



# HEALTHCARE WASTE INDICATORS FOR ASSESSING THE INFECTIOUS WASTE MANAGEMENT IN THE PUBLIC HOSPITALS OF LA PAZ (BOLIVIA)

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# OUTLINE

1. Introduction of the study area and objectives of the research
2. Methods
  - a) Cooperation with local stakeholders
  - b) Field analysis
  - c) The Indicators set
3. Results
4. Conclusions and future goals



# 1.INTRODUCTION

## Bolivia

Low-middle income country

GNI: about 3 000 USD

About 10 800 000

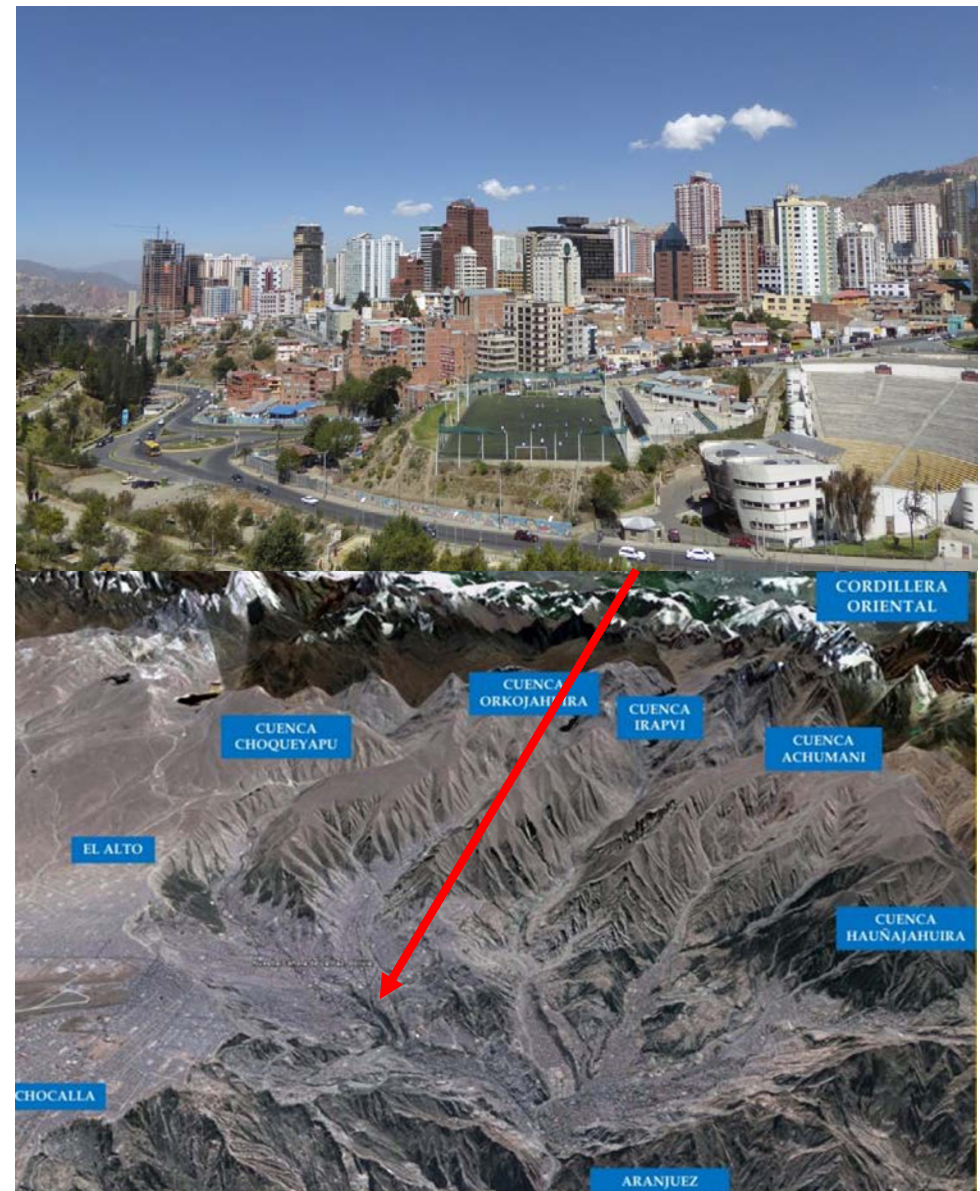
inhabitants

9 inhabitants per km<sup>2</sup>

## La Paz

About 900 000 inhabitants

420 inhabitants per km<sup>2</sup>



# 1.OBJECTIVE OF THE RESEARCH

The research would:

- Assess the main challenges for **improving** the HWM of the city.
- Study the feasibility for introducing a **HW treatment plant** appropriate for the case study.
- To introduce a plan of **best practices** for introducing a better HW collection, transportation, treatment and final disposal.



- To introduce an **indicator** as reference for understanding local challenges and opportunities about HWM and for evaluating the current scenario.



## 2.A. METHOD: COOPERATION WITH LOCAL STAKEHOLDERS

- Local Government
- Private companies for collection and treatment
- Universities
- NGOs or other donors (Rotary Foundation)

The interdisciplinary and **multi-stakeholder approach** allows applying the research and future projects.



## 2.B. METHOD: FIELD ANALYSIS

Municipal level:

- Field inspections (transport and final disposal)
- Interviews with local stakeholders
- Assessment of local needs for improving HWM

Hospital level: **Work in progress...**

- Interviews with directors and managers of the hospitals
- Field inspections
- Literature review of the Documents available locally  
(*Swisscontact, 2006*)
- Support of the university for the survey
- Assessment of HWM quality



## 2.C. METHOD: THE INDICATORS

Guidelines  
provided by  
the WHO

*World Health Organization, 2014*



Wasteaware  
Benchmark  
indicator approach

*Wilson et al., 2015, Waste Management*



6 indicators, 5 for hospitals and 1 for the municipality, each with 5 to 7 sub-indicators, each with 5 criteria of assessment, for a total of 35 sub-indicators and 175 sub-criteria.

Finally they are presented in a **Radar Scheme** and by a traffic-light code.



## 2.C. METHOD: THE INDICATORS, SUB-INDICATORS AND CRITERIA

- A. Collection and selective collection (6 sub-criteria)
- B. Storage (5 sub-criteria)
- C. Local treatment (5 sub-criteria)
- D. Maintenance and monitoring (7 sub-criteria)
- E. Awareness, security and prevention (5 sub-criteria)
- F. HWM at city level (7 sub-criteria)

- Assessment per hospital (not reported)
- Average results of the HWM service provided in the hospitals of the city
- Assessment at city level

| Percentage obtained | System analysis |
|---------------------|-----------------|
| 0-19%               | Unsustainable   |
| 20-49%              | Problematic     |
| 50-69%              | Satisfying      |
| 70-89%              | Fine            |
| 90-100%             | Excellent       |



## 2.C. METHOD: COLLECTION AND SC

- **A.1.** Percentage of selective collection (HW)
- **A.2.** Intermediary storage
- **A.3.** Internal transport
- **A.4.** Times of transports to external areas
- **A.5.** Use of personal protection equipment
- **A.6.** Typologies of waste collected in separate containers

Ex. A.1. - criteria

0 – Without selective collection

5 – 1-25% of SC rate

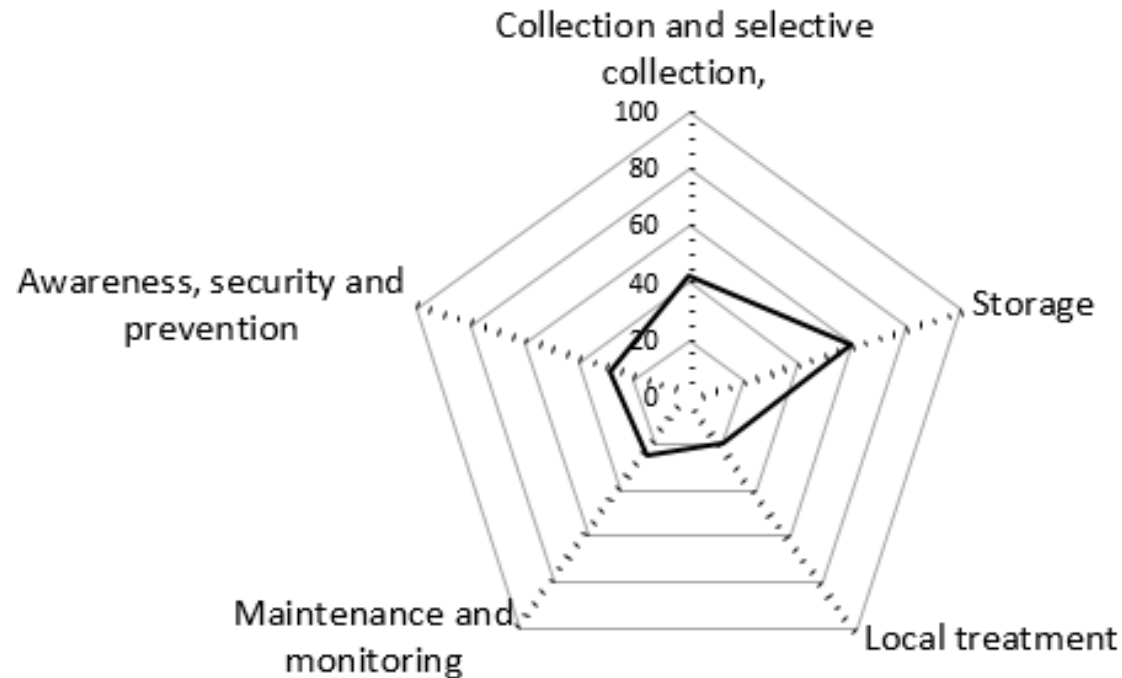
10 – 26-50% of SC rate

15 – 51-75% of SC rate

20 – 76-100% of SC. There are not HW within the MSW



### 3. RESULTS: THE HOSPITALS



Results of the state of the hospitals in 2003 (average result): The main issues detected regard awareness, monitoring and treatment.

The objective is to implement this graph for each hospital, and provide an average one as depicted.

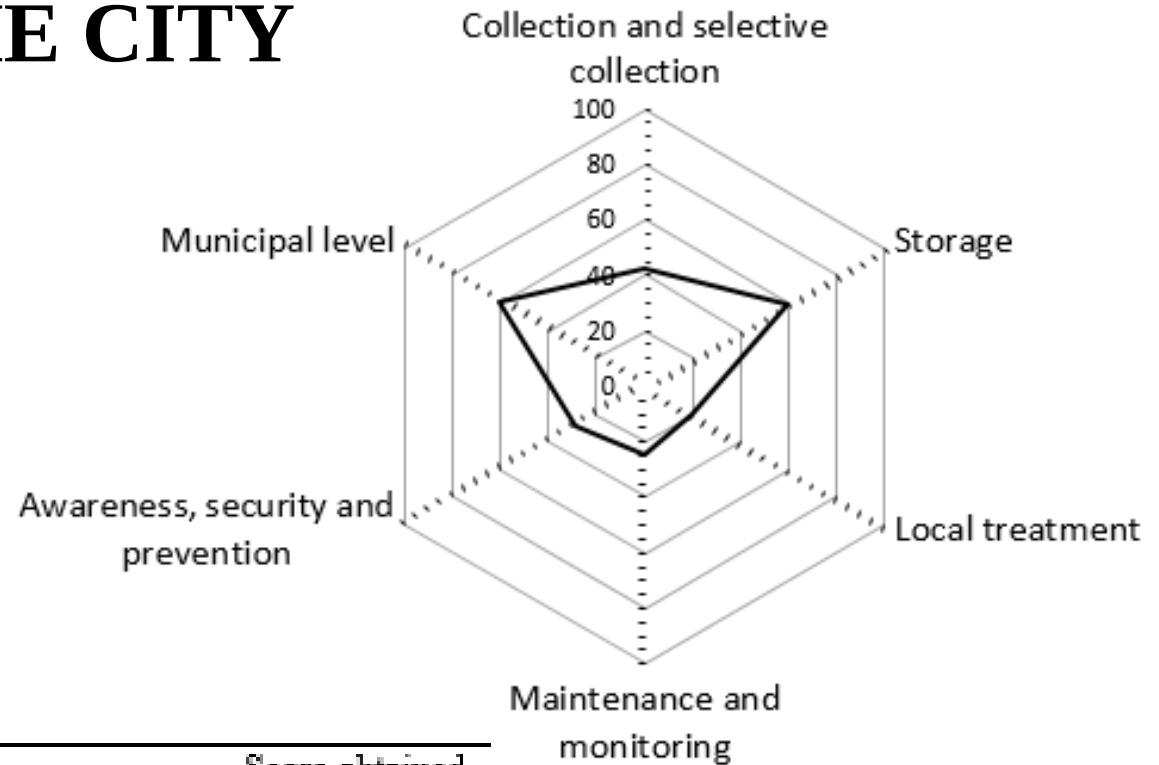


Source:  
Swisscontact, 2003



### 3. RESULTS: THE CITY

The main issue is about the financial sustainability for improving current HWM, especially for introducing a sustainable treatment system (on-site or off-site).



|            | Criteria                                                                         | Score obtained |
|------------|----------------------------------------------------------------------------------|----------------|
| I.         | Methodologies of centralized treatment and final disposal                        | 10             |
| II.        | Quality of the transport from hospitals to the treatment plant or final disposal | 15             |
| III.       | Local and national Laws                                                          | 15             |
| IV.        | System monitoring                                                                | 15             |
| V.         | Financial sustainability and investing                                           | 5              |
| VI.        | Collection time                                                                  | 15             |
| VII.       | Personal protection equipment                                                    | 10             |
| Satisfying |                                                                                  | 61%            |



## 4. CONCLUSIONS AND FUTURE GOALS

- The **main issues** detected about HWM are the treatment, maintenance and monitoring, awareness and security. These issues should be addressed in future management plans.
- The indicators could be a **reliable tool** for providing an integrated view of the main challenges and needs for improving local HWM.
- The **future objective** is to apply such indicators (which could be improved) for all the hospitals of La Paz, and for other countries worldwide in order to have more benchmark analysis about HWM, with the same method.





# ANY QUESTION?

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## 2.C. STORAGE

- **B.1.** Awareness and consciousness of the staff for the transporting process
- **B.2.** Temporary storage area on-site
- **B.3.** Storage time before treatment or external transport
- **B.4.** Personal protection equipment of the staff
- **B.5.** Container used for the temporal storage of HW

Ex. B.5. - criteria

0 – There are not appropriate containers

5 – There are only specific begs for HW

10 – There are containers and begs. However, there are not information about the danger and are not sterilized

15 – There are appropriate containers and begs for each HW, are well reported, although are not sterilized

20 – There are appropriate containers and begs for each HW, are well reported, and the containers are sterilized



## 2.C. LOCAL TREATMENT

- C.1. Treatment of the infectious and sharp HW
- C.2. Precautions applied during the treatment
- C.3. Wastewater treatment applied within the hospital
- C.4. Percentage of HW treated on site
- C.5. Treatment area

Ex. C.5. - criteria

0 – There is not a specific area for HW treatment, or there is no treatment on-site

5 – There is an area for the treatment, although it is not closed, monitored and maintained

10 – There is an area for HW treatment, closed and bounded, with external reporting. However, there is not control, monitoring and sterilization.

15 – There is an appropriate area for treating HW, however it is not sterilized

20 – There treatment area is closed, bounded, reported, monitored, maintained, clean and sterilized.



## 2.C. MAINTENANCE AND MONITORING

- **D.1.** Responsible staff for system monitoring
- **D.2.** Periodic assessment of the solid waste produced
- **D.3.** Monitoring of the storage areas and cleaning
- **D.4.** Assessment of service quality
- **D.5.** Assessment of expenses and economic sustainability
- **D.6.** Control and monitoring of the injuries of the staff
- **D.7.** Cooperation with external units for assessing the system

Ex. D.5. - criteria

0 – There is not a financial monitoring system, as well as the quantities of HW produced are not known.

5 – Some expenses are known, however, are not assessed and there are no sustainable practices for economic saving.

10 – The expenses of the HWM are known, are assessed periodically, although saving practices are not applied.

15 – The expenses of the HWM are known, are assessed periodically, saving practices are applied as well as for improving the system.

20 – There are also studies for reducing for reducing the costs and consultant are hired for writing internal report.



## 2.C. AWARENESS, SECURITY AND PREVENTION

- **E.1.** Internal rules and regulations
- **E.2.** Information campaigns and activities for the staff
- **E.3.** Diffusion of informative material about hygiene and good practices for HWM
- **E.4.** Vaccines to local staff
- **E.5.** Regulations and methods for preventing injuries

Ex. E.5. - criteria

0 – There are not internal rules for reducing the risk of injuries

5 – There are internal regulations for managing the HW, although are not supported by infrastructural precautions

10 – There are specific regulations with activities of sensitization and information.

However, there are not appropriate infrastructural precautions.

15 – There are appropriate containers and precautions for managing HW, as well as regulations and sensitivity campaigns. However the precautions are not always applied.

20 – There are appropriate infrastructures, sensitivity campaigns in support of the regulations and internal rules. Moreover, there is monitoring of the application.

