

# Investigation and analysis of medical waste generation in Enshi area of Hubei Province, China

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**Abstract.** Based on medical waste collecting data of Enshi medical waste disposal center. The generation of medical waste and its change trend in Enshi area were both studied. The influencing factors and changing rules of medical waste generation were also analyzed. It can be found that the amount of medical waste in Enshi area is increasing year by year, the average annual growth rate of about 6.14% between 2011-2014. It was also found that the output of medical wastes varied regularity by seasons. February was the lowest month for medical waste, March and July were the peak months. By statistical analysis, average annual medical waste production per 10000 people was 4.5 ton and per bed average annual production was 133.58 kg.

## 1. Introduction

Medical waste is hazardous waste, more and more attention had been attracted to medical waste management and safely disposal in many countries. In December 2008, Asian countries held an international conference on health policy in Asia and medical waste management at the university of Tokyo[1], calling for treatment of medical waste in the world. The related literature about medical waste the management and treatment in many countries, such as Greece[2], Sudan[3], Iran[4], provided useful references for the management and disposal of medical wastes in local and other countries.

Since the outbreak of SARS in 2003, China began to focus on medical waste disposal and to build medical waste centralized treatment center in many area. Before each medical waste treatment center is constructed, it is necessary to estimate the amount and generation trend of local medical waste. This paper analyzes the data of medical waste collection in Enshi area of 2012-2014 years, the regularity of medical waste generation and its influencing factors were studied, in order to provide reference for similar project.

Enshi area is located in the west of Hubei province, local population is of 3.29 million, the geographical area is of 24,000 square kilometers. A centralized medical waste treatment center had been finished in 2008, which adopted steam sterilization technology to treat medical waste. Due to longer operating time and perfect management system, medical waste within the region can be fully collected and treated. Therefore, the project is representative.

The data used in this paper was the actual collection records of Enshi medical waste treatment center. Includes the total amount of medical waste collected between 2012-2014 year and the monthly medical waste generated by each hospital.



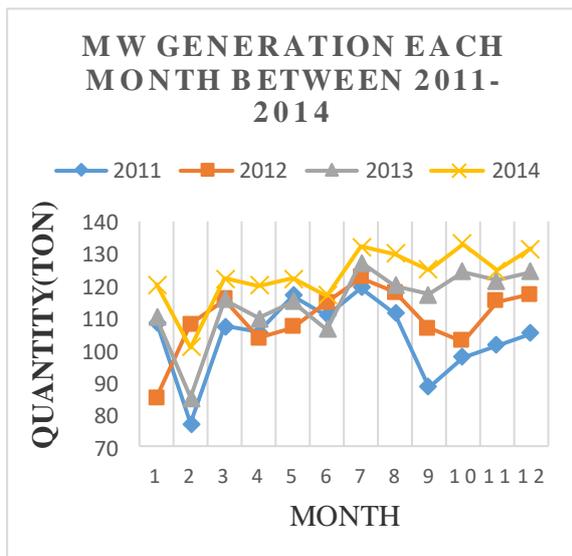


Figure 1. Medical waste generation each month between 2011-2014 in Enshi area

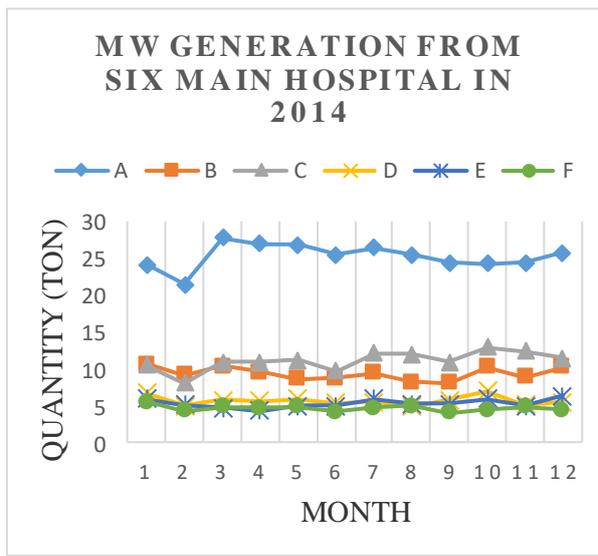


Figure2. Medical waste generation in six main hospital in 2014

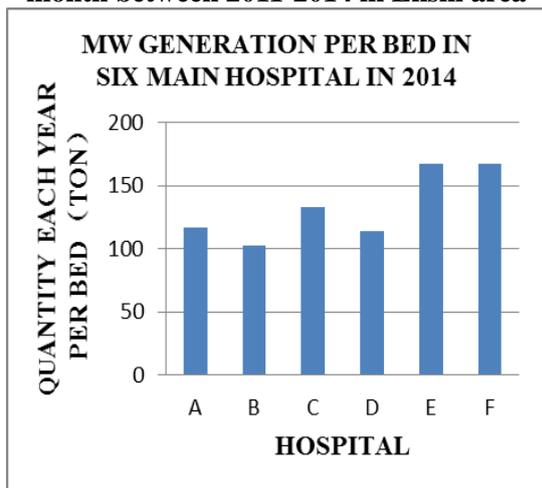


Figure 3. Medical waste generation per bed in six main hospital in 2014

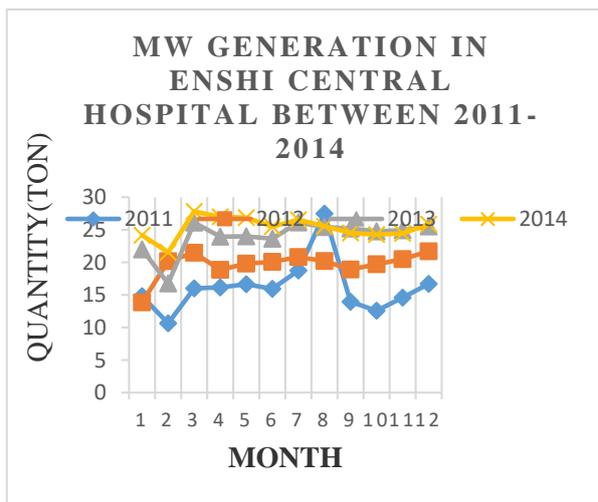
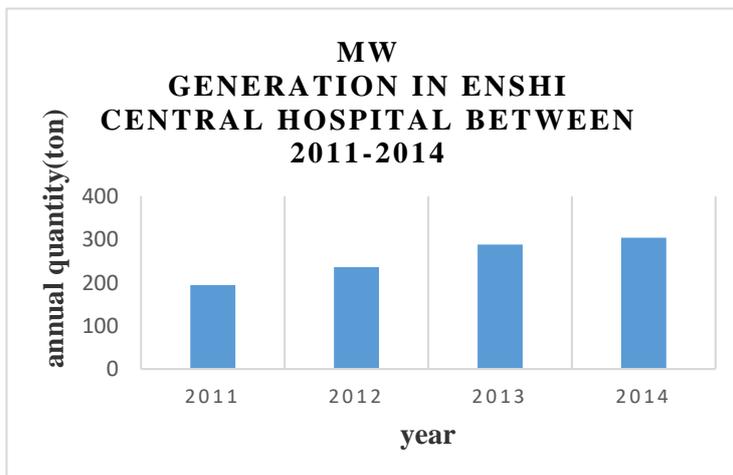


Figure4. Medical waste generation in Enshi central hospital between 2011-2014



### **Figure 5. Medical waste generation annually in Enshi central hospital between 2011-2014**

#### **2. Method**

The data used in this paper was the actual collection records of Enshi medical waste treatment center. Includes the total amount of medical waste collected between 2012-2014 year and the monthly medical waste generated by each hospital.

#### **3. Results and discussion**

Figure 1 describes the monthly medical waste production between 2011-2014, Figure 2 and Figure 3 are the results of medical waste production in the top six hospitals, Figure 4 and Figure 5 describe the generation of medical waste in the Enshi central hospital.

By analysis of medical waste production in Enshi area, it can be found:

##### *3.1 Medical waste generation showed a gradual increase trend.*

Based on the comprehensive analysis of data, it can be found that the medical wastes have been increasing year by year, this trend is reflected in the total collection of medical waste in Enshi between 2011-2014, from 2011 to 2014, annual amount of medical waste were: 1251.11 tons, 1317.64 tons, 1378.24 tons and 1481.54 tons, with an average annual growth rate of: 6.14%.

From the data of medical waste in Enshi central hospital, more obvious reflected the trend of increasing the amount of medical waste year by year, Enshi central hospital, in 2011-2014, the average annual growth rate of medical waste was 16.86%.

The trend of increasing medical waste production is very similar to that reported in Brazil[5]. The main reasons maybe as follows:

(1) With the continuous development of Chinese economy, people paid more and more attention to health, the ability to seek medical treatment was stronger, more and more people had been receiving hospital treatment when they were ill, resulting in the rise of medical waste.

(2) With the continuous promotion of government and environmental protection departments, people's awareness of medical waste collection continues to improve, the amount of medical waste into the collection has gradually increased.

##### *3.2 Medical waste produced less in February of each year.*

After the discussion with the hospital, the reason was found that February is the month of the Spring Festival in China, according to Chinese traditional customs, people generally avoid the Spring Festival hospitalization, therefore, the amount of medical waste generated was relatively less than other months.

##### *3.3 For four consecutive years, the peak of medical waste production in March and July*

After the discussion with several typical hospitals, the reasons maybe as follows:

(1) March is the first month after the Spring Festival, more patients visit hospital. In addition, March is the season changing month in this region, easily lead to disease, indirectly result in the increase in the amount of medical waste.

(2) Enshi is a famous tourist area in China, the tourism season is July and August, the influx of large numbers of tourists increased the number of local migrants. In 2015, for example, the annual tourists 37.5 million passengers, of which tourists received a total of 5.8 million passengers in July, Tourism population accounted for 174.7% of the local population. A large increase in population increased the number of hospital patient and medical waste production in the tourist season.

*3.4 In 2014, the per bed annual production of medical waste in Enshi's main hospitals was between 102-170 kg, and the average per bed production capacity of medical waste was 133.58 kg. This value is close to the medical waste data of Gansu province[6].*

*3.5 In addition, by calculation, we can get each ten thousand people's medical waste production capacity of 4.5 tons in Enshi area in 2014.*

#### 4. Conclusion

With the economic growth and people's health requirements for the improvement of medical condition, medical waste in Enshi area gradually increased, the growth rate is about 6%.

The amount of medical waste in Enshi area changed significantly with the month, minimum amount of medical waste was generated during Spring Festival. Affected by seasonal changes and tourism, medical waste generated a larger amount in March and July.

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