OPERATING ROOMS COST
ACCOUNTING

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Special Projects in Hospital Systems
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EXECUTIVE SUMMARY

INTRODUCTION AND BACKGROUND

This project resulted from the need to identify all the indirect costs associated with patient chargeable and non-chargeable medical surgical supply items. Currently, the indirect costs for chargeable supply items are accounted for in a 30% straight mark-up. The indirect costs for non-chargeable supply items are assumed to be accounted for in the room rate charge. There is no known basis for this 30% mark-up, as the indirect costs it is covering have never been identified. Scott Lovelace, Operating Rooms business manager, requested that this project be undertaken in an effort to develop a pricing strategy for which supply items to charge for, and how much the mark-up should be for each item or group of items. This project involved developing a strategy for allocating the indirect costs of supply items to the direct costs of these supply items, taking into account the combination of the price and quantity used of each item. The purpose of this report is to present the findings of the indirect costs of the supply items, and recommend an appropriate pricing strategy for cost allocation of the indirect costs, keeping in mind cost reimbursement implications from third party payors.

CONCLUSIONS AND RECOMMENDATIONS

The results presented conclude that the present strategy for allocating the indirect costs of supplies is the most appropriate, given the available information. However, this method disproportionately allocates the overhead to the supply items, because it ignores both the price and the quantity used of each item.

Ideally, the best strategy for allocating the overhead is a charge by procedure method. This method requires that all of the direct costs that go into each procedure be identified and calculated. Once this is achieved, the indirect costs are lumped on these direct costs by a straight mark-up. The resulting number will represent the total cost for each procedure. This is advantageous because it allows the hospital to better react to the increased competition in the health care industry. However, the information needed for this procedure is nearly impossible to identify and calculate.

The recommended strategy for allocating the overhead is a step function procedure. A complete list of medical surgical supply items, their prices, and the quantity used of each item must be known in order to implement this procedure. The quantity used of each item is weighed equally with the price of each item in spreading the indirect costs in a proportionate manner. This method allows for a better matching of the actual dollar amount of an item with the dollar amount that is being marked up.
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INTRODUCTION

This project involves the reviewing of all costs associated with patient chargeable and non-chargeable medical surgical supplies. Scott Lovelace, Operating Rooms business manager, requested that this project be undertaken in an effort to develop a pricing strategy for which supply items to charge for, and how much the mark-up should be for each item or group of items. This involved developing a strategy for allocating the indirect costs of supplies to the direct costs of these supply items, taking into account the combination of the price and quantity used of each item. Background information, project approach, findings, conclusions, possible strategies, and recommendations will follow.

BACKGROUND

This project resulted from the need to identify all the indirect costs associated with patient chargeable and non-chargeable medical surgical supply items. Currently, the indirect costs for chargeable supply items are accounted for in a 30% straight mark-up. The indirect costs for non-chargeable supply items are assumed to be accounted for in the room rate charge. There is no known basis for this 30% mark-up, as the indirect costs it is covering have never been identified. The actual indirect costs are desired in order to create a more accurate mark-up. Also, as a result of increased competition in the health care industry, knowing the actual costs that must be covered will aid in creating a more competitive pricing strategy.
The project approach and the methodology for each step of the approach were as follows:

1. **The identification of the total possible overhead items associated with operating room medical surgical supplies.**

   Initial brainstorming and a meeting with our project coordinator, John Gialanella, discussing possible overhead items, were used in identifying an initial list of possible items.

2. **The determination, with the client, of the overhead items to be included.**

   In a meeting with Scott Lovelace, the relevancy and availability of information of each item was discussed in determining the final list of overhead items (See Appendix A).

3. **The quantification of the total costs associated with the overhead items determined with the client, keeping in mind the cost reimbursement implications from third party payors.**

   The information needed was collected in several meetings. The data required for calculating the labor portion of the overhead costs was received in an interview with Dee Ford, Operating Rooms office manager. In a meeting with Diane Flute of the financial department, the procedure for allocating the overhead costs from non-revenue centers in the hospital was discussed.
In a separate meeting with Scott Lovelace, the actual calculations were made (See Appendix B).

4. The determination of a methodology for determining patient chargeable supply items versus non-chargeable supply items.

In several meetings with Scott Lovelace, the information needed to make this determination was discussed.

5. The determination of the information necessary for strategies of allocating the overhead costs, and to identify and describe the advantages and disadvantages of each strategy, realizing that non-chargeable supply items will be included in the overhead costs of the operating room charge.

In an interview with Dr. Richard Coffey, three possible strategies were identified. In a later interview with John Gialanella, the pro's and con's of each strategy were discussed. The availability of information needed for each strategy was discussed with Scott Lovelace.

6. The recommendation of the most appropriate strategy for cost allocation of overhead costs based on available information.

After carefully weighing the pro's and con's of each strategy, the best strategy was determined.
FINDINGS AND CONCLUSIONS

With the current available data, it is impossible to implement a methodology for determining patient chargeable supply items versus non-chargeable supply items. A complete list of the medical surgical supply items, the price of each item, and the quantity used of each item is needed for applying the following ABC type analysis.

1. A sorted list of the prices of each item, from highest to lowest, must be made.

2. A sorted list of the quantity used of each item, from highest to lowest, must be made.

3. The item cost of processing charge sheets must be calculated in order to find out which low cost items must be lumped in with the non-chargeable items because the time and labor spent may be more costly than the direct cost of the item.

4. All items from the list in the first step whose price is below the cost found from the third step must be eliminated from both lists and be labeled non-chargeable supply items.

5. From the sorted list of quantities of each item, the bottom 15% must be eliminated from both lists because of the infrequency of usage of the item. These eliminated items should be labeled chargeable supply items.

6. The remaining items on both lists should be grouped into one list.

7. The price and quantity of each item should be multiplied in order to find the total cost of each item.

8. The items should be ranked according to their total cost from highest to lowest.

9. The sum of the total costs should be calculated in order to compute the percentage of total cost for each item.
10. The percentages should be ranked from highest to lowest.

11. Next to each item in the list of ranked percentages, a cumulative total should be calculated (The last item on the list will have a value of 100%).

12. Finally, the list should be separated at the 80% mark on the cumulative scale. All items that appear above this mark should be labeled non-chargeable supply items. The remaining items should be labeled chargeable supply items.

The overhead costs for each of the identified areas were found from the information collected in several meetings. The methods for calculating our findings can be found in Appendix B.

The findings included (based on 1987-1988 fiscal year):

O.R. direct expenses of med/surg supplies: $9,177,543

Total labor overhead for med/surg supplies: $148,157

Overhead allocated to med/surg supplies from non-revenue centers:
- Purchasing $282,085
- Billing $43,241
- General & Admin. $1,879,826
- Plant, building, & Housekeeping $239,757
- Medical Records $95,336
- Lithotripter $26,678

Total $2,566,923
Total med/surg supplies overhead  $2,715,080
Total direct expenses and overhead $11,892,623

The calculations for the following results can be found in Appendix C.

% of indirect costs above direct costs:  29.6%

Considering allowances for third party payors:

Percent of contractual allowances for whole hospital (Assumed same percentage for O.R. of Main Hospital):  33.6%

Total direct expenses and overhead (including contractual allowances):  15,690,607

% of indirect costs above direct costs (including contractual allowances):  71.0%

From these findings it was concluded that the actual costs for the medical/surgical supplies are (29.6% or 71.0% if contractual allowances are considered) higher than the direct costs for medical/surgical supplies ($9,177,543). Therefore, in order to cover the direct and indirect costs of supplies, an appropriate pricing strategy for allocating the indirect costs must be used.
In determining a methodology for allocating the indirect costs of the supply items to the direct costs, three strategies were investigated. A fixed rate mark-up method, charge by procedure method, and a step function procedure were all considered. After thorough investigation, the pro's and con's of each strategy were weighed in determining the best strategy.

The simplest of the three strategies is a straight 29.6% mark-up on all supply items. This is the easiest strategy to implement because it only involves marking up the price of each supply item by this fixed rate, regardless of both the price and quantity of the item. The major flaw of this strategy is that in ignoring both price and quantity used of each supply item, the indirect costs are disproportionately allocated to the supply items.

The second strategy for allocating indirect costs is the charge by procedure method. This is an unrealistic model because it requires information that is not available now and may not even be available in the future. All of the direct costs that go into each procedure must be identified and calculated. Once this is achieved, the indirect costs are lumped on these direct costs by a straight mark-up. The resulting number will represent the total cost for each procedure. This is advantageous because it allows the hospital to better react to the increased competition in the health care industry. It is impossible to bargain with insurance companies for a particular procedure if the cost of that procedure is unknown. Another advantage is that it can easily be determined which procedures are making money (covering their costs), and which are not. Once it is known which procedures are not making money, these procedures can be reviewed and evaluated from a business standpoint in reducing the costs of each.
The last advantage of this procedure is that it allows for identifying economic costs in differences between physician's practices that perform the same procedure.

The third strategy is a step function procedure. This procedure is presented in the most detail because it appears to be the best strategy, given that the information that is not available now will be available in the near future. A list of all medical surgical supply items, their prices, and the quantity used of each must be known in order to implement this procedure. The quantity used of each item is weighed equally with the price of each item in spreading the indirect costs in a proportionate manner. This method allows for a better matching of the actual dollar amount of an item with the dollar amount that is being marked up. Also, this procedure results in the lowest value of maximum dollar mark up. The procedure is best explained in a step by step manner as follows:

1. Find the total cost for each item by multiplying the price of the item by the quantity used of each item.

2. Compute the total cost of all the supply items by summing each item's total cost.

3. Find the percentage of the final total cost for each item, by dividing the total cost for each item by the result from the second step.

4. Sort the percentages from lowest to highest.

5. Next to each item on the sorted list, compute the cumulative percentage of total cost (the last value on the bottom will be 100%).
6. Break the list of items into five groups of equal percentages of total cost. One group will contain all items from the top of the sorted list until the item whose cumulative percentage is closest to 20%. The next group will contain all the items between 20% and 40% on the cumulative scale, etc.

7. Designate the following variables,

A: mark-up percentage for items between 0% and 20%.
B: mark-up percentage for items between 20% and 40%.
C: mark-up percentage for items between 40% and 60%.
D: mark-up percentage for items between 60% and 80%.
E: mark-up percentage for items between 80% and 100%.

8. With these variables and the value of indirect cost percentage previously found (29.6%), the following formula is developed:

\[ A + B + C + D + E = (5 \times 1.296) = 6.48 \]

9. Since an item cannot be charged for below cost, the following constraint must be satisfied:

\[ 1.00 < M < 2.48 \]

where \( M \) is an element of \( \{ A,B,C,D,E \} \).

10. Quantify the total number of items in each grouping and rank the five groups from highest number of items to lowest.

11. Define the following variables,

\( V \) = the grouping that has the maximum number of items.
\( W \) = the grouping that has the next highest number of items.
\( X \) = the grouping that has the next highest number of items.
\( Y \) = the grouping that has the next highest number of items.
\( Z \) = the remaining grouping.

12. Assign the following values,

\[ V = 1.496 \]
\[ W = 1.396 \]
\[ X = 1.296 \]
\[ Y = 1.196 \]
\[ Z = 1.096 \]

and mark-up the items in each group accordingly.
APPENDIX A

OVERHEAD ITEMS CALCULATED IN THIS STUDY

1) The full salary and benefits of two supply clerks.

2) The full salary and benefits of three stock clerks.

3) Partial salary and benefits of the staff working charge sheets.

4) Costs allocated to medical/surgical supplies from the non-revenue centers in the hospital.
APPENDIX B

CALCULATIONS FOR TOTAL LABOR OVERHEAD

Average hourly wage rate plus benefits (1987-1988 fiscal year): (supply clerks, stock clerks, and support staff)

A = Total proposed salary ($429,494).
B = Total appointed hours in average week (1,044 hrs).
C = Average hours in work week (40 hrs).
D = Average hours in work year (2,080 hrs).

Average hourly wage rate = (A x C)/(B x D)
= (429,494 x 40)/(1,044 x 2,080)
= $7.91 per hour

E = Total staff salaries ($5,530,957).
F = Total staff benefits ($1,177,537).

Benefit percentage = F/E
= (1,177,537)/(5,530,957) x 100
= 21.3%

Average hourly wage rate plus benefits = ($7.91) x (21.3%)
= $9.60 per hour

Total supply labor hours per day:

Supply clerks:
Peggy Brown 8.0 hrs
Liz Wireman 8.0 hrs
Total 16.0 hrs

Stock clerks:
Trudy Sims 8.0 hrs
Shirley Smith 8.0 hrs
Ethel Osler 8.0 hrs
Total 24.0 hr

Support staff (charge sheets):
Write up:
First shift 6.0 hrs
Second shift 2.5 hrs
Third shift 2.5 hrs
Verification:
All shifts 4.0 hrs
ADTU:
Write up & Verification 2.5 hrs
Total 17.5 hrs

Recovery Rooms:
Phase I 2.5 hrs
Phase II 1.0 hrs
Total 3.5 hrs
The total costs involved in the labor overhead items:
(supply clerks, stock clerks, and O.R. support staff)

Average hourly wage rate plus benefits: $9.60 per hour
Total supply labor hours per day: x 61.0 hours
Total Labor Overhead (per day): $585.60 per day
Works days per year: x 253 days

Total Labor Overhead (per year) $148,157 per year

Calculations for overhead allocated to medical/surgical supplies from the non-revenue centers:

The five non-revenue centers are:
A) Purchasing
B) Billing
C) General & Administrative
D) Plant, Building, & Housekeeping
E) Medical records

Each non-revenue center allocated indirect costs to four areas of the operating rooms.
1) Main O.R.
2) Recovery
3) Ambulatory Diagnostic Treatment Unit (ADTU)
4) Ambulatory Recovery

Calculations of the med/surg supply portion of indirect costs allocated to the four areas of the operating rooms (in dollars).

**Purchasing**

% med/surg supplies: 
\[ \frac{\text{med/surg supply costs}}{\text{total variable supply costs}} \]

<table>
<thead>
<tr>
<th>Area</th>
<th>Percentage</th>
<th>Supply Costs (dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main O.R.</td>
<td>94.86%</td>
<td>282,989</td>
</tr>
<tr>
<td>Recovery</td>
<td>63.14%</td>
<td>3,609</td>
</tr>
<tr>
<td>ADTU</td>
<td>90.45%</td>
<td>12,563</td>
</tr>
<tr>
<td>Amb Recov</td>
<td>0%</td>
<td>911</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>$282,085</strong></td>
</tr>
</tbody>
</table>

**Billing**

% med/surg supplies: 
(percentages received from Scott Lovelace)

<table>
<thead>
<tr>
<th>Area</th>
<th>Percentage</th>
<th>Supply Costs (dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main O.R.</td>
<td>50%</td>
<td>52,291</td>
</tr>
<tr>
<td>Recovery</td>
<td>6%</td>
<td>100,464</td>
</tr>
<tr>
<td>ADTU</td>
<td>32%</td>
<td>34,584</td>
</tr>
<tr>
<td>Amb Recov</td>
<td>0%</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>$43,241</strong></td>
</tr>
</tbody>
</table>
General & Administrative

% med/surg supplies:
\[ \frac{\text{total cost of med/surg supplies}}{\text{total costs of O.R.}} \]

(the indirect costs from previously allocated revenue centers are included in total costs through a stepdown procedure)

1) Main O.R. - 52.44% x 2,834,684 = 1,486,508
2) Recovery - 52.44% x 290,734 = 152,461
3) ADTU - 52.44% x 435,054 = 228,142
4) Amb Rec - 52.44% x 24,248 = 12,715
Total $1,879,826

P.B. & H.

% med/surg supplies:
\[ \frac{\text{square footage used for med/surg supplies}}{\text{total O.R. square footage}} \]
(calculated as percentage of square inches on blue print)

All areas included together:
9.84% x 2,436,556 = $239,757

Medical Records

% med/surg supplies:
(percentages received from Scott Lovelace)

1) Main O.R. - 24.7% x 385,977 = 95,336
2) Recovery - 0% x 35,530 = 0
3) ADTU - 0% x 18,064 = 0
4) Amb Rec - 0% x 0 = 0
Total $95,336

In addition, the indirect costs for the Lithotripter are included as:
$26,678

Total overhead allocated to med/surg supplies from non-revenue centers:

<table>
<thead>
<tr>
<th>Department</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchasing</td>
<td>282,085</td>
</tr>
<tr>
<td>Billing</td>
<td>43,241</td>
</tr>
<tr>
<td>G.&amp; A.</td>
<td>1,879,826</td>
</tr>
<tr>
<td>P.B. &amp; H.</td>
<td>239,757</td>
</tr>
<tr>
<td>Med. Records</td>
<td>95,336</td>
</tr>
<tr>
<td>Lithotripter</td>
<td>26,678</td>
</tr>
</tbody>
</table>

TOTAL $2,566,923 per year
APPENDIX C

A = O.R. direct expenses of med/surg supplies (9,177,543)
B = Total direct expenses and overhead (11,892,623)
C = % of contractual allowances, based on whole hospital (33.6%)

% of indirect costs above direct costs:

\[
\frac{(B - A)}{A} \times 100 = 29.6%
\]

Direct expenses and overhead considering contractual allowances:

\[
B \times (100 + C) = 15,690,607
\]

% of indirect costs above direct costs considering contractual allowances:

\[
\frac{(15,690,607 - A)}{A} \times 100 = 71.0%
\]