

# Republic of Iraq

Ministry of Planning and Development Cooperation  
Central Organization for Statistics & Information  
Technology

Environmental Statistics Directorate

Kurdistan Region Statistic  
Office

Ministry of Health



## SUMMARY REPORT OF:

# “ENVIRONMENTAL SURVEY OF MEDICAL SERVICES ACTIVITIES IN IRAQ IN 2008”



# Republic of Iraq

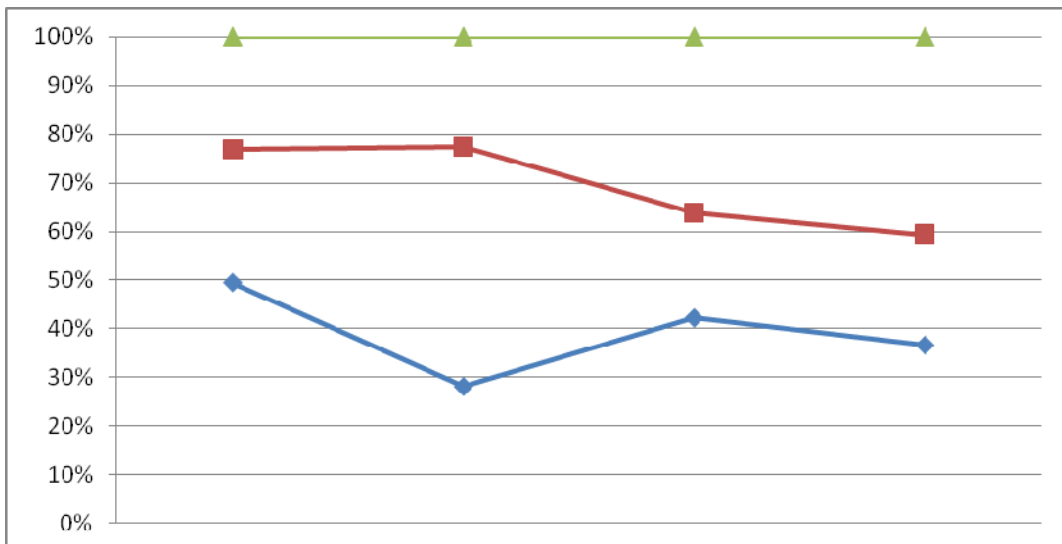
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August, 2009

# Environmental Survey of Medical Services Activities in Iraq in 2008

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## **1- Preface**

### **1.1 Introduction**

Medical services sector provides citizens with health care through the services it offers in fields of examination, treatment and surgery. While this sector endeavors to protect citizen's health and prevent spread of disease, it might be a cause of effecting health and environmental hazards. This could happen if proper and safe methods are not applied in handling waste which is generated in the course of carrying out day-to-day work, and also, if such waste is not disposed of in an appropriate manner whether inside or outside health facilities. In particular, hazardous waste, containing pathological and infectious agents, and chemical and radioactive wastes may pose health hazards to patients and workers inside those facilities, and to the community and environment if such wastes are mixed with the rest of health facility waste and disposed of to the external environment without carrying out the necessary treatment.

Hence, it has become essential to identify the amounts of waste generated and the methods applied in its collection, segregation, transportation and disposal. It is essential, as well, to identify the amounts of water consumed and wastewater generated, including treatment used to dispose of the latter, methods of dealing with gaseous pollutants resulting from waste incineration, workers in this field and the level of environmental awareness they have. All of that can be achieved through conducting an extended survey that includes health facilities. This survey is considered the first of its kind in Iraq.

### **1.2 Survey objectives**

This survey aims to provide a database on all aspects relevant to the actual picture of health facilities environment through the following indicators:

- 1- Number of health facilities by types, number of wards and operating theatres,
- 2- Number of inpatients, outpatients, days of inpatient care and bed occupancy rate,
- 3- Number, amounts and types of commodities requirements used and consumed at health facilities,
- 4- Volume of consumed water and generated wastewater and wastewater disposal methods,
- 5- Amount of waste generated (hazardous or ordinary), disposal methods, waste collection and transportation and regulations implemented in waste management,

# Environmental Survey of Medical Services Activities in Iraq in 2008

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6- Number of working cadres and the level of their educational qualification and environmental awareness,

7- Amounts and costs of fuel and power consumed at health facilities and costs of waste treatment.

## **1.3 Anticipated results and benefits from the survey**

1- Assessment of Governorates population needs for either new health facilities, or just expansion and development of existing ones, depending on results and statistics of bed occupancy rate and number of patients,

2- Identification of the actual need for the most commonly used material and medical requirements,

3- Identification of the need for waste incinerators and sterilization equipment for reusable medical instruments, or any other modern equipment that need be imported for waste treatment, or prevention of environmental pollution,

4- Identification of volume and sources of water used in health facilities, and methods of disposal of wastewater. This is required to determine the actual need for safe water, and endeavor to make filtration and treatment units available, should the necessity arise,

5- Provision of data on amounts of ordinary and hazardous waste, its collection and transportation requirements and treatment method used. This is meant to help develop waste management systems and provide high tech treatments,

6- Identifying number of cadres working in this field and the level of personal protection, environmental awareness and education they have. This is intended to work on promoting worker's efficiency and protecting him from occupational hazards,

7- Determination of the actual need of energy required for health facilities in order to provide quality services.

In light of the above, this survey provides an opportunity for decision makers from environmental and health entities to evaluate health facilities, work on upgrading its environmental condition, lay down new regulations pertinent to waste management, prepare programs aimed at raising the awareness of workers involved in those facilities and lay down, or upgrade guidelines and legislations and anything else that aims at the provision of quality services for patients and prevention of hazards to human health and environment ,that could result from these activities.

# Environmental Survey of Medical Services Activities in Iraq in 2008

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## **1.4 Problems and challenges**

Execution of survey had been through problems and challenges basically attributed to modernity of survey, unavailability of forms or a lack of past primary comprehensive database on such type of specialized surveys.

The following is a summary of the most important problems and challenges:

1- Gross deficit, at health facilities administration, in data documentation and formal records of types of waste and amounts of generated and incinerated waste,

2- Because of unavailability of water bills at most health facilities, estimation of water consumption was based on the number of water storage tanks in those facilities and the frequency of filling in tanks per day,

3- Difficulty in obtaining the required data because of routine procedures existing at some health facilities; a factor that delayed receiving survey forms,

4- Difficulty in obtaining precise technical information on incinerators specifications due to lack of necessary expertise among the majority of workers in hospitals, especially those in charge of incinerators,

5- Deficiency of required experience of employees of Environmental Statistics Directorate. In addition, there was a need for information about the experience in surveys of other countries which have experience in this field. This problem was the major challenge encountered by the directorate in auditing the logicity of data.

## **2- Research methodology and survey execution**

### **2.1 Level of representation**

The survey included all State and private hospitals, central health laboratories, chest disease clinics, specialized dental centers, allergic diseases and asthma centers, specialized health centers, forensic medicine and blood banks. In addition, it included general health centers (main centers only). The survey included (197) State hospitals, (80) private hospitals and (669) other health facilities. In addition, there are (43) health facilities that are either non functioning, or undergoing rehabilitation. The survey was conducted at the level of all Governorates of Iraq, including Governorates of Kurdistan Region.

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## 2.2 Questionnaire form

Due to the modernity of this type of survey in the Central Organization for Statistics and Information Technology, the survey questionnaire attained great importance. It was prepared in light of questionnaires of medical environmental surveys which were executed in some countries. The questionnaire was presented to a number of national and international experts and entities to enrich it with their opinions and knowledge. Of those entities are:

- 1- Ministry of Environment.
- 2- Ministry of Health.
- 3- United Nations International Children Fund (UNICEF).
- 4- World Health Organization (WHO).
- 5- Environmental Statistics Directorate / Jordan.
- 6- National Accounts Directorate / Central Organization for Statistics.
- 7- Social Statistics Directorate / Central Organization for Statistics.

Moreover, a local environmental expert was contracted to prepare the final draft of the form, examine data logicality, analyze statistical data and participate in the preparation of the final report.

## 2.4 Training

Training process of technical cadres attained great importance. It was not limited to technical cadres only, but included, as well, committee members, central supervisors, clerical auditors and data processors. In addition, a team of two field researchers participated in the field work; One of them was an employee at the Central Organization for Statistics and Information Technology, the other researcher was employed at the Ministry of Health in Baghdad and Governorates.

## 2.5 Steps of work execution

Steps of work execution are briefed as follows:

- 1- Preparation of a primary plan encompassing detailed objectives, time schedule and mechanism of work,
- 2- Field work. Depending on the volume of work allover Governorates of Iraq, field work continued for a (20-25) days period. A transportation vehicle was allocated to members of field teams and central supervisors,

## Environmental Survey of Medical Services Activities in Iraq in 2008

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3- Clerical work: After the completion of field work, questionnaires were subjected to a series of clerical work, the most important of which were checking the logicity of provided data, coding the questionnaires, data entry into the computer using Oracle program and the final data processing,

4- Results checking. This step passed through the following stages:

- \* As a preliminary stage, data logicity was checked by survey expert and Environmental Statistics Directorate,

- \* Results were presented to the higher committee of survey. The committee submitted its suggestions and comments. Corrections were performed in light of what was provided by the said committee,

- \* Ministry of Health. A technical committee was formed in the Ministry of Health. The committee reviewed the survey reports and provided its comments,

- \* Ministry of Higher Education and Scientific Research,

- \* Experts from World Health Organization (WHO),

- \* Social Statistics Directorate at the Central Organization for Statistics.

### **7- Analysis of results**

After extraction of tables of environmental survey of medical services activities in Iraq, the following was shown:

1- Number of health facilities included in the survey totaled to (946) of practically functioning facilities. In addition, a small number (43) of health facilities were either non functioning, or undergoing rehabilitation.

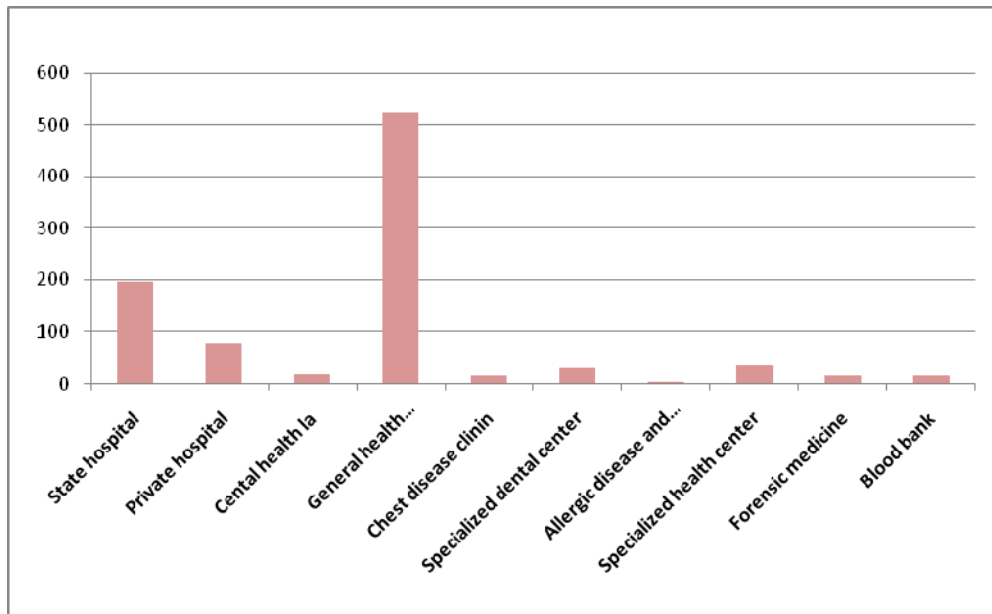
The survey covered all State hospitals in Iraq Governorates that summed up to (197) hospitals, the majority of which, or (39) State hospitals, were centrally located in Baghdad. Sulaimanya came next with (21) State hospitals, and the least number of State hospitals was in Al Muthanna Governorate with (4) hospitals; the reason for this small number is the small population of Al Muthanna compared with the rest of Governorates.

In addition, the survey covered private hospitals that totaled to (80) hospitals. Of this number (35) hospitals are in Baghdad. Private hospitals are available in all Governorates except Misan.

# Environmental Survey of Medical Services Activities in Iraq in 2008

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**Number of health centers by type**



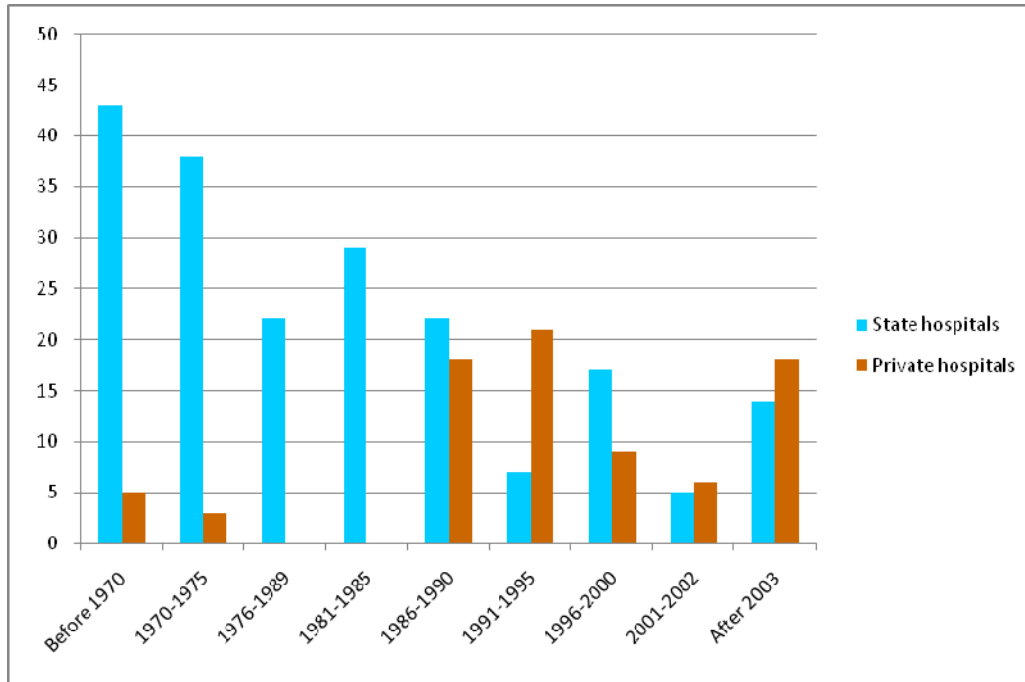
The number of main health centers summed into (523) centers. It comprised (108) general health center (Main) in Baghdad Governorate, followed by Ninawa and Sulaimaneya with (43) center in each. The least number of those centers was in Diala Governorate with (11) centers (Main). Other health facilities included in the survey were (146) health center comprising central clinical laboratories, forensic medicine, blood banks, specialized health centers ..... etc.

2- The growth of the construction of State hospitals attained its peak in the seventies. The number of newly constructed State hospitals then totaled to (60) hospitals. Afterward, the number started a decline that continued till the current decade. That was attributed to a decline in health development projects because of the sanctions and war conditions.

It is noted that after 2003, only 14 State hospitals were constructed, most of which concentrated in Sulimaneya and Erbil.

# Environmental Survey of Medical Services Activities in Iraq in 2008

**Number of State and private hospitals by year of construction**



3- Most private hospitals were constructed late in the eighties and nineties in all Governorates. It is also noted that no private hospital was constructed in the period (1976-1985), but after 2003, (18) private hospitals were constructed; 8 of which in Kurdistan Region.

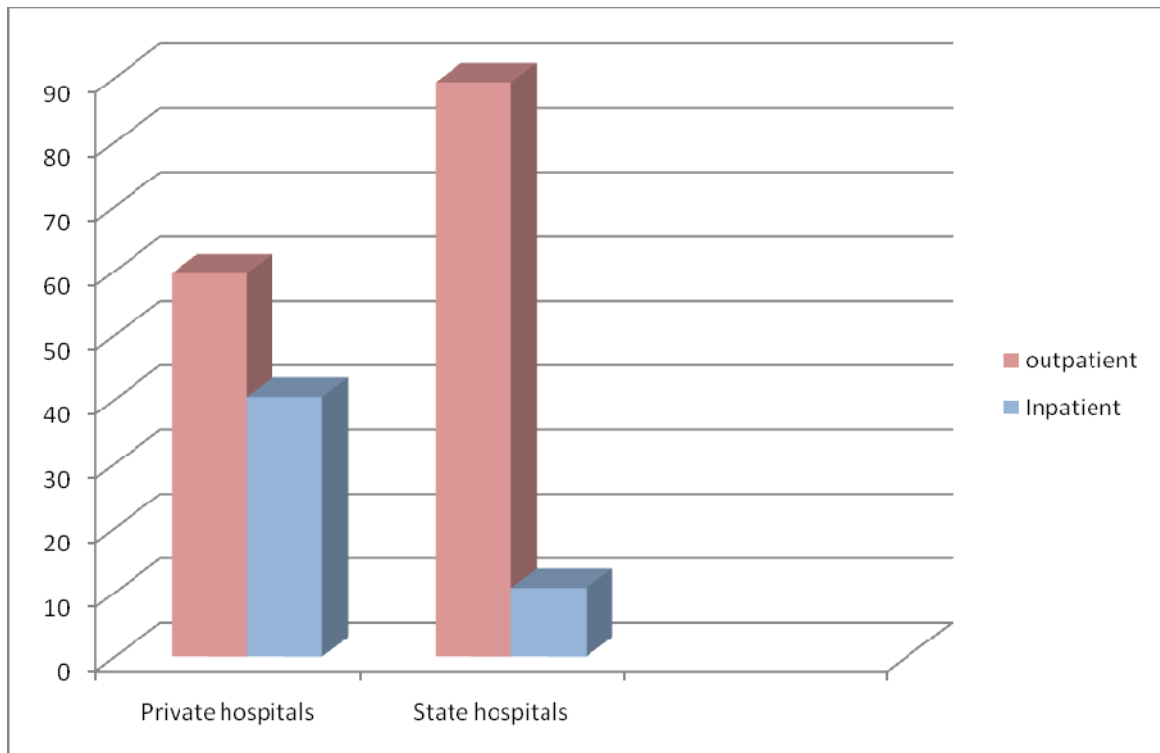
4- Number of male and female inpatients in State hospitals in the period 1 Jan., 2008 – 30 June, 2008 totaled to (1190881), while the number of male and female outpatients in State hospitals in the same period was (9972138).

Number of male and female inpatients in private hospitals in the same period was (91348), while outpatients' number was (134954) with a higher percentage of females in inpatients and outpatients in both types of hospitals.

The percentage of Inpatients of the total number of patients (Inpatients and outpatients) in State hospitals was (10.7%), while the percentage in private hospitals was (40.4%). It could be inferred from such data that State hospitals receive large numbers of outpatients seeking examination and treatment because of limited charges and availability of medications. In private hospitals, outpatients' number decreases and inpatients' number increases because of the nature of health services offered at those hospitals which is in the form of surgical operations and deliveries.

# Environmental Survey of Medical Services Activities in Iraq in 2008

**Percentage of inpatients and outpatients in State and private hospitals**



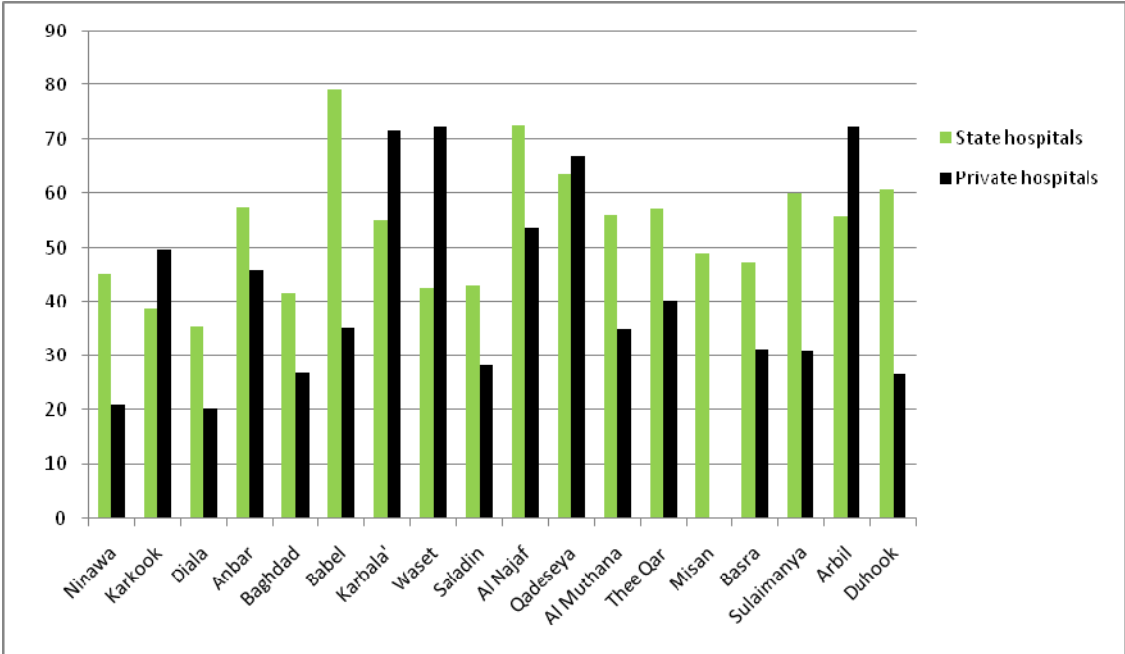
5- The bed occupancy rate at State hospitals was (49.8%), while at private hospitals the rate was (34.8%). The highest bed occupancy rate at State hospitals was in Babel Governorate where it hit (79.1%), and the least (35.5%) was in Diala Governorate.

Bed occupancy rate is calculated according to the following formula:

$$\text{Bed occupancy rate \%} = \frac{\text{No. of in hospital days of all patients in the 6 months period}}{\text{No. of beds equipped for inpatients X 182 days}} \times 100$$

# Environmental Survey of Medical Services Activities in Iraq in 2008

**Bed occupancy rate at State and private hospitals**



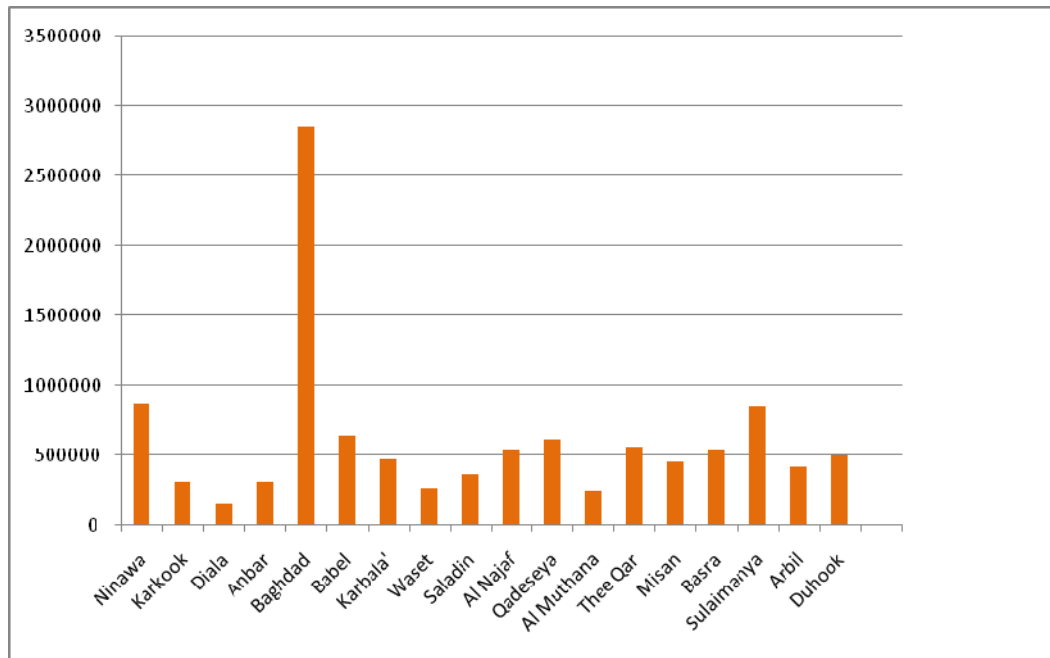
6- In the six months period, the outpatients' number at other health facilities included in the survey (except hospitals) totaled to (10944390). The variation in numbers among Governorates is obvious. Baghdad Governorate had the largest number of outpatients where they summed into (2857377), while the least number was in Diwala Governorate where it was (147785).

The number of outpatients at general health centers (main) was (9352994), and outpatients at forensic medicine was (18415).

## Environmental Survey of Medical Services Activities in Iraq in 2008

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**The number of outpatients at other health facilities**



7- The volume of used water at State hospitals in the six months period was (2.4) million cubic meters, while at private hospitals it totaled to (0.16) million cubic meters. The volume of water consumed per patient at State and private hospitals was (211) and (698.8) liter / patient respectively. The consumption depends on the nature of work of those hospitals, kind of health services offered and type of patients. At private hospitals, the majority of patients are inpatients accompanied by escorts, and health services are mainly surgical operations and deliveries, whilst at State hospitals, the majority are outpatients. It is to be noted that the term "used water" comprises all uses of water including drinking water, water for cleaning outside yards and cooling water, if available.

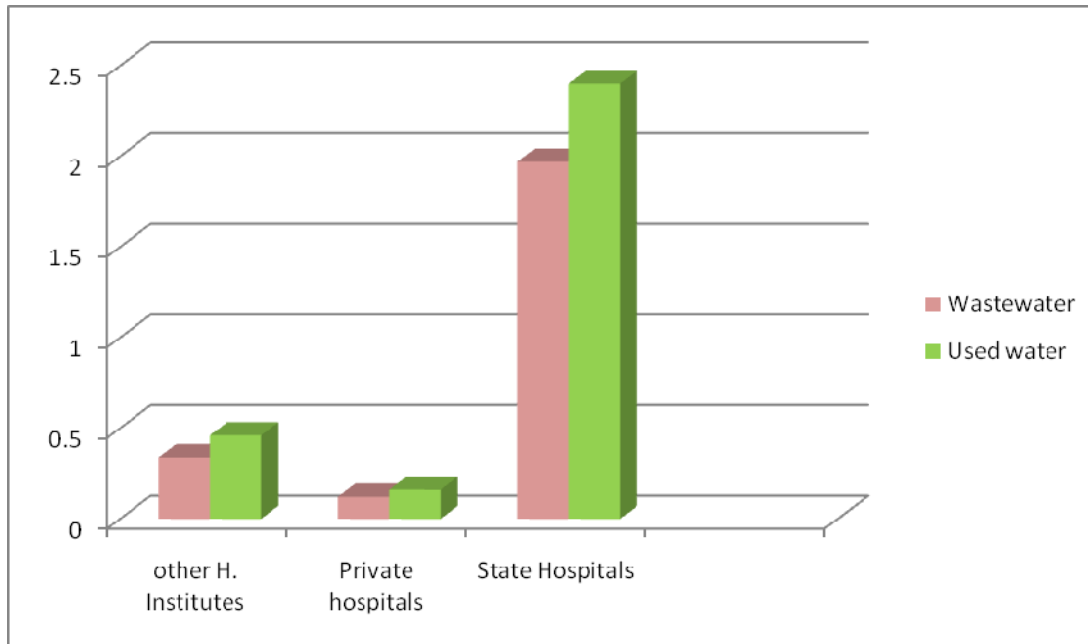
The volume of used water at other facilities was (0.46) million cubic meters. This indicates that the patient's consumption of water per day was (40) liters, noting that all patients were outpatients.

The most common source of water used at all health facilities, including hospitals, is the network of running water. Kurdistan region is famed for utilization of wells water as an additional source.

# Environmental Survey of Medical Services Activities in Iraq in 2008

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**Volume of used water and wastewater at State and private hospitals and other health facilities /Million Cubic Meters**



8- The volume of wastewater generated at State hospitals in the six months period was (1.97) cubic meters, of which ( 0.2% ) was treated at treatment units, (70.6%) was discarded to sewer network and (15.4%) was collected in sealed septic pits.

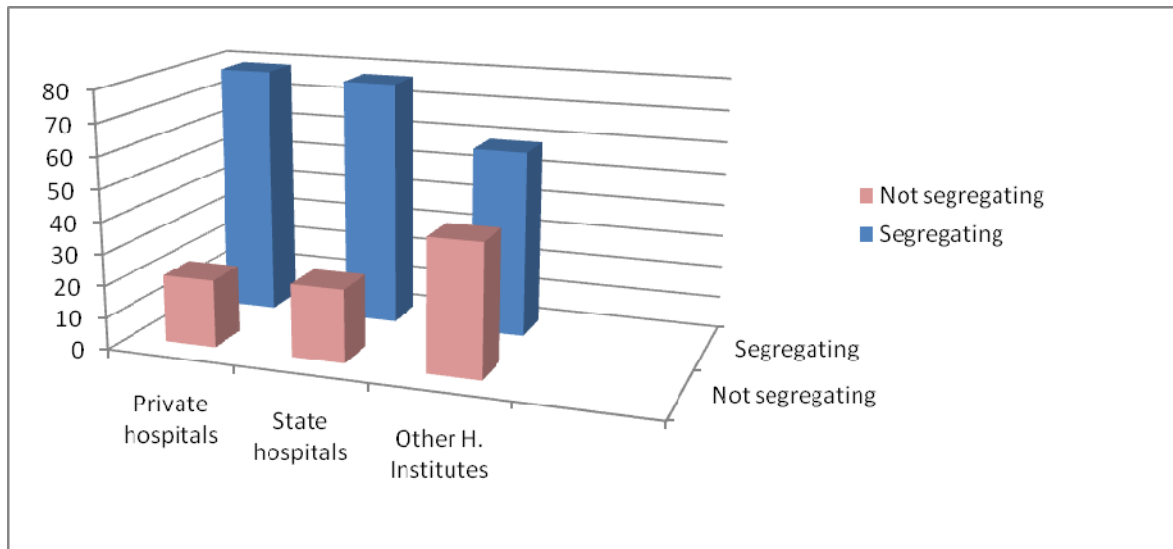
The amount of wastewater in private hospitals in the six months period totaled to (122.7) thousand cubic meters; (80.8%) were discarded to sewer network and (18.4%) were collected in sealed septic pits.

The wastewater amount at other health facilities totaled to (338) thousand cubic meters, of which (70.2%) was discarded to sewer network, and (25.5%) was collected in sealed septic pits.

It is worthy to mention that there is no treatment, at all, of wastewater generated at private hospitals and other health facilities. The percentages shown have serious significance, because most of the generated wastewater drains into sewer network and, subsequently, to rivers without any treatment of its hazardous contents.

## Environmental Survey of Medical Services Activities in Iraq in 2008

**Percentage of health facilities implementing / not implementing regulations of segregation**



9- State hospitals committed to segregation of medical hazardous waste separate from ordinary waste constituted (77.1%), whilst the percentage of commitment to segregation of private hospitals was (78.7%). The rest of health facilities were committed to segregation in (58.6%) of cases. Percentage of Commitment to segregation differs among Governorates. Segregation by implementation of color coding is dependent on type of health facility; whether a State or private hospital, or a health center ....etc.

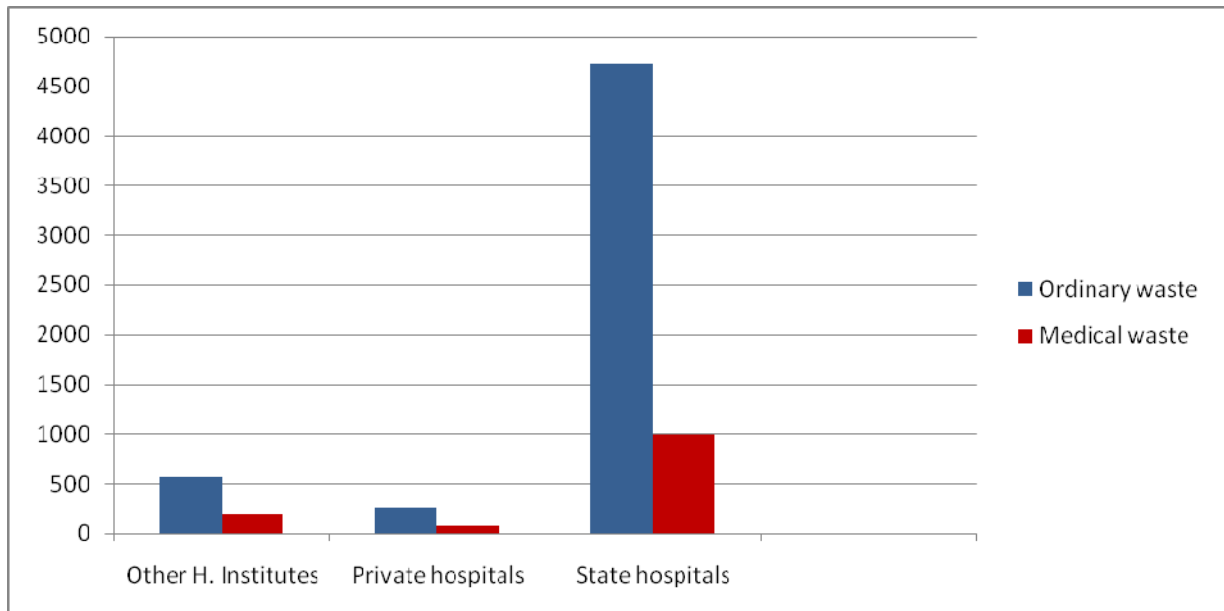
Yellow color, which is the color approved by WHO, was noted to be the most commonly used for bags and hazardous medical waste containers

10- The amounts of ordinary waste disposed by State hospital in the six months period was (990) thousand Kg., or (5.4) thousand Kg. per day. Private hospitals disposed (76.4) thousand Kg. in the six months, or (0.4) thousand Kg. per day. The rest of health facilities disposed (194) thousand Kg. in the six months, or (1.3) thousand Kg. per day.

The most common method of final disposal of hazardous waste used in State hospitals and other health facilities is incineration in private incinerators located onsite. In private hospitals, the most commonly used method is incineration outside the location in a central incinerator.

# Environmental Survey of Medical Services Activities in Iraq in 2008

**Amounts of medical and ordinary waste generated at health facilities in six months (Ton)**



There is an amount of radioactive waste totaling to (76) Kg/day that is generated at hospitals specializing in the nuclear medicine and treatment of tumors. Those hospitals are located in Baghdad, Ninawa and Kurdistan region. Though of a relatively small amounts compared to the total waste generated by all health facilities, yet such waste is considered very hazardous due to the hazardous nature of its constituents and the long standing effects on human and environment.

11- In the six months period, the amount of ordinary waste disposed by State hospitals summed into (4.7) million Kg. or (26) thousand Kg. per day, while private hospitals disposed (252) thousand Kg., or (1.4) thousand Kg. per day. Other health facilities disposed (559) thousand Kg., or (3.7) thousand Kg. per day.

12- Further to the above mentioned information about waste segregation, only (45) State hospitals, or (22.8% of all state hospitals) , (17) private hospitals, or (21.3% of all private hospitals) and (227) of other health facilities, or (41.4% of all other health facilities included in the survey), do not implement the regulation of waste segregation. Noting that the majority of health facilities included in the survey lacked records of data documentation.

In the six months period, the total waste disposed by State hospitals not committed to the regulation of waste segregation (unsegregated waste) amounted to (522) thousand Kg., or (2.9)

## Environmental Survey of Medical Services Activities in Iraq in 2008

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thousand Kg. per day, private hospitals disposed (82.5) thousand Kg. , or (0.4) thousand Kg per day and other health facilities disposed (424) thousand Kg., or (2.8) thousand Kg. per day. Being unsegregated, such wastes should be handled as hazardous waste. However, the most common method used in the disposal of this waste is handing it to the municipality for either landfilling or burning.

13-According to WHO sources, the ratio between hazardous medical waste and total waste at health facilities that segregate the waste ranges between (10%-25%). Reviewing the survey results shows that the ratios at State hospitals, private hospitals and other health facilities were 17%, 23% and 25% respectively, which is within the averages shown above.

The amounts of generated total waste / patient / day at State hospitals and private hospitals are (0.6) Kg. and (1.8) Kg. respectively.

The amount of waste generated by inpatients at State hospitals and private hospitals is (5.2) Kg. and (4.5) Kg / inpatient / day respectively.

The amount of total waste generated per bed at State hospitals and private hospitals was (1.02) Kg. and (1.01) Kg. / bed / day respectively. Comparing these figures with international data shows that the amount of generated waste / bed / day at health facilities of East Mediterranean Countries, according to WHO sources, is (1.3-3) Kg. / bed / day.

The amount of waste generated / bed / day in Tehran hospitals is (2.7) Kg. and in hospitals of Dhaka, Bangladesh is (1.93) Kg./bed/day and (0.52) Kg./patient/day.

It is noted that the amount of generated waste per bed or patient per day varies among countries, depending on population culture and type and level of health services offered.

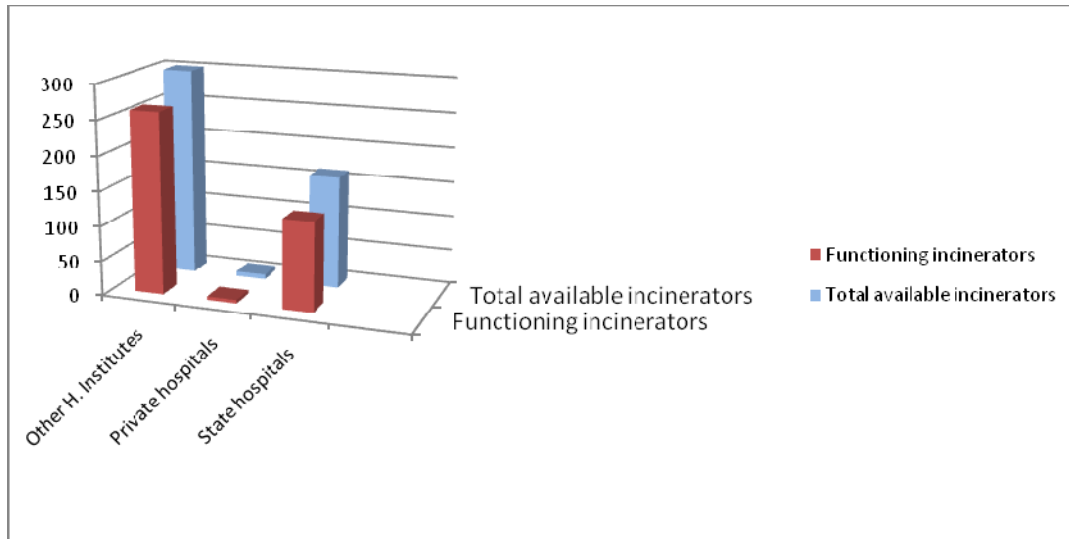
14- The number of workers in charge of waste collection and transportation services at State hospitals summed into (3712) workers; those trained on the hazards of wastes constituted (35.5%). At private hospitals, the number was (339) workers with the percentage of trained workers amounting to (26.2%), while in other health facilities, the number of workers was (2280); with trained workers constituting (16.4%).

15- The number of incinerators at State hospitals totaled to (162), of which (128) incinerators were functioning and (94) incinerators conformed to environmental standards. At private hospitals, incinerators summed into (7); (5) functioning and (3) in conformity with Environmental standards. Finally, there were (261) incinerators in other health facilities; (261) functioning ones, and (79) incinerators conforming to environmental standards. This data is according to the information provided by the administrations of health facilities.

# Environmental Survey of Medical Services Activities in Iraq in 2008

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## Total number of incinerators and number of functioning incinerators in health facilities



16- The estimated amounts of incinerated waste in the six months are (2.27) million Kg. in State hospitals, (28.4) thousand Kg. in private hospitals and (546) thousand Kg. in other health facilities.

17- The costs, in million Iraqi Dinars, of requirements used in waste management in the six months were (1526.1) in State hospitals, (103.4) in private hospitals and (487.9) in other health facilities.

The total costs in the six months period, in million Iraqi Dinars, of waste treatment, including requirements used in waste management, labor wages and the value of yearly depreciation of used equipment, were (5447.3) in State hospitals, (642.4) in private hospitals and (3573.1) in other health facilities.