

# Performance Audit Report of the Director of Audit on Biomedical Waste Management at Public Health Institutions

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#### **EXECUTIVE SUMMARY**

The purpose of this audit is to inform Parliament on biomedical waste management practices within selected public health institutions in Saint Lucia. The Ministry of Health, Wellness, Human Services and Gender Relations (MoH), is responsible for the administration of public health institutions; whilst the Saint Lucia Solid Waste Management Authority (the Authority), is responsible for administration of waste management programme. The *Waste Management Act* is the authority for managing waste.

The latest information from the Saint Lucia Solid Waste Management Authority indicates that during 2009/2010, 41.1 tons of biomedical waste was collected at 56 locations islandwide. Of this total 32 tons or 82% of the waste originated from public healthcare institutions. Victoria Hospital, the largest health care institution on the island, accounted for the majority of the waste which was 28 tons.

Our audit focused on three areas of biomedical waste management namely (1) classification and storage; (2) transportation, treatment and disposal; and (3) occupational health and safety. There were eight (8) audit criteria associated with our audit objectives. Management agreed to the suitability of our audit criteria as reasonable standards for management of biomedical waste. Our audit covered waste management operations from April 2012 to August 2012.

We examined four health facilities which together represent the majority of public health institutions that generate bio-medical waste in Saint Lucia.

We found that there are some strong features in the waste management process particularly in the areas of transportation, treatment and disposal.

Classification/segregation of biomedical waste practices at most health institutions was satisfactory and was consistent with local laws and World Health organization (WHO) guidelines. However, the two major health facilities need to properly segregate cytotoxic waste (highly hazardous waste generated from cancer chemotherapy treatment) from other biomedical waste up to time of disposal.

Storage of biomedical waste at most institutions was unsatisfactory. At one of the leading health facilities, storage practice posed risk to human health and the environment in that the storage area was not properly secured and free from unauthorized access.

Transportation of biomedical waste within the compounds of health facilities was not always in accordance with best practices. At two facilities biomedical waste was carried by hand instead of using the recommended wheeled vehicles.

However, transportation from health facilities to the sanitary landfill was in accordance with best practices. Treatment and disposal of bio-medical waste were also in accordance with best practices except for cytotoxic waste which was not safely disposed.

We found training for persons who handle biomedical waste to be inadequate and exclusive of a training plan. We saw little documentary evidence of supervision and monitoring of waste management practices at health institutions.

We concluded that although there are proper procedures for managing biomedical waste in public health institutions, there are still some practices that pose risk to human health and the environment.

The Waste Management Regulations continue to be in draft even after a number of years. There is also an apparent disparity between the draft regulations and the Waste Management Act with regards to the period of storage of biomedical waste.

We have highlighted some areas which we believe require management's attention.

Our report contains 10 recommendations for improvement.

#### INTRODUCTION

Biomedical waste also known as infectious waste or hazardous waste is defined as waste generated in the health-care sector as a result of diagnosis, testing, treatment, research or production of biological products and immunization of humans or animals. As such, biomedical waste can be hazardous, toxic and even lethal because of its high propensity for the transmission of diseases.

Improper waste management is one of the causes for the increase in infectious diseases. Blood, body fluids and body secretions that are constituents of biomedical waste harbour most of the viruses, bacteria and parasites that cause infection. Human health and the environment are at risk if growing health care waste associated with a growing population is not properly managed.

Properly managing medical waste is therefore important to all medical institutions and to St. Lucians. The Ministry of Health is responsible for the health and safety of people and the protection of the environment as it relates to the handling of medical waste.

The Government of St. Lucia through the Ministry of Health and the Saint Lucia Solid Waste Management Authority has the responsibility to effectively manage biomedical waste in order to protect lives and the environment.

The Ministry of Health manages all public health care facilities in Saint Lucia. There are four (4) public hospitals and one (1) recently opened Wellness Centre previously known as Golden Hope Hospital. The main hospitals are supported by thirty-one (31) health centres and one (1) polyclinic; the Gros Islet Polyclinic which is located in the north of the island.

The Waste Management Act 2004 and subsequent amendment govern the handling of biomedical waste. The Waste Management Act No. 8 of 2004 established the Saint Lucia Solid Waste Management Authority. The Authority is therefore a statutory corporation which falls under the purview of the Ministry of Sustainable Development, Energy, Science and Technology, and is administered by a separate Board. The Permanent Secretary of that Ministry is the chairperson of the Board.

Under the provisions of the Act, the Authority is mandated to provide coordinated and integrated systems for the collection, treatment, recycling and disposal of solid waste, including hazardous waste; and to establish and manage sanitary landfills throughout Saint Lucia as appropriate.

The key stakeholders namely the Ministry of Health, the Ministry of Sustainable Development and the Saint Lucia Solid Waste management Authority are also mandated to implement control measures over the handling of biomedical waste at both the operational and strategic level.

There is also a Memorandum of Understanding (MOU) between the Ministry of Health and the Authority. The memorandum clarifies the roles of each player in the biomedical waste management process.

#### **BACKGROUND**

The Ministry of Health and the Solid Waste Management Authority are jointly responsible for ensuring that biomedical waste is properly managed with due regard to the environment and public health.

The legislation specifically requires the Solid Waste Management Authority to formulate a National Waste Management Strategy; the promotion of proper handling, storage, transportation, treatment and disposal of biomedical waste; worker health and safety; and safety of the environment.

A Plan entitled "Medical Waste and Other Bio-Hazardous Waste Management" was prepared for the Saint Lucia Solid Waste Management Authority In 2001. The plan outlines the minimum requirements for the safe handling, transportation, treatment and disposal of bio-hazardous waste.

In 2008 Draft Regulations specific to biomedical waste were formulated; however as at September 2012 these regulations remain in draft. In the interim, the Authority issued health institutions a document entitled "Standards for Biomedical Waste" for guidance on the proper handling of bio-medical waste. These guidelines were found to be consistent with the requirements of the draft legislations and those of the World Health Organization.

In 2007 a report entitled 'Biomedical Waste Management in the Organization of Eastern Caribbean States (OECS)' prepared for the Pan American Health and Education Foundation, indicates that Saint Lucia fared better in managing biomedical waste than the other countries of the OECS.<sup>1</sup>

#### **AUDIT OBJECTIVES AND CRITERIA**

The objective of the audit was to determine whether biomedical waste management practices at selected health facilities posed any risk to the environment and human health. The audit focussed on three aspects of waste management namely classification storage and transportation, treatment and disposal, and occupational health and safety at four (4) public health-care institutions.

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<sup>&</sup>lt;sup>1</sup> This report is based on information that we consider reliable, but we do not represent that it is accurate or complete or free from technical inaccuracies, and it should not be relied on as such. We accept no responsibility to a third party who uses this information.

There were eight (8) audit criteria associated with our audit objectives. These criteria were used to assess management's performance in each of the three areas. Management agreed to the suitability of our audit criteria as reasonable standards for performance.

Our audit criteria are listed at Appendix B.

#### **AUDIT SCOPE AND APPROACH**

The audit covered the period April 2012 to August 2012. The audit focused solely on public health institutions. We did not examine private health institutions. The public facilities audited are listed in the table below:

	Health Institution
1	Victoria Hospital
2	St. Jude Hospital
3	Soufriere Hospital
4	Gros-Islet Poly Clinic

To achieve the audit objectives, we conducted interviews with management and staff of the Ministry of Health, health facilities, the Authority and the Deglos Sanitary Landfill; we reviewed records, policies, procedures, regulations and guidelines governing bio-medical waste management; we documented the systems in place and conducted physical inspections.

We compared current practices with best practices as recommended in the Waste Management Act and WHO Guidelines (Appendix A). We also conducted site visits to the Deglos Sanitary Landfill.

The audit was substantially completed in September 2012.

#### **AUDIT FINDINGS AND RECOMMENDATIONS**

The audit determined that satisfactory procedures were in place at health facilities and the Authority for classification, transportation, treatment and disposal of biomedical waste. However, we present the following findings for the three areas that were examined, which we believe warrants management attention. We have also included recommendations for improvement where deficiencies were identified.

#### **CLASSIFICATION/SEGREGATION AND STORAGE**

#### Classification

To effectively manage biomedical waste, health facilities and other generators are required to segregate specific types of waste from other types. Biomedical waste which is potentially infectious should be segregated from regular waste as close as possible to the point of generation. This segregation should also be maintained up to the point of treatment. Classifying and segregating hazardous from nonhazardous waste greatly reduces the risks of infection to persons who handle such waste.

# Satisfactory procedures were in place for classifying and segregating biomedical waste

We found that health facilities have institutionalized procedures to classify and segregate biomedical waste that are in accordance with national laws and best practices (international guidelines).

Although we found that classification of all waste was satisfactory, our audit revealed that health institutions placed stronger emphasis on sharps than other types of biomedical waste.

#### Cytotoxic waste although segregated was not stored separately from other biomedical waste

Cytotoxic waste consists of leftover or unused cytotoxic drugs; and waste material including tubing, tissues, needles, gloves and other materials which have come intact with a cytotoxic drug. Cytotoxic drugs works by causing the death of certain types of cells and are used to treat conditions such as cancer, rheumatoid arthritis, multiple sclerosis and some ophthalmic conditions.

Cytotoxic drugs are known to be high toxic to non-target cells, mainly through their action on cell reproduction. Some have been known to cause second cancers in cancer patients. Some have also been shown to be mutagenic (causing changes to DNA) or teratogenic (causing birth defects). Consequently, medical opinions suggest that even low levels exposure to cytotoxic drugs should be avoided.

Best practices require cytotoxic waste to be collected in strong, leak-proof containers clearly labelled "cytotoxic waste" and stored separately from other health-care waste in a designated secure location.

We found that the Victoria and St. Jude hospitals generated cytotoxic waste. Both hospitals segregate, label, and store the waste separately. However, we found that at the Victoria Hospital the cytotoxic waste is placed in a container with other biomedical waste.

This practice increases the risk of exposure during transportation and the risk that the cytotoxic waste will not be properly treated and disposed.

#### Sharp containers were filled above recommended levels

Sharps pose potential disease transmission hazard because of their ability to create a portal of entry through the skin. In particular, needle sticks injuries are known to cause the spread of infectious disease and is a serious occupational hazard.

To minimize the risk of needle sticks during removal, sharp containers should not be overfilled. Best practices recommends that sharp containers should not be more than three quarters filled.

At the St. Jude Hospital, we observed sharps collection containers filled above the recommended three-quarters level. This can result in an increased risk of needle sticks that can negatively affect the safety and health of waste handlers.



Full Sharp Container at St. Jude Hospital 17.08.12

## Storage

Proper storage is also critical for the effective management of biomedical waste. Biomedical waste should be stored in a secure location under lock and key, free from unauthorised access and with adequate ventilation reducing odour and vermin. Disposal of biomedical waste must be done in a manner that safeguards human health and the environment.

Biomedical waste at the larger health institution is collected on a weekly basis whereas, at smaller health facilities collection it is done monthly.

We found that most health facilities have designated areas for storing biomedical waste. However, some storages practices pose risks to the public and the environment.

# Improper storage practices posed risks to waste handlers, the public, and the environment

We found that the designated storage areas varied considerably between health facilities. At the Soufriere hospital, the designated storage area is not used. Instead, waste is stored and collected from the generation points.

At the Gros Islet Polyclinic, we observed that biomedical waste was stored in the laundry room. This practice increases the risk of exposure to persons who frequent the room for laundry and other maintenance activities. Staff complained of the unpleasant odour resulting from the weekly storage of this waste.



Waste Stored in Laundry Room, Gros-Islet Poly Clinic 27.08.12

At the Victoria Hospital we found the storage area was in an open space near the mortuary easily accessible to non-authorized persons and the public. We observed that the public placed regular waste such as soft-drink containers into these biomedical waste receptacles. At the same facility, we also observed that sharps containers were also easily accessible and could be targeted by drug addicts.



Open Storage at Victoria Hospital 14.08.12



Sharp Containers Stored in an Open Wall Cavity –Victoria Hospital 14.08.12

Overall, we found that biomedical waste was not safely and securely stored at three of the four facilities we visited. We found that storage facilities for bio-medical waste at the St. Jude's Hospital were satisfactory.

## Draft Regulations were non-compliant with the Act

The Waste Management Act stipulates that biomedical waste be stored for no more than four days of being generated. We found that the draft Regulations to the Act state that biomedical waste should not be stored for more than 30 days. The result is that the draft regulations are non-compliant with the Act and the increased storage time increases the risk of exposure.

#### Recommendations:

Health facilities should clearly label cytotoxic waste and keep it separate from other biomedical waste.

Health facilities should monitor and replace sharp containers when they are  $\frac{3}{2}$  filled.

Bio-medical waste should be properly stored in a secured location with restricted access.

Management should seek to resolve the apparent disparity for the storage period for biomedical waste that exists between the Waste Management Act and the Regulation.

#### TRANSPORTATION, TREATMENT AND DISPOSAL

### Off-site transportation was satisfactory

We found that off-site transportation and treatment of bio-medical waste were in accordance with best practices. The practice did not pose any risk to human health or the environment.

#### On-site transportation was not best practice

We found that health facilities had no guidelines for transporting biomedical waste within their compounds. Consequently, practices varied from institution to institution. We found that their practices were inconsistent and not in accordance with World Health Organization standards. These standards require that wheeled equipment be used to transport bio-medical waste within facilities. We found that wheeled equipment was not used at the Gros Islet Polyclinic or the Soufriere Hospital. It was used occasionally at the Victoria and St. Jude hospitals.

The normal practice is to transport waste by hand at all facilities. We also observed that workers were not wearing heavy-duty gloves and thick-sole shoes as recommended.

This situation poses a risk of contact exposure to handlers of medical waste who may not be aware of the danger involved in hand transportation.

#### Disposal

#### Cytotoxic waste was not properly disposed

The high toxicity of cytotoxic drugs makes it very dangerous to persons who handle or come into contact with them due to improper disposal.

Consequently, proper disposal is absolutely necessary due to the high risk to humans. In addition, any discharge into the environment could also have disastrous ecological consequences. Therefore, best practice recommends that cytotoxic waste be disposed by inertization or encapsulation (small amounts)

We noted that cytotoxic waste from the Victoria and St. Jude hospitals was not separated from other bio-medical waste, treated and disposed of as required. The best practice of using inertization or encapsulation methods for disposal were not being followed. As a result, there is a risk to the environment and public health as contamination level could rise over time.

#### Recommendations:

Health facilities should use wheeled equipment to transport biomedical within their compound. This would assist in minimizing occupational contact with biomedical waste.

Cytotoxic waste should be disposed by inertization or encapsulation

#### **OCCUPATIONAL HEALTH AND SAFETY**

Under the provision of the Occupational Health and Safety Act, an employer is required to ensure, so far as is reasonably practicable, that risk of accidents or injury to health do not arise as a result of handling dangerous substances. In addition, the employer is required to provide information, training and supervision necessary to ensure the protection of his/her employees against risk of accident and injury to health arising from employment.

In health facilities the workers at risk include health-care providers, hospital cleaners, maintenance workers, operators of waste treatment equipment, and all operators involved in waste handling and disposal within and outside health-care establishments. Biomedical waste training is necessary for these employees who work in a setting in which there is possible contact with sharps, blood, body fluids and other hazardous substances. Training is extremely important because protection of public health from infectious diseases that may spread if wastes are improperly handled is a priority and a responsibility. Through training programmes, employees learn how to protect themselves, identify, manage, disinfect and dispose of various biomedical wastes.

Training in health and safety should ensure that workers know of and understand the potential risks associated with health-care waste, the value of immunization against viral hepatitis B, and the importance of consistent use of personal protection equipment.

#### Inadequate training arrangements

The World health Organization (WHO) guidelines detail the components of a training program for workers who handle biomedical waste as follows:

- specific plans or activities for each category of workers
- identify persons who are responsible for implementing the training program
- maintain records of training sessions
- periodic reviews and updates
- testing
- follow up with refresher course

According to the terms of the memorandum of understanding between the Ministry of Health and the Authority, the Authority is expected to develop a biomedical waste training institute, which will assist all medical institutions at their request, in training staff who are engaged in the generation and handling of medical waste.

In addition, the Biomedical Waste Regulations require personnel who handle biomedical waste to complete annually refresher training and the training should detail compliance with the biomedical waste facility's Biomedical Management Plan.

We found no evidence of an established training policy for health-care and biomedical waste handlers. Neither the Ministry of Health nor the Authority provided us with a training policy document or were able to provide us with details of training provided to healthcare workers within the last three years. However, the Authority provided us with a sample of a training module which was in accordance with best practices.

Most of the healthcare workers we interviewed indicated that they had not received any form of training in handling bio-medical waste since assuming their responsibility. Others indicated that they had not received training from the Authority in recent times. Of concern to us is that, some workers informed that they learned mainly by on-the-job observations. In addition, we were informed that some of them did not always wear the protective clothing provided when handling bio-medical waste.

At the Victoria and St. Jude's Hospitals the Infection Control Officer was given the responsibility for providing training; however, we noted that this responsibility was not included in the job descriptions for the position. We found no evidence at any facility to indicate that there were established training programmes for workers who handled biomedical waste.

## No evidence of supervision and monitoring of biomedical waste management practices

Under the provisions of the Act, the Authority is required to monitor the management of biomedical waste at health facilities. Administrators of health institutions also have a responsibility to supervise and monitor waste practices at their facility as per the memorandum of understanding between the two parties.

This is important for monitoring to form part of the accountability process as it allows management to identify and rectify problems on a timely basis thus reducing the risk of improper practices continuing and accidents occurring. To promote a safe working environment it is of paramount importance that workers are given the supervision necessary to ensure their protection against risk of accident and injury to health arising from employment.

Without proper monitoring, there is a risk that issues of non-compliance with policy, procedures, and guidelines will go undetected and not addressed by the Ministry. Such conditions can result in an environment where unsatisfactory practices may continue, as they are not documented and may not be corrected. In addition, management runs the risk of not having the necessary information to make informed decisions.

We saw little evidence of monitoring that would allow management to identify areas of non-compliance and risk. Records on biomedical waste management were minimal. There were no reports on inspections done by the facilities.

The Infectious Control Officer and the Executive House-keeper at Victoria and St. Jude hospitals had responsibility for monitoring and supervision of biomedical waste practices however like the training, their job descriptions did not reflect such duties.

The memorandum of understanding indicated that, the Authority was to 'meet with personnel of health care establishments with responsibility for infection control to periodically assess the service and the system for waste management at the establishment'.

We saw no evidence that officials of the Authority met with personnel of health care establishments, to assess the service and system for waste management at their establishment.

During our interviews with management of the Authority, we were informed that annual audits of generators of biomedical waste were done. The reports were submitted to the generators and to the Ministry from time to time. According to the Authority, in some instances, no action was taken by the generators to rectify weaknesses or problems identified during the audit as compliance is voluntary. We requested some of those reports, but only two were provided.

#### Recommendations:

- Employee training modules should be implemented at health facilities with emphasis on occupational health and safety for ensuring that:
  - Workers become aware of the potential risk associated with handling biomedical waste;
  - Workers are informed of the proper use of protective clothing and equipment;
  - Training modules highlight the need to apply safety standards for each stage of the waste cycle.
- Training should be given to all levels and categories of staff. Training records should include information about the training process on the following:
  - Time of training
  - Frequency
  - Target group
  - Training topics/content
  - Facilitators
- A monitoring framework should be instituted to provide oversight and review of bio-medical waste operation; and also to assess whether the requirements of the memorandum of understanding are being met.
- Persons with responsibilities to train; supervise and monitor persons in biomedical waste management practices at health facilities should have these duties included in their job descriptions.

#### **AUDIT CONCLUSIONS**

#### Classification and storage

We concluded that while there were some areas of good practices, classification and storage of biomedical waste were not always in accordance with best practices.

The current practices of storage of biomedical waste increases the risks of infecting workers who handle such waste, as well as pose risks to the public and the environment.

#### Transportation, Treatment and Disposal

We concluded that on-site transportation of biomedical waste was not always satisfactory, whilst current practices for the transportation, treatment and disposal were satisfactory. Cytotoxic Waste was not safely disposed.

#### **Occupational Health and Safety**

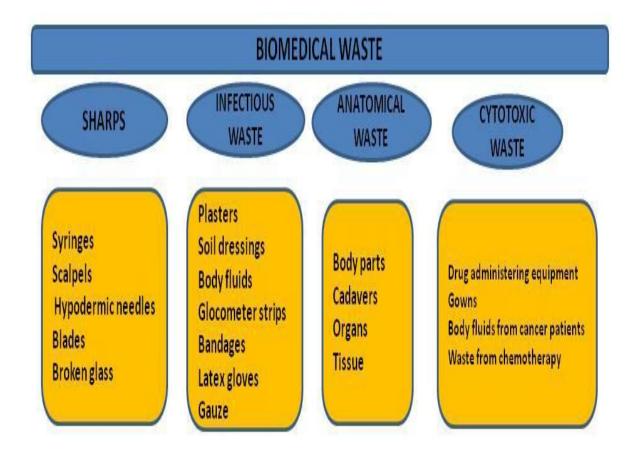
We concluded that occupational health and safety procedures are in place. However, the inspection, supervision and monitoring of health and safety practices are lacking and are not documented.

We concluded that while staff may be aware of the potential risk, there is no established training programme for health-care and biomedical waste handlers.

Whereas persons who handled biomedical waste were provided with some protective gears, some waste handlers did not always wear them. Also, the quality worn was sometimes not as recommended by the WHO guidelines.

#### **APPENDIX A**

#### RECOMMENDED BEST PRACTICES FOR HANDLING BIOMEDICAL WASTE



# Mode of containment at point of generation

Puncture proof container (WHO) Yellow disposal rigid container Red container-Puncture proof bag Red bin (WHO)
Yellow leak proof bag (WHO)
Store below 4 degrees

Strong leak proof containers clearly labeled cytotoxic

# Onsite transportation

- wheeled equipment;
- Easy to load and unload;
- •Do not have sharp edges that could damage bags/containers during loading and unloading;
- Easy to clean on a daily basis;
- •Cleaned with disinfectant that is manufactured specifically for that purpose;
- •Used for biomedical waste only.

# Indoor storage

- Storage areas are identified for biomedical waste.
- Area clearly marked as a biomedical waste storage area with a sign that is not less than 20cm by 20cm and which states "Caution Biomedical Waste Storage Area" and has the universal biohazard symbol clearly displayed.
- Physically separated from food preparation or supply areas of the facility, and protected from animals including insects and rodents and natural elements.
- •Waste Is in a standalone fridge or freezer.
- •The area has restricted access and is designated in a written operating plan.
- The area is located away from pedestrian traffic.
- •The area is vermin and insect free.
- •The area is maintained in a sanitary condition.
- The area is constructed of smooth, easily cleanable materials that are impervious to liquids.
- Ruptured or leaking packages of biomedical waste are placed into a larger package without disturbing the original seal.

# **Outdoor storage**

•The area is conspicuously marked with the international biomedical hazard symbol secured against vandalism and unauthorized entry.

# Offsite transportation

- •Internal surfaces are easy to clean;
- Suitable size with an internal body height of 2.2 meters;
- \*Dividing wall between the driver's cabin and the vehicle body, designed to retain the load if in an accident;
- System for securing the load during transportation;
- •Separate compartment for empty plastic bags, suitable protective clothing, cleaning equipment tools, and disinfectant, together with special kits for dealing with liquid spills;
- Internal finish can be steam cleaned and the angles rounded;
- Name and address of the carries was written on the vehicle;
- •International hazard sign and telephone no. was on the vehicle;
- Vehicle used for transporting biomedical waste only.

#### **AUDIT CRITERIA**

The following eight (8) criteria were used as standards against which we assess the health institutions performance in three significant areas of operations. The results of this work allowed us to conclude against our audit objectives.

#### CLASSIFICATION AND STORAGE

(1) Biomedical waste practices of health institution regarding classification and storage should be in accordance with national laws, regulations, guidelines and standards as promulgated by Guideline No. 7 of the WHO 'Safe Management of Waste from Health Care Activities'.

#### TRANSPORTING, TREATMENT AND DISPOSAL OF BIOMEDICAL WASTE

- (1) Transporting of biomedical waste both within and outside health facilities should not pose a risk to human health and the environment.
- (2) All categories of biomedical waste should be treated and disposed in a manner that safeguards human health and the environment.

#### **OCCUPATIONAL HEALTH AND SAFETY**

- (1) Health facilities should have occupational health and safety standards that are up to date and in accordance with Cap.16.02 *Employees (Occupational Health and Safety) Act Laws of Saint Lucia* 2006 Part 2 and WHO guideline #12.
- (2) There should be regular inspection, supervision and monitoring to assess the safety practices at health institutions.
- (3) Staff should be trained in the application of safety standards so that they are aware of the potential risks in non-compliance.
- (4) Accidents should be reported and dealt with in accordance with established protocols.
- (5) Persons who handle bio-medical waste should be provided with protective gear and clothing as recommended by the WHO guidelines.

#### **APPENDIX C**

#### **ACCRONYMS AND ABBREVIATIONS**

GOSL - Government of St. Lucia

MOH - Ministry of Health, Wellness, Human Services and Gender Relations

MOU - Memorandum of Understanding

PS - Permanent Secretary

The Authority - The Saint Lucia Solid Waste Management Authority

WHO - World Health Organization

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