



**Baseline assessment Report
of
Chhatrapati Shahuji Maharaj Medical
University
On
Healthcare Waste Management**

by
UNDP-GEF-MoEF project team on Healthcare waste management
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CONTENTS

Structure of the report

Background
About CSMMU
Objective of the study
Methodology
Observations
Recommendations
Key findings of the baseline
Limitation of the project

Annexures

Annexure 1: List of Nodal Officers and contacts
Annexure 2: waste Management committee
Annexure 3: baseline survey- hospital wide information
Annexure 4: Baseline survey-Department wise data
Annexure 5: Specific observations during baseline
Annexure 6: waste collection data

Abbreviations:

BARC	– Bhaba Atomic Research Centre		
CTF	– Common Treatment Facility		
CBWTF	– Common Biomedical Waste Treatment Facility		
ETP	- Effluent Treatment Plant		
PPC	– Puncture Proof Containers		
CSMMU	– Chatrapati Shahuji Maharaj Medical University		
UPPCB	– Uttar Pradesh Pollution Control Board		
MoEF	– Ministry of Environment & Forests		
UNDP	– United Nations Development Programme		
UPHSP	– Uttar Pradesh Health Systems Project		
HCWM	– Health Care Waste Management		
HCF	– Health Care Facility		
OT	– Operation Theatre		
ICU	– Intensive Care Unit		
KGMC	– King George Medical College		
SOPs	– Standard Operating Procedures		



1. Background

The UNDP/ GEF-MoEF project on healthcare waste management is a global project that focuses to protect public health and the global environment from the impacts of dioxin and mercury releases. To achieve this, the project is demonstrating best environmental practices and best available technologies at healthcare facilities that have been selected to serve as models within seven countries - Argentina, India, Latvia, Lebanon, Philippines, Senegal and Vietnam.

In India, the project is demonstrating the development of a model Centralized waste treatment facility in Tamil Nadu by holistically looking at creating best practices within the centralized facility and simultaneously addressing the needs of the cluster of health care facilities catered by the centralized facility. While, in Lucknow, Uttar Pradesh the project focuses on creating a model health care facility which will be an example for the other facilities in the region to duplicate and endorse best practices in healthcare waste management. A unique component to India is the IGNOU's distance learning program on health care waste management which has been integrated as a part of the project and will focus on the training needs of project. The project will further boost the healthcare waste management process in the country. At present, there are 95216 HCFs in the country as per Central Pollution Control Board (CPCB) and only half of them are having some system of waste management, a joint effort by different stakeholders need to be put together to create a larger impact in a country of millions.

In Uttar Pradesh the model health care facility chosen under the project is Chhatrapati Shahuji Maharaj Medical University formely called King George Medical College one of the oldest and largest health care facility in the region. The Project will develop models of good health-care waste management and mercury management in the selected facility which will serve well for learning and dissemination for other facilities in UP and the region.

1. About the model facility

King George Medical College, Lucknow, established in 1911, has been a frontrunner among medical education institutions in the country. By an act passed by the Government of Uttar Pradesh on the 16th September 2002, the college was transferred under a new university, called the Chhatrapati Shahuji Maharaj Medical University. The institution is committed to the dissemination and advancement of knowledge in biomedical sciences and establishing itself as a centre of excellence in tertiary level health care in the state. Chhatrapati Shahuji Maharaj Medical University has a hospital complex spread over an area of 88,000 sq mts with a conglomeration of buildings housing various departments and their respective wards. The institution has more than 40 departments and offers various services free of cost to the patients.



The hospital has various dedicated In-patient and outpatients Department and a separate building for Surgical Emergency & Trauma patients. The total number of registered beds are 2424 with a bed occupancy rate of 90-100%. The annual outpatient attendance is about 510,000 and the indoor admissions number about 51,000/year

All the faculty members of the clinical departments of CSM Medical University are attached

to the hospital as visiting consultants. Besides, the hospital has its own full time staff - administrative and technical. Thus the hospital is managed by some 250 Consultants, 500 Resident Doctors, 300 nurses, 63 Pharmacists, 100 technical & paramedical, 50 clerical and 1000 ancillary (Class IV) staff.

Facilities in the hospital

CSMMU has over 40 departments (list attached as annexure 2) and provides a range of medical facilities to its patients ranging from histopathology, cytology, hematology, biochemistry, serology, microbiology, radiology including ultrasound and computed tomography, cardiac catheterisation, pacemaker implantation, balloon arterial angioplasty, Holter monitoring, electroencephalogram, nerve conduction velocity, electromyogram, evoked responses, audiometry, electroretinogram, hemodialysis, endoscopy, bronchoscopy, open heart surgery, hormonal assays etc. Neonatal Intensive Care facilities are available, as are Medical Intensive Care and Intensive Coronary Care facilities.

3. Objectives of the baseline assessment

The objective for conducting baseline assessment is to provide the model facility (CSMMU), and the implementing agencies (UNDP/ GEF/ MoEF/ UPPCB) with information on the status of waste management of the model facility at the beginning of the project. The data collected during the baseline assessment will be used for the following purposes:

- To describe current good practices and techniques and identify potential gaps;
- To collect information on the present status of waste management and infection control practices in CSMMU (KGMC) and provide suggestions to improve on the situation.
- Prepare a MoU between CSMMU (KGMC), UPPCB and MoEF based on the baseline assessment and define goals and milestones in order to gauge progress and evaluate the success of the model facility component of the project.
- Identify the gaps in waste management system and address them during the implementation of the project.

4. Methodology of the baseline assessment

To undertake a detailed baseline assessment in the model facility (CSMMU) a methodology was devised to systematically address the various areas of waste management to be covered in the proposed model facility under the project. The following steps were taken to undertake the baseline assessment in CSMMU:



1. Prepared a detailed guidance for baseline assessment of infection control and health care waste management to be conducted in CSMMU from 12th April-24th April 2010.
2. CSMMU was advised to constitute a core team and appointed a nodal officer for coordinating the activities during the baseline assessment in the hospital and to assist the UNDP team in the baseline assessment in CSMMU.
3. Organized a meeting of the core team and the hospital administrations to discuss the methodology and the steps to be taken for collecting data during the baseline assessment.
4. Allocated responsibilities within the core team for conducting various activities in the baseline assessment.
5. Deputed health care professionals (3 Junior Resident Doctors, 15 interns of PSM department, Senior PRO and Senior Sanitary Supervisor) for assisting the core team and the UNDP team to conduct baseline assessment in the institution.
6. Members from the core team and the deputed healthcare professionals were divided into 6 teams to gather information on waste management practices in the hospital. Each team was allocated a small section of the hospital to collect data on waste collection, storage and transportation practices. The section of the hospital covered by each team was based on the waste collection route of the waste trolleys collecting waste within the hospital. Each team was assigned to accompany one waste collection trolley, to collect information on waste quantification and observe the waste management practices. The teams followed the waste collection trolleys both during the morning and the afternoon shifts (Annexure 3: Routes of the trolleys)
7. Each team not only observed the waste management practices but initiated waste tracking in the hospital. The waste bags collected from each point of generation were labeled for their origin and weighed. A record of the number of different colour bags and the type and quantity of waste in each bag was recorded and signed by the sister in charge of the area. The sister was informed about random inspection and opening of the bag by the core team members to assess the waste segregation practices in her area. These bags were later randomly weighed again and opened to check the waste generation and segregation pattern.
8. Department level information on various waste management practices was collected from each department by physical inspection and information collected from nodal officers of the departments. The designated HCWM nodal officers of each department were contacted to provide information on the current waste management practices in the department. Their inputs and suggestions were taken for improving waste management practices in their departments.
9. Department level data was collected in each department from the various points of waste generation such as OT's, ICUs, Emergencies, wards , OPDs and other areas of the department. (Annexure 4: Sample questionnaire for ward level data)



10. Hospital level data was collected from the VC, Registrar, purchase department and the nodal officer HCWM of the institution. The data collected included information on the type of hospital, departments and facilities provided in the hospital. Information on purchase policy, environment preferred purchasing etc. was also gathered. The nodal officer, HCWM of CSMMU provided an insight into the current practices and future programs to be taken up in the hospital for better waste management practices.
11. Data on the final waste storage and disposal in the health care facility and the CTF operations was collected from the hospital and by a visit to the CTF.
12. At the end of the baseline assessment a meeting was organized with the VC, Dean of faculty, Registrar, HoDs, nodal officers of different department, members of the baseline assessment team and CTF representatives to present the preliminary findings of the baseline assessment and value the cooperation and commitment from different stakeholders in the hospital for sound management of healthcare waste in the future.
13. The baseline assessment was carried for 15 days, as in 15 days a range of activities are carried out in the hospital and we would record the different waste generation patterns in the health care facility.
14. The data compiled through the baseline assessment will be used in identifying the areas of intervention in the model health care facility and an action plan will be prepared based on the baseline assessment for better health care waste management in the model facility.

5.0 Observations

The observations during the baseline assessment are compiled in different sub-sections based on the waste management practices and infection control practices in the model facility and the CTF.

5.1 Hospital Information

CSMMU is one of the largest health care facility in the region with more than 2450 beds and catering to around 2000 outpatients per day. The hospital is located in the heart of the city and surrounded by thick population. In spite of high staff: patient ratio (1 nurse: 60 patients) the hospital is highly committed to provide best medical facility to its patients. To bestowing the best in the limited human and financial resources allocated to the hospital, the hospital has not been able to focus on new and upcoming issues of healthcare waste management and infection control. The hospital has also not been able to allocate sufficient finances and human resource into the building of a sound health care waste management system.

The hospital is in a process of improving its waste management system and has applied for authorization under the Bio Medical Waste (Management and Handling) Rules, 1998 on 6th April 2010 to UPPCB. The hospital has constituted a HCWM committee, and has appointed a nodal officer to review the activities taken up for HCWM in the hospital. The hospital has also contracted a CTF for 39 lakhs /year from February'2010 for providing consumables and equipments needed for HCWM and undertaking waste transportation, storage and treatment as per the BMW Rules, 1998.



5.2 Waste Management Practices

The following observations highlight the present situation of HCWM in the institution.

5.2.1 Waste segregation

The waste segregation pattern in the hospital is very primitive with almost no segregation being followed in the hospital. All the different kinds of waste are mixed at the point of generation in the hospital making all the waste generated from the hospital highly infectious. Different coloured bins –red, blue and black have been provided mostly in all parts of the hospital but, due to lack of knowledge, lack of adequate bins and inappropriate size and placement of the bins all the bins have mixed waste disposed in them.

Small bowls or bins have been provided at the bed-side of each patient and as a practice very often in the patients bed side bin along with the food waste and other general waste disposed by the patients and their attendants, the doctors and the nursing staff dispose infectious waste. As these bins are small very often they are overflowing with waste and waste is also thrown on the floor near these bins. The infectious waste is not carried back to the nursing station for disposal into proper bins as medical professionals and the paramedical staff feel it is the responsibility of the waste handler to segregate the waste. The bed-side bins or bowls are later emptied by safai Karmachari (waste handler) into any big bin provided in the wards irrespective of the colour of the bin or the waste is swept on the floor and collected near the bigger bins provided in the wards.

Though most of the hospital has bad segregation some good practices of waste segregation have been observed in the radiotherapy ward of the institute, where proper segregation was observed.

Waste segregation pattern followed in the hospital

- Red bins/ Bags- Incinerable waste (body parts, anatomical waste, cotton and gausses)
- Blue bins/bags- Autoclavable waste (plastics syringes and other disposables and sharps)
- Black bins/ bags- General waste (food waste, packaging material and other non infectious waste)

Overall the waste segregation is not appropriately followed in the hospital due to non availability of adequate bins, needle cutter, sharps bins, chemical disinfection solution in all the departments. Presently the health care facility does not follow the prescribed colour codes under the Bio-medical waste rules it is using red colour bags instead of yellow colour bags for incinerable waste.

Waste generation data

Table 1: Total Quantity of waste generated per day in the hospital from 13th to 20th April

Day	Quantity of waste (Kgs)	No of Beds in the hospital	Average waste generation/bed/day (Kgs)
13.04.2010	3154	2450	1.3

14.04.2010	1965	2450	0.80
15.04.2010	1945	2450	0.80
16.04.2010	2476	2450	1.0
17.04.2010	2484	2450	1.0
19.04.2010	2459	2450	1.0
20.04.2010	2483	2450	1.0

The data in table 1 depicts the total quantity of waste generated/day in the hospital and the average waste generation/ bed/day.

Fig 1: Waste generation graph in Trauma Centre [The graph depicts the quantity of different waste streams (in Kg) generated /day (14th April 2010) in the trauma and emergency centre of the hospital]

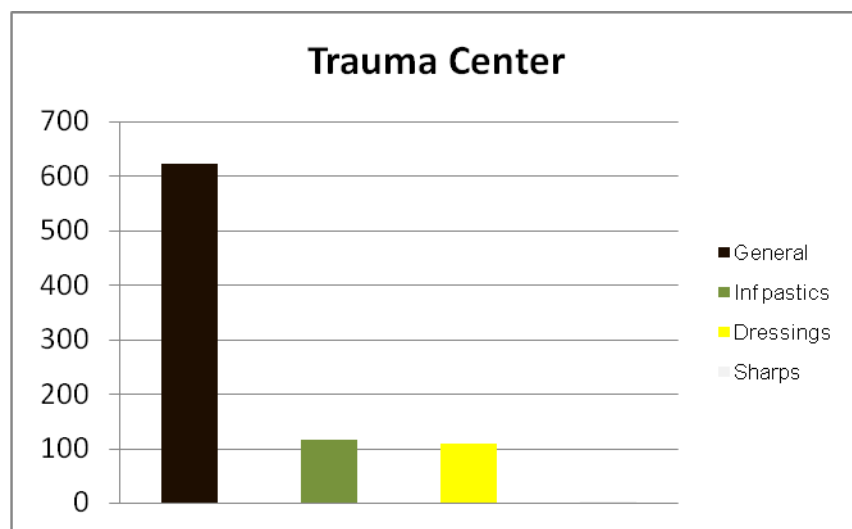


Fig 2: Waste generation graph in Queen Mary Hospital [The graph depicts the quantity of different waste streams (in Kg) generated /day (15th April 2010) in the Queen Mary Hospital when the mixed waste bags were opened and segregated manually at the interim storage site]

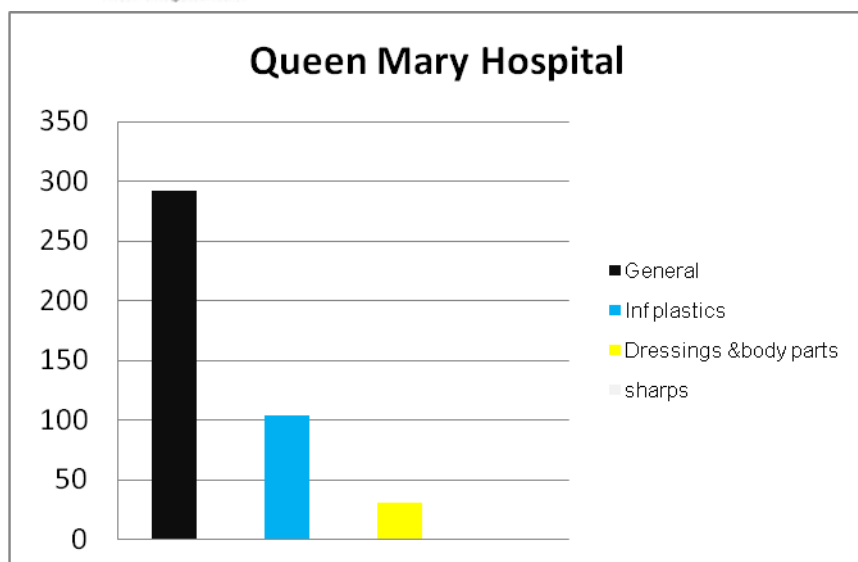
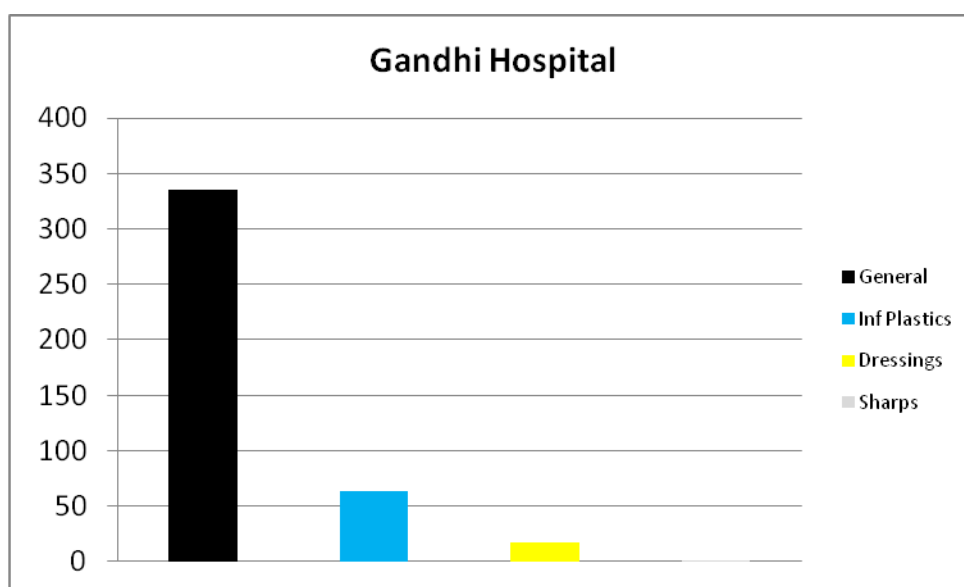


Fig 2: Waste generation graph in Gandhi Hospital [The graph depicts the quantity of different waste streams (in Kg) generated /day (15th April 2010) in the Gandhi Ward of the hospital when the mixed waste bags were opened and segregated manually at the interim storage site]



A secondary segregation was carried out at the interim storage site in the hospital to study the waste composition in the hospital. The figures 1-3 show that proper segregation in the healthcare facilities can reduce the problem of bio-medical waste from 100% to less than 20%.

Concerns regarding waste segregation:



- The hospital does not follow good segregation practices and waste is mixed in all the bins irrespective of their colour
- Non infectious waste is rendered infectious due to mixing of waste.
- Sharps cutters/ destroyers/PPCs were not seen at all points of generation
- Incinerable waste is being disposed into red colour bins instead of yellow
- Doctors and nurses do not segregate the waste at source and the waste is later disposed by ward boys or sweepers into the bins.
- The patients bin meant for general waste has infectious waste overflowing through them. While the infectious waste bins are in the reach of the patients and their attendants causing mixing of waste.
- Water and body fluids are being disposed in the waste bins by the patients attendants

Recommendations:

- Segregation of waste is the key to successful waste management.
- Adequate bins of appropriate size and shape should be provided at appropriate places to ensure good segregation practices.
- The colour code followed in the hospital should be as per the Bio-medical waste rules-
 - Yellow bins/ Bags(Instead of Red)- Incinerable waste (body parts, anatomical waste, cotton and gausses)
 - Blue bins/bags- Autoclavable waste (plastics syringes, other disposables plastics and gloves)
 - Black bins/ bags- General waste (food waste, packaging material and other non infectious waste)
 - Puncture Proof container- waste sharps (needles, blades, scalpels, nails etc)
 - Twin bin with chemical disinfection for used plastics
- Chemical disinfection and mutilation of waste sharps and used plastics and gloves can be introduced at various points of waste generation (like wards, OPD, OTs, Emergency, ICCU etc) in the hospital to ensure safe disposal and discourage the reuse of used plastics and sharps.
- Secondary segregation should be discouraged and segregation should not be done by the waste handlers. Waste should be segregated at source by the medical professionals.

5.2.2 Waste Collection and Transportation

Waste collection and transportation in the hospital is unstructured and haphazard. The issues that repeated came up from various parts of the hospital were:

Inappropriate size of the bins: The bins provided in some areas were either very large or small. Larger bins were provided for infectious waste and smaller bins or lesser no of bins were provided for general waste. The size of the bins has to be as per the quantity of waste generation pattern.



Placement of the bins: The hospital is more than 100 years old and has a mix of old and new buildings, providing little space for waste collection in the nursing station, each floor and departments in the hospital. The bins of red, blue and black colour are not placed at the point of generation or near the nursing station, they are either placed near the washrooms, corridors or in the common lobby. The bins for infectious waste are in the access of the patients and their visitors due to which general waste, food waste and water are disposed in all the bins irrespective of their colour, thus defying the process of segregation.

Lack of bins: Some areas compliant of non availability of the bins. Irrespective of the size of the wards and the procedures being carried out in the wards and other areas single bins of different colours each have been provided without any data inventorization and need analysis. In OT, Emergency wards and ICUs bins were provided far away from the procedure site due to which the waste was either disposed on the ground or was overflowing from the small bowls provided at the patient's bed side. While doing dressings and giving injections as there are no portable bins or provision to carry infectious waste and sharps in the nursing trolleys all the waste is thrown on the patient's bed side. Similarly extra colour bags have not been provided in the nursing station, so if the bags get full the nursing staff do not have the option of replacing the bags and as a result the waste is overflowing from the bins.

Size and type of the bins: Presently the hospital has been provided mostly with top lidded medium sized 40 lts bin. The size, capacity and the type of bins are not appropriate at various e points of waste generation. A data inventorization has been carried out along with the baseline assessment to understand the requirement of bins in all the departments.

Reuse of plastic liners: There have been complaints that the waste handlers are emptying the waste from the bags are reusing the bags for lining the waste bins.

Cleaning of the bins: Waste collection bins are not cleaned regularly, they are either cleaned once or twice a week with soap and water or plain water. There is no specific protocol reported for cleaning and disinfection of the bins.

Transportation system: The hospital has contracted a CTF for internal and external waste transportation. Manually operated cycle rickshaws/charts are used for waste transportation in the hospital. These are open/covered charts of 1sq mts dimension. These carts are made up of semi porous material (wooden sheets) and the liquid from the bags leaks from the carts and has a potential risk of spread of infections.

The waste carts/ trolleys carry waste from the point of waste generation to the final storage site in the hospital twice a day (morning and evening) depending on the department and the quantity of waste generated. The hospital staff has complaint of frequent breakdown of the trolleys due to multiple usage and rough terrain of the hospital.

The waste bins with tied waste bags are carried from the point of generation to the charts placed outside the buildings, here the waste bags are emptied from the bins into the carts and new bags are lined in the bins, later these bins with new bags are placed back at the point of generation. The waste handlers carry the bins with waste in the buildings from the OTs, Labour Room, ICUs, NICUs, wards, OPDs etc. through the common area, stairs or ramps (in trauma centre) to the carts. The waste handlers are allowed to enter the critical areas for waste collection in some portions of the hospital thus increasing the risk of infections to the patients.

Concerns regarding waste collection and transportation:

- Overflowing bins and mixed waste;
- Inadequate and inappropriate sized bins;
- Inappropriate placement of bins;
- Lack of availability of coloured bags at the point of waste generation;
- The waste handlers are allowed to enter the critical areas such as OT for waste collection in some departments of the hospital thus increasing the risk of infections to the patients.
- The waste handlers do not have a fixed time and route for waste collection;
- The waste handlers weigh the waste they are collecting from each point of generation, the receipt is signed by the sister incharge
- The waste handlers are in a hurry and leave the bins near the building entrance or keep changing positions of the bins causing inconvenience to the staff.
- Frequency of waste collection from the wards is not based on the quantum of waste and the area of generation;
- Number of waste collection carts (6) are not sufficient for such a big institution;
- The waste handlers are illiterate, mostly juvenile boys having no formal training for waste collection and the risk associated with healthcare waste. No ID cards are provided to the waste handlers;
- Occupational safety and universal precautions are not taken care by waste handlers
- The waste collection trolleys are open, semi porous and leaking with body fluids thus a source of spread of infections;
- Infectious and general waste are transported together in the same cart.
- The bins and the trolleys are not cleaned regularly;
- Due to the old architecture of the institution and layout of the different buildings in the university, no uniform system of waste collection is followed. Due to non availability of service lifts and ramps, the waste is carried through the crowded areas; Only at one building wheel barrows are used for internal transportation of waste. These wheel barrows are in bad shape and leaky.
- Breakdown and maintenance of waste trolleys is a major issue, which needs to be addressed;
- Anatomical and animal tissues from Anatomy and Pharmacology department are not being picked up presently by the CTF.

Recommendations:

- Adequate waste bins should be provided at each point of generation to ensure good segregation practices.
- The requirement of the bins and placement of the bins in each department should be in consultation with the nodal officers and department heads. Thus a proper assessment of the no of bins and other consumables required in the department must be undertaken.
- Only general waste bins should be provided at the patients bed side.



- Infectious waste bins (yellow, blue and PPC) should be only in the reach of the hospital staff. These bins should be placed in areas such as near the nursing station or dressing rooms or injection rooms etc.
- Two sets of bins (or what is found to be essential on the basis of the study) to be provided at each of the nursing station; these bins to be used on alternate days so as to ensure proper cleaning of bins after a day's use.
- Mobile waste trolleys can be provided for better segregation of waste at the time of doing any procedure (like changing dressings, giving injections) at the patients bed side. The waste from these bins should be transferred back to the respective bins in the nursing station.
- In emergency and critical care areas a set of different coloured bins of appropriate size can be provided at the bed side for easy waste disposal.
- The CBWTF operator must have at least one supervisor with each of the waste collection trolleys for understanding the needs of various departments in the institution.
- The CTF operator must ensure that the waste handlers are given proper orientation and training for the waste collection activities carried by them. They should be given proper uniforms, ID cards and regular medical checkups.
- Trolleys for waste collection should be leak proof and preferably different trolleys should be provided to collect infectious and non-infectious waste
- The waste trolley should be covered and have proper signage and symbol for bio-hazard waste
- Number of waste trolleys should be increased for proper and timely collection of waste. In case of any breakdown standby trolleys should be provided.
- The frequency, route and time for waste collection from each department must be fixed for the convenience of the departments.
- The waste trolleys should be cleaned and disinfected regularly.
- A waste tracking system must be introduced in the hospital to track the waste from the point of waste generation to its final disposal. This helps in monitoring the system and increases the accountability among the health care professionals towards sound waste management.

5.2.3 Waste storage and disposal

The hospital has a waste storage area located near its old incinerator site. The waste trolleys (containing waste bags) are emptied in the waste storage area which has a cemented floor, but not a fully covered roof. The area is not accessible to scavengers, but during the beginning of the baseline assessment the contractor collecting and treating the HCW had employed rag pickers to do secondary segregation and separate the recyclable waste with non recyclable and incinerable waste. This practice has been discontinued in the hospital and all the bags are handed over to the CTF for proper treatment and disposal.

Concerns regarding waste storage and disposal

- The waste storage area is not fully secure and is accessible to strangers.



- The waste storage area does not have a proper signage and biohazard symbol;
- The waste storage area does not have proper demarcations for storage of infectious and non infectious waste;
- There is no defined storage area for the waste trolleys;
- There is no proper cleaning and washing area for the waste trolleys
- The approach road to the waste storage area is rough and bumpy, thus causing frequent breakdown of the vehicles

Recommendations

- Proper final waste storage area should be planned within the campus of CSMMU.
- The final waste storage area should have adequate space for storage of waste bags, trolleys, washing and cleaning area and supplies for waste collection.
- Infectious and non infectious waste should be stored separately in the final storage area.
- The area should be well secure and not accessible to outsiders.
- The approach road to the final waste storage area should be smooth to avoid pilferage of waste from the trolleys.

5.2.4 Waste treatment and disposal

CSMMU has outsourced its waste collection, treatment and disposal to a CBWTF called S.S. Medical Services Pvt. Ltd. The CBWTF is responsible for providing consumables such as waste collection bags, bins, needle cutter/ destroyers, PPCs, twin bins, disinfectants and waste collection trolleys to CSMMU. The CBWTF is also responsible for providing IEC material and training on health care waste material in the institution. The CBWTF has exclusively employed waste mgt supervisors and waste collection staff for CSMMU. These staff members of CBWTF are responsible for providing adequate consumables for waste mgt to CSMMU and collection of waste from the departments to the final waste storage site within CSMMU. However only 1 supervisor is provided for CSMMU which is not enough looking into the geographical span of the institution (around 103 acres) and catering to the needs of waste management in the institution, thus causing delay in initiating proper waste management in CSMMU. The waste from the final waste storage area in CSMMU for final treatment and disposal in compartmentalized vehicles specifically designed for waste transportation to the CBWTF located in Faizabad 150 kms from Lucknow.

Presently CSMMU is sending all its waste to the CBWTF for treatment and disposal but in its agreement with the CBWTF, it has mentioned of installing an alternative waste treatment technology and an ETP within its campus. Until then the institution proposes to have onsite chemical disinfection and mutilation of used plastics and sharps.

Since the waste management system is recently initiated in CSMMU, the CSMMU staffs need lot of onsite support of the CBWTF operator and redressal of the problems encountered. The CBWTF operator does not have any such mechanism exclusively at CSMMU premises.

5.2.4.1 About the CBWTF



S.S. medical Services Pvt. Ltd. caters to around 5200 beds in the region of Lucknow, Faizabad and Gorakhpur in Uttar Pradesh. The facility is spread in an area of 1,30,000 sq ft . At the time of visit to the facility had an operational incinerator of 200Kg/hr capacity and a non-operational small 300 lits autoclave and a shredder for plastic waste.

The temperatures in the primary and secondary chambers were not meeting the CPCB standards and the Pollution Control Equipments and venturi scrubbers were also not meeting the standards as thick black soot could be seen coming out of the incinerator stack.

Temperatures shown on the control panel of the incinerator at the time of the visit (22nd April 2010, 6.00pm)

Primary chamber	450°C
Secondary Chamber	1053°C
Venturi scrubber inlet temp	593°C
Venturi scrubber outlet temp	69°C

Some of the observations made during the visit:

- The waste water coming out of the incinerator was just lying in a small pit without any treatment as the CTF does not have an ETP.
- The dry incinerator ash was lying in a pit without any linings or TSDf sheets. Once the ash pit is full the ash is dumped into the municipal dumps.
- The waste storage area within the CBWTF was very small and filthy; the bags were just dumped into a closed room.
- The autoclave and the shredder were not operational and no online records were produced of earlier waste treatment cycles carried out in the autoclave.
- There was no demarcated washing area for the waste collection vehicles.
- Records of waste collected and treated by the CBWTF were not available. The CBWTF operator does not seem to keep records of the daily waste collection from CSMMU as mandated by BWM Rules, 1998
- No steps for alternative or stand by arrangements in case of a breakdown were taken by the CBWTF.
- For waste collection, the CBWTF operator informed that he has a fleet of 11 small trucks that are placed in Lucknow and Faizabad locally and 2 bigger trucks for transporting waste from the highway. Before the waste is loaded to the bigger vehicles the black bags are disposed of into the municipal dump located on Hardhoi Road (Lucknow-Faizabad highway and only red, yellow and blue colour bags are send to the CBWTF for treatment.
- Secondary segregation is carried out by the CBWTF before incinerating the waste.

Recommendations



- As the CBWTF is not operating as per the BMW guidelines, it is the duty of the HCF to ensure that the waste generated from there facility is treated and disposed of properly.
- Until no alternatives are available CSMMU must initiate the process of chemical disinfection for used plastics, sharps and gloves. This will ensure that the recyclables and reusable plastics are treated and mutilated before leaving the institution.
- To reduce the dependency on the CBWTF and as proposed in their agreement with the CBWTF, CSMMU has funds available for procurement and installation of an autoclave and a shredder. Based on the size of the institution and quantity of waste generated the institution can decide on the kind and type of alternative technology to be installed within its premises of CSMMU.
- Rather than handing over the kitchen waste and other types of bio-degradable general waste to CBWTF operator, a bio-compost plant can be installed in the university campus, to capture the potential of non-infectious bio-degradable general waste.
- To improve the functions of the CBWTF, CSMMU should have a proper coordination mechanism with the CBWTF operator. Other than focusing on on-site operations of the CBWTF random inspections of the off-site CBWTF functions and check of its records should be carried out regularly. The payment to the CTF should be released only after CSMMU is satisfied with their operations.
- UPPCB needs to take an active role in streamlining the operation of the CBWTFs in the state and helping the HCFs choose a proper CBWTF based on their requirements and the credibility of the CBWTF.
- A standard rate of treatment and disposal should be prescribed by UPPCB for the CBWTFs so it is easy for the HCFs to choose a good CBWTF and not fall into the lower cotation trap of the non-performing CBWTFs.

5.3 Training and awareness

Training, awareness, aptitude and attitude towards waste management helps in implementing HCWM in the HCF. In CSMMU as a system of waste management is just evolving they are trying to understand the needs of waste management in the institution and have not been able to focus much on the training needs of its staff. Occasionally there is informal training taken up by the nodal officer and sometimes by the CBWTF on health care waste management for the hospital staff. Few general posters on health waste management are provided by CBWTF for the entire institution, but they need to be designed more specifically to address the needs of CSMMU.

Concerns regarding Training and awareness:

- Inadequate training and awareness among the staff. Training has not been consistent and some informal sessions of 10-15 mins have been given in some wards.
- Apathy attitude towards waste management. Staffs are not motivated towards waste management and consider it as waste of time and not so important area to be taken care by the medical staff. Waste management has always been the responsibility of waste handlers so the attitudinal change towards waste management is a major challenge in the institution.



- The message in the posters provided by the CBWTF is not clear, illustrative and bilingual.
- There are no proper signs and posters throughout the institution as the posters are scarce in number and are not placed appropriately near the waste generation areas in the departments.
- Patients and their attendants are not aware of the waste mgt system and tend to mix waste irrespective of the colour codes.
- The Public Relationship Department is working towards educating the patients

Recommendations

- Structured training and awareness program on waste management needs to be initiated in the institution.
 - A core team of trainers have to be identified in the institution who can further provide training to different health care professionals in the institution.
 - The training material for different health care professionals have to be prepared and both classroom training and onsite training needs to be provided to all the entire hospital staff.
 - The institution can fix up a time schedule for periodic orientation and training of its staff.
 - Change in attitude and mindset towards waste management can be addressed through multiple channels such as addressing the need and importance of health care waste management, fear psychosis, enforcement of rules, strict monitoring, penalty and reward system for best performing individuals, wards and departments.
 - Mass awareness about HCWM can be generated by creating different posters describing the need and importance and the process of waste management, articles and advertisements in hospital magazines, IPD and OPD slips, involving local NGOs and individuals in spreading awareness about the issue.
 - The posters designed for waste management should be very illustrative, self explanatory, bilingual and easy to understand.
 - The posters and awareness material should be placed near the bins and general waiting areas and corridors and lobbies in the HCF to increase awareness among the health care professionals and patients.
 - In the institution involve the administrators, medical, para medical staff and other administrative staff such as the PRO's and social workers in creating awareness on health care waste management to the patients and their attendants.
-
- IGNOU's training program

5.4 Resource allocation

Presently meager resources are allocated towards waste management in the institution. The institution has limited manpower and funds devoted to HCWM. But now as the institution has



decided to have a sound waste management system in place, it needs to dedicate more resources towards waste management. As a first step towards successful implementation nodal officers for waste management have been designated in each department and have tied up with a CBWTF to handle and treat HCW in the institution.

Recommendations:

- One and all need to be responsible and accountable for waste management in the institution for a successful waste management plan.
- Depute dedicated staff for the establishment and running of health care waste in the institution.
- Dedicated funds for HCWM to be allocated within the annual budget of the health care facility.
- The project will initially help in building capacities within the institution which will have to be taken over and sustained by the institution for a successful implementation of the project.

5.5 Monitoring and reporting

Presently there are no protocols for monitoring and reporting HCWM in the institution. There has been no monitoring of HCWM practices by any internal or external agency in the institution. Very recently the institution has constituted a Core committee to oversee the activities carried in the area of HCWM.

Concerns regarding monitoring and reporting of HCWM:

- No informal or formal monitoring protocols on HCWM exist till now in the institution.
- No written responsibilities of top administration - VC, Registrar, HoDs, Nodal officers and hospital staff towards waste management
- The onus of HCWM is on the junior staff and CBWTF, problems are found in their functioning but, there is no self check process
- No waste tracking and monitoring systems, to check the process of waste segregation or any HCWM procedure established in the HCF. Once the bags are collected from the respective points of waste generation there is no system that will trace back the source of the problem.

Recommendations:

- A written protocol and SOPs on HCWM should be prepared in the institution. The document should mention the HCWM procedure to be followed in the institution and address the roles and responsibilities of different health care professionals and HCF staff.
- Top administration should include monitoring of HCWM as a part of their routine activities and also specially take rounds to oversee the process of HCWM. it should be taken up more seriously and on regular basis.
- Appoint nodal officers within each department to monitor and report the issues within the departments



- Various teams comprising of HoDs, nodal officers and others should be constituted that will take up monitoring of HCWM in rotation within the institution.
- A team under the leadership of the nodal officer with members from CBWTF should be constituted that will be dedicated to address the issues related to HCWM, in case of any problem reported the team will assist to resolve it at the earliest.
- Self checks and monitoring is the best tool to analysis the process of HCWM this will regulate our actions and minimize error. Waste handlers and CBWTF staff can help in reporting back any errors in the system. Thus a two way approach of top to bottom and bottom –up approach will help in building a good system of waste management. CSMMU senior officials should undertake monitoring of staffs (sister in charges, nurses, ward boys, aayas) and juniors should do it for the seniors.
- Waste tracking mechanism such as labeling, weighing and bar coding the sealed bags will create a consciousness among one and all and help improve the system drastically.
- The institution is not yet computerised; computerisation would ensure proper and paperless record keeping.
- Identifying champions and rewarding the good performers will motivate others to do better.

5.6 Mercury management

Mercury based devices are still being used in the health care facility. There is no method or mechanism for safe use and disposal of mercury from medical devices and instruments used in the facility.

Concerns regarding mercury management:

- Mercury based devices are being used in the institution
- There is no mechanism for the management of mercury spills
- No interim storage system for mercury based devices
- The mercury from broken instruments is drained off or disposed into the bins

Recommendations

- The hospital has to phase of from mercury to mercury free devices
- Provide a mercury spill management kit at each point of waste generation
- Provide an interim mercury storage facility
- Extensive training of the staff on hazards of mercury, mercury spill management and use of mercury free devices

5.7 Other issues

5.7.1 Environment preferred purchasing

The concept of environment preferred purchasing is not very popular in the institution. Though individual efforts have been taken up by the departments to purchase environmentally safe products such as floor disinfectants, surface disinfectants and instrument cleaners.



A policy for environment preferred purchasing needs to be developed for the institution with the concepts of bulk purchasing, preparing a list of the existing chemicals, paints, pesticides, PVC devices, mercury devices etc, being used in the institution and the list of alternatives available and their benefits. The institution can provide a minimum standard for procurement of consumables and equipments with specifying basic environmental standards and looking into carbon credits during purchases.

5.7.2 Waste minimization

There is no documented evidence of waste minimization in the institution. As a part of the project a waste minimization policy addressing reduce, reuse and recycling principle needs to be introduced in CSMMU to reduce the quantum of waste generated in the facility. Simple steps like using emails for official communications, double side printing, reusing linen after washing, minimize packaging, bio compost, paper recycling etc, will help in reducing the quantity of waste generated by the institute.

5.7.3 Special waste streams

- a) **Sharps waste:** Sharps such as needles, syringes, blades, slides, broken bottles are the most dangerous category of waste, though being less in volume it has the maximum potential to spread infections. No special precaution is being taken while handling and disposal of sharps in the institution. Though in some areas Needle destroyers, cutters and PPCs have been provided to mutilate and dispose sharps.

Concerns regarding sharps management:

- No special precautions are taken while handling sharps
- Very often needles are bend or recapped before disposal thus increasing the risk of needle stick injuries to the staff
- No PPC's are provided in the institution for disposal of sharps and the sharps are disposed in normal non PPC/ bags. This increases the risk of needle stick injury to the waste handlers
- No special puncture resistant containers are provided to transport sharps from the point of generation to final storage within the institution and also from CSMMU to CBWTF, thus in case of a spill there is a greater risk of infections to the waste handlers and the general public at large.
- Due to lack of segregation, treatment and mutilation of sharps at the point of generation and later secondary segregation by the CBWTF chances of reuse of unsafe sharps increases greatly.

Recommendations

- Never recap or bend needles
- Needle destroyers and PPCs should be provided at each point of waste generation
- The injection unit should be securely got back (in a box, tray) to the nursing station for mutilation, treatment and disposal in PPC.



- Sharps should be transported from the point of generation to final disposal site in the institution only in large PPC's.
- Any sharps injury it should be reported immediately.

b) Liquid waste: Any liquid including blood and body fluids, chemicals, waste water comprise of the liquid waste generated from a HCF. In CSMMU currently there are no protocols followed for liquid waste management, spill management etc. and the liquid is simply disposed off into the drains without any pretreatment.

Concerns regarding liquid waste management

- No defined protocol for disposal of liquid waste
- The Blood and body fluids, chemicals used in the hospital are disposed down the drain without any pretreatment or nuterilization
- In case of a fluid spill it is wiped by the normal mop and the mop is reused later after washing
- Sputum cups and bowls of post operative patients containing body fluids are disposed into the bins. Liquid from cleaning of patients food trays are also disposed into the bins. This practice exposes all to risk of infectious through the fluids leaking from the bins and the trolleys.
- No ETP installed for liquid waste treatment

Observation from post OT ward

The staffs of CSMMU are unaware of general protocols like sweeping, infection potential, spill management etc. in one of the post op wards, one sweeper was found to broom the floor all the way within ward to general area. The waste contained blood soiled waste, syringes etc. thus while sweeping, the blood stains were spread all over the floor through which sweeping was done spreading infection all over.

Recommendations

- Develop protocols for liquid spill management and liquid waste disposal
 - No liquid waste to be disposed in the bins
 - As mandated by the rules, ETP has to be installed in the institution. But due to old architecture and non-availability of civil works layout, if an ETP cannot be installed, then alternatives have to be looked into.
 - Rain water harvesting and use of treated water for gardening purposes
- c) **Chemical waste:** Used chemicals, cytotoxic drugs, pressurized containers are handed to the CBWTF for final disposal. As the CBWTF is not working upto the standards there is a need to be understand the mechanism of final treatment and disposal of these waste streams.



- d) **Anatomical and animal tissues:** These wastes from Anatomy department and Pharmacology department are not picked by the CBWTF. The centralized facility needs to pickup these waste streams and treat them as per the BMW rules.
- e) **Radioactive waste:** This waste stream is strictly handled as per the Atomic Energy Act in the institution and handed over to BARC for final disposal.

5.8 Record Keeping

Presently no records are maintained for HCWM in the HCF. Very recently the HCF has asked the CBWTF operator to give a slip to the sister in charge for the number, colour and quantity of waste collected from the wards. As the system has just initiated the slips were either stacked in any register or thrown away.

Concerns regarding Record keeping

- No protocol for record keeping
- No records could be collected on the number of bins, bags, hub cutter/ destroyer supplied in the hospital
- Staff says they are overworked and already maintaining different records for different activities, an additional register for waste management will be difficult to handle
- There are no records on the type and quantity of waste being send to the CBWTF for final disposal.

Recommendations

- Develop a protocol for record keeping
- Inventionization of records in each department on the number of existing bins, needle cutters and the future requirements should be conducted as this will help in understanding the demand- supply chain for these consumables and equipments in the institution. This will help in setting SOPs and waste tracking for waste management in the institution.
- A register for waste management procedures, quantity of waste etc to be maintained by the nodal officers of the departments.
- Record of accident reporting (like needle stick injury) and spills to be maintained in each department as per the BMW rules 1998
- Record of total quantity of waste and quantity of different types of waste generated per day in the HCF to be maintained for submission in the annual report on HCWM as mandated by BMW rules 1998

5.9 Infection control and Occupational safety

CSMMU is in the process of setting up an infection control committee and is looking for suggestions and recommendations on improving the occupational safety and infection control practices in its institution.

Concerns regarding infection control and occupational safety



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- There are no protocols for infection control and occupational safety.
- The staff collecting blood samples and handling sharps do not wear gloves regularly
- The staff were seeing recapping and bending needles
- Needle stick injuries were not reported and recorded
- Short supply of gloves in certain areas of the hospital
- Proper PPE were not always used by the waste collection staff.
- Not all staff are vaccinated against Hep B and tetanus.

Recommendations

- All the staffs of the CSMMU should be made aware of the infection control protocols and universal precautions for efficient infection control.
- Antibiotic policy and infection control policy to be formulated
- Proper uniforms and PPEs for waste collection staff
- Vaccination for all staff members
- Accident reporting and Post exposure prophylaxis measures to be initiated

6. Key recommendations of the baseline assessment

These recommendations are based on the extensive baseline carried out in KGMC and focus on the areas where the project will intervene to improve the health care waste management system in the institution.

6.1 Focus areas of project intervention:

1. Policy framework for waste management in CSMMU
2. Systems development for waste management in CSMMU
3. Procurement of consumables and equipments for waste management if needed
4. Strengthen the institutional capacity for waste management
5. Employee full time professionals for implementing successful waste management systems under the project, this will be later sustained by the institution under their own funds
6. Introduce mercury free devices, spill management kits and interim mercury storage area in the institution.
7. Assist in developing prototypes of waste collection bins and trolleys for waste collection and transportation within the institution. These prototypes can be replicated later by CSMMU.
8. Assist in developing and constructing final waste storage area in the institution
9. Assist in designing and development of IEC material. IEC material on infection control in waste management can also be identified and procured from the existing sources and translated into hindi if needed.
10. Technical assistance in procurement of alternative waste treatment technology by the institution.
11. Assist in installation of the alternative treatment technology within the institution.
12. Provide extensive TOT program to the identified nodal officers and core committee members and the of the waste management cell CTF operator in CSMMU.
13. Assist in development of training material for different health care professionals in CSMMU.
14. Assist in introduction of waste tracking systems from the point of generation to final treatment and disposal of waste.
15. Assist in development of bio-compost pit for bio-degradable general waste.
16. The activities undertaken under the project will be taken up by the institution and sustained by them.

6.2 Proposed role of different stakeholders

1. As the UP component of the project has only a single beneficiary- KGMC it is proposed that a tripartite MoU be signed between MoEF, UPPCB and CSMMU (KGMC) and the funds flow directly from UNDP to CSMMU on the recommendation

- of MoEF and UPPCB. This will fasten the process of implementation of the project in the model facility.
2. MoEF stations the PMU of the project and is responsible for overall implementation of the project in the country
 3. The role of UPPCB in the project should be of a regulatory agency in the state and should facilitate and monitor CSMMU in achieving the project objectives.
 4. CSMMU will be the model facility for the implementation of the project and the project shall be implemented directly by CSMMU under the guidance of UPPCB, MoEF and UNDP global team.

6.3 Fund allocation

USD 1,40,000 is allocated towards the UP project component

6.4 Limitations of the project

1. With 95,216 number of health care facilities in the country and an ever expanding number of health care facilities and ever increasing burden of disease in the country the project addresses a miniscule of the problem of health care waste in the country due to limited project funds.
2. The scope of the project is limited to two states for establishment of model health care facilities and a model CTF. It is important to link up the resources and findings of the project with other similar projects in the area.
3. Limited intervention in the health care facilities focuses on a sector wise improvement of the system, but simultaneously there is a need to addresses the problem through the perspective of the patients and the general public. Mass awareness campaigns need to be initiated to sensitize the people at large about the issues of health care waste and patient safety.
4. Further a prototype for waste tracking will be developed in the project, this need to be scaled up further to online monitoring and reporting which will help to speed up the process of data collection from the health care facilities to the SPCBs and MoEF.

Annexure 1: List of key contacts

Key Contact	Name	Title
Administrator, Head, or Director	Dr. Saroj Chooramani Gopal	Vice Chancellor (VC)
Treasurer or Chief Financial Officer	Mr. Subedar Singh	Finance Officer
Chief Medical Officer	Dr. S.N.Sankhwar	Chief Medical Superintendent
Chief Nursing Officer	Mrs. R.K Gautam	Matron
Head of Infection Control	Dr. S.N.Shankhwar – Chairman	
Chief Facility Engineer or Facility Manager	Mr. Uttam Kumar	Chief Engineer, works dept
Environmental Services Manager	Done through Registrar's Office	
Other Important Contacts	Mr. V.P.Singh, Dr. J.V. Singh, Dr. S.N. Shankwar, Dr. Ajay Singh,	Registrar Dean, Faculty of Medicine Chief Medical Superintendent Deputy Medical Superintendent and Medical Officer (Stores)
Designated Contact for the UNDP Project	Dr. Kirti Srivastava	Nodal officer , BMW committee



Annexure 2: List of Departments in CSMMU with contact details

Annexure 3: Routes of the trolleys



Annexure 1

S.NO	Department	No of wards in the depts	Head of the Dept	Designated Nodal Officer for HCWM	E-mail Address
1	Anatomy		Dr. S.K.Srivastava	Dr Punita Manik	punitamanik@yahoo.co.in
2	Anaesthesiology		Dr.J.C.Bogra	Dr Mohd.Parvez	
3	Bio-Chemistry		Dr.B.K.Singh	Dr AA Mahdi	mahdiaa@rediffmail.com
4	Cardiology		Dr. R.K.Saran	Sri Vijay Kumar Singh	
5	Community Medicine		Dr.J.V.Singh	Dr Reema Kumari	reema_tua05@yahoo.co.in
6	ENT		Dr. S.P.Agarwal	Dr Virendra Verma	drveerendraverma@rediffmail.com
7	Forensic Medicine		Dr. Baljit Singh	Dr Maushmi Singh	
8	Geriatric Mental Health		Dr. S.C.Tiwari		
9	Gastro Surgery		Dr. A.K.Wahal	Dr Anshuman Pandey	pananshuman@gmail.com
10	Hospital Administration		Dr. B.K.Srivastava		
11	Medicine		Dr. A.K.Vaish	Dr Abhisek Singh	lucky23@indiatimes.com
12	Microbiology		Dr. Mastan Singh	Dr KP Singh	
13	Neurology		Dr. R.K.Garg	Dr Rajesh Verma	drrajeshverma32@yahoo.com
14	Neuro Surgery		Dr. B.K.Ojha	Dr Anil Chandra	bkojha@rediffmail.com
15	Obstetrics & Gynecology		Dr. Vinita Das	Dr Rekha Sachan	sachanrekha@yahoo.com
16	Ophthalmology		Dr Deeak Kumar	Dr Sanjiv Kumar Gupta	
17	Orthopedics Surgery		Dr. G.K.Singh	Dr Santosh Kumar	skkgmu_69@rediffmail.com
18	Otorhinolaryngology		part of ENT??		
19	Pathology		Dr. Raj Malhotra	Mr GS Rana	
20	Pediatrics		Dr. G.K.Mallick	Dr Archana Kumar	archanakumar53@yahoo.co.in

21	Pediatric Surgery		Dr. S.N.Kureel	Dr Ashish Waklu	
22	Pharmacology		Dr. K.K.Pant	Dr Anuradha Nishchal	nischal-anuradha@gmail.com
23	Physical Medicine & Rehabilitation		Dr. B.P.Sharma	Dr KP Singh	
24	Physiology		Dr. Sunita Tiwari	Dr Dileep Kumar Verma	
25	Plastic Surgery		Dr.A.K.Singh	Dr Rajeev Agarwal	drrajivagarwal@rediffmail.com
26	Psychiatry		Dr. S.K.Trivedi	Dr Anil Nishchal	an.kgmu@gmail.com
27	Pulmonary Medicine		Dr. Rajendra Prasad	Dr SK Verma	
28	Radiodiagnosis		Dr. Ragini Singh	Dr Manoj Kumar	manojgautm@yahoo.com
29	Radiotherapy		Dr. M.C.Pant	Dr Kirti Srivastava	drkirtis@rediffmail.com
30	Rheumatology & Immunology		Dr.S.K.Das	Dr Anupam Wakhlu	anupamwakhlu@gmail.com
31	Surgery		Dr. Ramakant	Dr Shailendra Kumar	skkgmu@yahoo.co.in
32	Surgical Oncology		Dr. Sanjeev Mishra	Dr Vijay Kumar	drvkumar2007@rediffmail.com
33	Thoracic & Cardio-vascular Surgery		dept closed??		
34	Urology		Dr. S.N.Sankwar	Dr Rahul Janak Sinha	rahuljanaksinha@yahoo.co.in
35	Operative Dentistry		Dr.	Dr Promila Verma	promilarajesh@yahoo.co.in
36	Oral & Maxillofacial Surgery		Dr. Shadab Hussain	Dr US Pal	uspalkgmu@yahoo.co.in
37	Oral Pathology & Oral Medicine & Dental Radiology		Dr Shalini Gupta	Dr Shalini Gupta	sgmds2002@yahoo.co.in
38	Orthodontics		Dr. V.P.Sharma	Dr Alka Singh	
39	Pedodontics			Dr Rakesh Kumar	
40	Periodontics		Dr. Jaya Dixit	Dr Shalini Kaushal	drkaushal_09@yahoo.co.in
41	Prosthodontics		Dr. Pooran Chand	Dr Balendra Singh	balendra02@yahoo.com



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वहो है सुखावाली ॥



OFFICE OF THE REGISTRAR
C.S.M. MEDICAL UNIVERSITY, LUCKNOW.

Order No. 1636 /G.A./2009

Date 17/02/09

ORDER

In view of effective control and monitoring over disposal of Bio-Medical Waste (BMW) pertaining to different hospitals of this University the following committee, to be known as "Waste Management Committee" is hereby constituted with the approval of Hon'ble Vice-Chancellor. The committee shall meet every month or even earlier when ever required to deliberate and resolve the action to be taken by administration of the University. The committee shall resolve the relevant issues and take care of routine matters at its end.

1. Special Invitee - Prof. Dhal, HOD, Microbiology, SGPGI, Lucknow.
2. CMS/Superintendent, GM & AH, CSMMU UP, Lucknow. - Convener
3. I/c Legal Cell (Dr. Uday Mohan) -Member
4. Dr. Shailendra Yadav 9415017353 -Member
Department of Surgery (Gen.)
CSMMU UP, Lucknow.
5. Dr. K.P. Singh, Department of Pathology, CSMMU UP, Lucknow. 9415010403 - Member
6. Dr. Manish Bajpai, Department of Physiology, CSMMU, Lucknow. -Member
7. Dr. Kirti Srivastava, Department of Radiotherapy, CSMMU, UP, Lucknow -Secretary
8. Sr. Matron, GM & AH, CSMMU, UP, Lucknow -Member
9. Executive Engineer (Civil), CSMMU, Lucknow -Member
10. Senior Sanitary Inspector, CSMMU UP, Lucknow. -Member
11. Finance Officer/Nominee, CSMMU, UP, Lucknow -Member

Advisory Committee

1. HOD, Medicine, CSMMU, UP, Lucknow.
2. HOD, Obst. & Gynaecology, CSMMU, UP, Lucknow. (9839009980)
3. HOD, Surgery, CSMMU, UP, Lucknow.
4. HOD, Orthopaedics, CSMMU, UP, Lucknow.

The following members are requested to give consent to be nominated as Hon'ble member of the said Advisory Committee.

1. CMO, Lucknow.
2. Regional Officer, Pollution Control Board
3. Medical Officer for Health (M.O.H.). Lucknow Nagar Nigam

(V.P. Singh)
Registrar

Distribution:

1. Order Book.
2. Above members.
3. P.S. to Hon'ble V.C.

Annexure 3

1.0 Basic Facility Data

a. Facility name: Chhatrapati Shahuji Maharaj Medical University (CSMMU)

b. Name of key contacts

Key Contact	Name	Title
Administrator, Head, or Director	Dr. Saroj Chooramani Gopal	Vice Chancellor (VC)
Treasurer or Chief Financial Officer	Mr. Subedar Singh	Finance Officer
Chief Medical Officer	Dr. S.N.Sankhwar	Chief Medical Superintendent
Chief Nursing Officer	Mrs. R.K Gautam	Matron
Head of Infection Control	Dr. S.N.Shankhwar – Chairman	
Chief Facility Engineer or Facility Manager	Mr. Uttam Kumar	Chief Engineer, works dept
Environmental Services Manager	Done through Registrar's Office	
Other Important Contacts	Mr. V.P.Singh, Registrar Dr. J.V. Singh, Dean, Faculty of Medicine Dr. S.N. Shankwar, Chief Medical Superintendent.	Dr. Ajay Singh, Deputy Medical Superintendent and Medical Officer (Stores)
Designated Contact for the UNDP Project	Dr. Kirti???	



c. Contact information of the facility and designated contact person:

Address	Chhatrapati Shahuji Maharaj Medical University, Chowk, Lucknow, Uttar Pradesh – 226003
Telephone	Dr Kirti??
Fax	
Website (if available)	www.kgmcindia.edu
Email of Designated Contact	??
Phone of Designated Contact	??

d. General description of the facility

The King George Medical College, Lucknow India established in 1911, has been a frontrunner among medical education institutions in the country. By an act passed by the Govt. of Uttar Pradesh on the 16th Sept 2002, the college was transferred under a new university called the Chhatrapati Shahuji Maharaj Medical University (CSMMU). The institution is committed to the dissemination and advancement of knowledge in biomedical sciences and establishing itself as a centre of excellence in tertiary level healthcare in the state.

The hospital attached to the **Chhatrapati Shahuji Maharaj Medical University** is called the Gandhi Memorial & Associated Hospitals This is really a hospital complex spread over an area of 88,000 sq mts with a conglomeration of buildings housing various departments and their respective wards. Besides the main or original hospital building which houses the Radiodiagnosis, Radiotherapy, Orthopedic Surgery and ENT Departments and also the offices and surgical wards, there are separate buildings for the Tuberculosis & Chest Diseases, Medicine, Pediatrics, Ophthalmics, Obstetrics & Gynecology, Surgery (General, Neurosurgery, Plastic Surgery, Pediatric Surgery, Surgical Oncology and Urology), Psychiatry, Geriatric Mental Health, Cardiology, Neurology and Pathology, Rehabilitation & Physical Medicine, Orthopedics and Rheumatology Departments. There are also separate Outpatients Department and a new Surgical Emergency & Trauma Centre. The total number of beds are 2424 with a bed occupancy rate of 90-100%. The annual outpatient attendance is about 510,000 and the indoor admissions number about 51,000/year. The hospital provides speciality services in all branches of medicine. Patients are attended to and admissions are made round the clock. This is a Medical University hospital where all medical, surgical and



nursing care was provided free of cost. However, charges were introduced in August 2000. Patients now have to pay a nominal charge for admission to hospital and for investigations and procedures done here. In addition, patients may have to buy drugs and disposables as the hospital budget does not allow for all medicines to be supplied free to the patients. All the faculty members of the clinical departments of CSM Medical University are attached to the hospital as visiting consultants. Besides, the hospital has its own full time staff - administrative and technical. Thus the hospital is managed by some 250 Consultants, 500 Resident Doctors, 300 nurses, 63 Pharmacists, 100 technical & paramedical, 50 clerical and 1000 ancillary (Class IV) staff.

- e. Number of beds: **2424**
- f. Average occupancy rate: **110-125% (reported by VC)**
- g. Average outpatients per day: _____
- h. Hospital services offered

This is a Medical University hospital where all medical, surgical and nursing care is provided at a nominal cost. The hospital has facilities for histopathology, cytology, hematology, biochemistry, serology, microbiology, radiology including ultrasound and computed tomography, cardiac catheterisation, pacemaker implantation, balloon arterial angioplasty, Holter monitoring, electroencephalogram, nerve conduction velocity, electromyogram, evoked responses, audiometry, electroretinogram, hemodialysis, endoscopy, bronchoscopy, open heart surgery, hormonal assays etc. Neonatal Intensive Care facilities are available, as are Medical Intensive Care and Intensive Coronary Care facilities. There are 39 Operation Theatres (OTs) in the hospital including 1 emergency OT each in Surgery, Obstetrics & Gynecology and Orthopedics.

Intensive Care Units: Intensive Care Units are functional in Cardiology, Medicine, Neurosurgery, Surgery (Postoperative room), Cardiothoracic Surgery and Pediatrics.

- i. List all departments of the facility – attached as annexure
- j. Type of hospital: _____
- k. Level of hospital: _____
- l. List current policies related to healthcare waste management
- m. Take good photos of the hospital and obtain permission to publish the photos on the project website or in future project reports. Attach the photos and a scan of the signed permission. See Annex A for a copy of the permission form.



CHECKLIST OF ATTACHMENTS FOR SECTION 1:

- Signed permission to publish photographs (use Annex A form)
- Attachments of current policies related to healthcare waste
- List and brief description of photos

2.0 Baseline Rapid Assessment

Final score from the I-RAT: _____

Attach a copy of the completed I-RAT, copies of any facility policies, plans or training curriculum, and your evaluation of the tool. In the space below, cut and paste all of the questions to which the response was NO:

QUESTION

CHECKLIST OF ATTACHMENTS FOR SECTION 2:

- Copy of completed I-RAT
- Attachments to the I-RAT if not provided elsewhere
- Consultant's evaluation of the I-RAT tool and process

3.0 Information on Waste Management Practices

a. Permits

- i. Is there a national or local permitting process dealing with healthcare waste management?
_____ If YES, answer the questions below.

YES, State Pollution Control Board (SPCB) issues authorization for the operation and maintenance of Health Care Facility.

- ii. If a permit is required for waste generation, treatment, or disposal, does the hospital have a valid waste generation permit and/or waste treatment and disposal permit?

As per the Biomedical waste (Management and Handling) Rules, 1998 permit required from SPCB for waste generation, treatment and disposal. CSMMU has applied for permit from SPCB for waste generation as waste collection, treatment and disposal is subcontracted to a private party M/s S.S. Medicals CSMMU has applied for permit for the first time vide its application dated 6th April 2010; the permit is yet to be accorded.

- iii. For how long are the permits valid?

Generally the permits are for a period of one year; CSMMU has applied recently for a permit and yet to receive it.

- iv. Do the permits cover all categories and types of waste currently generated and/or treated by



the hospital?

Yes; CSMMU has applied for permit for generation of all categories of waste.

v. Is the hospital obliged to prepare an annual report to a competent authority on waste categories and their amounts?

Yes; the CSMMU management was unaware of this till date and hence no reports on hospital waste management generated and submitted to SPCB yet however, they intend to prepare reports and other documents as sought from the authorities now on.

vi. If a shipment registry or manifest system is required, does the hospital register its shipments of waste to outside contractors for external disposal operations?

The CSMMU has recently started maintaining records of the waste to be shipped by the Common Treatment Facility (CTF) operator

b. Healthcare Waste Management Organization

i. Does the hospital have a waste management committee?

Yes, it is constituted in Feb 2009

ii. Is the healthcare waste management committee included in the overall organizational structure of the hospital?

Yes, it has 10 core members and 7 advisory members

iii. Is the healthcare waste management committee composed of representatives from different sections/departments?

Yes, composition of the committee attached

iv. Does the healthcare waste management committee hold meetings regularly?

Yes, it is conducted on quarterly basis.

v. Does the healthcare waste management committee have programs / activities on proper healthcare waste disposal?

The committee has initiated various activities on waste management; the annual activities are been chalked out.

c. Procurement

i. Is there an existing supply and equipment procurement policy?_____ If YES, attach a copy if



not already included.

The CSMMU follows procurement policy of Govt. of Uttar Pradesh; no separate procurement policy.

ii. Does the hospital follow the principles of environmentally preferable purchasing (green purchasing)? _____ If YES, attach a copy of green purchasing policy if not already included.

The procurement of items is governed basically by the parameters of quality and cost. No component of green purchasing identified.

iii. Who are the decision-makers regarding procurement of hospital products?
_____ Is there a product evaluation committee? _____

A purchase Committee is constituted to look into all the aspects of procurement. The composition of the Purchase Committee is attached as annexure.

iv. What is their basis for selecting products?

The procurement of items is governed basically by the parameters of quality and cost (in that order).

v. Describe the process for procurement and receipt of products.

A ward through its sister incharge submits its requirement to the head of the department; the request is forwarded to the DMS & MO (Stores). The request needs to be put up at least 3 months prior. (In some cases, provision of emergency procurement is also available). Requests from all departments are received, the requests are compiled and tenders are floated for the mentioned requirement. The purchase committee scrutinizes the tenders and ranks them on the parameter of quality and cost (in that order). The contract is awarded to the party having maximum compliance. The various items that are ordered are received from the party and kept in central stores (central stores are 2 in no; one for medicine and another one for surgical). At the central stores, the items are inventorised and then distributed to the sub-stores (7-8 in nos). as per the requisition placed earlier, these sub stores release the items required to the respective departments and wards

vi. Give examples of green products used.

No concept of green products

d. Hospital supply inventory control

i. Who is in charge of the hospital supply inventory?

A ward through its sister incharge submits its requirement to the head of the department; the request is forwarded to the DMS & MO (Stores).the DMS & MO (Stores) authorizes for the issue of the item requested and hence DMS & MO (Stores) is in charge of the hospital supply



inventory.

ii. Does the facility have a centralized distribution of its supply inventory?

Yes; there are 2 central stores, one for medicines and other for surgicals. From these central stores, items are issued to the sub-stores and subsequently to the departments and wards.

iii. Are there inventory procedures for the distribution center and/or for all departments that maintain stocks?

Yes, records are maintained for the stock available at each of the stores, requests for new items are made when distribution centre reaches its minimum level of stock of items.

iv. Are containers, shelves, and storage cabinets containing inventory stocks clearly labeled?

Yes, central store has items stored in alphabetical order (labeling is done as per the compound name and not the brand name). However space constraint is reported which hinders proper storage of the items.

v. Does the facility keep track of its inventory? _____ If YES, how frequently is this monitored?

Yes, every 3 months the inventory is tracked. Records are maintained manually.

vi. Does the facility keep accurate track of the expiration dates of pharmaceuticals, chemicals, and other degradable products in its inventory?

Yes; on receipt of items from the company, the central store inventories the items (manual record keeping). During the inventorisation, expiry dates of the items are also mentioned. While procurement of the items, buy-back clause is also prevalent. Apart from this when the expiry dates of an item is near (atleast 3 months before), information is sent to all the nearby government hospitals informing them the availability of the medicines. These hospitals can send the requirement to CSMMU and thus excess medicines are circulated amongst the other hospitals ensuring their consumption prior to their expiry

vii. Which method does the facility use to assess and control its inventory: (a) an informal visual system (i.e., looking at shelves to determine when stocks are low and orders must be placed); (b) a periodic system, wherein stocks are counted and recorded at regular intervals and compared with the minimum desired levels; (c) a perpetual monitoring system, wherein the inventory is monitored at all times generally using a computerized system; or (d) other method (please describe)?

System mentioned vide (b) is followed.

viii. Has the facility conducted an assessment of its inventory system, including its inventory carrying cost and inventory turnover rate? _____ If YES, what is its inventory carrying cost and turnover rate?



No assessment conducted formally.

ix. Does the facility apply concepts of inventory control, such as the ABC classification system, economic order quantity (EOQ) model, FIFO (First in, First out), “just-in-time” inventory control, modified stockless inventory, etc.? _____ If YES, please describe: _____

The data from e section onwards is a ward level data

Annexure 4

Anatomy Department

The anatomy department has a dissection hall and a separate room where bodies for post mortem are kept. The bodies are preserved in 10% Formalin & the fluid gets spilled at many places. Gloves are used by the people dissecting and employees handling the cadavers. Sometimes, 2-3 post mortem of bodies are conducted in a day. Vaccination for tetanus is given to the staff. Hepatitis vaccine is given to students entering in new batch every year i.e., from August / September. Posters can be seen in the Dissection Hall & the Anatomy Notice Boards.

Geriatric Mental Health

This department has:

1. Male ward
2. Female ward
3. Private ward

There are total 22 beds in the department. There are 5 nurses, 4 ward boys / sweepers and 2 aayas. The gloves used by the staff are not reused and disinfectants such as Lysol, Phenyl and Carbolic Acid are used for disinfection of instruments and fumigation and floor cleaning. There is one hub cutter which is kept near the nurses' table. The fluids spilled are cleaned with Lysol and Carbolic acid.

The needle stick injuries are very rare. No vaccination is given to the staff for prevention against infections. There are no posters in the department and also no training has been conducted here so far.



The waste generated is disposed in black, red and blue coloured, medium sized bins kept near the bathroom or outside the ward. The waste is collected once in a week and there is no fixed time of waste collection. The bins are rarely washed.

Annexure 5

Observations of various departments of KGMC on 13th April 2010 w.r.t. HCWM

- Mr Manoj, PRO of KGMC reported that the waste collection staff of SS Medical System sometimes does not wear uniforms. They also do not have ID cards. The matter is reported to Mr Billal from S S Medicals, and he ensured corrections from his end.
- There is no fixed timings of waste collection. Mr Billal was asked to furnish schedule of waste collectors with the details of duty schedule of waste collectors with names.
- Cleanliness of the waste collection bins not done on regular basis. It is conveyed that it is the primary responsibility of the sister in charge.
- In most of the wards, the waste collection bin set i.e. 1 black, 1 blue and 1 red are kept in bathrooms. Blue and red bins are to be kept in the custody of the nursing staff while general public to have access to black bin.
- There are no proper signages, posters throughout the hospital. Need is felt that illustrative posters to be provided wherever required.
- In many of the OTs it is found that the kgmc staff does not give waste to the waste collection staff. The waste collection staff has to go inside OT premises to take it. Earlier, the kgmc staff used to give the waste outside the OT premises to the waste collection staff however eventually they deferred from this practice.
- Majority of places do not have double bucket container meant for disinfection of sharps.
- CTF staff also complained of shifting of locations of bins from the designated locations.
- The staff of kgmc are unaware of general protocols like sweeping, infection potential, spill management etc. in one of the post op wards, one sweeper was found to broom the floor all the way within ward to general area. The waste contained blood soiled waste, syringes etc. thus while sweeping, the blood stains were spread all over the floor through which sweeping was done spreading infection all over. It is required that all these protocols need to be documented and circulated in all the staff.
- In most of the wards, sweepers reported that nursing staff do not segregate waste; nurses ask the sweepers to segregate the mixed waste.
- In many of the wards, trolleys are used for dressing of the patients. These trolleys has a small bucket which is meant for storing the waste generated from dressing of the



patients. It is suggested that this bucket to have a red liner where in the infected waste to be stored which later on to be disposed off in the bigger red bin.

EMPIMA WARD

- Empima ward – 1st floor non operational, 2nd floor has only 1 blue bin, 3rd floor has only 1 red bin and 4th floor has only 1 black bin.
- In majority of the wards as all bins are placed in the bathrooms or places easily accessible by the general public, the plastic bags are found to be filled with excessive water. People are found to spit in the bins; many times urine and faeces are also found to be disposed off in the bins.
- Waste collection receipts are handed over by the waste collectors to the nursing staff without filling the info as the waste collectors are illiterates. Since the KGMC staffs are overworked, it is advised that the receipts to be filled up by the collection staff itself and only signature of the kgmc staff to be received on the receipt.

UROLOGY DEPT

- Urology dept 1st floor has all offices and 1 lithotripsy investigation room. Office rooms have small dustbins which are emptied in common dustbin. The waste from investigation is also disposed off along with general waste.
- Near pantry has 1 yellow bin.

GENERAL SURGERY WARD

- General surgery ward- day care OT only has 1 black bin. The staff confirmed that one red **bucket** is present in which sharps and anatomical waste is disposed off in it. The staff also complained that there is no fixed time for waste collection nor the waste collection staff gives receipt of the waste collected.
- General OT-Minor OT- 2 in no has 2 red bins, 1 blue and 1 black.
- General surgery OT 3 (inside oncology OT) has only 1 blue bin. The staff reported that the waste collection do not occur regularly. Further, they want collection between 8.30 am to 9 am
- General surgery post op ward has bins kept inside bathroom.
- Basement of surgery dept staff reported that paediatric (surgery) ward throughs waste from upper floor.

GASTRO ENTROLOGY OT3

- Waste collectors have to jump through window to collect waste. A proper entry to be provided to the waste collectors for waste collection.
- This location has 2 bins only- one blue and 1 black.

PAEDIATRICS Surgery Ward

- Has only red bin which is moved from pediatric ward.
- From this ward, waste is thrown in the basement.



Pediatric ward

- Bins are kept inside bathroom; the bathroom has open leaking tap and the whole bathroom is filled with water. This has also resulted in filling of bins with water.
- This location has 1 blue and 1 black bin; the red bin from this location is moved to paediatric surgery ward.

Neurosurgery Ward - Male

- Have 3 bins- blue, black and red. Sister In charge reported that 2 days back only 1 bin was present.

Neurosurgery Ward - Female

- Have 2 bins- one black bin in bathroom and 1 blue near nursing station.

Neurosurgery Post Op Ward

- Only 1 black bin present.

Neurosurgery OT No 1, 2 & 3

- 3 bins are reported to present at this location.
- Even after repeatedly asking, the kgmc staff was not giving waste although the bins were full.

Plastic Surgery Female Ward

- Only 1 black bin which is located at bathroom.

Plastic Surgery Male

- 1 black bin in bathroom.
- 1 blue, 1 black and 1 red in common waste storage area of ground floor.
- Main corridor of plastic surgery and special / private ward has one black bin wherein the staff disposes biomedical waste.

Plastic Surgery Major OT – 2nd floor

Have 4 bins – 2 red, 1 black and 1 blue

Plastic surgery office area – 3rd floor

- Has 1 black bin as only offices located.
- Also has 1 red bin which needs to be replaced with black.

CHDS - PAEDIATRICS

- One foot operated blue bin.
- Backside area has 2 black, 1 red and 1 blue bin. Nurses reported that at this location only black bin required hence the red and blue could be replaced with black bin.
- Nursing staff maintain daily waste collection record.

Paediatric ICU

- Has red, blue and black bin.



- Nurses want sharp cutter and double bucket system.
- Paediatric ICU entrance is a common area and has 1 black bin.
- Basement of paediatric reception / office has 1 blue which to be replaced with black bin.

NICU

- In front of NICU, 1 BLACK bin given
- Bathroom area of NICU has 1 blue, 1 red and 1 black bin.
- Private ward of NICU has 1 blue, 1 red and 1 black bin.

Cancer Ortho (adjacent to NICU)

Bathroom area has 2 sets of bins (i.e. 2 blue, 2 black and 2 red)

Trauma Centre

- Pathology of trauma at ground floor has 2 blue bins only.
- Ortho OT 1 has 1 set bin.
- Ortho ward has 2 red bins only at 2 different locations.
- Ground floor of trauma centre has 1 black bin.
- Emergency medicine unit has 1 black, 1 blue and 1 red bin in front of bathrooms. This location is ok.
- Trauma centre ground floor near lift area has 1 black bin.
- Trop T & ABG lab has 1 blue bag.
- In front of trauma neurosurgery entrance 1 black bin is provided.
- Inside trauma neurosurgery dept, 1 blue, 1 black and 1 red present.
- RSO ward near entrance has 2 blue, 2 red and 2 black bins; red and blue bins accessed by general public.
- In ESW, near bathroom 2 blue, 1 red and 2 black bins are provided.
- Trauma centre OT 4&3 has 4 red and 2 blue bins.
- Ortho OT 2 has 1 black and 1 red bin.
- Neurosurgery OT 1 has 1 blue and 2 red bins
- Paediatrics has 1 blue, 1 black and 1 red bin.

Queen Mary's Hospital

- While in rest of the departments' of KGMC, only black bin should be accessed by general public, in QMH both red and black needs to be accessed by patients and their residents.
- PPOT needs 1 black bin.
- In the infertility & ART centre neither bins are provided nor waste collection is initiated.
- PV room has no bins; 1 small set of bins required.
- Post natal ward has been given 1 set of bin but this set is kept out of reach in the interior and hence not used for waste disposal.
- NNU procedure room doesn't have any bin right now.

Annexure 6

Sample

Day 1											
Date	S.No	Source of Generation			Quantity of waste generated (kgs) Morning					Signature of the in charge	remarks
		Ward / working station	Dept	Segregation	Red bins	Blue bins	Black bins	Sharps waste	any other waste		
13.04.10		Ophthalmology OT	Ophthalmology			6	4				
		Ophthalmology OT In side			4	7	5				
		Ophthalmology Female ward			24	1					
		RT Male Ward	Radiotherapy	Y		6	4				
		RT OT					2				
		RT Female Ward			10	6	6				
		Ophthalmology Male ward	Ophthalmology			4	7				
		Surgical 8 Gastroenterology	Gasto Surgery		10	18	16				Register not maintain
		Surgical 7	General Surgery		14	32					
		Private Ground Floor	Private Ward		8	8	10				HUBCUTTER
		Private 1st Floor			12		18				No Black
		Private 2nd Floor			8	10	5				No Sharp Container
		Oncology			20	8					No Black
		Surgical 2	Ortho		18	22	16				
		Surgical 3	ENT		26	22	30				
		Surgical 4	ENT		5	16	27				No Training
		KCH Ground Floor	TB & Chest		8	6	14				
		KCH USM/USF			8		22				No Blue bin
		KCH NBUS ward				8	16				No Red bin
		KCH NBDS ward				6	16				No Red bin
		Total			175	186	218				