogenic and infectious wastes are considered hazardous and therefore covered by this law.

This law provides that the Department of Environment and Natural Resources is responsible for the implementation by providing the powers to confiscate or impound the materials if prima facie evidence is present that said materials present unreasonable risk or injury to health or the environment. The law also defines the prohibited acts and provides for administrative and criminal penalties.

Institutions and Agencies

Three agencies are primarily responsible for managing and regulating hospital waste in Metro Manila. These are the following:

Metro Manila Development Authority (MMDA)—The MMDA is currently responsible for managing Municipal Solid Waste (MSW) landfills for Metro Manila. In principle, collection is the responsibility of the LGU's although the smaller LGU's depend on the MMDA to collect the MSW. MM A Ordinance No. 16 prohibits disposal of regulated hospital wastes to any MMA landfills.

The Health Operations Center (HOC) in MMDA has the responsibility for implementation, monitoring and enforcement of MM A Ordinance No. 16.

Department of Health (DOM) The DOU has several responsibilities for regulating hospitals in the Philippines, and in addition operates 45 hospitals in Metro Manila. In principle, DOH inspectors have some responsibility for ensuring proper waste management and disposal.

The DOH is monitoring the management of hospital wastes through the following health services;

- ◆ Environmental Health Services
- ◆ Hospital Operation and Management Services
- ◆ Hospital Maintenance Services

- ◆ Health Infrastructure Services
- ◆ Radiation Health Service
- ◆ Bureau of Licensing and Regulations

DOH through the Bureau of Licensing and Regulations has the power to withhold or revoke licenses of hospitals in cases of violations of its orders, policies or guidelines.

Department of Environment and Natural Resources (DENR) This agency regulates certain categories of hospital wastes under Republic Act No.6969 Therefore the DENR is responsible for regulating incinerators (design, operations, air emissions, and residue disposal). In principle, the DENR inspects hospital sites (and hospital incinerators) to ensure compliance with regulations promulgated under Republic Act no. 6969.

1.5.4 Management of Hospital Wastes

There appears to be no safe way of managing all the hazardous medical wastes that are currently produced in Metro Manila. A private incinerator operated by International Waste management Inc. (IWMI) has no flue gas treatment on either of its 2 incinerators. It has been found that 13 hospitals in MM have "incinerators," however, most of them are no more than an uncontrolled burning boxes with stacks and do not meet Philippine and international standards for incineration of infectious waste and for safe handling system. Most are not in operation at present. None appear to have adequate control of emissions, post combustion, or adequate temperature control

A large volume of infectious wastes is disposed in burial pits located at hospital sites, and in municipal landfills, both practices of which pose significant risks to humans, including direct contact and contamination of surface water or groundwater. Furthermore, previous studies and the current study showed that majority of the hospitals is not practicing pre-treatment procedures for their infectious waste and not adhering to color-coded system required by MMDA Ordinance No. 16. Hazardous hospital wastes are being mixed with general medical waste in black plastic bags (which should only contain non-infectious solid wastes). The black bags are designated for delivery to municipal landfills.

Hospital Waste Generation and Treatment

Based on the Study entitled " Hazardous Hospital Waste Management in Metro Manila" undertaken by the Pasig River Rehabilitation Program (PRRP Study), infectious waste (hazardous waste) generation for the surveyed 55 hospitals has reached a value corresponding to 0.38 kg per-patient-per-day Based on the average expected bed occupancy in the NCR of 12,120 patients per day, the present average hospital infectious waste generation will be 4,600 kg/day

Presently, the infectious waste are either landfilled, incinerated in simple incinerators, burned in the open, dumped inside or outside the hospital compound, buried or composted.

Existing Incinerators

Existing installations of waste incinerators in both hospital and industrial sectors were assessed by the PRRP Study based on their existing incinerator capacities.

The incineration facilities are categorized as follows:

- Commercial Type Hospital Waste Incinerator

- Improvised Hospital Waste Incineration

Commercial type hospital waste incinerators are incinerators commercially available and with some kind of control devices for improvement of combustion.

In addition hereto the privately owned firm IWMI (Integrated Waste Management Incorporated) possesses two 65 kg/h (1.360 kg /day) incinerators. Until recently the fWMIJ was serving some hospitals and industrial firms. However, the two **IWMI** incinerators have not been allowed to operate by the DENR allegedly due to air pollution since they were operating without any flue gas cleaning devices. Presently, IWMI is operating after the installation of these devices.

Improvised hospital waste incinerators are basically single combustion chambers without any additional control devices. These are often locally made. Four hospitals have these improvised waste incinerators with a total capacity of 3,295 kg/day

DENR was strict in the implementation of environmental laws in the evaluation of the operations of IWMI since this company was incinerating hospital waste for profit. The main business of IWMI is incineration of hospital waste while the main activity of the four hospitals with improvised waste incinerators is to provide medical care to patients. The existence of the incinerators is only incidental to their main activity.

Present Incineration Capacity

Six (6) hospitals are listed as having commercial incinerators These are Mary Chiles Hospital, Our Lady of Lourdes Hospital, Capitol Medical Center, National Kidney Institute, Philippine Heart Center, and the National Center for Mental Health, all located in Metro Manila.

Five (5) hospitals in the NCR have operational incinerators with a total capacity of 927 kg/day. Four other hospitals have improvised incinerators lacking the possibility for adjusting the combustion satisfactory

In house Waste Handling

Proper on-site handling and storage of infectious hospital wastes are very important in the reduction of risks to health and the environment posed by these wastes. In the PRRP Study, pre-treatment of these wastes is also practiced with 80% using chemical disinfectants and 40% using both chemical disinfectants and autoclaves. Common storage containers are plastic bags, and glass jars with temporary storage facilities such as bins, pits and rooms.

In the same study, the most common facilities used for storage of infectious waste are plastic bags, covered bins/trash cans, and glass jars with covers The use of plastic bags is more popular in private hospitals than in government. The differences between government and private hospitals could reflect different levels of financial resources available.

Transportation

Most (78%) existing collection points are within the services departments of the hospital as was discovered in the PRRP Study. There are however collection points outside the buildings (53%) as well as in alleys and streets (15%). Waste collection frequencies are varied with most (78%) hospitals having collection once to three times a day using pushcarts for transport.

Most transportation of hospital waste is carried out by use of traditional dump trucks often together with municipal solid waste. However, during 1992 an increasing number of private hospitals have contracted a private hazardous waste management company, the Integrated Waste Management Incorporated (IWMI). This company supplies the plastic containers (0.20 cubic meter) to their clients and hauls them to their incinerators.

Treatment/ Disposal

Most hospitals in the NCR avail themselves of the collection service offered by MMA. However, because of the Local Government Code, the respective LGUs are now responsible for the collection of solid waste. Due to MMA Ordinance No 16 which mandates waste segregation and color coding, hospitals are presently separating and color coding their hospital solid waste prior to collection for final disposal. However, the degree of compliance varies greatly among the hospitals. No special disposal service for the hospital waste is presently being provided for by the MMA.

Comparison between the governmental and private hospital shows that the governmental hospital in general have a significantly higher frequency of low cost and high risk infectious waste disposal as open burning, burying and composting compared to private hospitals.

General Findings

The general findings and conclusions of the PRRP study are as follows:

- ◆ Due to the absence of satisfactory and environmental friendly disposal facilities for hazardous hospital wastes, the public is exposed to health risk and adverse environmental impacts created
- ◆ The existing treatment capacity is insufficient for the proper disposal of the major part of medical wastes generated in Metro Manila area. Survey shows that existing capacity for incinerating these wastes totals to less than 3 tons/day, whereas the total daily quantity of dangerous medical wastes generated was estimated to at least 12.4 tons (8.5 tons/day for National Capital Region alone)
- ◆ Most of the existing treatment facilities (generally utilizing some form of burning the waste) are considered unsafe to (the environment. If strict compliance of environmental standards is enforced, it appears that none of the existing facilities would be allowed to operate.
- ◆ Pre-treatment of infectious waste, as required by the MMA and DOH, is not practiced.
- ◆ Due to inadequate segregation of infectious from non-infectious wastes which is in violation of the color code system as mandated by MMA Ordinance No. 16., much of the generated hospital waste is being disposed directly to municipal landfills, some of which are uncontrolled and occupied by thousands of squatters. The risk posed to the general public by transport and disposal of these wastes with the general municipal waste is high.

CHAPTER 2 CASE STUDY 1 - CAPITOL MEDICAL CENTER INC

2.1 GENERAL BACKGROUND

Capitol Medical Center Inc. (CMC) is a tertiary hospital located at Quezon Avenue corner Magbanua St., Quezon City along a major thoroughfare of Metro Manila in a middle income area and is very accessible to the nearby low income areas including some slum and squatter settlements (see Appendix 1).

It is a stock corporation and was founded by Dr. Thelma Navarrete-Clemente and a handful of her contemporaries in the medical profession. The board of directors of the hospital is responsible for providing the direction and policy while the corporate officers are responsible for the day to day operations. The medical center was built and inaugurated on March 19, 1970, three years after the corporation was first organized. CMC has now more than one hundred (100) stockholders (most of the stockholders are doctors of the hospital) and the family of Dr. Clemente owns fifty percent of the shares of stocks.

The Capitol Medical Center is a modern medical center and has four (4) major departments namely, Medicine, Surgery, Pediatrics and Obstetrics. Available facilities in the hospital include Radiology, Laboratory, Spine Center (specialty), CT scan, Ultrasound, Homography and Mammography.

The institution's progress over the years can be clearly seen from its rapid expansion. From an initial 8-storey building hospital with a 150-patient bed capacity, the CMC II (annex) building was constructed in 1975 after barely 5 years of operation to increase their capacity to 200 beds and additional doctors' clinics and offices. Patient admission also grew from an average of 5,000 at the beginning of its operations to 10,000 patients a year at the end of the first decade.

A third building, the CMC III, was constructed, which presently houses the Comprehensive Out-Patient Center of the hospital. Bed capacity was increased to 250 beds in 1989 with the construction of additional private rooms and installation of hospital equipment.

A fourth building started last November 1996 and it will add another 100 private rooms, new medical equipment and a three floor parking space. This building will expand the medical facilities such as cancer treatment facilities like cobalt and linear accelerator, and a comprehensive physical and medical rehabilitation center. In addition, the hospital has acquired a 3,575 sq.m neighboring parking lot for future expansion.

Bed occupancy rates all along this time averaged 80-85 percent, reaching as high as 95% during peak periods. Peak periods are those months where the average patients' admissions reached more than one hundred seventy (170) patients. During the period from July 1995 to June 1996 the average occupancy rate was 75.4%.

As of September 1996 there are 473 regular employees of Capitol Medical Center. Janitorial service is being contracted to the Building Care Corporation while the Safeguard Security Agency is rendering security service. Solid waste management is the responsibility of the housekeeping section under the administrative department. There are a total of 65 personnel being provided by these two contractors to the CMC.

2.2 OFFICIAL HOSPITAL WASTE MANAGEMENT SYSTEM

The official hospital policy on waste management is based on MMDA Ordinance No. 16 which regulates the management, collection and disposal of hospital waste and similar institutions in Metro Manila (Appendix 4).

2.2.1 Segregation

CMC requires the use of three waste cans lined with three (3) colored plastic bags for every patient room, emergency room-out patient department, operating room recovery room, delivery room-nursery, intensive care unit-coronary care unit, floor nurses station, x-ray and CT scan areas to separate infectious, non-infectious and biodegradable wastes.

Waste cans (8"x10"x12") lined with black plastic bags are for non-biodegradable and non-infectious wastes such as cans, bottles, tetrabrick containers, styropor, straw, plastic, boxes, wrappers, newspapers.

Waste cans lined with green plastic bags are biodegradable wastes such as fruits and vegetables' peelings, leftover food flowers, leaves, and twigs.

Waste cans lined with yellow plastic bags are for infectious waste such as disposable materials used for collection of blood and body fluids like diapers, sanitary pads, incontinent pads; materials (like tissue paper) with blood secretions and other exudates; dressings, bandages, used cotton balls, gauze; IV tubings, used syringes; Foleys catheter/ tubings; gloves and drains.

In the Department of Pathology, there are three types of wastes that are segregated namely, dry non-infectious waste, blood, serum and plasma and urine and feces Dry non-infectious waste such as paper, plastics and other non-infectious ordinary wastes are placed in separate black plastic bags and are collected daily by the housekeeping personnel for disposal

Excess blood, serum and plasma specimens from different sections of the laboratory are collected in a glass container or flask (9"x5"dia.) and sterilized by autoclaving (pressure cooker) for thirty minutes at 121 degrees centigrade. Used and expired blood bags are packed together and disposed by incineration.

Pipettes, test tubes, and other glassware used in testing infectious specimen (hepatitis, AIDS, typhoid fever, etc) are soaked in 0.5% sodium hypochlorite for at least 30 minutes before disposal.

Sharps like disposable syringes are collected in bags and bought down for incineration. Needles and sharps are collected immediately after use in cans or puncture free containers (8"x4"dia. hard plastic) for incineration Pathological waste such as tissues, organs, fetuses and body parts are disinfected and/or preserved in covered plastic or bottle containers with 10% formalin. These are disposed by incineration

For other hospital sections not included in the previous discussions such as dietary and canteen, administrative offices and doctors' offices, two waste cans lined with plastic bags

shall be maintained. The black plastic lined cans are for nonbiodegradable while the green plastic lined cans are for biodegradable wastes.

2.2.2 Collection

Garbage shall be collected every shift (3 shifts in 24 hours) by the janitors properly protected by masks and gloves. Infectious waste including sharps, syringes and needles shall be brought down to the incinerator room for incineration.

Non-infectious waste shall be brought down to the central storage or transfer station for proper sorting and segregation. Biodegradable waste shall be sold as feeds or to be brought to the composting site. Non-biodegradable shall be sorted by janitors for recycling purposes.

The residual waste was formerly collected by the Environmental Sanitation Center of the Metro Manila Development Authority. However, because of the local Government Code which devolve some of the functions of national government agencies to local government units the collection of solid waste is now the responsibility of the Quezon City government.

2.2.3 Enforcement

To effectively implement the policy on waste management, CMC established Infectious Control Committee (ICC) to monitor waste practices in the hospital. An ICC nurse goes around in every patient room and ward to inform patients as well as visitors of proper handling of waste.

Employees were given an orientation and training seminar last 1994 and a three-day seminar for nurses. New employees are given an orientation on company policies and these include their policy on waste management. A two-day seminar on waste management is scheduled in 1997.

Violators of the waste management policy are given corresponding penalties. First offenders are given warnings. Subsequent violations are given suspensions.

2.3 ACTUAL WASTE MANAGEMENT PRACTICE

The housekeeping section under the administrative department is responsible for the implementation of the hospital policy on waste management. The janitors of the Building Care Corporation, the contractor for janitorial services, are under the supervision and control of the housekeeping section (See Appendix 5 for actual waste flow).

The maintenance section that is responsible for the maintenance of the infrastructure for solid waste management is under the engineering department. Close coordination with the housekeeping section is being undertaken to keep the hospital premises clean.

2.3.1 Segregation

There are two janitors assigned to each floor. Usually, one (1) hour before the end of each shift the assigned janitors collect the waste from each room. These are brought to the

electrical room (8-10 sq.m) in each floor that also serves as the storage and segregation area for hospital waste. After the janitors for each floor collect the black, yellow, and green plastic bags, they segregate the recyclable (paper and cartons) from the black plastic bags. The supervisor of janitors makes the rounds on every shift to ensure that all wastes are collected properly.

The collected wastes are then placed temporarily in a room to await for the scheduled time for them to use the elevator so that they could place the garbage in the central storage room. This storage room (8 sq.m) has a two-day capacity and is located at the back of the main building.

A laboratory aide is collecting infectious waste for the whole hospital. Infectious wastes are supposed to be placed inside the incinerator room, but the incinerator operator instructs the janitors to place the yellow plastic bags outside the incinerator room. During data gathering, yellow plastic bags were observed aligned along those that are going to the incinerator room.

Syringes are collected and placed in a big plastic container (hard plastic) at the nurse's station, these syringes are incinerated. Previously, they use to separate the needles from the syringe body (plastic) but because of the risk and labor involved; they just incinerate the syringes and the needles together.

The blades of scalpels are included in the sharps container for disposal while the scalpel handles are autoclave and re-used again. In separating the blades from the handles, forceps are utilized to minimize possible contamination or infection.

Tools used for segregating waste includes gloves, liners and carts. Some gloves (thick rubber gloves) that are used for non-infectious waste segregation are being autoclaved and reused again.

The laboratory aide usually collects infectious waste around 5:30-6:30 in the afternoon. Incineration takes place every night around 8:00 PM. However, if the quantity of infectious waste is minimal, the hospital incinerates them every other day.

Hospital linen of patients with contagious diseases are segregated from the rest of the linen and properly tagged. These are soaked with a chemical disinfectant before undergoing the usual laundry procedures. This cleaned linen is then issued to patients with similar diseases. Ordinary linen are used up to six months while linen issued to patients occupying hospital suites are used up to three months. These condemned linen together with other linen are then cleaned and donated to the Golden Acres, a home for the aged as rags.

2.3.2 Storage

The storage phase is largely influenced by the size of their central storage room located at the back of the hospital. It can only store around two-day equivalent of solid waste generated by the hospital. The unreliability of the garbage collector assigned to collect from the Quezon City government has adversely influenced the storing of waste by CMC. Usually, the garbage collector collects the waste only one or twice a week. In these cases, the waste, plastic bags that cannot be accommodated in the storage room are placed near the incinerator.

Traditional recyclable materials such as cullets, cartons and paper are stored in a bodega inside the hospital. When sufficient quantity has accumulated the personnel in charge of

selling these materials call the cullet traders and/or bidders for cartons and paper to verbally offer their buying price. Buyers pick up the recyclable materials.

Placentas that are produced in the delivery room during delivery of babies are put in a freezer supplied by Prime Commercial, a business entity that buys placentas from hospitals in Metro Manila. In cases where the mothers request to keep the placentas, the hospital gives the placentas to the mothers. There are some parents who bury the placentas in their yards in the belief that these will help their lives to financially prosper while others bury them together with ballpens or pencils in the belief that the children will become talented. Some parents plant trees on the spots where they bury the placentas in the belief that the newly born child will have long lives like the trees planted.

Presently, Prime Commercial has stopped buying the placentas. CMC disposes them together with other biodegradable to produce compost that will be used in the hospital premises and for the residence of the head of the hospital. The hospital is presently looking for other buyers of placentas. In the meantime, these placentas are buried in a pit inside the hospital grounds near the parking lot.

The hospital management has given instructions to the security force to prevent unauthorized persons from entering the storage area and collecting recyclable materials. This was a response to previous incidences wherein scavengers were retrieving recyclable and in the process scattering the waste. Even stray dogs are not allowed to go near the storage room to rummage or scavenge.

Based on interviews with some key informants in the hospital, it is estimated that around 80%-90% compliance on waste segregation is being achieved by CMC. Frequent violators are visitors of patients who are ignorant or apathetic to the ongoing segregation of the hospital.

2.3.3 *Collection*

The collection of solid waste from the hospital is the responsibility of the local government unit. In the case of CMC, the Quezon City government is responsible for the collection, transport and disposal of solid waste. Hospital waste is collected together with other municipal waste within their jurisdiction.

The Quezon City government utilizes contractors for the collection of solid waste. REN Transport, one of the solid waste collectors of Quezon City, covers the area of CMC. An open garbage truck (12-15 cubic meter capacity) is assigned by the contractor to collect all the hospital waste in Quezon City.

REN Transport collects the bulk of the hospital waste generated by CMC. The garbage collector servicing majority of the hospitals in Quezon City is Carlito Manuel, who is an employee of REN Transport. He drives the garbage truck that collects hospital waste in Quezon City. Usually, he has four helpers with him in collecting garbage from the hospitals. One helper is tasked to segregate the recyclable on top of the truck (palero) while the three helpers collect the waste.

His assigned truck figured in a vehicular accident recently and he is borrowing a truck from his fellow drivers to collect the waste from the hospitals. The lack of transport adversely affects the collection of waste in his assigned route.

CMC generates approximately 50 bags (around 0.20 cubic meter per bag) a day. In addition, the contractor also collects the ashes that are produced in incineration. These are stored in plastic bags or sacks and placed in cartons (24" x 15" x 8") including burned needles and blades. The hospital produces an average of 3-4 cartons of ashes a month.

For each load of waste being delivered in the dumpsite, the operator of the Payatas Dumpsite is charging a dumpsite fee of P200 00. This is partially defrayed by the incentives being paid by some private hospitals as in the case of CMC where it is giving P700.00 a week to the garbage collector.

2.3.4 Incinerator

CMC uses a commercial type of incinerator that was bought around 1969. Through the years, the incinerator was periodically rehabilitated and remodeled to its present form. Presently, the incinerator uses LPG gas fuel and can incinerate around 50 kg per loading. The firing time of the incinerator is at nighttime. There are plans to replace the incinerator by January 1997. The proposed incinerator can accommodate even the general waste of the hospital if the garbage collector fails to collect their waste. The bigger incinerator can also accommodate the toxic and hazardous waste of other hospitals for incineration.

2.3.5 Reuse and Recycling

The driver of the garbage truck assigned to collect the hospital waste deliver the recyclable to Clarita's Junk Shop at Payatas, Quezon City, a junkshop owned by his mother who specializes on hospital waste. The recyclable that are normally retrieved are paper, empty bottles, plastic, and cartons. The infectious materials such as blades and syringes are not usually retrieved by the paleros of the garbage truck.

Empty dextrose bottles are segregated and crashed to produce cullets in the hospital. This is also done to reduce the volume of waste in the hospital. The cullets are then sold to two junkshop specialists namely, Chrisma Enterprise and Mallari Trading for a total of around P2,000 to P3,000 a month.

Uncontaminated paper and cartons are also segregated in the hospital. Confidential papers are shredded before these are sold to the buyers through oral bidding. These are then sold to interested buyers who pick up these recyclable. These buyers are usually itinerant buyers of recyclable who own or rent a vehicle to pick up the materials from the hospital. The buying prices of recyclable vary depending on the prevailing buying prices in Metro Manila. The purchasing department is negotiating the selling prices of these recyclable with the buyers. The proceeds of the sales go directly to the Treasury of Capitol Medical Center.

Previously, scavengers enter the hospital premises and separate paper and other recyclable from the black plastic bags. However, when management found out the practice and the mess that this created, it instructed the janitors to automatically separate papers and cartons to centralized the retrieval of materials and prevent the unhygienic conditions that this practice has created.

Biodegradable waste from the kitchen and canteen are stored and collected every day by a businessperson for hog-feed Besides food waste, she also collects used cooking oil. Collection time is usually at around 4:00 in the morning when there are minimal activities in the hospital.

CHAPTER 3 EAST AVENUE MEDICAL CENTER

3.1 GENERAL BACKGROUND

The East Avenue Medical Center is a tertiary government hospital located at East Avenue, Diliman, Quezon City, a major thoroughfare in Metro Manila. It is the nearest government tertiary hospital offering general medical care to the National Government Center where the largest squatter settlement in the Philippines is located. As of 1995, it was estimated that the National Government Center contains approximately 42,000 squatter families.

The East Avenue Medical Center (EAMC) was organized by virtue of Executive Order No. 48 Series of 1986 promulgated by President Corazon Aquino. It was formerly named as the Hospital Ng Bagong Lipunan that was established on January 8, 1978 by virtue of Presidential Decree (PD) No. 1411 after the dissolution of the old GSIS General Hospital which transferred all its asset and liabilities to the Ministry of Health.

The former GSIS Hospital was originally a 500-bed capacity medical care institution catering to the members of GSIS and their dependents before it was transferred to the national government. The bed capacity was reduced to 350 with the intention of accommodating service patients and training its staff in the different fields of medical specialization.

The EAMC, since its reorganization after February 1996, has been moving progressively within the aim of living up to its standard as premier education and training as well as service to hospital under the Department of Health. Construction and repairs are on going hand in hand with the efforts to give high quality standard to patient care to the optimum number of the populace irrespective of social, educational, economic, and religious creed

The East Avenue Medical Center is governed by the Board of Governors and headed by the Secretary of Health as provided by PD 1411. The Secretary of Health is assisted by his Undersecretaries. The daily operation is undertaken by the Chief of the East Avenue Medical Center.

EAMC has two buildings, a seven-storey main building and a two-storey that houses the outpatient department. As of September 30, 1996 the hospital has a total of 963 employees broken down into 165 employees for administrative services, 65 for paramedical services, 242 for medical services and 491 for nurses services. The solid waste management is the responsibility of the housekeeping unit under the administrative department.

Low-income households usually patronize government hospitals because the Department of Health subsidizes medical care. This subsidy has attracted patients not only in the neighboring areas but also from the provinces where medical services and facilities are limited. While the authorized bed capacity is officially pegged at 350 beds, the actual bed capacity in EAMC is around 450 beds. The 1995 occupancy rate for adults was 133% while bassinet's occupancy rate was 282%.

The EAMC has eight (8) general service departments namely, Administrative, Consultation, Out-Patient, Laboratory, X-ray, Operation, Intensive Care, and Pulmonary departments. In addition it has six (6) clinical departments namely, Surgery, Medicine, Ophthalmology, Pediatrics, EENT and Obstetrics-Gynecology.

There are two types of employees in EAMC namely, permanent and contractual employees. The Department of Health hires permanent employees while contractual employees are hired by the hospital for a fixed duration renewable at the option of the hospital. Positions having contractual employees are elevator operators, technicians and telephone operators. In addition, the hospital has also contracted the janitorial services (PRC Janitorial Services) and security force from private companies.

3.2 OFFICIAL HOSPITAL WASTE MANAGEMENT SYSTEM

The waste management of the hospital is the responsibility of the Administrative Department through the housekeeping unit. There is the Infectious Control Committee (ICC) to supervise or monitor the waste management system but it has no separate budget. It is estimated that the hospital produces approximately 1,600 kg of hazardous waste a month.

The official waste management system was developed based on the Manual on Hospital Waste Management from the Environmental Health Service of the Department of Health and Metro Manila Authority Ordinance No. 16, series of 1991 (see Appendix 6).

3.2.1 Segregation

EAMC segregates its hospital wastes into three (3) categories namely, non-infectious dry waste (black bags), non-infectious wet waste (green bags) and infectious waste (yellow bags). Please refer to Appendix 4 for the official waste disposal procedures. These plastic bags are placed into plastic waste cans (8"x10"x12"). Black plastic lined waste cans are for non-infectious waste such as tin cans, empty softdrinks/ medicine bottles/tetrabrick containers, styropor containers, wrappers, empty medicine boxes and plastics. Green plastic lined waste cans are for biodegradable wastes (can be used as feeds or for composting purposes) such as fruit/vegetables peeling and skins and left over food. Based on the official waste management system adopted by this hospital, these waste cans should be inside every patient's room, and the rooms of the different departments generating these types of waste.

Yellow lined waste cans are for infectious waste such as used dressing, bandages (for wounds) cotton balls, materials (like tissue paper) with blood, secretions and other exudates, disposable materials used for collection of blood and body fluids (including diapers, sanitary packs, incontinence pads), tubings, used syringes, Foley catheters, F. suction cath / tubing and gloves.

Pathological wastes such as organs, tissues are usually treated before collection. These are soaked into a formalin or sodium hypochlorite solution before these are placed into yellow plastic bags.

3.2.2 Collection

The janitors of EAMC collect waste containers from every room of the hospital every end of the work shift (3 times a day). There is one (1) janitor assigned to each floor. Wastes are placed into bins or receptacles (4'x2'dia) located in every floor and transported into the garbage disposal area (10-12 sq m) located at the back of the hospital.

Non-infectious wet waste from the dietary/canteen unit are segregated and stored in separate containers (same size). A separate area (8 sq.m) is allocated for the storage of the yellow bags.

Unlike in private hospitals, government hospitals cannot just sell their recyclable materials to junkshops or buyers because of certain government regulations promulgated by the Commission on Audit. It is required that certain formalities be complied with, such as, bidding, with at least three bidders, etc., before any government entity can dispose or sell its property. In effect, the trading of hospital recyclable by hospital personnel just went underground and benefits only a selected few who holds key positions.

3.2.3 *Disposal*

The black and green bags are picked up by the Quezon City Environmental Sanitation Center through its garbage contractors. However, the collection service is not *n* regular. The open garbage truck (12-15 cubic meter capacity) collects around four | $\vee\backslash$ times a week but there is no regular schedule. '

The yellow bags are incinerated in other government hospitals such as the National j Kidney Institute or the San Lazaro Hospital in Manila. These are transported by the j hospital ambulance every Tuesday and Friday. Presently these hospitals cannot ; accommodate the yellow bags of EAMC. The hospital was constrained to use the services of the Integrated Waste Management Inc., a private company providing j incineration services for hospital waste. The company charge P40/kilo and the hospital is spending around P70,000 a month

3.2.4 *Enforcement*

The hospital waste management program was instituted last 1995 and an orientation seminar was provided for the hospital employees. This seminar was again repeated this year. New employees are given this orientation as part of their pre-employment training. In addition, the hospital has prepared information materials for the employees and patients. These are in the form of posters, handouts and waste manual. Presently, there are only three (3) hospital personnel that are trained in hospital waste management.

The official waste management system in place at EAMC is an official hospital policy. Violators of this policy are given 72 hours to explain their sides and if such explanations are insufficient to justify their actions, such violators are subject to sanctions. Sanctions include reprimands, warnings and suspensions. As of this date, no violators have been sanctioned.

3.3 **ACTUAL WASTE MANAGEMENT PRACTICE**

3.3.1 *Segregation*

EAMC does not have yellow plastic lined waste cans at the wards and patient rooms. Only green and black plastic lined waste cans (8"x 10"x 12") are provided in these rooms. Yellow plastic lined waste cans are provided only at the emergency, operating, delivery, laboratory and other similar facilities. In addition, each floor has a container for sharps and needles. The waste segregation and recycling system of EAMC is illustrated in Appendix 7.

Like other hospitals, the hospital janitors collect waste in every floor at the end of every work shift. However, in EAMC, there is only one janitor assigned per floor who collects waste in addition to his/her responsibility of cleaning all the rooms including the toilets within the floor. This has adversely affected the segregation initiatives of the hospital.

The blades of the scalpels are separated from the handles and are put together with the syringes and the other sharps in the sharps containers and disposed of through the yellow bags. The scalpel handles are autoclaved and reused again by attaching new blades to the handles. The IV tubings are also collected and put also inside the yellow bags for incineration.

The dextrose bottles are placed separately and delivered to the dietary department where these are autoclaved and used as containers of liquid food for some patients. However, the increase usage of plastic dextrose bottles has correspondingly decreased the supply of these glass bottles. These plastic dextrose bottles were observed as being used as alternative Christmas decorations in the hospital.

After the collection of waste in every room, the assigned janitor places the black or green plastic bags into bigger black and green plastic bags as the case maybe and deliver these to the storage area at the back of the hospital within the compound.

Linen of patients with contagious diseases is separated from the rest of linen and placed in thick transparent plastic bags with the proper labels (name of patient and linen used). These are then soaked in a disinfectant before laundering. Normally linen can last up to a year of use.

3.3.2 *Storage*

Black and green plastic bags are placed together in an enclosed storage area (10-12 sq.) while the yellow plastics are separated and placed near the said storage area (8 sq.m). The unreliability (1-2 times a week) of the schedule of the garbage truck has adversely affected the sanitary conditions of the area. The practice presently is to place all the bags outside of the storeroom to prevent the bad odor from overwhelming the janitors. These areas are not secured enough to prevent stray cats and chickens in scavenging in search for food.

It has been observed that those traditional recyclable materials such as bottles, paper and cartons are not significantly present volume-wise in the wastes that are collected by the municipal collection system. The person in charge of the storage area was asked about the absence of these materials. His reply was evasive and ambiguous. It is hypothesized that some hospital personnel are operating an informal materials retrieval system and sell the recyclable elsewhere.

Because of the data gathering of this study, the housekeeping section became aware (of the financial potentials of these materials and has initiated the centralized retrieval of traditional waste materials such as paper, newspapers, cartons and bottles. The housekeeping section plans to sell these materials or give to the garbage collector as incentive to collect their garbage more frequently. However, this can only be done informally because of the restrictions on the sale of government property.

3.3.3 *Collection*

The dump truck assigned by the ESC of Quezon City to collect waste from the Capitol Medical Center (Mr. Carlito Manuel) is also the one collecting waste from EAMC. Usually, the paleros of Mr. Manuel open the black bags to retrieve recyclable materials before loading the waste into the truck. The paleros avoid opening the yellow bags because of their awareness of the possible dangers of these wastes to their health. This aggravates the unsanitary condition in the storage area. This practice has been tolerated by management because of the possibility that the truck may limit its frequency route to the hospital once they prevent the paleros in opening the black bags.

3.3.4 *Reuse/Recycling*

The rules governing government entities in selling off their property has limited the options of this hospital to generate income to defray its expenses in waste management. Officially, the recyclable materials cannot be sold to any entity without the required public bidding participated by at least three bidders. However, this policy does not preclude the hospital in utilizing the recyclable in other forms.

Biodegradable waste generated from the canteen and dietary sections are segregated and placed in sealed plastic bins and sold to a collector for hog feeds. This collector then sells the biodegradable waste to hog growers. The collection takes place in the early morning when activities in the hospital are at a minimum. The proceeds of the sales of the biodegradable waste from the hospital are kept personally by the key personnel of the canteen and dietary sections.

Dextrose bottles are separated from the main waste flow and stored in one area. The dietary department uses these bottles as containers for liquid food after these have undergone autoclaving. The cleaned bottles are stored in the dietary department.

Recyclable materials are kept in the black bags as incentives to the garbage collectors to collect their solid waste more frequently. The garbage collectors open these bags on the back of the garbage truck for recyclable before these are move to the inner part of the truck. However, the presence of some hospital personnel who have their own recycling activities have significantly decreased the materials that can be retrieved by the garbage crew.

As in CMC, placentas that are produced in the delivery room during delivery of babies in EAMC are put in a freezer supplied by Prime Commercial. In cases where the mothers request to keep the placentas, the hospital gives the placentas to the mothers. Placentas are classified as good or bad depending on the circumstances during birth. Good placentas come from mothers that deliver their babies without complications or abnormalities. Bad placentas also include those with miconium (child produces waste inside the womb). Presently, Prime Commercial has stopped buying the placentas. EAMC disposes them together with other pathological waste.

The burn unit of the hospital uses the good placentas as substitute for adhesives (to cover temporarily the burned parts) which are quite expensive. These placentas come from cesarean section cases. They recover the amnion, a thin layer of the placenta and soak it into a 5 cc (Zonrox) bleaching agent and 95 cc sodium sulfide solution. These are then stored inside their freezers for future use.

3.3.5 *Disposal*

Hospital waste are collected by REN transport and disposed at the Payatas Dumpsite. The driver of the garbage truck assigned to collect the hospital waste deliver the recyclable to Clarita's Junk Shop at Payatas, Quezon City, a junkshop owned by his mother who specializes on hospital waste. The recyclable that are normally retrieved are paper, empty bottles, plastic, and cartons. The infectious materials such as blades and syringes are not usually retrieved by the paleros of the garbage truck.

Infectious waste are incinerated usually at the San Lazaro Hospital in Manila another government tertiary hospital. The ambulance delivers the yellow bags twice a week. Each delivery contains around 200-250 kg. To defray the expenses, EAMC is supplying two (2) liters of crude oil (around P10.00) for every one kilogram of infectious waste.

The use of the ambulance to deliver these infectious wastes has some advantages. The hospital has very limited vehicles and majority are assigned to heads of departments. The ambulance has a larger carrying capacity compared to ordinary vehicles and this is enclosed. Priority is given to the ambulance as this travel through the Metro Manila streets. Hence, traveling time is shorter compared to ordinary vehicles..

When the incinerator at the San Lazaro Hospital is not available, EAMC avails of the services of Integrated Waste Management a private company with a small incineration plant. This was the case last July 95 when San Lazaro Hospital stopped the incineration of infectious hospital waste of East Avenue Medical Center for 3 months. The yellow plastic bags were just placed at the compound. The total bill they spent from October '95 to Sept.'96 for disposing infectious waste alone amounted to P 812,340.80 .

CHAPTER 4 SMALL AND MICRO ENTERPRISES (SMES)

4.1 INTERMEDIATE HANDLERS

The intermediate handlers were identified through unstructured interviews with hospital personnel responsible for solid waste management. The research assistant assigned to do these interviews was provided with topics that she must cover during the interviews. Unstructured interviews were also undertaken with the driver and crew of the garbage truck assigned to collect the hospital wastes.

The interviews of the intermediate handlers were conducted on the month of November to December 1996. Rapport with the respondents was first established before the interview proper was conducted. The topics that were covered by the terms of reference of this study were explained to the research assistant who did the interviews. Considering that these intermediate handlers were part of the underground economy, the consultant preferred unstructured interviews to be conducted as the presence of questionnaires might intimidate the respondents in telling the real situation of their businesses.

The frequency of visits and the duration of the actual interviews with the respondents varied. These variations were dependent of the availability of the respondents and the degree of confidence that they have to answer the questions of the interviewer.

The data regarding Prime Commercial were generated by (1) interviewing the hospital personnel who were handling the placentas and (2) office personnel of the company. The personnel of the company were very evasive in providing data upon the instruction of the manager. However, a member of the company reluctantly provided information on the general operations of the company.

To provide a better understanding of the operations of the intermediate handlers, the value of the Philippine Peso to the US Dollar was 26:1 which was the average prevailing currency exchange.

4.1.1 *Clarita's Junkshop*

Mr. Manuel, the garbage collector assigned to collect waste from the Quezon City hospitals retrieve recyclable while on route. These recyclable are being delivered to Clarita's junkshop owned by his mother.

Clarita's Junk Shop is located at Kapalaran Street Batasan Hills, Quezon City. This place is located near the Payatas Dumpsite where the waste of Quezon City is being disposed. This junkshop specializes on hospital waste including those from the Capitol Medical Center and the East Avenue Medical Center because of its access to these wastes through her son. However, she still buys recyclable from paleros who find her prices attractive enough to sell the materials to her.

She started with P10,000 capital for her junkshop business in her present address. She wanted to register formally with the city government and get a permit but because of her tenurial status, she failed to get the necessary permits. The city government requires the prospective registrant to submit some documents to prove that she has some rights over the property.

Unfortunately she was not able to produce any document because she is just squatting on the property.

Upon the arrival of the garbage truck from the hospitals, the helpers discharge the materials to the vacant lot adjacent to her junkshop. Materials such as aluminum, paper, bottles, plastics and metals are segregated. Sharps and blades are placed in a separate container and returned back to the truck for disposal to the dumpsite.

These are weighed and the paleros are promptly paid based on the prevailing prices that day. In addition, the paleros are given ten percent on top of the prevailing price as incentive to bring their recyclable to the junkshop. She has no employees and has to do farther sorting and packing herself. Her son when available helps her in the operation of her small business. After these preliminary activities, the materials such as paper, cartons and plastics are then tightly packed and sold to big junkshop dealers.

The intravenous tubings and other plastic products from hospitals are treated as ordinary plastics and segregated together with other forms of plastics. These are then sold to big junkshop buyers who supply the plastic materials to the recyclers or pelletizers.

Her junkshop grosses an average of around P4,000 worth of recyclable a week from the collection of her son. The 10% of this amount are paid to paleros of her son. Her mark up ranges from 50% for plastics, 25% for aluminum cans, cartons and paper, to 20 % for medicine bottles.

Based on the interview, she has two major problems namely, (1) lack of registration of her business and (2) lack of capital. The lack of registration makes her susceptible to extortion and harassment by the police and other government officials. The lack of additional capital limits her buying capacity that in turn limits her capacity to earn more.

The materials from Clarita's Junkshop are sold to big junkshop dealers or specialists who specializes on a particular material. These consolidators buy their specialized material from the small junkshops. After amassing sufficient quantity, the material is then delivered to the recyclers or reusers.

In this particular case, the junkshop is selling the plastics to Cunanan Enterprises, Carpel Enterprises for cartons and paper and metals to Mameng's Junkshop.

4.1.2 Chrisma Enterprises and Mallari Trading

These two businesses are registered with the Bureau of Domestic Trade under the Department of Trade and Industry. These are also registered with the local government unit concerned to acquire the necessary mayor's permits needed to operate in a certain locality. Chrisma Enterprises is located in Mandaluyong City while Mallari Trading is located in Marikina City. Other required registrations are with the Social Security System and the Bureau of Internal Revenue.

The organizational structures of these two businesses are simple. These are owned by individuals (Mrs. Christina Pangan for Chrisma Enterprises and Jose Marie Mallari for Mallari Trading). They employ very few workers who are paid on a daily basis. The compensations are below the prescribed minimum wage in Metro Manila. The workers live in

the nearby squatters' areas. The workers are usually migrants from the provinces who want to have better lives. They are not equipped with the skills needed to land them better paying jobs. Their ages range from the very young (12-18 years) to the middle age (45-60 years). The middle age group is usually married while the very young are single. Male workers predominate this type of business.

The labor turn over is fast due to the fact that the working conditions are bad. In addition, the low compensation influences the laborers to transfer into higher paying jobs if these are available. For the part of the owners, the unskilled requirements of the jobs make it easy for them to find new replacements.

These two entities specialize on the buying of cullets from all possible sources. One good source is from the hospitals. Upon instructions from these specialists, CMC breaks the empty dextrose bottles and stores these in their premises. After accumulating sufficient quantity, CMC notifies either of these two specialists who then pick up the cullets

In the case of EAMC, these two enterprises have no direct access to the cullets. The cullets find their way to these small junkshops through the paleros or dumpsite scavengers who retrieve these materials. The difficulty in accessing into the recyclable of government hospitals has discouraged this type of junkshops in directly accessing the waste materials.

The cullets from CMC are brought to these two specialists and if there are different colored cullets included in the pick-up, these are segregated from the clear glass cullets through manual labor. The delivered cullets are placed on a makeshift table for segregation. The cullets are then soaked in water to partially remove the dirt attached to the cullets. The cleaned cullets are then placed on baskets to drain. The dried cullets are then placed in the storage areas. Once sufficient quantity is reached (one truckload), the cullets are delivered to the San Miguel Glass Plant, a local glass factory as raw material for the production of bottles.

The waste water used in cleaning the cullets is disposed through the drainage system. There is no pre-treatment prior to disposal. Other waste from the cullets such as labels, stickers and dirt are disposed through the usual municipal waste system which inevitably find their way to the dumpsites and landfills.

4.1.3 Mameng's Junkshop

Mameng's junkshop is located at Malakas St., Litex Road, Payatas, Quezon City and owned by Carmen Sibal, a widow. Her children assist in the operation of the junkshop. Two of her children operate their own junkshops. They buy bottles, paper, plastics, cartons and metals. The approximate volume is around one ton per item per week. She employs 6 male workers who report for work from 7 AM to 5 PM. Their ages range from 18 to 22 years old. Based on the interview, she is giving the minimum wages applicable to the National Capital Region.

Previously, this junkshop specializes on aluminum scraps. However, the market for aluminum went down forcing the many of the junkshops to sell their scraps at a loss or to retain the scraps and wait for a better price resulting in the impairment of their buying capital. The instability of the price of this material has forced many junkshops like this one to temporarily stop buying aluminum scraps.

Presently, this junkshop converted itself into a junkshop generalist, buying many types of waste materials. These wastes are normally segregated into general classifications such as paper, plastics, etc. Once the agreed buying price is reached and payment given, the workers further classify and segregate the materials into subclasses as in the case of plastics such as PP, PE, PS, PVC, etc. These are then packed together and delivered to the bigger junkshops.

4.1.4 *Cunanan Enterprises*

This big specialist junkshop is located in Dona Victoria Aracity Village, Tenajeros, Malabon. It is a single proprietorship owned and operated by Romualdo Cunanan Jr. with a starting capital of P20,000. and registered with the Bureau of Domestic Trade and municipal government of Malabon.

The business employs 10 workers, 6 males and four females with ages ranging from 15-25 years. Majority of his workers comes from the provinces. The ages range from 18 to 35 years and the highest educational attainment is the high school level. Almost all are Roman Catholics.

There are two forms of compensation utilized by the business namely, a fixed rate per day (P150.00/day) or "pakyawan." This type of compensation fixes an amount to do a certain activity. An example is cleaning of one ton of plastics for a certain fixed amount within an agreed period.

His main source of supply comes from the small junkshops around the Payatas dumpsite area. His supply of plastic scraps is adversely affected by the weather because during rainy season, the roads leading to the Payatas area is severely restricted by the bad conditions of the roads. The business averages around 10 tons of plastics per week.

The plastics are cleaned with plain water from the nearby creek. These are then dried and packed in plastic sacks ready for delivery to the recyclers and manufacturers.

4.1.5 *Carpel Trading*

This is a single proprietorship owned by Mr. Bong Teves located at 512 Litex Road, Payatas, Quezon City. His business is registered with the Bureau of Domestic trade under the Department of Trade and Industry and with the government of Quezon City. He started his business in 1986 with an initial capital of P40,000.00 and an old jeep for transporting materials.

Carpel Trading employs around 20-30 workers depending on the work load. The mode of payment is "pakyawan" meaning, the worker should finish a certain amount of work for a fixed fee irrespective of the number of days worked. He has no permanent workers. All his workers are males, ranging from 20-40 years of age, all Roman Catholics, living in the nearby squatter area who all came from the provinces. The highest educational attainment is in the high school level. His workers earn around P200.00 a day. The usual working hours is from 7AM to 5PM.

He specializes in paper and cartons. These materials are collected from different private and government offices, schools and junkshops. These are delivered to his junkshop and segregated by his workers into white, assorted, cartons and other classifications. In the

process of segregation, the contaminants and impurities are separated such as staple wires, fasteners, binders and tapes. The presence of these materials depresses the value of the materials.

The average mark-up of his materials range from 20%-100% depending on the demand and the quality of his materials. These are delivered to the paper mills such as Manila Paper mills, World Wide Paper mills, Dasmariñas Paper Mills and Paper land. He averages around 400 tons a month He is paid with post dated checks ranging from 60 to 90 days. He presently owns four trucks to deliver his scrap paper.

He went into business because when he was young, his parents operate the canteen of one of the paper mills. It was in this age that he was exposed to the business of supplying scrap paper to the paper mills. After he passed the mechanical engineering board, he decided to pursue his business.

His primary concern is the unabated importation of scrap paper to the country. This adversely affects the scrap paper business locally. He suggests that a kind of restriction be implemented by the government to control the importation of paper scraps to the country.

4.1.6 Green Ground Enterprise

This partnership registered at the Bureau of Domestic Trade is jointly owned by a Wilfredo Liyon, a Filipino-Chinese and a Mr. Cheng, Taiwanese national with an initial capital of 2 million pesos. It is located a No. 9 San Diego St., West Canumay, Valenzuela. The company processes waste plastics

The company employs around 60 workers (30 males and 30 females) and 5 office personnel (4 females and 1 male) The ages of the workers range from 18 to 35 years. The skilled workers receive the minimum wage while the non-skilled workers receive less. The working hours start at 6 AM and end at 3 PM. Services rendered in excess are considered overtime.

The waste plastic materials are supplied by the specialists of plastics such as Cunanan. The cleaned plastics are delivered to their premises by these specialists. The plastics are segregated into three categories namely, plastics for blowing, for injection and rejects. The rejects are sent back to the suppliers. The two remaining categories are further segregated according to colors. These are then reduced in size through the crusher. Each load of plastics into the crusher ranges from 60 to 90 kg. The crushed plastics are then loaded into the extruder machine which the company have two. Through heat and pressure, the plastics adhere to each other to produce a spaghetti-like plastic which are chopped to produce the pellets. These are then bagged and sold to manufacturers of plastic products.

The cleaned plastics delivered by the specialists are presently being bought by the company at around P1000/kilogram. The rejected plastics are deducted from the amount due the specialists. The plastic pellets for injection are sold at P15.00/ kg while plastic for blowing costs around P21 00/kg.

The company is experiencing an acute lack of space to store their plastic raw materials being delivered by their suppliers. This adversely affects their capacity to receive additional raw materials. The plastic recycling sub-sector is also experiencing tough competition brought about by the presence of many competitors.

4.1.7 *Prime Commercial*

Prime Commercial is a company involved in the retrieval of placentas. The company was formerly located in Binondo, Manila but stopped its operations around October 1996. Based on the information gathered, the company is experiencing problems with their buyers who are based on Europe.

Based on interviews with hospital personnel, the placentas are first cleaned and soaked into a sodium sulfide solution before these are stored inside the freezers. The freezers were supplied by Prime Commercial. After sufficient quantity is accumulated, hospital personnel with previous arrangement with Prime Commercial call the company to pick up the placentas. The company pays the hospital based on the weight (per kilogram). If the arrangement is not official as in government hospitals, some hospital personnel keep the payments for themselves.

After sufficient quantity is collected, these are shipped through refrigerated container vans to unknown destinations in Europe. Based on informants, certain enzymes are extracted from these placentas and used as ingredients to produce medicines.

As of December 15, 1996, Prime Commercial started to be pulled out the freezers from the different hospitals. This indicates a permanent cessation of its business activities.

4.2 ANALYSIS

4.2.1 *Overview*

The ease in entering into the business of trading with recyclable materials has encouraged many to venture into this field. The low capital requirement to start this trading business and the existing payment arrangement has emboldened many to start their own businesses. The required equipment are simple such as the weighing scale and simple tools like pliers, hammer and binding materials such as rope and plastic strings. However, many businesses went bankrupt because of many factors.

The main factor to successfully enter into the junkshop business is the ability to accurately distinguish one material from the others. This talent is particularly needed to distinguish various types of plastics and metals. There were incidences when newly established junkshops suffered rejected deliveries or pick ups because of inaccurate segregation. In addition, their buying activities might result in business losses because of imprecise identification.

Other important factors that affect the success of a small junkshop business are the following; (1) sufficient capital, (2) location or access to the supply of recyclable; (3) access to good prices of the specialists.

At the start of the trading business, the entrepreneur is faced with the prospect of uncertain sources of sufficient materials and buyers of recyclable. If the entrepreneur can hurdle this problem and the business grows, the specialists will provide capital to make sure that the recyclable are sold to them. The crucial point of the trading business is the gestation period in

which he has to hurdle during the start-up phase. If this can be hurdled, he has proven to the specialists that he deserves the credit line from them because of his proven track record.

The location or access to recyclable is also an important factor in the success of the trading business. It is usual that junkshops proliferate around dumpsites and along roads leading to the sanitary landfills. There are two sanitary landfills (San Mateo and Carmona) and the rest are plain dumpsites. If this is not possible, the entrepreneur has to locate the sources and tap the materials. Usually, they own hauling vehicles and have connections or linkages to the generators of waste as in the case of Clarita's junkshop. Others like the specialists, focus on certain materials and collect from the small junkshops the materials such as Carpel Trading and Cunanan Enterprise.

To ensure the steady supply of materials, the specialists advance payments to the ' /v small junkshops in the hope that the materials will be sold to them. However, this is I " not an assurance that all of the materials bought by their financial resources will be sold to them.. Sometimes, the difference of the buying price of the specialists who advanced the money is significant compared to the prevailing buying price. This disparity has led to the emergence of the "pirates" who offer better prices and have been successful in buying some of the recyclable earmarked for the specialists.

Other factors influence the buying price of the specialists. The quality of materials directly affects the prices especially of materials wherein accurate classification is important. The mode of transport is also influential in the determination of price. Materials delivered to the specialists command a better price than materials picked up. Adjustments are made to accommodate transport costs. There are materials that fluctuate seasonally because of events like the Christmas season. Prices of recyclable are generally lower on the first quarter of the year because of the higher generation of waste during this season. Moreover, the arrival of imported waste materials tends to depress the local buying price of recyclable.

4.2.2 Motivations

The scant requirements to enter into the junkshop business have encouraged specially the low income group to participate in this business. Educational attainment is not a pre-requisite to be successful in this business. The low capital requirement to start a junkshop business as shown in the case of Clarita's Junkshop has resulted in the easy entry and easy withdrawal within the business. In addition, the area needed is not initially that large. Hence, the junkshops serve also as their houses especially along the Payatas Dumpsite where the largest concentration of squatter families is located.

The motivation of many of the intermediate handlers is survival. The lack of employment opportunities has driven them to be "forced" entrepreneurs. The nature of business of handling waste has restricted the entry to those that are willing to face waste materials retrieved from the garbage daily with all the obnoxious odors and contaminants.

In addition, the lure of starting a business at home where the female can also fulfill her household chores have influenced the likes of Clarita and Mameng to establish their own businesses.

A few, like the owner of Carpel Trading, are a result of choice. He has been exposed to paper and carton trading during his early age and this persuaded him to enter the business in spite being a licensed mechanical engineer

As shown in the materials flow, (see Appendix 8) the lower the entry point in the materials pathway the lesser is the need to have high educational attainment, capital, and facilities. As the entry point goes higher, the presence of higher educational attainment, more capital and larger facilities are required. The specialists who are on the top positions in the retrieval of recyclable require much more of these achievements and things. They are the ones who transact directly with the established recyclers and manufacturers and this requires some knowledge in business management, of financing, banking and law.

4.2.3 Recycling Activities

The small junkshops entail the further segregation of waste into general categories. The main activity is the proper identification of materials according to the types required by their buyers and recyclers. Contaminants are separated from the materials before these are packed to be delivered to specialists.

The specialists further segregate the materials according to the specifications of their buyers. In the case of cullets, clear cullets are segregated from the amber and emerald cullets before these are delivered to San Miguel Glass Plant. In the case of plastic waste, these are cleaned in the nearby creek before these are delivered to the pelletizer. These process of further segregation and cleaning to remove the impurities and contaminants are repeated in the other recyclable waste.

However, the cleaning processes of these recyclable pose environmental and health risk to the cleaners. The residues of the cullets and plastics ultimately find their way to the river system and contribute to the further degradation of the environment. In the process, the cleaners are also exposed to toxic and probably, infectious waste during the cleaning process.

This process adds value to the retrieved materials because it improves the quality of the materials needed by the recyclers. At the same time, the volume of materials is reduced because of the separation of the dirt from the rest.

It has been cited by some respondents that the quality of materials is a crucial factor in the junkshop business. Recyclers of paper for instance cite the low quality of scrap paper as a reason for the continuous importation of scrap paper. While it is more expensive to import waste paper, the high quality compensates for the high costs.

4.2.4 People Involved

The low skills required to enter into this sub-industry have led to the entry of unskilled workers. They are mostly transients who come from the provinces to seek better opportunities in Metro Manila. Their ages are very young and usually receive wages below the minimum wage set by law.

The working conditions are very inadequate for the workers. In segregation of the materials, workers are exposed to contaminants brought about by the inadequate segregation of the toxic and hazardous waste from hospitals.

Majority of workers undertakes these chores as temporary work to sustain them in their daily requirements. Once better opportunities are located, they resign from these jobs. On the part of the junkshop owners, because of the level of skills required in this sub-industry, they are not particularly concerned of retaining their workers because of the ease in getting replacements.

Some pay the workers based on the "pakyawan" system. This practice in reality is a form of sub-contracting. The persons who undertake the chores are not really employees but sub-contractors. In the event of any accident, sickness or death, the junkshop owners are not legally liable to the persons. There is *no* employer-employee relationship but a contractual relationship to perform a certain service for the junkshop owner.

4.2.5 *Issues*

An important issue in the junkshop business is the unpredictability of prices. As discussed earlier many factors influenced the fluctuation of prices such as the quality of materials, transport arrangement, seasonality and presence of alternative imported scrap materials.

The wide fluctuation range of the buying prices of recyclable has led into bankruptcy of many junkshops. This has led to the suspicion that unseen hands are manipulating the buying prices of recyclable. In the metal scrap business, an elite group has been documented to have a certain degree of control over the buying prices of iron and aluminum scraps.

The wide fluctuation of prices had led to the industry practice of having high mark ups to create a buffer amount to absorb the sudden decrease in the prices. As seen in some of the junkshops, mark-ups of 50% are usual in the business.

The small junkshops are usually backyard operations without the formalities of registration with the appropriate government agencies. In the case of Clarita's junkshop, the owner wanted her business operation to be registered but the requirements of the agency of producing a document that the prospective registrant has some kind of right over the property prevented the her business registration.

The lack of registration has opened junkshops with similar problems to be harassed and extorted by unscrupulous persons especially by members of the local police force. The presence of the Anti-fencing Law which provides that prima facie evidence exists if the owner of the place possesses stolen property has exacerbated the situation.

The extortion happening to the junkshop in the Payatas Dumpsite area is a major concern of the owners. These extortions are happening despite the proper registration of many of the large junkshops in the area.

The junkshop business is characterized by "easy entry easy exit" operation. Prospective entrants to the business find it easy to set up a junkshop business and operate. The capital requirement is small and the tools are easily available. This characteristic encourages fly by night operators who exploit the financial arrangement of the industry of specialists giving buying capital for the materials in exchange for the owner selling the materials to the specialist. In addition, the presence of the "pirates" who exploit the situation by offering better prices to the small junkshops has wreak havoc to the industry.

It is important to have a good track record in the industry to access more capital from the specialists. Trust is an important factor because proper documentation through the use of official receipts and invoices is seldom used.

It was observed in the scrap metal industry that specialists operate along geographical lines. Major operators have been identified in the North and South sectors of Metro Manila. However, small junkshops operate in a certain area focusing in a known and proven supply area. Hence, small junkshops proliferate in the Payatas dumpsite a proven source of recyclable materials

If an additional source of supply becomes available, the small junkshops will not hesitate to exploit that opportunity. Aside from the proven sources of materials, the junkshops have the capacity to wage a guerrilla type operation to tapped new sources of materials. The junkshop business is very flexible to address new realities such as the case of Aling Mameng's junkshop which converted itself into a generalist when the aluminum scrap market became unviable.

CHAPTER 5 RECOMMENDATIONS

5.1 HOSPITAL WASTE MANAGEMENT

Management of toxic and hazardous waste (THW) of the health care sector requires enforcement and closer monitoring of their compliance with existing laws and regulations. MMDA ordinance No. 16 is sufficient for the proper segregation of the three types of wastes. The guidelines promulgated by the Department of Health covers in detail the handling, storage, and collection of THW. The problems encountered by the two case studies are in the enforcement of these laws and regulations.

5.1.1 Additional Financial resources

Compared with the government hospital, CMC fares better in the in-house solid waste management (see Appendix 9). The presence of the financial support and political will of the hospital management has influenced the personnel to comply with the existing hospital policies regarding solid waste management.

However, EAMC, which is a typical government hospital in terms of availability of funds for SWM, fared badly because of financial constraints. Government hospitals should have a separate budget to properly enforce these laws and regulations. In EAMC, the lack of financial resources has led to the lack of plastic bags, which are being issued intermittently to the different sections, and departments of the hospital. Yellow bags are not issued in wards and patients' rooms because of financial constraints.

In the two hospitals, the storage facilities while waiting for the municipal collection are grossly inadequate. These can be traced on the low financial priority of solid waste management of private and government hospitals. The unreliability of the collection of the LGU concerned exacerbates this lack of priority.

Financial resources should also be allocated for a more effective and vigorous education and information campaign (IEC) for the hospital personnel, patients and guests. The frequency of the IEC of once a year is inadequate to sustain a continuous compliance especially in terms of segregation at source.

5.1.2 Mandatory Incineration for toxic and hazardous Waste

The options given to hospitals in their disposal of waste should be minimized to compel these hospitals either to build their own incineration facilities, share with other hospitals or to use the private incineration plant. The options of unregulated burning, burying or disposing the THW with the other wastes should be avoided.

There have been proposals in the DOH not to renew the licenses of hospitals that either have no incineration facilities or do not have arrangements with entities who have their own incineration facilities. This is in the right direction because of the perils of infection and contamination to the handlers of wastes especially to the persons outside of these hospitals.

5.1.3 Single Enforcement and Monitoring Agency

MMDA should be given the proper financial and manpower support to implement rigorously its ordinance. The present manpower complement and financial resources of the Health Operation Center (HOC) of MMDA is grossly inadequate to monitor all the hospitals in Metro Manila.

In addition, the monitoring of the compliance to the pertinent laws and regulations regarding solid waste in general and toxic and hazardous waste in particular of hospitals and other medical facilities should be lodged under one government agency. This agency should then be given the necessary support to implement its mandate. It should be empowered to give the corresponding sanctions to the erring hospitals and if necessary suspend or revoke its license to operate.

5.1.4 Legalized Sale of recyclables

An amendment to the existing regulations of the Commission on Audit regarding the sales of recyclables should be enacted to accommodate the daily generation of recyclable. This regulation was formulated to prevent unfavorable transactions to the government. This very rule prevents the centralized disposition of recyclable which should have been used to augment the scarce financial resources devoted to solid waste management. If government hospitals are empowered to dispose legally their recyclables to the highest buyers, the very ill that this regulation sought to prevent will be prevented. The proceeds of the sales will legally go the hospital coffers and not to the pockets of some hospital personnel.

5.2 SMALL AND MICRO ENTERPRISES (SMEs)

Small junkshops usually fall under the category of the informal sector. This sector is characterized by the lack of proper documents from the concerned government agency to undertake legally a business. In the process, the government is defrauded of the proper taxes due from these informal businesses.

The lack of legal personalities of these businesses attracts unscrupulous persons in harassing and extorting them. As shown in the case studies, one of the recurring problems of these SMEs is their lack of legal personalities.

Regulations should be passed to relax the requirements to register these types of businesses with the appropriate agencies to cloak them with legal personalities. This will enable the SMEs to operate legally and create for the local government a new source of tax.

The formalization of retrieval of recyclable from government hospitals will help a lot in accessing junkshops to this source. Hospitals can officially retrieve these materials from their solid waste and sell these to the junkshops. Better prices can be offered to these hospitals which can be used to augment these meager resources for SWM.

Segregation should be mandatory to generate the volume of recyclable needed by the recycling industry. Segregation will produce bigger and better quality recyclable locally. This will stabilize the prices because it will minimize the importation of imported scraps. This will also save foreign currency of the country.

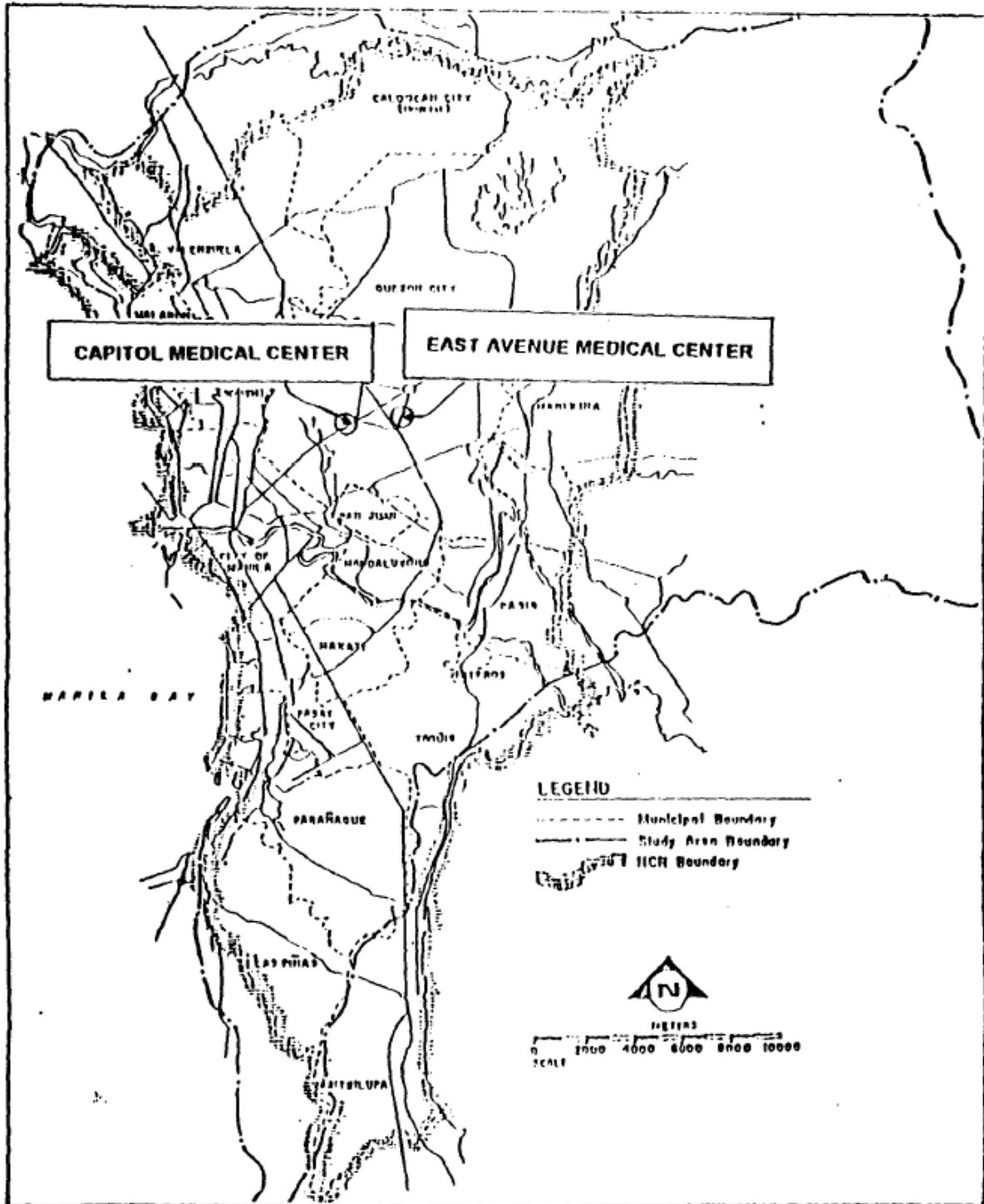
The transfer of technology for the utilization of the placentas locally will create a new form of SME and create job opportunities locally. The extraction of certain enzymes from the placentas can be done locally if the technology is available. Linkages should be established with pharmaceutical companies to use locally produced enzymes.

REFERENCES:

- Capitol Medical Center (1994), Policies on Hospital Waste Management.
- Center for Advance Philippine Studies (1992), A Study on Urban Environment- Related Activities for Non-Government Organizations and Community-Based Organizations, Philippines: Asia -Pacific 2000-UNDP, December
- Center for Advance Philippine Studies (1992) Waren Project: Recycling Activities in Metro Manila, Philippines : Waste Consultants, Netherlands February
- Consoer, Townsend and Associates, Inc.(1989), Solid Waste Feasibility Study for Metropolitan Manila Philippines Vol II , Philippines
- Department of Environment and Natural Resources (1993). Pasig River rehabilitation Program: Feasibility Report on Hospital Hazardous Waste Management in Metro Manila . Volume I
- Department of Health (undated) Manual on Hospital Waste Management.
- East Avenue Medical Center (1995). Handouts on East Avenue Waste Management.
- Environmental Health Service (1994) A Study on Solid Waste Management
- Gonzales, Delfin . Handout on Handling and Storage of Hospital Waste
- Lapid, D. and Soncuya R. (1995), Community-Based Urban Environmental Management in Metro Manila, University of Hawaii/ East-West Center, September.
- Metro Manila Development Authority Handouts on Ordinance No. 16
- Ng, G (1993) Decision Makers Guide to Solid Waste Management in Hong Kong, Hong Kong: The Conservancy Association, April.
- Soncuya, R. and Villoria , L. (1993), Solid Waste Study of Mandaluyong and San Juan, UNDP- Metropolitan Environmental Improvement Program (MEIP), Quezon City
- Soncuya, R. and Catangay, A (1995), State of Data Availability and Research Issues for Resolution Relative to Sorting and Recycling-Based Solid Waste Management Efforts, Development Academy of the Philippines, May.
- Soncuya, Rolando (1996), A Study to identify Additional Sources of Aluminum and Copper Scraps from the Materials Pathways of Solid Waste. July.

ANNEX 1

THE LOCATION OF THE STUDIED MEDICAL CENTERS IN MANILA



ANNEX 2 LAWS AND POLICIES ON SOLID WASTE MANAGEMENT

1.0 National

1.1 Standard

PD 1152 promulgated in 1977 consolidated various laws into (he Environmental Code of the Philippines On solid waste management, trie code set the standard that should be included in the program, the methods of solid waste disposal and the incentives regarding tariff duties and taxes for pollution control equipment. However, these incentives were good only for 5 years. Besides PD 1152, several other laws contain the prescribed standards to be followed. There was PD 552 which prescribed sanitation requirements in the operation of establishments and facilities catering to the traveling public. PD 856 (Code of Sanitation of the Philippines) set the sanitation requirements for food establishments and the refuse collection and disposal system in cities and municipalities.

1.2 Enforcement and Implementation

General Order No. 13 stated the responsibility of the residents to keep their surrounding clean. PD 825 mandated **all** residents to undertake the cleaning of their own surroundings, their yards and gardens as well as the canals, road or streets in their immediate premises. It also provided the penalty of imprisonment of not less than 5 days nor more than one year or pay a fine of not less than P100 nor more than P2,000 or both Without prejudice to the imposition of a higher penalty under any other law or decree for the improper disposal of garbage and other forms of uncleanliness and other purposes.

E. O. No. 432 dated October 23, 1990 ordered the strict enforcement of PD 825. This shall be imposed by all law enforcement agencies and officers particularly the barangay level. For this purpose the barangay may designate the barangay tanods as sanitary officers.

PD 984 defined the powers and functions of the National Pollution Control Commission (Pollution Adjudication Board) to determine the location, magnitude, extent, severity, causes, effects, and other pertinent information regarding pollution in general. LOI 558 directed the commissioner, National Pollution Control Commission, heads of Authorities, **City** and Municipal mayors, and heads of government owned and controlled corporation to appoint pollution control officers to enforce the rules and regulations implementing PI) 984. PI) 1160 vested the authority in barangay captains to enforce pollution and environmental control laws.

1.3 Source of Enforcement anil Legislative Power

Section 2238 of the Revised Administrative Code stipulated the general powers of the councils to enact ordinances and make such regulations on the health and safety for the comfort and convenience of the community and the protection of the property therein

RA 7160 or the Local Government Code devolved some of the powers and facilities of the national government to local government units For the Province/city, the national government

devolved enforcement of forestry laws, pollution control law, small scale mining law and other laws to protect the environment.

For the City/municipality, it devolved solid waste disposal system or environmental management system and services or facilities related to general hygiene. For the barangay it devolved services and facilities related to general hygiene and sanitation, beatification and solid waste collection.

2.0 Local

The local ordinances documented in this study came from Quezon City and the newly created City of Makati These local ordinances dealt mostly on regulating or prohibiting certain activities that pollute surroundings and provide penalties for the violations thereof.

QC ordinance No. 9820 S-73 regulates solid waste disposal practices, including the prohibition of open dumping in vacant lots, in esteros and in other water courses. NO. 106 S-89 requires all owners of land, business establishments, residential houses and lessees thereof to undertake the cleanliness of their areas within their premises. No 172 S-90 prohibits urinating, defecating and indiscriminate disposal of waste, trash and any form of garbage in public places, except in any designated allowable areas or places

3.0 Proposed Legislative Measures

3.1 Approach

The proposed bills reflect the realization of our legislators that the current laws on solid waste are not sufficient to address the deteriorating problem of solid waste. Senate S. No. 1378 will provide for a comprehensive solid waste management planning and control program

Senate Bill 906 proposes to protect the Philippine environment against pollution and garbage problem through reduction, re-use and recycling scheme of waste management. This bill is significant because the importance of the three Rs' is being highlighted by this bill and its capability to address the problem of solid waste House bill no. 9824 realizes the need to support the recyclers by priming the development of an industry involved in the processing and/or recycling of liquid and solid wastes and for this purpose, prohibiting the disposal *or* discharge of any unprocessed solid and/or liquid wastes directly into the earth and/or waterways.

3.2 Enforcement

The proposed bills focus on industry as an active participant to address environmental degradation by promoting environmentally friendly materials; like Senate S. No. 1043 requiring the use of recyclable materials for the packing of consumer products to be sold commercially, providing mechanisms therefore. In the same light, congress is also aware of the dangers of certain materials and their adverse effects on the environment like House bill 9825 prohibiting the manufacture, use of styrofoam food containers in all fast food, restaurants, hotels, and other food establishments. House Bill 4942 will regulate the manufacture, distribution and direct usage of non-bio-degradable plastic bags and establish

the production of bio-degradable substitutes, House Bill 3218 will regulate the production, processing, manufacture, sale and use of polyethylene materials.

**ANNEX 3 REGULATING THE MANAGEMENT, COLLECTION
AND DISPOSAL OF HOSPITAL WASTE AND THOSE
OF SIMILAR INSTITUTIONS IN METROPOLITAN
MANILA**

**METROPOLITAN MANILA AUTHORITY OFFICE OF THE CHAIRMAN
METROPOLITAN MANILA COUNCIL**

Ordinance No. 16

Series of 1991

**REGULATING THE MANAGEMENT, COLLECTION AND DISPOSAL OF
HOSPITAL WASTE AND THOSE OF SIMILAR INSTITUTIONS IN
METROPOLITAN MANILA**

WHEREAS, the Metropolitan Manila Authority is mandated by EO 392 Section 1 thereof to deliver basic urban services one of which is sanitation and waste management;

WHEREAS, the hospital waste/ garbage of more than 172 private and government hospitals in Metro Manila when properly managed can prevent the spread of viral and bacterial infections and therefore reduce environmental nuisance and minimize health hazards;

WHEREAS, results of several studies conducted to determine the observance of safety measures/standards in hospital waste disposal showed the majority of hospitals in Metropolitan Manila are getting rid of their infectious, potentially infectious and radioactive solid and liquid wastes without proper disinfection and treatment through Metro Manila's collection system which are open dumps and/or through the hospital's plumbing system into septic tanks to sewerage facilities,

WHEREAS, the number of hospitals with incinerators are almost negligible while some other hospitals burn their uncollected general waste within the hospital compound resulting in air pollution;

WHEREAS, the "sharps" such as needles, syringes, scalpels, saws, blades, broken glass, and nails which are either thrown away with general waste, burned, buried, stored for specimen use or sold for recycling, endanger hospital personnel, garbage collectors and scavengers;

WHEREAS, as a consequence of such unsatisfactory hospital waste disposal system it has become necessary for the Authority to take immediate steps and or initiate measures which will improve the hospital management, collection and disposal of wastes particularly the infectious ones.

NOW, THEREFORE, be ordained by Metro Manila Council as it is hereby ordained, pursuant to Section 2, Executive Order No. 392, that:

SECTION 1. Objectives of the Ordinance

- a. Prevention of nonocomial (Hospital acquired) infection
- b. Environmental protection
- c. Protection of hospital personnel, other individuals going in and out of the hospital facilities, garbage collectors, scavengers and the community at large.
- d. Maintenance of ecological balance of the benefit of the constituents of MMA through the discipline on sanitation and proper disposal of hospital wastes.

SECTION 2. COVERAGE

1. The provisions of this Ordinance, the standard requirements/guidelines enumerated hereunder shall apply to all hospitals in Metropolitan Manila whether owned and operated by city/municipal government and whether or not receiving assistance from the Metropolitan Manila Authority, to wit

- a. Ospital ng Maynila
- b. Quezon City General Hospital
- c. Ospital ng Kalookan
- d. Pasay City General Hospital
- e. Paranaque Community Hospital
- f. Ospital ng Makati
- g. Mandaluyong Medical Center
- h. Pagamutang Bayan ng Malabon
- i. Such other city/municipal hospitals as may be established in Metropolitan Manila

2. All private and government hospitals, research institutions, medical and dental clinics, laboratories and blood banks in Metro Manila handling and disposing infectious and potentially infectious and hazardous wastes;

SECTION 3. Classification of Hospital Waste/ Garbage

1. Dry Waste - domestic type of hospital waste generated from packing materials of drugs, and other related materials which may be classified as noninfectious including housekeeping, building and waste from ward sweepings, hospital compounds sweepings and other debris

2. Wet Waste - domestic type of hospital generated waste from kitchen, canteen, such as leftover foods, and waste from dietary preparation of menu from hospital kitchen/dietary section.

3. Sharps - such as needles, blades, scalpels, nails, saws, glass, slides, etc.

4. Clinical Waste - hospital waste may be generated from medical, nursing , dental, veterinary, laboratory, pharmaceutical or similar practice, investigation, treatment care, teaching or research which by nature of its toxic, infectious or dangerous content may prove a hazard or may give offense unless previously rendered safe or inoffensive. Such waste includes human or animal tissue or excretions, contaminated drugs, medicinal products, swabs and dressings, instruments and disposable gloves, masks, gowns and similar materials and substances.

5 Pathological Waste - type of hospital waste which includes tissues, organs, body parts, human fetuses from surgical operation, biopsy, and autopsy. Also included are animal carcasses, blood and body fluids usually coming from patients services.

6. Chemical Waste — hospital waste usually generated from diagnosis and experimental section, cleaning and disinfecting procedures which is classified as hazardous and non-hazardous in the form of gas, solid and liquid chemicals.

7. Radioactive Waste - hospital waste generated from nuclear medicine section, diagnostic and therapeutic procedures and the paraphernalia used This is in the form of solid, liquid and gas contaminated with radionuclides, exemplified by radio-iodine technetium 99 and Indium in particular; excreta of patients who underwent radioisotopic therapeutic application; needles and syringes, test tubes and tap waste washing of such paraphernalia

SECTION 4. Standard Hospital Waste Garbage Collection System

To ensure the uniformity and safety, the hospital should provide four (4) kinds of trash bags which shall be identified individually:

1. Black Trash Bag - for collection of non-infectious dry waste
2. Green Trash Bag - for collection of non-infectious wet waste.
3. Yellow Trash Bag - for collection of dry and wet:
 1. chemical waste and other potentially infectious waste
 2. pathological waste
 3. chemical waste
 4. sharps contained in punctured-proof container covered with thick solution of lime
4. Orange Trash Bag with Trefoil Sign- for collection of radioactive waste which will be stored in the hospital until rendered as inactive and/or disposed of in accordance with the prescribed rules and regulations of Philippine Nuclear Research Institute (PNRI).

The hospitals are further required to match the color of the plastic bag to the color of the storage receptacle to facilitate efficient collection system.

SECTION 5. STANDARD STORAGE PROCEDURE

All collected hospital waste/ garbage should be tightly closed, segregated according to colors and handled/stored as follows:

1. Yellow trash bags should be placed in an enclosed area which should be secured with lock and key to prevent encroachment of scavengers and stray animals
2. Black and green trash bags may be disposed off through Metro Manila's city and municipal collection and disposal system
3. Orange trash bag with trefoil sign should be placed in an enclosed interim storage of the hospital which should be secured with lock and key to prevent encroachment of scavengers and stray animals until the radioactive waste became inactive or disposed of at Philippine Nuclear Research Institute

A central storage or transfer station shall be provided by the hospital and must conform with the following criteria:

1. It must be located as near as possible to the center of waste production on the collection area which it serves.
2. It must be accessible to municipal/city collection service.
3. It must be located in a place where the transfer operation could be done with the minimum public objection and in accordance with sanitation procedure.
4. Location must meet local requirements such as zoning ordinance
5. When transfer station is not feasible within the hospital compound, an arrangement with municipal collection service must be provided in the transferring/ disposing hospital waste to the disposal site

SECTION 6. Hospital Waste/ Garbage Disposal System

All hospitals shall be required to provide their own colored trash bags for waste collection. They shall also be required to provide their own means of disposal by using any applicable disposal system described below, for public environmental health :

1. HOSPITAL INCINERATOR SYSTEM - This is provided with smoke or exhaust air scrubber with high pressure diesel fuel fired at burning capability of 1000 C temperature heat. This will handle hospital waste in yellow trash bags and may also include waste in black and green bags.

2. HOSPITAL ENCLOSED BURNING PIT - With a smoke stock and located about 50 to 100 meters from the hospital facilities. This is ideal for hospital with open spaces and away from nearby buildings. The wind direction is studied. The location of the pit must be at a place where the wind blows the smoke away from the hospital facilities, the ashes of left-over burnt materials are thrown in the public dumpsite. This will handle hospital waste in yellow trash bags.

3. GROUND PITS - This is a dug up ground hole about 2 meters deep and 1 meter wide located at a safe distance from the hospital facilities This is used to dump contaminated wastes described under Hospital Waste 3,4, and 5. This will be covered by lime and by 10 cm. soil periodically or daily depending on the volume of such wastes. When this pit is filled up to 10 cm. from the ground level, this will then be covered with soil to ground level and labeled as to date to be identified and to be kept close and non-usable for at least 4 months after which this pit can be reuse again. The hospital availing of this method should at least have 3 to 4 such pits for rotational schedule. The lime powder are made of thick solution before actual application.

4. SEWAGE DISPOSAL SYSTEM - For urine and fecal materials in cases of typhoid, infectious diarrhea, poliomyelitis and infectious hepatitis, the technique for handling is dependent upon available sewage disposal facilities. In hospitals when there is no treated sewerage system or properly functioning septic tank, feces should be broken up and emptied into a covered can containing a five (5%)percent solution of phenol or creosol type

disinfectant (add one and a half ounces of phenol or creosol type disinfectant to one quart of water) The mixture should stand for one hour before being emptied into hopper or toilet If the hospital waste enter a treated sewerage system or with properly functioning septic tank, bed pans may be emptied into hoppers or toilets preliminary treatment. Incinerators which is occasionally employed is an absolute safeguard.

However, in consideration of the economic implication of providing individually by each hospital their own disposal system, groups of hospitals may jointly establish a disposal system that can service adequately the need for disposal facilities. Networking of available facility is likewise encouraged.

SECTION 7. Funding Service

All hospitals or entities shall be required to earmark specific amount necessary for the implementation of this ordinance.

SECTION 8. Special Garbage Fee For Infectious and Hazardous Waste and Its Payment

All hospitals shall continue to be charged with the usual garbage fees related to general waste depending on their bed capacities or volume of garbage produced, whichever case applies, based on existing taxation regulation pursuant to Section 63 of Ordinance No. 82-03 as amended by Ordinance No.83-02 of the Revenue Code of Metropolitan Manila. However the fees for infectious and hazardous wastes are as follow:

A minimum monthly fee of Three Hundred Pesos (300.00) shall be charged from each hospital plus additional fee of Fifty Pesos (50.00) per cubic meter of garbage generated in excess of 5 cubic meters.

An order payment shall be secured from the health operations Center of the Metropolitan Manila Authority before payment is made either at MMA Main Office at Makati or the city/municipal Treasurer of the locality.

The quarterly payment shall be paid by the hospitals, clinics, and laboratories within the first 10 days of the months of April, July, October, and January Failure to pay herein fee within the prescribed period, the payer shall be subject to a surcharge of twenty five percent (25%) of the amount due for each month of delinquency or fraction thereof after the due date until the amount is fully paid.

Disposition of proceeds - All revenues collected shall accrue to the fund of the Metropolitan Manila Authority to be used for maintenance, collection and disposal and other improvement thereof.

SECTION 9. Penalties

Violations of any provisions, rules, and guidelines embodied in this ordinance shall be punished by a fine not less than P100.00 fine nor more than P2,000 or imprisonment of not less than 5 days nor more than one year or both such fine and imprisonment at the discretion of the court

If the violator is a corporation, firm or other corporate entities, the maximum penalty shall imposed upon the President, Director, Manager or person responsible for its operation.

SECTION 10. Collection of Fines and Penalties

The fines imposed for violation of the Ordinance shall be paid to the city or municipal treasurer concerned in the Metro Manila area, and shall accrue as special fund of the Metro Manila Authority to be expanded in the implementation of this ordinance.

SECTION 11. Implementing Agencies

The Health Operations Center of the Metropolitan Manila Authority with the assistance of local government units concerned shall ensure that provisions of this ordinance are faithfully and strictly implemented and enforced throughout Metro Manila Area.

SECTION 12. Transitory Provision

All concerned institutions shall be strictly required to provide their own particular or joint waste disposal system. Meanwhile during the process of establishing the said system, if they have no other means of managing their infectious and hazardous waste the concerned institutions may opt to enter a contract with MMA, but not to exceed a period of 6 months, otherwise, the penalty clause of this ordinance shall be enforced.

SECTION 13. Separability

Clause If any provision of this ordinance or the application thereof is to any person or circumstance declared unconstitutional or invalid for any reason, the same shall effect the validity of other provisions.

SECTION 14. Effectivity

This Ordinance shall take effect ten (10) days after its publication in any newspaper of general circulation in Metro Manila.

APPENDIX 4

CAPITOL MEDICAL CENTER

Quezon City, Philippines

POLICIES ON WASTE MANAGEMENT

Pursuant to Metro Manila Council Ordinance No. 16, Capitol Medical Center formulates policies on proper waste disposal with the following objectives:

- a. Prevention of nonsocomial (hospital acquired) infection
- b. Environmental Sanitation and beautification
- c. Protection of hospital personnel, other individuals going in and out of the hospital, garbage collectors, scavengers and the whole community
- d. Promote ecological waste management

Policies shall be disseminated to all doctors, hospital personnel, patient, relatives and guest for proper implementation through seminars, memos, posters, etc.

A PATIENT ROOM

- I. Three waste cans lined with plastic bags shall be placed in the room.
 - a. waste can lined with black plastics are for non-biodegradable and non-infectious waste such as:
 1. cans, bottles, tetrabrick container
 2. styropor, straw, plastic
 3. boxes, wrappers, newspapers, etc.
 - b. waste can lined with green plastics are for biodegradable waste (can be used as feeds or for composting purposes) such as :
 1. fruits/vegetables peelings
 2. left-over food
 3. flowers, leaves, twigs
 - c. waste can lined with yellow plastic are for infectious waste such as :
 1. disposable materials used for collection of blood and body fluids like diapers, sanitary pads, incontinent pad
 2. materials (like tissue paper) with blood, secretions and other exudates

B ER-OPD, OR-RR, DR-NURSERY, ICU-CCU, FLOOR NURSES STATION, X-RAY, CT SCAN,

Three waste cans lined with plastic bags and sharp container shall be placed in each station.

- a. Waste can lined with black plastic are for non-infectious waste such as:
 1. cans, bottles/tetrabrick containers
 2. _styropor containers, straw
 3. boxes, proper plastics
- b. Waste can lined with green plastics are for biodegradable wastes (can be used as feeds or for composting purposes) such as:
 1. fruits/vegetables peelings
 2. left-over food
- c. Waste cans lined with yellow plastic are for infectious waste such as:
 1. dressings, bandages, used cotton balls, gauze
 2. materials (like tissue paper) with blood secretions and other exudates
 3. disposable materials used for collection of blood and body fluids (including diapers, sanitary pads, incontinent pads)
 4. IV tubings, used syringes
 5. foley catheter
 6. suction catheter/ tubings
 7. gloves, drains
- d. Sharp containers - for needles, scalpel, broken ampules, test tube,
 - a. blades, glass slides.

C DEPARTMENT OF PATHOLOGY

- a. Dry non-infectious waste

1. Paper, plastic and other non-infectious ordinary wastes are placed in separate black plastic bags. The bags are collected daily by the housekeeping personnel for disposal.
- b. Blood, Serum and Plasma
1. All excess blood, serum and plasma specimens from different sections of the laboratory are collected in a glass container or flask of sterilized by autoclaving (pressure cooker) for 30 minutes at 121°C (250°F).
 2. Used and expired blood bags from the Blood Bank are packed together and disposed by incineration.
 3. Pipettes, test tubes and other glasswares used in testing infectious specimen (hepatitis, AIDS, typhoid fever, etc.) are soaked in 0.5 % sodium hypochlorite solution (100 ml of 5% household bleach to a 1 liter of water) for at least 30 minutes before disposal or with detergent.
An alternative method is to autoclave as in no 1.
- c. Urine and Feces
1. After the testing is finished, fecal material in plastic and carton containers are placed inside plastic bags and disposed by incineration.
 2. Slides cover slips, test tubes and bottles containing fecal material are soaked in 5% phenol solution (1 1/2 OZ. of phenol to 1 quart water or 5g phenol dilute to 100 ml then emptied into sewage system.
 3. Urine and other body fluids are disposed directly into the sewage system. If infectious, disinfectant like 10% formalin or 0.5% hypochlorite solution is first added before disposal.
- d. Bacteriology
1. Culture media and other infected materials are sterilized by autoclaving before disposal or washing
- e. Syringes, Needles and Sharps
1. Disposable syringes are collected in bags and brought down for incineration
 2. Needles and blades are collected immediately after use in cans or puncture free containers. These are incinerated.
- f. Pathological Waste
1. Tissues, organs, fetuses and body parts are disinfected and/or preserved in covered plastic or bottle containers with 10% formalin. They are disposed by incineration

D. NUCLEAR MEDICINE SECTION

- a. IODINE 125
1. Solid waste (test tube, beads, tissue paper, kit)
 - seal the RIA waste, record and indicate the date of sealing
 - store and decay for 2-3 months.
 - dispose by incineration when standard dose rate is equal to background
 2. Liquid waste
 - discard in the hot sink with continuous flow of water about 1 hour

b. IODINE 131

1. Solid waste (syringes)
 - place all used syringes in a plastic bag inside the hot trash
 - record and indicate the date of sealing
 - store and decay for 2-3 months
 - dispose by incineration when standard dose rate is equal to background ct.
2. Liquid waste (standard used in RAIU)
 - place all used standard in a shielded container at hot lab
 - seal and record date of sealing
 - store and decay for 2-3 months when standard dose rate is equal to background ct. dispose by incineration

c. TECHNETIUM - 99m

1. Solid waste (syringes)
 - place all used syringes in a plastic bag inside the hot trash
 - record and indicate the date of sealing
 - store and decay for 3 weeks to 1 month
 - dispose by incineration when standard dose rate is equal to background ct.
2. Liquid waste (vials for elution)
 - place vials in a shielded container at hot lab
 - place all used vials in a plastic bag inside the hot trash
 - record and indicate date of sealing
 - used and decay for 3 weeks to 1 month
 - dispose by incineration when standard dose rate is equal to background ct.
3. Used technetium-99m generators (expired)
 - place all used technetium-99m generators in a room solely for its storage and place a label of radioactive outside the door.

C. DIETARY AND CANTEEN SECTION, ADMINISTRATIVE OFFICES, DOCTORS OFFICES AND OTHER OFFICES NOT MENTIONED IN A, B, C, AND D

- I. Two waste cans lined with plastic bags shall be placed in each offices.
 - a. Waste can lined with black plastic are for non-biodegradable such as:
 1. cans, bottles/tetrabrick containers
 2. styropor containers, straw
 3. boxes, folders, etc.
 4. bond paper, fax thermal paper, receipts, news print
 5. typewriter ribbons

- b. Waste can lined with green plastics are for biodegradable wastes (can be used as feeds or for composting purposes) such as:
 - 1. fruits/vegetables peelings
 - 2. left-over food
 - 3. flowers, leaves, twigs

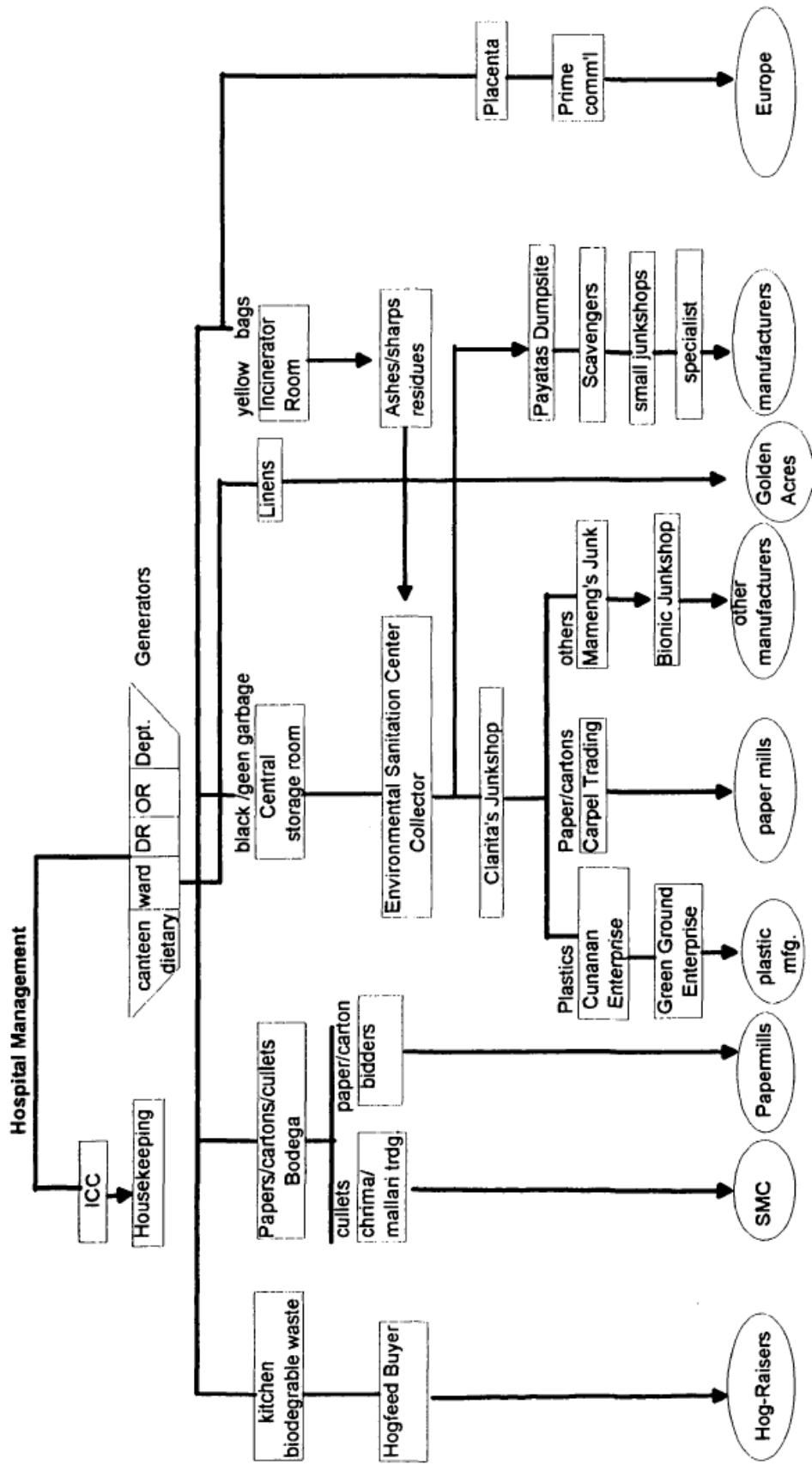
- II. Garbage shall be collected every shift by the janitors properly protected with mask and gloves

- III. Infectious waste including sharps, syringe and needles shall be brought down to the incinerator room for incineration

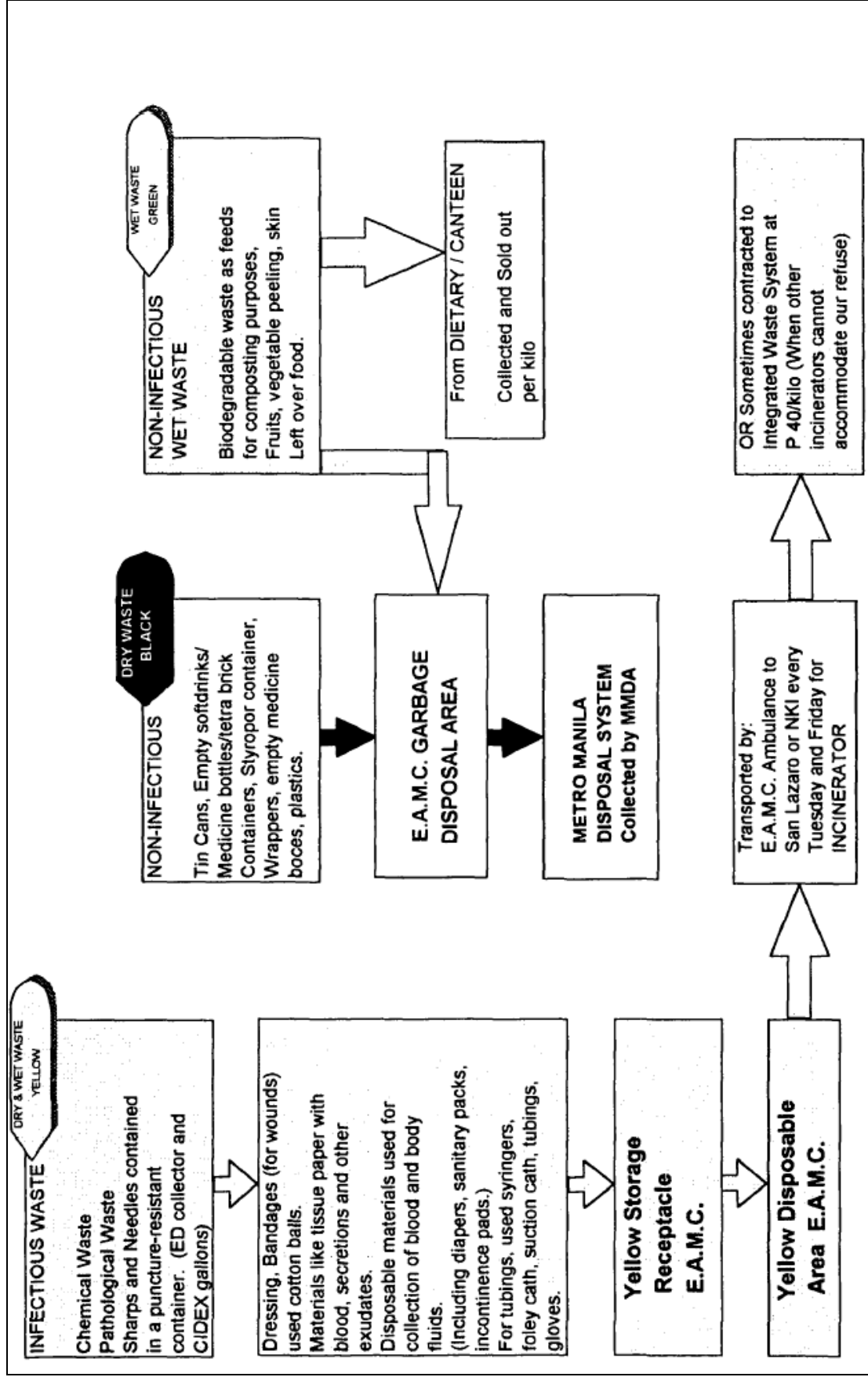
- IV. Non infectious waste shall be brought down to the central storage or transfer station for proper sorting /segregation
 - Biodegradable - to be sold as feeds or to be brought to the composting sight
 - Non-biodegradable - proper sorting shall be done by the janitors for recycling purposes

- V. Schedule of garbage collection shall be coordinated with Environmental Sanitation Center Metropolitan Manila Authority

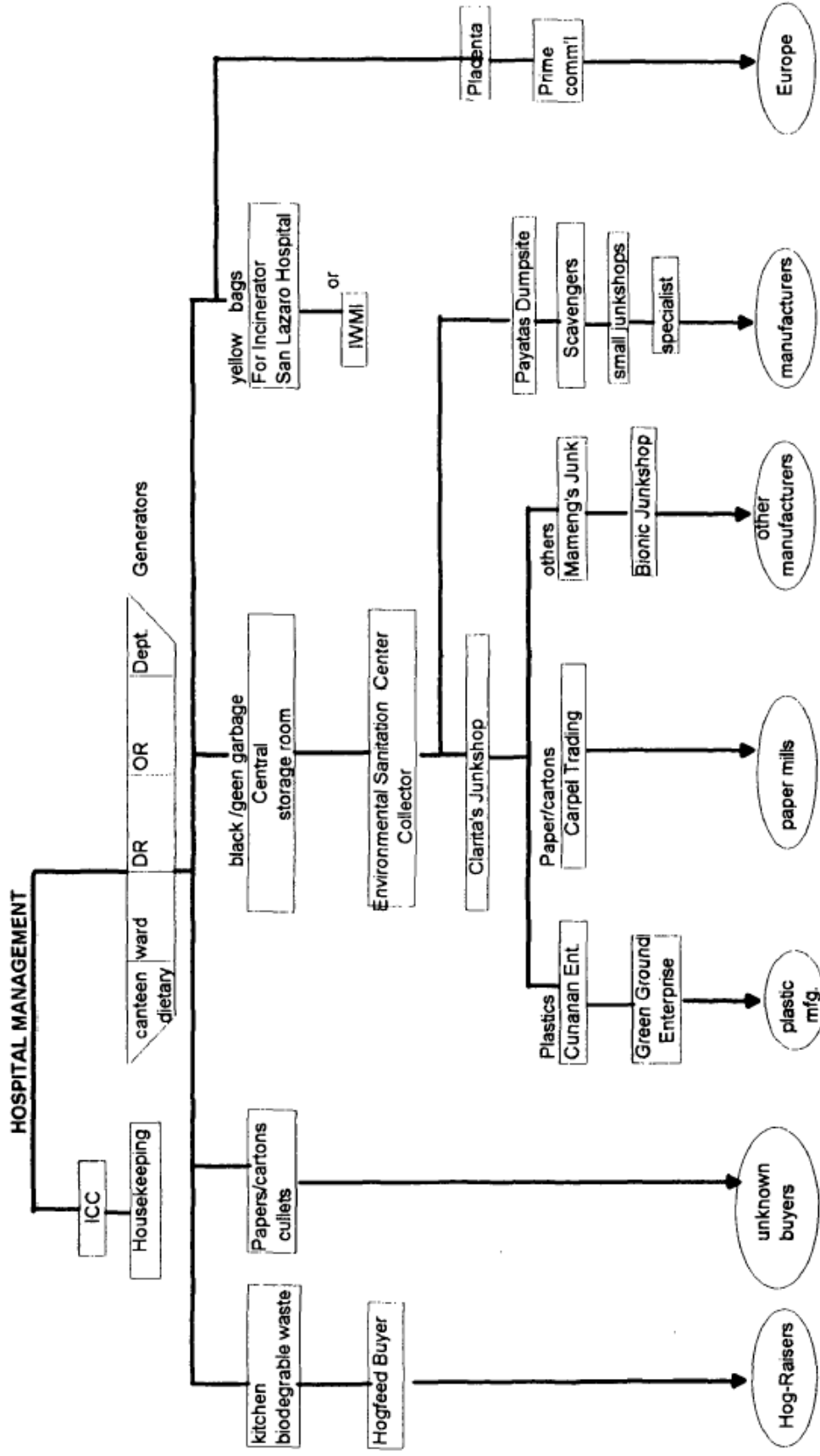
ANNEX 4 CAPITOL MEDICAL CENTER WASTE MATERIALS FLOW

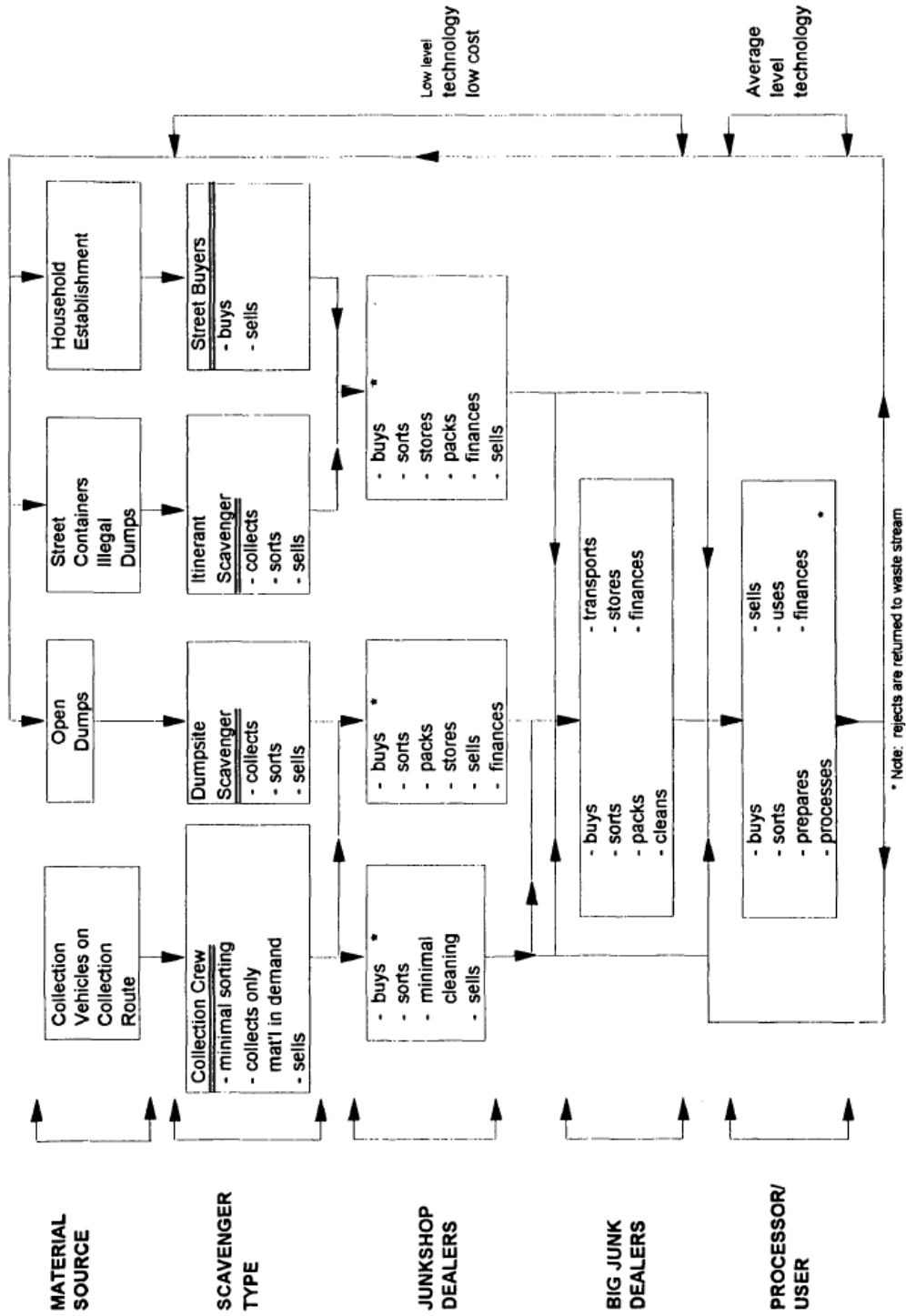


ANNEX 5 EAST AVENUE MEDICAL CENTER



ANNEX 6 EAST AVENUE MEDICAL CENTER WASTE MATERIALS FLOW





ANNEX 8

COMPARISON OF THE HOSPITAL WASTE MANAGEMENT SYSTEM

	CAPITOL MEDICAL CENTER		EAST AVENUE MEDICAL CENTER	
STAGE	OFFICIAL	ACTUAL	OFFICIAL	ACTUAL
Segregation	Uses black, green and yellow bags for the three types of waste in every patient room and other areas	Same as official practice	Uses black, green and yellow bags for the three types of waste in every patient room and other areas	Only black and green bags are used in the patients' rooms yellow bags are supplied in treatment areas
In-house collection	Collection is on every workshift bags are placed into bigger plastic bags with the same color	Collection is on every workshift by two janitors assigned to each floor bags are placed into bigger plastic bags with the same color, sharps are collected in the nurses' stations, infectious waste are delivered to the incinerator area by the laboratory aide	Collection is on every workshift bags are placed into bigger plastic bags with the same color places improper waste to the proper bags	Collection is on every workshift One janitor is assigned to each floor precluding proper collection and segregation
Storage	Infectious waste including sharps are brought down to the incinerator Non-infectious waste are brought to the central storage area for further segregation; biodegradable are sold as feeds or composted; non-biodegradable are further sorted and sold	Infectious waste including sharps are brought down to the incinerator by the laboratory aide or the janitor Initial sorting is done in the electrical room on each floor before being brought down to the central storage room for further segregation as biodegradable or non-biodegradable	There is a storage area for the black and green plastic bags and one for the yellow plastic bags	Do not use either of the two storage rooms; the black and green plastic bags are placed in front of the storage area while the yellow bags are placed under a tree

	CAPITOL MEDICAL CENTER		EAST AVENUE MEDICAL CENTER	
STAGE	OFFICIAL	ACTUAL	OFFICIAL	ACTUAL
Outside collection/disposal	Biodegradable are sold as hog collection/ feeds; non-biodegradable are sold disposal to different entities; residuals are collected by ESC of Quezon City and disposed at Payatas Dumpsite Sharps and infectious waste are incinerated in the hospital	Same as official practice Placentas are being buried at the hospital compound	Black bags are collected by ESC of Quezon City; green bags are collected and sold as hog feeds; yellow bags are transported by ambulance to San Lazaro hospital or National Kidney Institute or contracted out to IWWS	Same as official practice
Reuse & Recycling	Reuse and recycling is an official hospital policy; proceeds are used to partially finance SWM of the hospital; tools are provided by the hospital to support these activities	Official policy on reuse and recycling evolved from the actual practices of the hospital	Only biodegradable waste are officially sanctioned to be recycled	In addition to biodegradable waste informal retrieval of recyclable are being practiced secretly by some employees
Enforcement	Housekeeping section is responsible for enforcement while ICC monitors the performance Sanctions for non-enforcement are official policies	Housekeeping section is responsible for enforcement while ICC monitors the performance through the ICC nurse	Housekeeping section together with the executive director of the nursing service enforce hospital policy	Housekeeping section implements policy through the janitors