

## DIRECT AND INDIRECT COSTS CORRELATED WITH NOSOCOMIAL INFECTIONS IN COUNTY CLINIC EMERGENCY HOSPITAL OF BRASOV

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### Abstract:

Nosocomial infections represent an important chapter in infectious pathology that knows a continuous development as an expression of the diversity of practices for the healthy and sick people. This is a descriptive study on the cases of reported nosocomial infections (146), on a 3 years period of time (2011-2013) at the County Clinic Emergency Hospital of Brasov, where we analysed the impact of hospital-acquired infections on direct and indirect costs. From the total cost of hospitalization for nosocomial infection were paid significant amounts, 50.42% in 2013, 60% in 2012 and 32.38% in 2011. Of the total days of hospitalization in patients with reported nosocomial infections, 32% in 2011, 54% in 2012 and 45.75% in 2013 were due to nosocomial infection. The hospital managed to increase the quantity of antiseptic from 150 litres in 2011 (20% of needs), 200 litres in 2012 to 230 litres in 2013 (about 35% of needs).

**Key-words:** nosocomial infections, direct costs, indirect costs

### 1. Introduction

Nosocomial infections represent an important chapter in infectious pathology that knows a continuous development as an expression of the diversity of practices for the healthy and sick people [1, 2]. The costs caused by the care provided to the cases of nosocomial infections can significantly influence the progress of the entire health system management. Monitoring consists in calculating the direct costs (because of provided care the due to longer treatment duration) as well as the indirect costs allocated to post hospitalization care or to post-surgical intervention (recovery assistance, antibiotics and analgesics, hospitalization or reinterventions, absence of patient from work) [3, 4].

### 2. Material and methods

This is a descriptive study on the cases of reported nosocomial infections (146), on a 3 years period of time (2011-2013) at the County Clinic Emergency Hospital of Brasov, where we analysed the impact of hospital-acquired infections on direct and indirect costs. Data were collected from SPCIN reports, indicators from the Statistics Service of the Hospital, as well as data from Financial Accounting Service, Administrative Service for the purchase and use of the antiseptics, disinfectants, antibiotics, reagents.

Nosocomial infection diagnosis was based

on case definition stipulated by the Public Health Ministry Order no. 916/2006, and to the Protocol 203 regarding the informational system for the declaration of nosocomial infections in County Clinic Emergency Hospital of Brasov.

Documentary analysis was performed using the statistical data processing programs such as Epi Info 2002 and Microsoft Excel.

### 3. Results

#### 3.1 Direct costs with nosocomial infections from the hospital

For 2011, in those 35 patients with reported nosocomial infections the total cost of hospitalization was 683814.03 lei, of which the cost of hospitalization for nosocomial infection accounted 221425 lei (32.38%). From nosocomial infection hospitalization cost 36978 lei (16.7%) represented the cost of antibiotics.

In 2012, 40 nosocomial infections were detected in 39 patients. In 2011 the average total cost of hospitalization of patients with nosocomial infections was 19537.54 lei, and in 2012 it increased by 500 lei reaching 20084 lei. In 2011 the average cost of hospitalization due to strict nosocomial infections was 6326.4286 lei, almost double the amount in 2012, 11958.47 lei. In 2011 the average costs for antibiotics in patients with reported nosocomial infections was 1056.6 lei / patient, in 2012 the average increased by 200 lei / patient.

In those 39 patients with reported nosocomial infections the total cost of hospitalization was 783277.61 lei of which the hospitalization cost for nosocomial infection accounted 466380.56 lei, i.e. 60% in 2012 versus 32.38% in 2011.

For 2013 there were 71 reported nosocomial infections which cost less compared to 2012.

In 2011 the cases of reported nosocomial infections had the average cost of hospitalization of 19537 lei, and for 2012, 20,084.04 lei (increased by 500 lei in 2012); for 2013 it was 14655 lei, a downward trend, being even lower than 2011.

In 2011 the average hospitalization costs due to strictly nosocomial infection was 6326.4286 lei, in 2012 it was 11958.4 lei (almost doubled the amount in 2012), and in 2013 it was 6939.7 lei, downward trend versus 2012.

In 2011 the average costs for antibiotics in patients with reported nosocomial infections was 1056.6 lei / patient, in 2012 it was 1256.33 lei, the average increased by 200 lei / patient in 2012, in 2013 the average was 609 lei /patient with nosocomial infection, a downward trend, which shows clearly the success of the awareness of the physicians about the risks of incorrect or chaotic antibiotic prophylaxis and therapy.

In those 71 patients with reported nosocomial infections the total cost of hospitalization was of 1025893 lei of which the cost of hospitalization for nosocomial infection accounted 517321.3 lei, i.e. 50.42% (60% in 2012 and 32.38% in 2011).

### **3.2 Indirect costs on the hospital and orthopaedics 2011-2013**

In 2011, from 1223 hospitalization days in patients with reported nosocomial infections,

386 days were due to nosocomial infection (32%). Regarding those 35 patients, 68.6% had received antibiotic prophylaxis; from those 24 cases with prophylactic antibiotic treatment 18 patients (75%) received more than one dose of prophylactic antibiotic, respectively: a total of 177 days with an average of 9.8 days / patient, with a minimum of one dose and a maximum of 37 days. In 2011 the average days of hospitalization in patients with reported nosocomial infections is 34.9429 (dropped in 2012).

In 2011 the average days of hospitalization due to nosocomial infections was 11 days. From the total of 1159 hospitalization days in patients with reported nosocomial infections, 625 days were due to nosocomial infection, 54% in 2012 versus 32% in 2011.

In 2011 the average days of hospitalization in patients with reported nosocomial infections are 34.9429, 29.71 days in 2012 and in 2013 is 26.6 days (downtrend).

In 2011 the average days of hospitalization due to nosocomial infections was 11 days, in 2012 was 16.01 days and in 2013 was 12.17 days. From 1862 hospitalization days in patients with reported nosocomial infections, 852 days were due to nosocomial infection (32% in 2011, 54% in 2012 and 45.75% in 2013).

According to the data from the Hospital Administrative Service, in 2011 the monthly budget allocated to disinfectants was 30000 lei. In 2012 this amount increased to 35000 lei, and in 2013 to 40000 lei per month.

The hospital managed to increase the quantity of antiseptic from 150 litres in 2011 (20% of needs), 200 litres in 2012 to 230 litres in 2013 (about 35% of needs), (see chart no. 1).

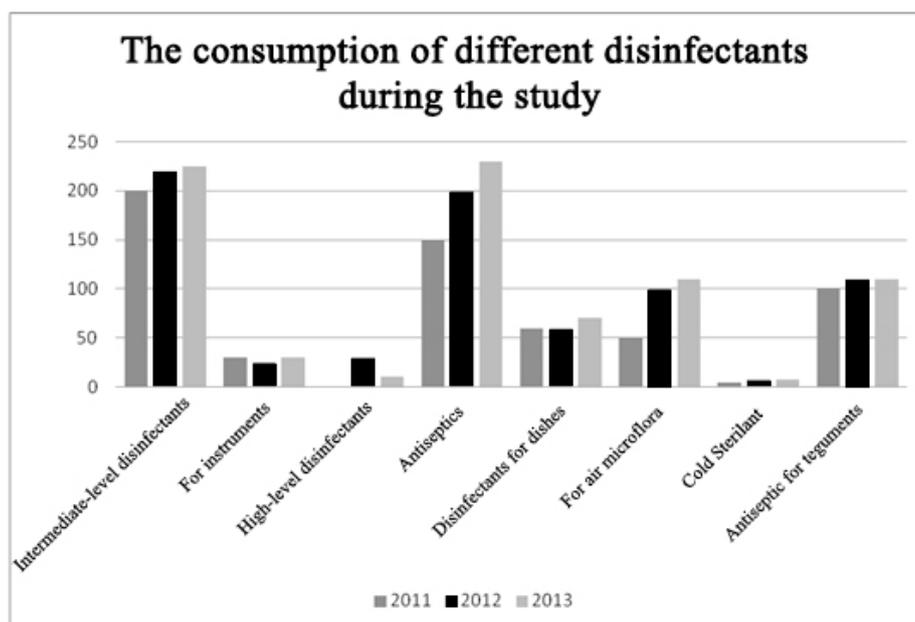


Chart no. 1. The consumption of different disinfectants during the study

### 3.3 History of antibiotics cost at hospital

In 2011 the costs of antibiotics used in the entire hospital amounted 972993.13 lei, with a high consumption of Oframax, Ampicillin and Gentamicin. In 2012 the total consumption of antibiotics in the hospital is 823322.16 lei, with a high consumption of Oframax, a third-generation *cephalosporin*, with broad spectrum that induces a resistance very quickly, but it is the cheapest on the market, highly sought in public hospitals. In 2013 the total cost of antibiotics reaches 945425.65 lei, keeping Oframax consumption at high level. Our study reveals that in the entire hospital, third generation cephalosporins are overused and overprescribed as well as large amounts of Oxacillin and Gentamicin, both prophylactically and therapeutically, although the strains circulating in the hospital and the ones isolated from nosocomial infections are resistant to these antibiotics.

### 4. Conclusions

The calculation of the extra costs of nosocomial infections confirmed that: from the total cost of hospitalization for nosocomial infection significant amounts were paid, 50.42% in 2013, 60% in 2012 and 32.38% in 2011; of the total days of hospitalization in patients with reported nosocomial infections, 32% in 2011, 54% in 2012 and 45.75% in 2013 were due to nosocomial infection.

The hospital managed to increase the quantity of antiseptic from 150 litres in 2011 (20% of needs), 200 litres in 2012 to 230 litres in 2013 (about 35% of needs).

The average costs for antibiotics during the study had a linear downward trend, which shows clearly the success of the awareness of the physicians about the risks of incorrect or chaotic antibiotic prophylaxis and therapy.

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