REASSESSMENT OF HEALTH INSURANCE
INPATIENT HOSPITAL SERVICES
IN ALEXANDRIA

Part II: EFFECT OF CONSOLIDATION

By

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INTRODUCTION

It has been shown by many authors that the large hospitals (or units) have higher occupancy rate than the small ones (Blumberg, 1961; London and Sigmond, 1961; Long, 1964; Rosenthal, 1964; Shonick, 1972; Donabedian, 1973; Mac Stravic, 1979; Reeves et al., 1979, and Mac Stravic (1984). This phenomena as explained by Rosenthal (1964), Shonick (1972), Mac Stravic (1979) and Feldstein (1983), is based on the random nature of hospital demand and its fluctuation over the time. According to this explanation, the occupancy rate depends on two factors; namely, the average daily demand (average daily census-ADC) and the extent of variation around it (as measured by the standard deviation). So, if the range of fluctuation around the ADC is wide, greater number of excess beds than the ADC are required to ensure availability of beds when demand is high. On the other hand, if fluctuation is narrow, fewer beds in excess to the number of ADC will be needed. Now, if we consider the size of hospital, a large hospital is serving large number and the demand for service in this case is high and relatively more stable with lower fluctuations than in the case of a small hospital. Consequently, a large hospital will require fewer excess beds than a small one, and hence higher occupancy rates are achieved.
Aim of the Study:

The results of part I of the present study indicated shortage of available beds for the insured population in Alexandria. As the delivery of services to this population is done through two independent hospitals which are further subdivided into independent sections, so it was felt that studying the possible effect of consolidation of service (hypothetically) is required.

MATERIAL AND METHODS

The general surgery section was chosen for this study above the effect of consolidation. This was done for two main reasons. Firstly, it was the section having the highest negative balance in bed requirement. Secondly, three independent general surgery units are present in each hospital, with the highest number of units in comparison with other sections.

Data used in the study included the average daily census and the number of beds of the different 6 units for the year 1984.

It was shown by various authors that the daily census of a hospital or unit follows the Poisson distribution and its square root formula, (Long, 1964; Shonick, 1972; and Mac Stravic, 1979). In this case the standard deviation of the ADC equal its square root (S=ADC) and the number of beds required to satisfy this situation and to keep low overfilling (1%) equal (ADC + 3S). This square root formula of the Poisson distribution was used to test the effect of consolidation for the general surgery section.

RESULTS

The results of the study are shown in the following table; it is clear from the table that the estimated number of required beds was greater than the available bed for 5 out of the 6 individual units (it was the same in the 6th). A negative bed balance of -29 beds was observed for the 6 individual units altogether. It is also clear that if consolidation could be achieved for each the 3 units in each hospital, a negative balance of only -2 beds could be observed in Abdel Nasser Hospital, while a positive balance of +9 beds in Karmouz Hospital. Moreover, if all the 6 units can be consolidated, a positive balance of 22 beds could occur i.e. 22 available beds are over than the requirement.
The table also indicates that the consolidation could be effective in elevating the occupancy rate. An occupancy rate of 63.0% to 64.8% and 56.4% to 61.3% are observed for the non-consolidated units in Abdel Nasser and Karmouz Hospitals respectively. It increased to 75.4% and 71.5% for the consolidated 3 units of the two hospitals respectively, and further increased to 80.0% for the consolidated 6 units.

DISCUSSION

The results of the present study support the hypothesis that consolidation of facilities and aggregation of demand decrease the extend of fluctuation of the daily census with increase in the occupancy rate and diminished overfilling rate. Moreover, they indicate that consolidation could result on possible savings in beds required and operating expenses.

It is clear from the table that of units operate independently (as they currently do), Abdel-Nasser hospital will need 22 beds more than the 109 available ones and Karmouz hospital will need 7 more beds. Thus, a total of 29 beds will be required in addition to general surgery available beds to meet the demand ADC and its fluctuation. This will not only result on increasing the financial requirements, but also in lowering the occupancy rate as most of these beds will remain empty during low demand periods.

On the other hand, if the 3 general surgery units in each hospital are consolidated so as to function as one coordinated unit the situation will change markedly. In Abdel Nasser Hospital only 2 extra beds will be required (instead of 22) and the annual operating cost of 20 beds could be saved. Moreover, in Karmouz Hospital it will lead to availability of 9 beds in excess than the required, instead of being in need for 7 new beds, which is equivalent to a saving of the annual operating cost for 16 beds.

Through a simple mathematical procedure one can conclude that if the 3 general surgery units in each hospital are consolidated the total saving in the annual operating expenses will amount to 198000 LE (110,000 LE for the 20 beds saved in Abdel Nasser Hospital and 88,000 LE for the 16 beds saved in Karmouz hospital).

Now, if consolidation can be further extended to include
all the 6 general surgery units of the two hospitals, further reduction in the number of beds required will be noticed. In this case only 177 beds will be required, which means saving of 15 beds more than the 36 beds which can be saved by consolidating the 3 units in each hospital. So, the total beds which can be saved will thus rise to 51 with saving of about 280,000 LE annually (annual operating expenses of one saved bed is estimated as 5,500 LE, which is corresponding to 11% of the total operating expenses of the occupied bed).

SUMMARY

The occupancy rate was shown by many authors to be higher in large hospitals (or units) than in small ones. This was explained by the fact that the larger the served population is, the higher the demand will be and hence the fluctuations in the demand will be relatively low.

The delivery of services for the insured population in Alexandria is conducted through two independent hospitals. Furthermore, each hospital is divided into several independent sections. It was mentioned in part I of this study that this could be the reason for the low operational efficiency observed. Based on the previously mentioned situation, this study was conducted to explore the possible effect on consolidation of services. As an example to these effects, the general surgery section was chosen.

The results of the study indicate that if consolidation of each of the three general surgery units in each of the two hospitals could be done, 36 beds can be saved. This will result in total saving of 198,000 LE of the annual operating expenses. Moreover, if consolidation can be further extended to cover all the 6 units of the two hospitals a total of 51 beds can be saved and consequently saving of about 280,000 LE annually can be achieved.

REFERENCES


Mac Stravic, R.E. (1979): Area wide fluctuations in hospital daily census, Medical Care, 17: 1229.


### Hospital Beds and Service Bed Database

<table>
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<tr>
<th>Unit</th>
<th>Current Bed</th>
<th>Bed Available</th>
<th>Occupancy Rate</th>
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</tr>
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<tr>
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<tr>
<td>C</td>
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Legend:
- **Unit**: Unit of bed availability according to the hospital's bed database category.