

# Cold bed: A challenge for an academic medical center in San Luis Potosí, Mexico

*Camas frías/muertas: Un reto para un centro médico académico en San Luis Potosí, México*

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## Abstract

**Objective:** The objective of this study was to identify the time period during which a hospital bed could be virtually available according to the informatics and administrative hospital system while still being physically occupied by a patient in a hospital in Mexico. **Materials and methods:** A cross-sectional study was conducted in a 250-bed Academic Medical Center located in Central Northern Mexico during February 2015. Both administrative and real patient discharges were registered in a hospital format. Central tendency measures were used to present collected data and bed/day costs were obtained from official national published costs. **Results:** Nine hundred and forty-three patients were followed up during their hospital discharge process. Overall, 2.4% of hospital beds were occupied by discharged patients. The annual cost only for cold beds was \$959,220.00 US\$ (\$14,348,304.00 MXN), without bringing about any benefits for patients. Cold beds represented 1.31% of the 2015 annual hospital budget. **Conclusions:** Quality improvement initiatives must be implemented to allocate beds to patients more efficiently. The discharge process must be standardized to reduce bed/day direct hospital costs and strengthen the supervision of medical residents during this process.

**Key Words:** Patient discharge. Hospital bed capacity 100-299. Bed occupancy. Academic medical center.

## Resumen

**Objetivo:** Identificar el periodo de tiempo durante el cual una cama hospitalaria está virtualmente disponible en el sistema informático, mientras está ocupada por un paciente, en un hospital de México. **Método:** Se realizó un estudio transversal en un centro médico académico de 250 camas, localizado en el centro-norte de México, en febrero de 2015. El alta administrativa y real del paciente fueron registradas en un formato institucional. Se utilizaron medidas de tendencia central para presentar los datos. El costo del día/cama se obtuvo de lo oficial publicado para la nación. **Resultados:** 943 pacientes fueron seguidos durante el proceso de egreso. El 2.4% del total de las camas estuvo ocupada por pacientes egresados. El costo anual por las camas frías/muertas fue de \$959,220.00 US\$ (\$14,348,304.00 MXN), sin beneficio para los pacientes. Las camas frías/muertas representaron el 1.31% del presupuesto hospitalario anual en el año 2015. **Conclusiones:** Es necesario

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*implementar iniciativas de mejora para asignar eficientemente las camas a los pacientes. El proceso de egreso debe estandarizarse para reducir el costo directo hospitalario por día/cama. Hay que fortalecer la supervisión de médicos residentes que participan en este proceso.*

**Palabras Clave:** Alta del paciente. Capacidad hospitalaria de 100 a 299 camas. Ocupación de la cama. Centro médico académico.

## Introduction

Hospital health-care performance must be measured with the purpose of providing strong evidence for stakeholders and policymakers to implement processes, procedures, and policies to improve outcomes<sup>1,2</sup>. To achieve the objective of improving the health state of the population under the instruction of the World Health Organization in 2016, countries had to guarantee universal coverage along with effective access to health systems<sup>3</sup>. Nevertheless, it is deemed necessary to understand how real resource optimization and efficiency in hospitals work since it has been shown how improving the quality of care can decrease hospitalization costs<sup>4</sup>.

Mexico has both a public and private health-care system. However, the public system has more than six different providers and coverage will be different among them the Mexican Institute of Social Security, the Institute for Social Security and Services for Civil Servants, the Mexican government's system of social protection for health best known as "Seguro Popular," Health Services for Mexico's Oil Company (PEMEX) providing government-paid health insurance for state oil industry workers, and the Institute for Social Security for the Mexican Armed Forces (MARINA and SEDENA).

In an ideal setting, all public hospitals should promptly allocate a hospital bed to the patient who needs it. However, this is not always the case due to factors that cannot be controlled by hospital staff. Patients often remain in beds even after having been medically and administratively discharged.

The patient and her/his family are the ones who decide when to leave the hospital once the medical and administrative discharge has been completed. The latter problem has been addressed in other manuscripts worldwide but not in Mexico or high-middle-income country<sup>5-8</sup>.

To present a better understood on "cold bed" concept, a cross-sectional study was conducted in a 250-bed Academic Medical Center in the state of San Luis Potosí, Mexico. The hospital is located in the Central Northern region of Mexico, it treats the population covered

by the Mexican government's system of social protection for health best known as "Seguro Popular," and it is the referral center in the state for 1.6 million people.

The objective was to identify the time period during which a hospital bed could be virtually available according to the informatics and administrative hospital system while still being physically occupied by a patient in a public hospital in Mexico.

The authorization for publishing this data was obtained from the Ethics Committee of the Academic Medical Center.

## Materials and methods

During February 2015, all patients discharged from the four hospitalization areas (Internal Medicine, Surgery, Pediatrics and Gynecology, and Obstetrics) were identified by performing a follow-up in the administrative and real patient discharge process. Times were documented in a hospital format.

We refer to the term administrative discharge as the moment when a bed became available for reallocation according to the real-time hospital informatics system, and the term real patient discharge as the moment when a patient physically left the bed.

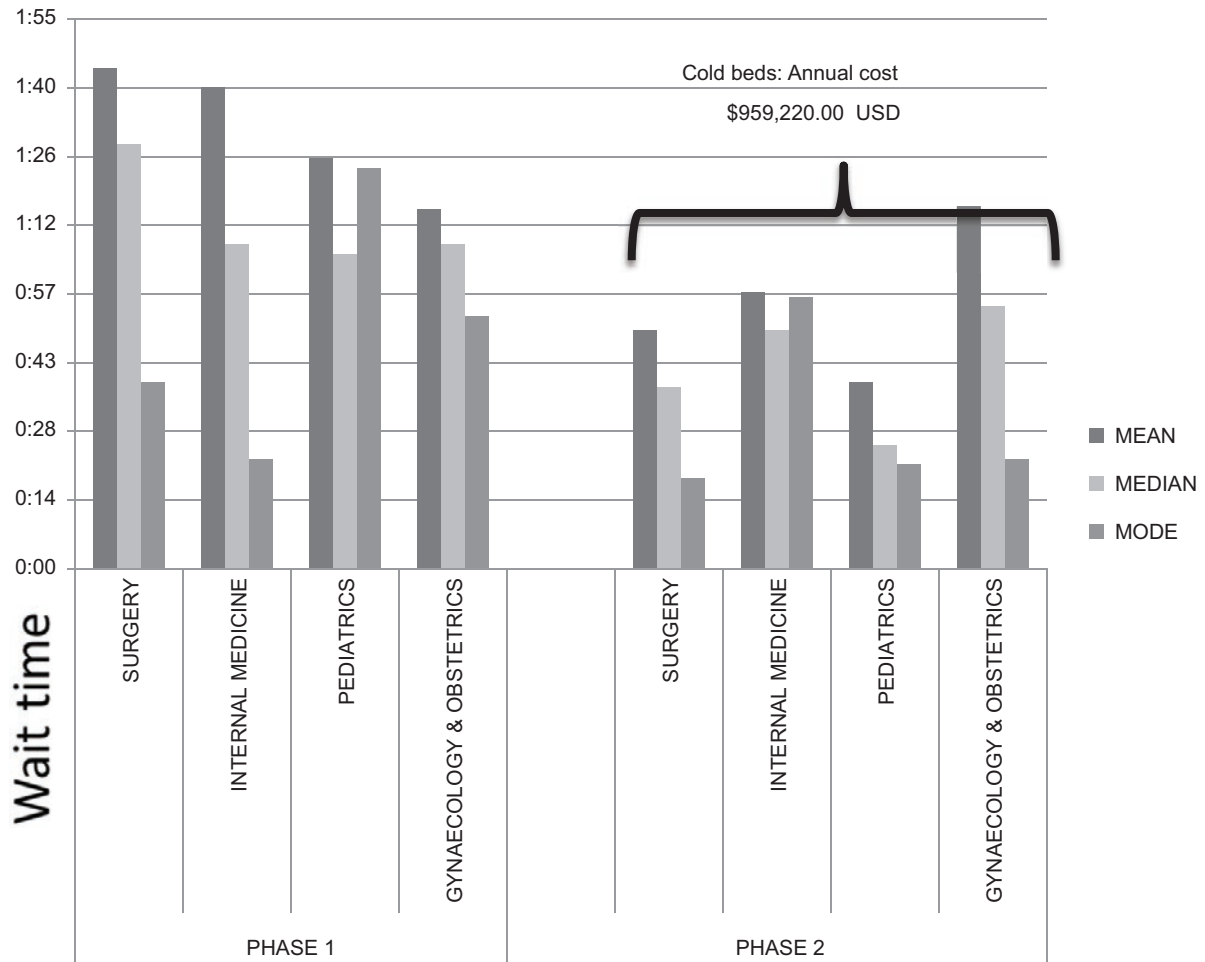
The discharge process in the hospital was as follows:

First step: once the medical order and all the documents had been completed, the nurse provided the social worker with a discharge document to be authorized (time 1).

Second step: the social worker guided the patient's relative or companion to the administrative area to cover the bill or to provide a signature in case the expenses had been fully covered by "Seguro Popular" (time 2, administrative discharge).

Third step: once the second step was completed, the patient physically left the bed, and the security department documented the time when she/he had done so (time 3, real patient discharge).

A database was created in Microsoft Excel<sup>®</sup> using three main data: social worker authorization discharge time, administrative discharge, and real patient discharge. All data were analyzed using central tendency measures.



**Figure 1.** Time between social work authorization, administrative, and real patient discharge in an Academic Medical Center with a 250-bed capacity. Phase 1: the time between social work authorization and administrative discharge. Phase 2: the time between administrative and real patient discharge.

Finally, the hospital division of financial resources provided annual hospital operative budget information and cost for a single bed/day in 2015. The cost of each cold bed per day adjusted for February 2015 inflation<sup>9</sup> was US\$ 12,000 (\$6,550 MNX)<sup>10</sup>.

## Results

During a 28-day period, a total of 1501 discharges from the four hospitalization areas were identified in the Automated Hospital Discharge Subsystem (SAEH), which is operated by the General Direction of Health Information (DGIS) of the Ministry of Health in Mexico. Discharges belonged to the four main medical divisions as follows: 446 (29.71%) to surgery, 183 (12.2%) to internal medicine, 670 (44.63%) to gynecology and obstetrics, and 202 (13.46%) to pediatrics.

Of the 1501 discharges, 191 (12.7%) were from ambulatory surgery, 217 (14.5%) from non-countable

beds, 62 (4.1%) due to death, and 35 (2.3%) due to delay from January 2015 informatics system. The discharges from ambulatory surgery, non-countable beds, due to death or delay from the previous month, were not included in this study. Finally, of the 996 discharges, only 943 (94.7%) had the full necessary information to be used for further analysis in a database.

The average time interval from time 1 to time 2 (social worker authorization discharge to administrative discharge) was 89 min (ranging from 72 to 135 min) and the medical divisions with the highest mean times were surgery and internal medicine. The median was 74 min (ranging from 54 to 113 min), and the medical divisions with the highest median values were surgery, pediatrics, and internal medicine.

For the time interval from time 2 to time 3 (administrative discharge to real patient discharge), the mean values of the medical division where patients took the

longest were gynecology and obstetrics (58 min). In addition, the services of male patients (69 min), female patients (79 min), and transplants (80 min), the last three belonging to the medical division of internal medicine.

The services with the highest median time values during this phase were the burns unit (56 min) belonging to medical division of Surgery, the area of gynecology and obstetrics (50 min), the services of male patients (55 min), and transplants (68 min) from the medical division of internal medicine.

The results of this month studied (administrative discharge to real patient discharge), projected in an annual setting, and resulted in a total of six hospital beds per year that are being occupied (2.4% of annual bed/day hospital capacity), independently of the mandatory time for cleaning and sanitation.

A total of US\$ 959,220 (\$14,348,304 MXN) were the projection of the annual hospital cold bed. The cost for cold beds, in 2015, represented 1.31% of the annual hospital budget and 31.45% of the annual hospital bed/day budget in the Academic Medical Center studied (Fig. 1).

## Discussion

To the best of our knowledge, this is the first study conducted in a high-middle-income country and in Mexico that addresses the issue of hospital cold bed. The results highlight that the Academic Medical Center studied had a hidden hospital bed capacity, in 2015, due to cold beds<sup>11</sup>.

This problem has been addressed with the possibility to achieve better control of the volume of patients without having to make a capital investment, through more effective and efficient management of existing resources<sup>6,11</sup>.

A cold bed represented in this study as the time period from time 2 to time 3 (administrative discharge to real patient discharge) did not generate real patient discharges or hospital revenues. The reported hospital bed occupancy rate could be lower than the real one, if consider only the hospital informatics system. Moreover, the opportunity to allocate a bed to a patient was delay and the impact on this regard was not evidence with this study.

This direct cost for cold bed will be higher in a developed country according to the bed/day cost or in private sector due to hospitality<sup>5</sup>.

The limitations of this study included but not limited to were not possible to identify if the real patient discharge was delay due to other hospital processes in

which participate both physicians (including students at bachelor or graduate level) and nurse staff. The follow-up was only 1 month and the shortest month in 2015. Some patients and their families decided to stay one more night at the hospital because no transportation to their municipalities was available afternoon or late in the afternoon.

These results will be different from those presented in non-Academic Medical Centers or in private hospitals, in which the cold bed cost is charged in the bed occupancy.

## Conclusions

Quality improvement initiatives must be implemented to allocate beds to patients more efficiently as well as to simplify both administrative and real patient discharge. The discharge process must be standardized to reduce bed/day direct hospital costs. Finally, it is necessary to make stakeholders aware of how this situation affects other patients who have to wait for a hospital bed in areas including recovery rooms or intensive care units because beds are unavailable, and how the consequences of this situation lead to a lower quality of care.

## Conflicts of interest

The authors of this manuscript certify that we have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

## Ethical disclosures

**Protection of human and animal subjects.** The authors declare that no experiments were performed on humans or animals for this study.

**Confidentiality of data.** The authors declare that no patient data appear in this article.

**Right to privacy and informed consent.** The authors declare that no patient data appear in this article.

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