FINAL REPORT:

DATABASE ORGANIZATION FOR AUTOMATED BUDGET COMPARISONS

PROJECT TEAM 8:

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Submitted:  
20 April, 1987
EXECUTIVE SUMMARY

The Departments of Psychiatric Nursing, Activity Therapy, and Inpatient Education within the University of Michigan Hospitals have recently undergone some major programming changes and budget reductions. With these changes, the need for comprehensive budget analysis has become necessary. Currently, budgetary data is not in a usable form that will allow easy analysis. Consequently, a request for Industrial and Operations Engineering students to create a database that would provide a basis for analysis was made by Dr. Carol D. Spengler.

The database was created using Excel, a budget worksheet program. Data entered included information on budgeted full time equivalent positions, salary, commodity dollars (shown as line items), fringe benefits, and average length of stay for fiscal years 1983-84 through 1986-1987.

The project team began the analysis of budgetary trends in the form of graphs and charts. Some preliminary trends have been observed. There have been some budget reductions, but total F.T.E. levels have not decreased appreciably while F.T.E. job class distribution in some accounts has changed. Average length of stay numbers have decreased considerably.

The database has permitted volumes of data to be stored efficiently on one computer diskette. Besides being able to store data, the database can also be used as a budgeting tool. Formulas that may be entered in the database will allow different budgetary proposals to be analyzed and compared graphically.

Because of the scope of the database, the project team observed that many types of analyses are possible. The team has provided some initial findings. However, there are many other comparisons that could be made. In order to facilitate continued use of the database and further analysis by personnel in the aforementioned departments after the transition, a training session was held.

In the future, the database should continue to be a useful budgeting tool, provided personnel become familiar with the capabilities of Excel.
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INTRODUCTION

PURPOSE

The purpose of this document is to summarize the work and results that have been accomplished for Dr. Carol Spengler by the project team between January and April, 1987, as well as the recommendations that are being made.

BACKGROUND

In recent years, Psychiatric Nursing, Inpatient Education, and Activity Therapy have gone through some major budgetary and programming changes. These changes have produced the need for a method which would enable individuals to look at the budget in a condensed, easy to read form that will facilitate the analysis of these numbers.

Realizing this, Dr. Carol Spengler moved to start the appropriate project. A project similar to this was initiated earlier, but due to the need for outside expertise, it was postponed and Hospital Management Systems was contacted. The completion of the database allows for the analysis of trends in budgetary allotments and serves as an effective tool for budget preparation.
CURRENT OPERATIONS

Currently, the easiest way to access fiscal data for the concerned departments is to go through numerous volumes of records. These are kept on record in the office of the Administrative Associate. All questions regarding such data must be channeled appropriately. Data retrieval is unnecessarily complicated due to the fact that most employees are not located near the data, massive mounds of paper must be searched for specific numbers, and the Administrative Associate is not always available.

Analysis of any trends is further complicated. First, various numbers must be observed to decide whether or not analysis is even worthwhile. Currently, the books of data must be sorted through, and then the numbers entered into some type of graphics and/or worksheet program so that their possible relations can be observed. In the process, error may be introduced a number of areas. The current method has resulted in the placement of a very high priority on managerial intuition because data is not is not easily accessible.
The project was approached without a set of specific alternatives being considered. Changes were then developed and adopted as deemed necessary. This allowed the concentration on one solution that considered all of the various problems encountered.

A prototype for the database was developed, in pieces, with the help of Bonnie Burn, the Administrative Associate. After a few modifications the prototype was accepted as an efficient, easy-to-understand method of organizing the data into an effective database. The choice of this approach was supported throughout the actual data entry since a minimal number of modifications were necessary.
METHODOLOGY

The database had few initial guidelines that had to be followed during its development. It was to be formatted using the Excel software package for implementation on the Apple Macintosh computer, as per client request. It was to include full time equivalents, budgeted and actual payroll and commodities expenses for Psychiatric Nursing, Activity Therapy, and Inpatient Education, as well as length of stay data. Initially, the project team and Administrative Associate cooperated in the development of a database prototype.

Once approved, the data entry began by entering the budgeted amounts for all of the accounts in the involved fiscal years. This information was obtained directly from the budget worksheets for the individual fiscal years. Next, the actual information was entered from the Year-to-Date totals found on the June trend reports. The final data to be entered was that of length of stay, from the June length of stay reports. All data was obtained and made available by the Administrative Associate.

After completing the database, trends were searched for and then supported with graphical illustrations. The Excel package allowed various comparisons to be shown through the use of its gallery of graphing options. The ability to generate useful analysis was dependent upon knowledge of the information in the database and a moderate degree of familiarity with the Excel software package.
FINDINGS AND CONCLUSIONS

The database effectively eliminates many of the complications involved with the maintenance of fiscal information in yearly volumes. The logical, uniform organization makes the data easily accessible and makes the monitoring of fiscal trends a much less laborious task. This in turn reduces departmental dependency on the ability of the manager to intuitively control the department.

The database will allow others to have ready access to the data when necessary. This will facilitate the generation of needed reports to aid in the financial monitoring process. The analytical capabilities of Excel should also help individuals remain aware of spending trends in their respective departments.

The database should prove to be a valuable asset in relation to budget preparation. During the budget process, formulas can be implemented in Excel that will allow an individual to monitor the overall effects of alterations made in specific areas. For example, the individual categories within a given job classification can be included in a formula that would yield total payroll. Also, by observing past spending trends in given areas, budgeted amounts can be formulated while considering historical patterns.

The reporting of trends by the project team was not inclusive. Only more apparent trends, and a few requested analyses, were studied. Many other relevant trends could be discovered and analyzed by individuals within the concerned departments. Such people would be able to supplement the
information in the database by incorporating their personal knowledge regarding the inner workings of their respective departments. This would enhance the usefulness of the database and serve as a basis for further analysis.
RECOMMENDATIONS

The database should be made available to, and implemented by, appropriate personnel, as deemed necessary by the Associate Hospital Administrator. Concerned departments would use it as a tool in budget preparation and fiscal management. The people that will be involved with the database should have a working knowledge of the Excel software package. It is also recommended that University Hospital Management Systems be contacted regarding a workshop or training session in the effective presentation of information in a graphical format. This would insure that involved personnel are able to use the analytical capabilities of Excel to generate useful and informative output.
On April 22, 1987 the database will be complete and turned over, along with an extra copy, to the Associate Hospital Administrator. The database can be implemented by providing appropriate personnel with a copy of the database and training in the Excel Software package. Once implemented, the database should have a significant impact on the budget process and the monitoring of financial data.

To insure that the database remains a useful financial tool in the future, it should be updated as additional data becomes available. Maintenance and updating of the database will be the responsibility of the Associate Hospital Administrator, or delegated personnel.
Respectfully Submitted,

James Cameron

April 22, 1987

Date

Michael Hoekstra

April 22, 1987

Date

Christopher Rennie

April 22, 1987

Date

Melissa Weber

April 22, 1987

Date
DATABASE DOCUMENTATION AND SPECIFICATIONS

IMPLEMENTATION REQUIREMENTS:

COMPUTER: Designed for use on the Apple Macintosh Plus Computer System.

SOFTWARE: Microsoft EXCEL Spreadsheet, Version 1.0.

PHYSICAL CHARACTERISTICS:

SIZE: The database currently has dimensions of 1223 rows by 13 columns, which occupies 340K bytes of information on the computer. The EXCEL spreadsheet itself has dimensions of 16,384 rows by 230 columns. This unused space represents potential for the storage of very large amounts of additional information.

ORGANIZATION:

The first two rows contain headings for the individual columns. Row 1 contains the fiscal year designation, with the most recent information being located at the leftmost available portion of the database. Row 2 divides the information for each fiscal year into three columns, the first column for budgeted full-time equivalents, the second for budgeted expenses, the third for actual expenses incurred. Column A is divided into blocks, each block representing one account. The blocks then hold the information associated with that account (e.g. payroll, commodities, length of stay, as well as subdivisions for each classification). The accounts are organized in the database according to the department with which they are associated. The accounts for the Department of Psychiatric Nursing occupy rows 3 through 699. Accounts for the Department of Activity Therapy are located in rows 700 through 1067. Finally, rows 1068 through 1223 contain the accounts for the Department
of Inpatient Education.
Within each account the indentation pattern is as follows:
Account Titles are not indented. Payroll and Commodity titles are indented three spaces. Job Family titles and Commodity subtitles (i.e. variable and overhead), are indented eight spaces. Finally, items that are categorized under the Job Family titles or Commodity subtitles are indented eleven spaces.

FOOTNOTES: This section contains an explanation of the various footnotes that are part of the database.

(1) FTE: These figures are the budgeted full-time equivalents. These numbers are obtained by dividing the budgeted hours, from the Budget Worksheets for the respective fiscal years, by 40.

(2) BUDGET: The information in this column is also obtained from the Budget Worksheets. The only budgeted data that was not taken from the Budget Worksheets was that for accounts 208174, 208177, and 208158 for FY 1985-86. These figures were obtained from the June 30, 1986 Trend Reports, from the Budget column.

(3) ACTUAL: The data for this column is obtained from the June 30 Trend Reports for the respective fiscal year. The figures come from the Year-To-Date column.

(4) FRINGE BENEFITS: The actual fringe benefits are taken from the June 30 Trend Report. The value is from the TOT STAFF BENEFITS row under the Year-To-Date column. The budgeted figures for fringe benefits are a projected value. The amount of projected fringe dollars is computed by: .21*(The sum of the job family totals minus Special Salary Items and Other Payroll Expenses). The Special Salary Items and Other Payroll Expenses were subtracted so that the fringe benefits were based solely on total wages.
(5) LENGTH OF STAY: This data is only included in the Nursing accounts for the Department of Psychiatric Nursing. These values were taken from the June 30 Length of Stay Reports, for the appropriate years.

(6) TOT APH 208134/144/174: This is the average length of stay for the adult units. They are included in accounts 208134, 208144, and 208174. These figures were also taken from the June 30 Length of Stay Reports.

(7) TOT CPH 208234/244/274: This is the average length of stay for the child/adolescent units. They are included in accounts 208234, 208244, 208274. These figures were obtained from the June 30 Length of Stay Reports.

(8) TOT LOS FOR PSYCH NURSING: This is the average length of stay for the entire Psych Hospital. These were also taken from the June 30 Length of Stay Reports.

(9) For accounts 208174 and 208177 the FTE's were excluded since the unit began on February 14, 1986.
The following is a collection of some of the graphic comparisons the project team created. It is not inclusive. The complexity varies within this package, with both simple and more involved comparisons being included. You are encouraged to use these as a basis for further investigation.
DEPARTMENT OF PSYCHIATRIC NURSING
P.N. FTE'S vs. Length of Stay

<table>
<thead>
<tr>
<th>Year</th>
<th>FTE'S</th>
<th>LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY 83/84</td>
<td>143.1</td>
<td>83</td>
</tr>
<tr>
<td>FY 84/85</td>
<td>152.8</td>
<td>67</td>
</tr>
<tr>
<td>FY 85/86</td>
<td>143.3</td>
<td>37</td>
</tr>
<tr>
<td>FY 86/87</td>
<td>137.9</td>
<td>NA</td>
</tr>
</tbody>
</table>

Source: Budget Worksheets for FY 1983-84 to FY 1986-87 and Length of Stay Reports

UM Hospital
April 20, 1987
DEPARTMENT OF PSYCHIATRIC NURSING
FTE's to LOS Ratios

Source: Budget Worksheets for FY 1983-84 to FY 1985-86 and Length of Stay Reports
UM Hospital
April 20, 1987
LENGTH OF STAY FOR ADULT, CHILD/ADOLESCENT, AND ENTIRE HOSPITAL

Source: Length of Stay Reports

UM Hospitals
April 20, 1987
INPATIENT EDUCATION
BUDGETED AND ACTUAL DOLLARS

Source: Budget Worksheets for FY 1983-84 to FY 1986-87

UM Hospitals
April 20, 1987
DOLLARS PER FTE
PSYCHIATRIC NURSING, ACTIVITY THERAPY, AND INPATIENT EDUCATION DEPARTMENTS

Sources: Budget Worksheets for FY 1983-84 to FY 1986-87 and Trend Reports for FY 1983-84 to FY 1985-86

UM Hospital
April 20, 1987
BUDGETED DOLLARS - FY 1986-1987
DEPARTMENTAL BREAKDOWN

PSYCH NURSING 10.57%
ACTIVITY THERAPY 14.90%
SCHOOL 74.53%

SOURCE: Budget Worksheets for FY 1986-87

BUDGETED DOLLARS:
Psych Nursing 4,310,687
Activity Therapy 861,819
School 611,040
Total: $5,783,546
CHANGE IN DISTRIBUTION OF FTE'S FOR C9UH NURSING

Source: Budget Worksheet for FY 1986-87
UM Hospitals
April 20, 1987
RATIO OF FTE'S TO LENGTH OF STAY FOR EACH PSYCH. UNIT
FISCAL YEARS 1984 - 1986

SOURCE: Budget Worksheets for FY 1983-84 to FY 1985-86 and June Length of Stay Reports

UM Hospitals
April 20, 1987