Costs, Benefits, and Return
From UMMC Total Quality Process:
July 1991 Through June 1992

May 24, 1993

Lisa Adams
Eduardo Alonso
Erik Long
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Costs, Benefits, and Return From

Executive Summary

May 24, 1993

In order to maintain consistency and ease of combination with the report titled Costs, Benefits, and Return from UMMC Total Quality Process: July 1987 through June 1991, this report will contain few modifications of the previous report.

One of the most commonly asked questions about the Total Quality Process (TQP) at the University of Michigan Medical Center (UMMC) is what the benefits have been, and in particular whether there has been a positive financial impact in addition to the many quality benefits. Physicians, staff, managers, and external people are interested in the financial impact of our Total Quality efforts, particularly in an environment requiring increased cost effectiveness.

Approach and Methodology

This report summarizes key results from fiscal year 1991-92, ending in June 1992. The approach was to identify those incremental costs and benefits associated with implementation of the Total Quality Process, and the associated official and unofficial quality improvement teams (QITs). Thus the focus was on those costs and benefits not already included in the budget of the University of Michigan Hospitals (UMH). One important reason for calculating only incremental costs and benefits is that in the future managers and staff will be expected to use TQM methods for all their work. Total Quality Management (TQM) will become a way of life in which it will be impractical if not impossible to separate how much time each person spends on TQM. It may be 100 percent of the time.

The methodology included collecting information on net marginal or incremental costs and benefits after accounting for payer mix, insurance allowances, and bad debt. This report differs from the previous study in that it also includes the costs and benefits of unofficial QITs which completed projects in fiscal year 1991-92.
Costs and benefits of quality improvement projects were counted for only two years from implementation, even though the benefits continue on. Implementation costs were subtracted from the benefits. The annualized value of one-time savings and capital cost was calculated at an interest rate of 7.4% per year. The present value of costs and benefits in fiscal year 1991-92 dollars was calculated using an 8.5% discount rate. The costs and benefits of each quality improvement project were calculated from the year the recommendations were approved.

Costs, Benefits, and Return

In addition to the numerous quality improvements, the financial benefits were greater than the costs for the fiscal year of 1991-92. The present value, in 1991-92 dollars, of costs in this fiscal year was $1,519,683. The present value of combined benefits over fiscal year 1991-92 was $2,703,688, for a net gain of $1,184,005 in incremental benefits over costs. The present value of benefits was 1.78 times, or 178%, the present value of costs.

The quality improvement projects required negligible resources to implement their recommendations. Thus, most improvements have been made with current resources.

Although UMMC did not pay incremental costs for managers, physicians, and most staff to attend Total Quality orientation, education, and training programs, some believe these training costs should be included in the financial analysis. This approach is more pessimistic and includes no estimate of the value of the new knowledge or any improvements people make based on this new knowledge.
Introduction

One of the questions surrounding the Total Quality Process (TQP) at the University of Michigan Medical Center (UMMC) is whether the process can produce a positive return on investment, in addition to the quality and customer satisfaction improvements. There are people within the UMMC and other external people as well, who are interested in the financial impact of the Total Quality Process at the University of Michigan Medical Center. The financial costs and benefits of the TQP have been analyzed over the last five years to help address this concern.

Purpose

The purpose of this project was to extend the findings related to the costs, benefits, and return from the University of Michigan Medical Center's Total Quality Process to include July 1991 through June 1992. The previous findings only cover July 1987 through June 1991. UMMC's fiscal year begins in July of each year.

Background

An analysis of the costs and benefits of the UMMC Total Quality Process was undertaken last year to determine the financial impact of the program, as well as the improvements in quality and customer satisfaction. The results for July 1987 through June 1991 were presented in the publication:


Approach and Methodology

The approach and methodology used to analyze the costs, benefits and returns of the UMMC Total Quality Process were the same as those used in the previous study. The reason for using the same approach and methodology is to maintain continuity between the two studies. At some point in the future, the two studies will be compiled into one report, so the approaches, methodologies, and formats of the two studies will match as close as possible. The following descriptions of approach, methodology, and related issues are modifications of the approach and methodology section from the previous study noted in the references.
Approach

There are two alternative approaches to identify the costs and benefits associated with implementing a Total Quality Process. The first is to attempt to identify and evaluate every possible cost and benefit related to the effort. This approach would attempt to identify every hour spent in a meeting or working on Total Quality efforts, and the costs of those hours, supplies, etc. The second approach is to attempt to identify only those marginal or incremental costs and benefits associated with the effort. We chose to use the later approach, identifying only those costs and benefits not already experienced or included in the budget of the Hospitals. Sample incremental costs include: additional staff and equipment dedicated to the TQP, training materials, room rentals, other costs of the training programs, and costs to implement projects. One important reason for calculating only incremental costs and benefits is that managers and staff will be expected to use TQM methods as a regular part of their work. It will become a way of life in which it will be impractical if not impossible to separate how much time each manager spends on TQM.

The strategy was to include all incremental costs which could be identified, but to estimate the benefits conservatively.

The analyses excluded specific adjustments for price increases or inflation, separate from the present-value calculations. The analyses also excluded any estimates of long-term benefits. No estimates were made for the long-term financial impact of additional satisfied customers, better-satisfied customers, or improved working environment. In the long run, UMMC will gain additional return and referred patients due to our Total Quality Process. The improved quality and image of UMMC can have a major impact on the Medical Center. In addition, improved working environment will reduce staff turnover, reduce training costs, and reduce labor grievances. However, due to the difficulty of making such estimates, no values have been assigned to improved customer satisfaction or improved working environment in our financial calculations.

Methodology

Appropriate labor time and other costs have been calculated in dollars. Benefits, on the other hand, include both non-financial and financial improvements. The analyses included centralized costs and benefits of the Total Quality Process, such as training, plus the costs and benefits of the specific quality improvement teams which have implemented their recommendations during the 1991-92 fiscal year.

The following interpretations were used to calculate the costs, benefits, and return of the UMMC Total Quality Process.
• **Financial Costs.** Net marginal or incremental costs were included along with any net revenue losses.

• **Financial Benefits.** Net marginal cost savings were included along with net revenue increases. Gross revenues were reduced to account for payer mix, insurance allowances, and bad debt.

• **Discount or Interest Rate.** The annualized value of one-time costs and revenues were calculated at 7.4% of that value. For example, the reduction in accounts receivable days brings in additional cash to the hospital, but the on-going value of that cash is the interest income it can produce, or alternatively the interest cost it can avoid.

• **Years Of Benefits and Costs.** Although cost savings, revenues, and operating costs are expected to continue indefinitely, we calculated the financial impact of each project for only two years. Thus the financial benefit of a project with annualized savings implemented in fiscal year 1990-91 was counted for fiscal year 1990-91 and fiscal year 1991-92.

• **Implementation Costs.** One-time implementation costs were subtracted from the first year's benefits, or if greater than the first year's savings, from the second year's savings.

• **One-Time Benefits and Costs.** The annualized impact of one-time benefits, such as savings, and one-time costs are calculated as the interest rate on those benefits or costs.

• **Start Date.** The costs and benefits of each quality improvement project were calculated from the year the recommendations were approved.

• **Inclusion of informal/unofficial Total Quality efforts.** The financial costs and benefits of informal Quality Improvement Teams (QIT's) were not included in the previous study. This report will include the financial costs and benefits of informal/unofficial QIT's which were identified as having implemented their recommendations during the 1991-92 fiscal year. In order to qualify for this study, the informal projects had to meet the following criteria:
  
  • Team effort. The project was conducted by a team of people.
  
  • Focus on quality improvement. Quality improvement was a key priority of the project.
  
  • Quality improvement tools used. Quality improvement philosophy, tools, and techniques taught in the UMMC Total Quality programs were used during the project.
• Identified as a quality improvement effort by managers, based on the above criteria. The project is known and identified by management as a quality improvement project.

The centralized costs included training, cultural assessment, salaries of facilitators, consultants, incremental equipment, and other costs. The incremental central costs were taken from financial records of administration, management systems, and training and development, where they were incurred. To date, the primary central benefits with calculated financial values have been from site visits, seminars, speaking honorariums, and consulting engagements.

The costs and benefits of the quality improvement projects were determined jointly with the quality improvement team (QIT) leaders and facilitators. The decentralized costs and benefits associated with QITs were more difficult to determine for the following reasons. First, the primary focus was on quality improvement, so financial costs and benefits were not tracked during the projects. Second, some of the financial changes of quality improvement projects occurred simultaneously with other changes.

Related Issues

Calculation of the impact of the UMMC Total Quality Process involves a number of issues which cannot practically be separated from the calculations.

Quality and Non-Financial Costs and Benefits. The primary focus of the whole effort was to improve the services, products, and information provided to our customers. Yet the positive impacts of these improvements in quality have long-term, and sometimes unmeasurable, benefits. No estimate of such non-financial impacts was made. Hence, this financial analysis substantially underestimates the long-term benefit of the process.

Benefits From Improvement Teams and Improvements In Daily Operations. As people are exposed to the principles and methods during Total Quality orientation and training programs, many use these to make improvements. Improvement teams (ITs) do not meet all of the criteria to be a quality improvement team, yet make many improvements. Also, managers and staff make improvements as part of their daily work. For example, QIT members frequently identify potential improvements during team meetings, then make those improvements separate from the team's primary effort.

Difficult To Separate Out Benefits Due To Total Quality Projects. Since there are many changes occurring simultaneously within UMMC, it is difficult to separate the benefits resulting from QIT projects from benefits of other actions. Multiple research and management projects are frequently being conducted.
simultaneously in a large area like the operating rooms. Another impact is the simple fact that when a process is being carefully studied, this will by itself cause changes. This is known as the "Hawthorne effect". However, we attempted to separate the costs, non-financial benefits, and financial benefits of the quality improvement projects when possible.

Costs, Benefits, and Return

The costs, benefits, and returns in this project were calculated in the same manner as those in the previous study for fiscal years 1987-88 through 1990-91. Again, to maintain consistency and ease of combining the two projects, this section will contain few modifications of the Costs, Benefits, and Return section from the report noted in the reference section.

The primary emphasis of the quality improvement teams (QITs) and other quality improvement efforts has been to improve the processes on which they were working. Each team has measured a number of benefits in addition to costs and benefits. The project summaries in Appendix B describe contributions to each of the UMMC Total Quality goals:

- Improve quality of all products and services, especially patient care.
- Improve customer satisfaction
- Improve cost effectiveness
- Improve working environment, or quality of work life
- Improve competitive position

Incremental Costs, Benefits, and Return. The financial costs, benefits, and return for fiscal year 1991-92 are summarized here. Supporting specific centralized and project costs and benefits are given in Appendix A. The following information can be summarized from Appendix A:

- The only costs associated with the Total Quality effort for the fiscal year of 1991-92 were the centralized costs. Thus, the improvements during this time period have been made within current resources. This is counter to the fears of many leaders and managers that quality improvement teams will request major resources. The major cost to the Total Quality effort resided in the salaries and fringe benefits of the centralized support staff and the facilitators. The centralized support staff had combined salaries and fringe benefits of $310,406 whereas the facilitators had combined salaries and fringe benefits of $672,240.

- In addition to the quality improvements, the financial benefits were substantially greater than the costs. The present value, in 1991-92 dollars, of incremental costs over the four-year period was $1,519,683. This figure
excludes the value of manager, physician, and staff time spent in training programs, which is separately addressed below. The present value of combined benefits over the same period was $2,703,688, for a net gain of $1,184,005. The present value of benefits was 1.78 times, or 178%, the present value of costs.

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
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<tr>
<td>Present value of direct financial benefits</td>
<td>$2,703,688</td>
</tr>
<tr>
<td>Present value of incremental costs</td>
<td>1,519,683</td>
</tr>
<tr>
<td>Incremental financial contribution</td>
<td>$1,184,005</td>
</tr>
<tr>
<td>Benefits/Costs, excluding training time</td>
<td>1.78</td>
</tr>
</tbody>
</table>

- The financial benefit of the Drug Usage Evaluation QIT includes the cost reduction for the twelve drugs listed in Appendix A. These drugs were not included in the previous report, so the two year benefit associated with these cost savings was included in this report for the the fiscal years of 1990-91 and 1991-92, when the appropriate cost savings data or estimates were available.

More Pessimistic Calculations Including Training Time. Although UMMC did not pay incremental costs for managers, physicians, and most staff to attend Total Quality orientation, education, and training programs, some believe these training costs should be included in the financial analysis. This approach is more pessimistic and includes no estimate of the value of the new knowledge or any improvements people make based on this new knowledge.

Acknowledgments

We would like to acknowledge the hard work of those who assisted in this project. Our thanks to Patrice Lyons, who assembled the previous report and provided us with much appreciated guidance in this project. Also, we would like to thank those at the UMMH who provided additional support for this project.
APPENDICES
Appendix A
Financial Costs, Benefits, and Return
By Project and Activity: FY 1991-92

The financial costs, benefits, and return for activities and projects during fiscal year 1991-92 (1Jul91 - 31Jun92) are included on the following pages. The centrally accrued costs and benefits are listed first, then the costs and benefits related to specific quality improvement projects are listed.

This analysis was based on the following methodology and assumptions:

- **Financial Costs.** Net marginal or incremental costs were included along with any net revenue losses.

- **Financial Benefits.** Net marginal cost savings were included along with net revenue increases. Gross revenues were reduced to account for payer mix, insurance allowances, and bad debt.

- **Discount or Interest Rate.** The annualized value of one-time costs and revenues were calculated at 7.4% of that value. For example, the reduction in accounts receivable days brings in additional cash to the hospital, but the on-going value of that cash is the interest income it can produce, or alternatively the interest cost it can avoid.

- **Years Of Benefits and Costs.** Although cost savings, revenues, and operating costs are expected to continue indefinitely, we calculated the financial impact of each project for only two years. Thus the financial benefit of a project with annualized savings implemented in fiscal year 1990-91 was counted for fiscal year 1990-91 and fiscal year 1991-92.

- **Implementation Costs.** One-time implementation costs were subtracted from the first year's benefits, or if greater than the first year's savings, from the second year's savings.
• **One-Time Benefits and Costs.** The annualized impact of one-time benefits, such as savings, and one-time costs are calculated as the interest rate on those benefits or costs.

• **Start Date.** The costs and benefits of each quality improvement project were calculated from the year the recommendations were approved.

• **Inclusion of informal/unofficial Total Quality efforts.** The financial costs and benefits of informal Quality Improvement Teams (QIT's) were not included in the previous study. This report will include the financial costs and benefits of informal/unofficial QIT's which were identified as having implemented their recommendations during the 1991-92 fiscal year. In order to qualify for this study, the informal projects had to meet the following criteria:
  
  • Team effort. The project was conducted by a team of people.
  
  • Focus on quality improvement. Quality improvement was a key priority of the project.
  
  • Quality improvement tools used. Quality improvement philosophy, tools, and techniques taught in the UMMC Total Quality programs were used during the project.
  
  • Identified as a quality improvement effort by managers, based on the above criteria. The project is known and identified by management as a quality improvement project.

• **Financial Benefits Exclusions.** The direct financial benefit calculations excluded any estimated value of improved customer satisfaction, working environment, etc. In the long run, there will be tremendous value of improved customer satisfaction and working environment, but no estimates were made due to their undefined nature.

• **Interpretation Of Table.** Costs are shown as negative numbers in parentheses, and benefits are shown as positive numbers. A zero entry in the table indicates negligible incremental financial cost or benefit.
### FINANCIAL COSTS, BENEFITS, AND RETURN BY PROJECT AND ACTIVITY: FY 91-92

University of Michigan Medical Center Total Quality Process

Interest rate for present value calculations = 7.4%

<table>
<thead>
<tr>
<th>Description or QI Project/Team</th>
<th>Marginal Costs and Benefits [2]</th>
<th>Present Value as of FY 91-92</th>
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<tr>
<td></td>
<td>FY 90-91 Costs</td>
<td>FY 91-92 Costs</td>
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<tr>
<td></td>
<td>Benefits</td>
<td>Benefits</td>
</tr>
<tr>
<td>Centralized Costs</td>
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<tr>
<td>Salaries and Fringe Benefits</td>
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<tr>
<td>Centralized Support Staff</td>
<td>($310,406)</td>
<td>($310,406)</td>
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<tr>
<td>Facilitators</td>
<td>($672,240)</td>
<td>($672,240)</td>
</tr>
<tr>
<td>Applied Practice Management Group</td>
<td>($89,035)</td>
<td>($89,035)</td>
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<tr>
<td>Consultants</td>
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<tr>
<td>University of Michigan School of Public Health</td>
<td>($44,518)</td>
<td>($44,518)</td>
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<tr>
<td>Qualtec Inc.</td>
<td>($25,682)</td>
<td>($25,682)</td>
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<tr>
<td>Vector Analysis and Cultural Assessment</td>
<td>($94,952)</td>
<td>($94,952)</td>
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<tr>
<td>Med. Director Office of Clinical Affairs/Rothman (91)</td>
<td>($61,830)</td>
<td>($61,830)</td>
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<tr>
<td>Other Expenses</td>
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<tr>
<td>Central Support</td>
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<td>General Office Supplies</td>
<td>($91,102)</td>
<td>($91,102)</td>
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<td>Telephone and Communications</td>
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<td>Travel and Food</td>
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<tr>
<td>Equipment Space and Depreciation</td>
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<td>($40,129)</td>
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<tr>
<td>Applied Practice Management Group</td>
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<tr>
<td>General Office Supplies</td>
<td>($9,778)</td>
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<td>Telephone and Communications</td>
<td>($2,186)</td>
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<tr>
<td>Travel and Food</td>
<td>($15,523)</td>
<td>($15,523)</td>
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<tr>
<td>Equipment Space and Depreciation</td>
<td>($700)</td>
<td>($700)</td>
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### Management Systems

#### Travel Costs
- **Intermountain Healthcare** 9/15/91: $(1,427)
- **GOAL/QPC** 11/10/91: $(696)
- **GOAL/QPC** 3/19/92: $(828)
- **GOAL/QPC** 5/14/92: $(653)
- **Total Quality Pins**: $(200)
- **Books**: $(528)
- **Biomedical Engineering (copies of slides)**: $(1,103)
- **MERG (original of slides and overheads)**: $(1,144)
- **Federal Express**: $(365)

### Centralized Benefits

#### Speaking/ Honorarium
- **Applied Practice Management Revenues**: $56,625

### Subtotal: Centralized Costs & Benefits

- **Costs**: $(1,519,683)
- **Benefits**: $85,088
- **Net Benefit or Loss**: $(1,434,595)

### QUALITY IMPROVEMENT PROJECT COSTS AND FINANCIAL BENEFITS

#### Accounts Receivable Unbilled:

**Commercial Insurance Holds**
- **Costs: Impl. & 1-Time [4]**: $0
- **Costs: Annual**: $0
- **Benefits: Cost Reduction**: $0
- **Benefits: Revenue Increase**: $343,242

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**Accounting**

**Management**

**Systems**

**Travel**

- **Costs**
  - **Intermountain Healthcare** 9/15/91: $(1,427)
  - **GOAL/QPC** 11/10/91: $(696)
  - **GOAL/QPC** 3/19/92: $(828)
  - **GOAL/QPC** 5/14/92: $(653)
  - **Total Quality Pins**: $(200)
  - **Books**: $(528)
  - **Biomedical Engineering (copies of slides)**: $(1,103)
  - **MERG (original of slides and overheads)**: $(1,144)
  - **Federal Express**: $(365)

**Centralized Benefits**

- **Speaking/ Honorarium**: $56,625
- **Applied Practice Management Revenues**: $28,463

**Subtotal: Centralized Costs & Benefits**

- **Costs**: $(1,519,683)
- **Benefits**: $85,088
- **Net Benefit or Loss**: $(1,434,595)

**Quality Improvement Project Costs and Financial Benefits**

**Accounts Receivable Unbilled:**

- **Commercial Insurance Holds**
  - **Costs: Impl. & 1-Time [4]**: $0
  - **Costs: Annual**: $0
  - **Benefits: Cost Reduction**: $0
  - **Benefits: Revenue Increase**: $343,242
Accounts Receivable Unbilled:
End-Stage Renal Disease
Costs: Impl. & 1-Time $0 $0
Costs: Annual $0 $0
Benefits: Cost Reduction $0 $0
Benefits: Revenue Increase $59,200 $59,200

Accounts Receivable Unbilled:
Medicaid Pending
Costs: Impl. & 1-Time [4] $0 $0
Costs: Annual $0 $0
Benefits: Cost Reduction $0 $0
Benefits: Revenue Increase $336,528 $336,528

Charge Processing Errors (Financial impact still under evaluation)
Costs: Impl. & 1-Time $0 $0
Costs: Annual $0 $0
Benefits: Cost Reduction $0 $0
Benefits: Revenue Increase $0 $0

Chelsea Family Practice
Costs: Impl. & 1-Time $0 $0
Costs: Annual $0 $0
Benefits: Cost Reduction $0 $0
Benefits: Revenue Increase $0 $0

Drug Usage Evaluation
Cefoxitin
Costs: Impl. & 1-Time $0 $0
Costs: Annual $0 $0
Benefits: Cost Reduction $151,789 $109,614
Benefits: Revenue Increase $274,305 $0

Cefotetan
Costs: Impl. & 1-Time $0 $0
Costs: Annual $0 $0
Benefits: Cost Reduction $29,189 $29,189
Benefits: Revenue Increase $0 $0

Albumin
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<tr>
<th>Drug</th>
<th>Costs: Impl. &amp; 1-Time</th>
<th>Costs: Annual</th>
<th>Benefits: Cost Reduction</th>
<th>Benefits: Revenue Increase</th>
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<td>Albumin (LVP)</td>
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<td>Project</td>
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<td>Costs: Annual</td>
<td>Benefits: Cost Reduction</td>
<td>Benefits: Revenue Increase</td>
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<td><strong>Benefit 3st Reduction</strong></td>
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**Subtotal, QI Projects**

Costs: $0
Benefits
Cost Savings $404,143 $1,441,135 $1,879,630
Revenue Increase $0 $738,970 $738,970
Total $404,143 $2,180,105 $2,618,600

Net Benefit or Loss
(benefits - costs)
$404,143 $2,180,105 $2,618,600

TOTAL: Centralized + QI Projects

Costs
$0 ($1,519,683) ($1,519,683)

Benefits
Cost Savings $404,143 $1,441,135 $1,879,630
Revenue Increase $0 $824,058 $824,058
Total $404,143 $2,265,193 $2,703,688

Net Bottom Line
(benefits-costs)
$404,143 $745,510 $1,184,005

Return
(benefits/costs)
1.49 1.78
Appendix B
Summaries Of Selected Quality Improvement Projects

Summaries of several projects completed by quality improvement teams (QITs) are presented on the following pages. Each summary describes the opportunity for improvement, the analysis and countermeasures, results, and the contribution to the goals of the University of Michigan Medical Center (UMMC). Summaries are given for all the quality improvement projects listed in the financial summary in Appendix A.

Summaries are provided for:

1. Accounts Receivable unbilled - Commercial insurance holds.
2. Accounts Receivable unbilled - End-stage renal disease.
3. Accounts Receivable unbilled - Medicaid pending.
4. Charge Processing Errors.
5. Chelsea Family Practice.
12. Stockroom.
Opportunity for Improvement: Discharged unbilled Commercial Insurance cases had averaged 154 from September 1989 through June 1990. A cross-functional team was formed with representation from: Patient Accounts, Billing & Third Party Collections, and Utilization Review. This team's mission was to: Reduce the number of Commercial Insurance cases and correspondent amount of gross charges outstanding.

Analysis & Countermeasures: The Commercial Insurance billing process was flowcharted and portions of the process were "targeted" for analysis. Targeted areas were unsigned/unavailable Hospital Insurance Processing Forms (HIPS), Commercial Authorizations (for M-Care, Care Choices, and other HMOs), availability of insurance information, and motor vehicle accident follow-up. Countermeasures included:

- Development of pilot to utilize clerical float on floor to obtain signatures on HIPS for anticipated discharges.
- Initiation of FAX pilot with M-Care to receive admission authorization in addition to conducting concurrent review on all M-Care patients.
- Agreement with Care Choices whereby "baby" authorization numbers were issued based on the mother's authorization number. Also, screening of authorization numbers as received against unbilled "F" list.
- Changing policy to bill most commercial accounts with authorization unavailable, since most cases were being paid by third parties.
- Formation of sub-team to continue to address issues between Preadmission Review, Utilization Review, the Business Office, and Accounts Receivable.
- Development of pilot to provide motor vehicle accident follow-up.

Results: Commercial insurance cases on "hold" decreased from an average of 154 from September 1989 to June 1990 to an average of 65 between July 1990 and October 1991. Gross inpatient discharged unbilled accounts receivable balance declined from 43.8 days to 35.8 days for an actual reduction of 8 days in accounts receivable. Twenty-six percent of our average gross daily revenue of $2.23 Million is billed to Commercial Insurance Carriers. This yields a reduction of ($579,800 X 8) $4,638,400. The financial benefit of this increase in working capital is declared to be the interest income on these funds for two years. The short-term interest rate for fiscal 1990-91 was 8.5% and the interest income was $394,264. The short-term interest rate for fiscal 1991-92 was 7.4% and the interest income was $343,242.

Control Chart

CONTRIBUTION TO UMMC GOALS

Improvement of:

- Quality of Products & Services: Patient accounts were settled sooner.
- Customer Satisfaction: Patients received bill promptly after discharge.
- Cost Effectiveness: Working capital was increased by reducing days in accounts receivable.
- Working Environment: Interdepartmental communication and cooperation increased.
- Competitive Position: Increases in working capital, provide more resources to meet customer requirements and help postpone the need for charge increases.

May 1993
ACCOUNTS RECEIVABLE - End Stage Renal Disease

Opportunity for Improvement: There was a four to five month backlog of unprocessed claims for End Stage Renal Disease patients. Dialysis services accounted for five percent of overall outpatient volume, but accounted for forty-five percent of unpaid claims over one year. There was no Accounts Receivable System on the market which addressed all the unique needs related to End Stage Renal Disease (ESRD) billing. A cross-functional team was formed with representation from: Billing, Collections, Patient Accounts, and the Dialysis Unit. The team’s mission was to: Examine the end-stage renal disease process to reduce billing and collection time while simultaneously enhancing the quality of billing and improving collections.

Analysis & Countermeasures: The team used a Theme Selection Matrix, Brainstorming, Cause & Effect Diagrams, and Pareto Charts to help with their team’s progress. The team implemented several countermeasures including:

- Individual staff responsibility for billing & collection of accounts.
- Development of a training program for all involved in the ESRD billing & collections process.
- Instigation of quarterly meetings with Blue Cross & Blue Shield of Michigan, our Medicare fiscal intermediary.
- Formation of Work Groups with charging departments (especially the Emergency Room) to help clarify problems presented by late charges.

Results: Average Application Days declined from 72 to 24. Net End Stage Renal Medicare receivables declined from $2.7 M to $1.9 M between February and June of 1991, for a working capital increase of $800,000. With an interest rate for fiscal year 1990-91 at 8.5%, there was interest income in the amount of $68,000 for 1990-91 and with an interest rate for fiscal year 1991-92 at 7.4%, there was interest income in the amount of $59,200 for 1991-92 on this reduction in net ESRD Medicare receivables.

CONTRIBUTION TO UMMC GOALS

UMMC GOALS, Improvement of:

Quality of Products & Services: Reduced percent of unbilled accounts.

Customer Satisfaction: Reduced frequency of telephone calls to patients to verify information.

Cost Effectiveness: Decreased net ESRD Medicare receivables by $800,000.

Working Environment: Improved inter-departmental communication and understanding.

Competitive Position: Improved cash position provides additional resources for reinvestment in new services for customers and helps delay the need for charge increases.

May 1993
ACCOUNTS RECEIVABLE - Medicaid Pending

Opportunity for Improvement: The number of uninsured patients admitted to the University of Michigan Hospitals and the number of days their Medicaid applications were pending was increasing. Between March and July of 1990, the Medicaid application process for Group 2 patients was studied. These Group 2 patients are between the ages of 21 and 65, excluding mothers delivering babies. For these patients there were extensive requirements to prove Medical as well as Financial need. A cross-functional team was formed, comprised of members from Patient Accounts, Billing & Collections, Preadmission Review, Utilization Review, and Medical Information. This team's mission was to: Reduce the number of days between discharge and application for Medicaid and to increase the percentage of Group 2 patients approved for Medicaid coverage.

Analysis & Countermeasures: To analyze this process, a Flowchart was constructed showing the numerous steps involved in the application process. A Cause & Effect Diagram was constructed to show possible causes of delay in the process. Medical denials, delays in the application process, and denials for noncompliance were identified as root causes of the problem. Countermeasures included:

- Establishment of procedures to obtain case summaries directly from Medical Information upon their completion.
- Preparation of Medical Exam Reports for these applications by Utilization Review. This improved the timeliness and accuracy of these reports.
- Identification of Medicaid eligible cases via training of Hospital Account Representatives.
- Requirement of collection of financial verification documents from patients during admission.
- Tracking of all Medicaid pending cases to the Special Accounts Unit.

Results: The percent of Medicaid Group 2 cases approved increased from 44% to 63%, and has maintained at that level. This produced incremental revenue of $336,528. Days patients were discharged and Medicaid applications were awaiting case summary decreased from an average of 33 days to 18 days.

<table>
<thead>
<tr>
<th>Year</th>
<th>Cases/Yr</th>
<th>Approval Increase</th>
<th>Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY 91</td>
<td>492</td>
<td>19%</td>
<td>93.48</td>
</tr>
<tr>
<td>FY 92</td>
<td>492</td>
<td>19%</td>
<td>93.48</td>
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</tbody>
</table>

UMMC's average revenue per Medicaid case is $6,400 but we are reimbursed for a percentage of our bad debt. Average bad debt reimbursement per case is $2,800. Therefore on each incremental Medicaid application approved, UMMC increases revenue by $3,600. The increased revenue as a result of this QIT is credited for the next two fiscal years.

CONTRIBUTION TO UMMC GOALS

Improvement of:

Quality of Products & Services: Patient accounts were settled more quickly.

Customer Satisfaction: Increased Medicaid approval rate, reduced bad debt and charity care.

Cost Effectiveness: Increased reimbursement was received for these cases.

Working Environment: Communication improved between departments participating on the QIT.

Competitive Position: Allowed increased reimbursement improving financial position and helping to delay the need for charge increases.

May 1993
Opportunity for Improvement: As of October 21, 1990, yearto-date revenue was below budget by $453,524 or 0.26% even though yearto-date admissions were above budget by 201 admissions or 2.7%. This problem merited further investigation by a Quality Improvement Team (QIT). A cross-functional team was formed with representation from: UH/KEC Administration, Internal Medicine, Finance, MedSport, Ambulatory Care, Occupational Therapy, Emergency Services, Physical Therapy, Information Networking Services, Physical Medicine & Rehabilitation, Pathology, Nephrology, Cardiology, and Pulmonary. This team's mission was to: identify factors and implement countermeasures to reduce the incidence of lost charges.

Analysis & Countermeasures: The team flowcharted the charge ticket process, used a Cause & Effect Diagram to identify potential root causes, and used a Pareto Chart to identify the most prevalent root causes of charge processing errors. Analysis revealed that 3.1% of charge tickets had errors, representing $1.3 Million in revenue. Also, 0.5% of charges representing $212,546 were written off because they were too late to submit or were not processable. The main countermeasure developed as a result of the QITs analysis was an educational program for all departments on proper completion of charge tickets. The educational program included information on:

- Understanding Master Fee Codes (MFC)
- Required demographic information on charge tickets
- Understanding difference between Pre-assigned price codes and variable price codes.
- Stressed that description of service/procedure needed when service not listed in the Price Book.

Results: The instruction manual was piloted in January, 1991, in Cardiology. A dramatic reduction in the percent of charge processing errors was achieved. An inservice program was presented Wednesday, October 2, 1991 for all users of charge tickets. The financial impact of this team is still under evaluation.

CONTRIBUTION TO UMMC GOALS

Improvement of:

Quality of Products & Services: Patient accounts services were improved via increased accuracy of bills. Departments were able to capture revenue for all services rendered.

Customer Satisfaction: Reduced rework for internal customer, Financial Services. Fewer claims resubmitted to payors for outpatient services. Revenue generating departments receive credit for all services rendered.

Cost Effectiveness: Reduced rework and waste. Enhanced revenue through reducing write-offs.

Working Environment: Improved working relationship between all CT users and Financial Services.

Competitive Position: Reducing lost revenue strengthens UMMC's financial position, increases funds available for new services, and helps delay the need for charge increases.
Opportunity for Improvement: The Chelsea Family Practice, associated with the University of Michigan Hospitals, has had an unofficial quality improvement team since 1990 which targeted daily cash collections at the site. Normally, the majority of the cash collections rely on the final bill that is sent out to both the patient and the insurance companies. This translates into months of waiting to collect for services rendered. This team’s mission was to improve cash collections instead of sending out bills, increase cuts on back-end billing, and provide training for the staff.

Analysis & Countermeasures: In order to increase cash collections, the staff received training on what alternatives patients have for paying their bills. By having a more knowledgeable staff, customers are better informed on the options available for paying their bills, particularly with the meticulous regulations established by different insurance agencies. When clients know what insurance benefits and plans they have, they are better informed about their payment options (this commercial insurance billing help had never been provided, leaving clients no option but to send the bills directly to the insurance agencies). By having a trained staff informing clients on their choices and establishing concrete procedures for collections, the Chelsea Family Practice initially increased cash collections by $200 a day.

Results: Since 1989-90 (the benchmark year) cash collections have increased from an average $376.50 per day to a current average of $788.44. This is approximately a $52,000 increase over 1989. The QIT also had a tremendous impact on the establishment and its workers, who feel they are now well trained and more reliable. The practice’s clients feel satisfied since they are informed on their payment options and are not inconvenienced by multiple billing notices over a long period of time.

CONTRIBUTION TO UMMC GOALS

Improvement of:

Quality of Products & Services: Staff is trained and informed on all cash collection options.

Customer Satisfaction: Patients are well informed by trained staff on their billing payment options and procedures.

Cost Effectiveness: $52,000 increase over 1989 in cash collections.

Working Environment: Staff felt empowered by their training and knowledge.

Competitive Position: Reduced delay in cash collections increase the practice’s financial status and increases available funds.

May 1993
DRUG USAGE EVALUATION COMMITTEE

Committee Mission:
The Drug Use Evaluation (DUE) Committee, under the jurisdiction of the Pharmacy and Therapeutics (P&T) Committee, is responsible for monitoring and evaluating the safe and effective use of drugs at the University of Michigan Hospitals. Provided that safety and efficacy are assured, the cost effective use of drugs is also assessed. The DUE Committee is responsible for ensuring that corrective actions are pursued via the P&T Committee once opportunities for improvements are identified for either processes related to the provision of pharmaceutical care (prescription, administration, preparation and dispensing, and monitoring the effects of medications) or individual physician prescribing habits.

Composition/Membership:
The Committee composition consists of at least four representatives from the medical staff (with representation from adult internal medicine, pediatrics, surgery, and the house officer staff), the Pharmacy Department, Nursing Services, medical records, and a biostatistician. The DUE Committee chair is the Associate Director of Pharmacy responsible for the DUE. The chair appoints the DUE Committee secretary.

Committee Actions:
The DUE Committee focuses its review on drugs that are frequently used, present a significant risk to the patient, are suspected or known to be problem prone, or are a critical component of the care provided for a specific diagnosis, condition, or procedure.

Table 1: Summary of DUE Cost Savings

<table>
<thead>
<tr>
<th>DRUG</th>
<th>FY 90-91</th>
<th>FY 91-92</th>
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</thead>
<tbody>
<tr>
<td>Cefotetan</td>
<td>$151,789</td>
<td>$29,189</td>
</tr>
<tr>
<td>Cefoxitin</td>
<td>$83,530</td>
<td>$83,530</td>
</tr>
<tr>
<td>Albumin</td>
<td>$117,840</td>
<td>$252,980</td>
</tr>
<tr>
<td>Vancomycin</td>
<td>$50,984</td>
<td>$50,000*</td>
</tr>
<tr>
<td>Imipenem</td>
<td>$89,908</td>
<td></td>
</tr>
<tr>
<td>Filgrastim</td>
<td>$56,529</td>
<td></td>
</tr>
<tr>
<td>Albumin (LVP)</td>
<td>$42,315</td>
<td></td>
</tr>
<tr>
<td>Piperacillin/Timentim</td>
<td>$99,327</td>
<td></td>
</tr>
<tr>
<td>Bumex</td>
<td>$75,000*</td>
<td></td>
</tr>
<tr>
<td>Ondansetron</td>
<td>$60,000*</td>
<td></td>
</tr>
<tr>
<td>Protocol Modifications for Bone Marrow Transplants</td>
<td>$100,000*</td>
<td></td>
</tr>
</tbody>
</table>

* Indicates an estimated value

The DUE Committee develops annually a priority list of drugs, drug classes, or diagnoses that are scheduled for DUE review based upon data collected from the screening tools and current priorities.

The DUE Committee ensures that screening data is routinely reported to the Committee to identify potential problems or opportunities to improve the use of specific drugs or categories of drugs. Screening tools that will be used include at least the following:

1. Annual reports of drug use by order volume and clinical service
2. Annual reports of drug use by cost
3. Annual pharmacy and medical staff surveys
4. Bi-annual adverse drug reaction reports and quarterly medication incident summary reports
5. Annual reviews of the pharmacy literature
6. Routine monitoring of selected indicators of drug use (DUE indicators) as identified by the DUE Committee and as is possible with existing staff time and computer resources
7. Reporting of ad hoc requests made by the P&T Committee

The DUE Committee reviews and approves all proposed evaluations of drug therapy prior to their initiation. For each review, a physician consultant(s) with expertise in that area of drug is selected by the lead author and approved by either the DUE chair or secretary to review and approve the study methodology and criteria. While emphasis is placed on prospective and concurrent reviews, the study methodology may be either prospective, concurrent, or retrospective.

Committee Results:
The previous study included the DUE Committee’s results for the drug Cefazolin only. Since then, several more drugs have been evaluated and reported and have resulted in substantial savings. Because patients were billed the same amount and received less dosages, a net savings was incurred. These results are provided in Table 1. Detailed measures taken for the drugs Albumin and Cefotetan, H2RA, and Imipenem accompany this report.

May 1993
### DUE - Albumin (LVP) QIT

**Opportunity for Improvement:** The Drug Usage Evaluation (DUE) Committee initiated a study on Albumin in large volume paracentesis as a result of more recent literature which better defined appropriate albumin use and the need to follow-up further on inappropriate albumin identified in previous studies. For the 20 patients included in the study, it was found that these patients received a total of 56 paracenteses procedures. This team's mission was to: developedevelop the appropriate levels of albumin for patients based on previous studies.

**Analysis & Countermeasures:** An excessive amount of albumin was used in 85% of the evaluable diagnostic tap procedures and 84% of the therapeutic tap procedures, primarily on the adult internal medicine services (82%). Of the 149 units administered, 49% of the units were considered excessive. The data has been shared with Dr. Nostrant and he has presented it to the Division of Gastroenterology. Dissemination of the results, revision of the guidelines, and the development of a pharmacy-based intervention in conjunction with Dr. Nostrant are planned.

**Results:** Follow-up indicated an annual cost savings of $42,315 in fiscal year 1991-92.

### DUE - Cefotetan QIT

**Opportunity for Improvement:** The pharmacy Target Drug Program exists to monitor, evaluate, and if necessary, take corrective actions to ensure the appropriateness of prophylactic, definitive and empiric drug use at the University of Michigan Hospitals. The Drug Usage Evaluation (DUE) Committee studied Cefotetan use in surgical prophylaxis because of its frequent use and the relative lack of knowledge among physicians about single dose prophylaxis. For the 82 patients studied, it was found that none of the patients met all five study criteria. Compliance with the appropriate dose and route of administration was very high (98-100%), but in most patients cefotetan was found to be administered greater than one hour prior to surgery (94%) and an excessive number of postoperative doses were administered (95%). This team's mission was to: to develop an educational intervention program targeted towards reducing the duration of surgical prophylaxis.

**Analysis & Countermeasures:** Early experience with this program found that prescribing had improved to the point that few interventions were possible, probably as a result of the joint effort with Surgery and the widespread communication of the problem to various committees and medical staff. The duration of antimicrobial prophylaxis for surgery has been designated as a hospital wide indicator for P&T and routine reporting to select medical staff. Two such reviews have been performed to date.

**Results:** Follow-up indicated an annual cost savings of $29,189 in fiscal year 1991-92.

### CONTRIBUTION TO UMMC GOALS

**Improvement of:**
- Quality of Products & Services: Cefotetan and albumin levels are more appropriately administered.
- Customer Satisfaction: Physicians are better educated.
- Cost Effectiveness: Institutions saves around $29,000/year by properly administering cefotetan and $42,315/year on decreased dosing for albumin.

**Working Environment:** Pharmacists feel empowered to meet management expectations.

**Competitive Position:** Cost reductions free up resources for meeting customer requirements and help delay the need for charge increases.
May 1993

DRUG USAGE EVALUATION - H2RA QIT

Opportunity for Improvement: The pharmacy Target Drug Program exists to monitor, evaluate, and if necessary, take corrective actions to ensure the appropriateness of prophylactic, definitive and empirical drug use at the University of Michigan Hospitals. The Drug Usage Evaluation (DUE) Committee was informed that the pharmacy staff was seeing a significant increase in the use of injectable H2 Receptor Antagonists (H2RA), and while the parenteral route of H2RA administration was indicated in patients who were unable to take medications orally or who require a rapid onset of drug action, a significant number of patients were maintained on parenteral H2RA unnecessarily. A preliminary study of H2RA orders was conducted and showed that 80% of the parenteral H2RA orders contained an incorrect dose and/or route of administration (38% being inappropriate route, 7% inappropriate dose, and 35% inappropriate route and dose). Therefore it was decided that there was a need to conduct a comprehensive review of H2RA against approved criteria for use which was developed by the DUE Committee and two physician consultants (Chiefs of Gastroenterology and GI surgery). This team’s mission was to: Reduce the percentage of inappropriate H2RA drug prescriptions.

Analysis & Countermeasures: The approved acceptable criteria for IV H2RA was based upon clinical situations that did not permit oral therapy (risk of aspiration, gastrointestinal obstruction, pre/postoperative fast, etc.), that resulted in questionable drug absorption (nasogastric suction, motility disorders of stomach, esophagus, short bowel syndrome, frequent antacid administration, etc.), or that required a rapid onset of action. Data was collected from 199 adult patients who received at least two consecutive doses of H2RA over a two month period. The results of this baseline review showed that 55% of all IV H2RA doses were administered inappropriately and could have been administered by the oral route. A one time education was performed, but only resulted in a slight improvement to a 45% inappropriate mark. Therefore, the DUE Committee developed a computerized prospective TDP educational program, whereby the committee gets a computer report each morning of all patients who are on IV H2RA and also on other PO medications and who do not have an NPO order in the Dietetics computer system. Then the clinical pharmacist intervenes by either educating the physician or automatically changing the route of administration in accordance with an approved dosing program.

Results: The efforts of the committee on H2RA did not only produce annual cost savings of $129,890 in fiscal year 1989-90, $117,840 in fiscal year 1990-91, and $252,980 in fiscal year 1991-92, but also decreased the average length of IV H2RA therapy by approximately 3 to 4 days, and has thereby improved the quality and liability of the care provided. As the quality of patient care increased, the legal liability for the hospital and its staff decreased.

CONTRIBUTION TO UMMC GOALS

Improvement of:

Quality of Products & Services: H2RA dosing and prescription are more accurately prescribed.

Customer Satisfaction: Physicians are better educated and patients receive appropriate drug treatment.

Cost Effectiveness: Institution saves around $100,000 - $200,000/year on decreased dosing.

Working Environment: Pharmacists feel empowered to meet management expectations.

Competitive Position: Cost reductions free up resources for meeting customer requirements and help delay the need for charge increases.
Opportunity for Improvement: The pharmacy Target Drug Program exists to monitor, evaluate, and if necessary, take corrective actions to ensure the appropriateness of prophylactic, definitive and empirical drug use at the University of Michigan Hospitals. A Drug Usage Evaluation (DUE) Committee was formed as the pharmacy's version of a Quality Improvement Team. It was a cross-functional team with membership comprised of pharmacists, physicians, nurses, Medical Information staff, and a Ph.D. biostatistician. The team identified Intravenous Imipenem-cilastatin (Primaxin) usage as an opportunity for improvement at UMMC. This DUE was initiated as a result of adverse reaction reports which indicated that several (n=6) patients had seized while receiving imipenem. A retrospective and a concurrent study were performed in order to assess whether appropriate doses of imipenem were being prescribed for patients given their degree of renal function and to determine if physicians would accept the dosing recommendations of pharmacists when notified of the problem. Dosing was found to be appropriate in 79% of the patients. In the concurrent phase, physicians accepted pharmacist recommendations 67% of the time, thus lowering the dose used in eight of the twelve patients who were found to be receiving too much imipenem given their level of renal function. This team's mission was to: assess appropriateness of imipenem dosing, document the actions taken by physicians in response to pharmacy interventions, determine the frequency of central nervous system toxicity risk factors, and document the occurrence of adverse effects.

Analysis & Countermeasures: Following development of a computer report which merged serum creatinine data from Pathology with imipenem dosing data from Pharmacy, an active intervention program was initiated where pharmacists routinely intervene in cases where the dose is too high for the patient's renal function. This program has resulted in reductions in the average dose used per patient and reductions in the number of seizures noted. All seizures which have occurred in the active intervention phase were in patients receiving appropriate doses of imipenem and whom had a predisposition to seize. A total of 30 imipenem courses administered to 29 patients and 105 courses administered to 92 patients were evaluated. Dosing of imipenem was considered completely appropriate (i.e., from initiation through discontinuation of therapy) in 23 of 30 (76.7%) and 86 of 105 (81.9%) retrospective and concurrent courses of therapy, respectively. All cases of inappropriate imipenem dosing resulted from failure to decrease the dose for renal insufficiency. The team concluded that the problem with imipenem ordering was predominantly an educational issue. The first countermeasure taken involved distribution of a memo from the DUE committee and Chief of Infectious Diseases to all division chiefs and section heads of the Departments of Surgery and Internal Medicine. The memo described approved criteria for appropriate imipenem dosing and requested that each chief/section head educate their house officers on appropriate imipenem dosing. The second countermeasure involved the certification of pharmacists to perform each specific imipenem intervention. This was achieved by distributing background/instructional information to the pharmacists and quizzing them.

Results: Follow-up indicated an annual cost savings of $89,908 in fiscal year 1991-92.

May 1993
**Opportunity for Improvement:** An informal group was created to revise the patient menu at the UMMC and the University of Michigan Hospitals. Approximately 2,373 meals were being processed each day. Reports that other hospitals had saved from 5 to 15 percent by making menu changes was this group’s initial motivator; however, the potential benefits incurred by both the customer and the budget was realized early on. Representatives from different units in Nutrition, Production, Procurement, Patient Food Services, as well as, a registered dietician to represent the clinical aspect of the study formed the team. This team’s mission was to maintain/enhance customer satisfaction while decreasing the average cost per meal.

**Analysis & Countermeasures:** The team began by defining their purpose. They integrated the rules from the total quality process into their weekly meetings. They began by evaluating the current menu. They solicited customer input (patients, nurses, administration, food and nutrition services) by a survey. This survey required the customer to rank in order of importance ten menu qualities. Food taste was ranked by 80% of the people as most important, followed by self-selection of food and finally appearance and temperature. The group then analyzed the data. The next step of their process was developing a menu and also developing and revising recipes. Some of the changes they made included adding more breakfast choices, presenting the meal differently (separating the meat and bread for a sandwich so there were no "soggy" sandwiches), and the menu itself. A complete nutritional analysis was performed, as was a complete cost analysis. For example, the portion size of french fires was listed as 6 ounces. The correct portion size is 2.5 ounces which decreases the cost per portion by $.0738 including ketchup. Taste tests were also conducted. For example, the current frozen vanilla pudding cost $2.21 per serving and the new instant vanilla pudding cost $.13 per serving. These items were then taste tested. A new menu was designed and then implemented. The University of Michigan Hospitals publication, the *Star* (Dec/Jan 93) reported this team’s results.

**Results:** This was a fast paced initiative, in which the group began their task in October 1991 and in six and a half months revamped the patient menu.

During this time preceding implementation, they collected data, set goals, surveyed customers, tasted food, revised recipes, established new procedures, revised reference books and inserviced employees. $182,000 is now saved annually as a result of this group’s work. There were several reasons for these savings. First, items that were costly were removed from the menu. These items were often the least favorably looked upon by the patients as well. Second, user friendly/common foods, which patients seem to like more, were incorporated into the menu. Next, the group looked at the recipes to see if the portion/sizes of the USDA recommended allowances were too large. For example, many people get more than the necessary amount of protein in their diet, and so this portion would be reduced. Finally, the recipes were streamlined to have fewer variations. Surveys were conducted before and after the menu changes showed satisfaction levels above an already high level, to above a four on a five point scale. Several QITs have been initiated as a result of this group in order to foster the continual improvement process.

**CONTRIBUTION TO UMMC GOALS**

<table>
<thead>
<tr>
<th>Improvement of:</th>
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<tbody>
<tr>
<td>Quality of Products &amp; Services: Patient menu reflects items less costly, yet just as nutritious, and more satisfying to the customer.</td>
</tr>
<tr>
<td>Customer Satisfaction: Patients receive food they report that they liked more.</td>
</tr>
<tr>
<td>Cost Effectiveness: $182,000 is saved annually as a result of this team’s revamping of the menu.</td>
</tr>
<tr>
<td>Working Environment: Satisfied customers leads to less customer complaints and more satisfying working conditions.</td>
</tr>
<tr>
<td>Competitive Position: Customer requirements and nutritional needs are monitored and continually revised.</td>
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</tbody>
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May 1993
Opportunity for Improvement: The work schedules for Security Officers did not address the needs of staff and the department. The University of Michigan Hospitals' hiring process was very lengthy resulting in excess overtime assignments, staff burn out, and needless expense for the institution. Although Security Officers received every 5th or 6th weekend off and worked an 8.5 hour day, they wanted every weekend off and an 8 hour workday. A weekend was defined as two consecutive days off, one being a Saturday or Sunday. A functional team was formed comprised of members exclusively from Security Services. This team's mission was to: Improve employee satisfaction with the quality of work life.

Analysis & Countermeasures: The team conducted a survey of existing personnel and found work schedules to be the number one issue. A Cause & Effect Diagram was used to identify root causes of daily overtime. The staff assignment process was flowcharted. Countermeasures included:

- Development of a Training Day
- Development of a system for information sharing
- Elimination/reduction of clerical work for supervisors

The development of a training day was made possible financially through revenue producing agreements to train security personnel for other local area healthcare provider organizations. Supervisors also began rounding to free up training time during the work day.

Information sharing improved via bulletin boards, radios, VCRs and inexpensive redesign of physical space. Also, all security officers were trained to become computer literate, including knowledge on accessing Electronic Mail.

Elimination of redundant filing through better information management reduced the need for clerical work performed by Supervisors.

Results: Security Officers work day was decreased from 8.5 to 8 hours. A training day was created. Better communications occurred within the department. $70,743 was cut from the budget in 1991 due to overtime, payroll and D-Card reductions. Overtime paid to staff to come in on their off-shift to participate on the Quality Improvement Team amounted to $7,556 in fiscal 1990-91. There is less clerical work for supervisors. Management has become more accessible. The $70,743 cut from the budget was extended for fiscal 1991-92.

CONTRIBUTION TO UMMC GOALS

Improvement of:

Quality of Products & Services: Decreased paperwork for supervisors increased available time to focus on "real" issues.

Customer Satisfaction: The only customers of this QIT were the employees themselves. Employee satisfaction increased.

Cost Effectiveness: Substantial budget reductions occurred through streamlining of indirect/support tasks.

Working Environment: Security officers and management communicated better and the level of trust increased.

Competitive Position: Greater employee satisfaction among Security Officers results in more cheerful front-line workers to greet UMMC's customers.

May 1993
**Opportunity for Improvement:** Outside of their formal Quality Improvement Team, a group of Stockroom QIT members formed a task group to look at improvement of vendor relationships and less costly alternatives to replacing parts for "robo carriers." The group is also concerned about down time for maintenance workers because parts needed for repairs are not received in a timely manner.

**Results:** Lead time was cut by 75% through ordering of robo carrier parts from Thyssen Automation in Utah, instead of the previous European vendor. The task force arranged to have "choppers" for robo carriers rebuilt at a cost of $400 instead of paying $2,400 for a new one. Since they order approximately 50 "choppers" per year, this amounts to a substantial cost savings estimated at $100,000 per year. In fiscal 1990-91, new electronic boards were also requested. The purchase order would have been $70,000. The task group arranged to have these rebuilt also, at a cost of $30,000 for a $40,000 savings. These savings were extended for fiscal 1991-92.

<table>
<thead>
<tr>
<th>STOCKROOM - Maintenance /Stockroom Task Group</th>
<th>CONTRIBUTION TO UMMC GOALS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Opportunity for Improvement:</strong> Outside of their formal Quality Improvement Team, a group of Stockroom QIT members formed a task group to look at improvement of vendor relationships and less costly alternatives to replacing parts for &quot;robo carriers.&quot; The group is also concerned about down time for maintenance workers because parts needed for repairs are not received in a timely manner.</td>
<td><strong>Improvement of:</strong></td>
</tr>
<tr>
<td><strong>Results:</strong> Lead time was cut by 75% through ordering of robo carrier parts from Thyssen Automation in Utah, instead of the previous European vendor. The task force arranged to have &quot;choppers&quot; for robo carriers rebuilt at a cost of $400 instead of paying $2,400 for a new one. Since they order approximately 50 &quot;choppers&quot; per year, this amounts to a substantial cost savings estimated at $100,000 per year. In fiscal 1990-91, new electronic boards were also requested. The purchase order would have been $70,000. The task group arranged to have these rebuilt also, at a cost of $30,000 for a $40,000 savings. These savings were extended for fiscal 1991-92.</td>
<td><strong>Quality of Products &amp; Services:</strong> Reduced lead time for parts, allows maintenance to repair robo carriers in a more timely manner.</td>
</tr>
<tr>
<td></td>
<td><strong>Customer Satisfaction:</strong> Robo carrier users are pleased when machinery is repaired quickly.</td>
</tr>
<tr>
<td></td>
<td><strong>Cost Effectiveness:</strong> Arranging for robo carrier parts to be rebuilt saves UMMC significant cash outlays.</td>
</tr>
<tr>
<td></td>
<td><strong>Working Environment:</strong> Employees are empowered to make some major decisions and feel their input is valued.</td>
</tr>
<tr>
<td></td>
<td><strong>Competitive Position:</strong> Decreased costs help UMMC delay the need for price increases.</td>
</tr>
</tbody>
</table>

May 1993
## Appendix C
### List of Project Contacts

<table>
<thead>
<tr>
<th>Contact</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lana Berry</td>
<td>Contacted about informal/unofficial QIT's.</td>
</tr>
<tr>
<td>Kevin McKillup</td>
<td>Contacted about cost reduction in fiscal year 1991-92 for Stockroom QIT.</td>
</tr>
<tr>
<td>Connie Hansen</td>
<td>Prepared centralized costs for Management Systems.</td>
</tr>
<tr>
<td>Marlene Muscott</td>
<td>Contacted about interest rate to use for fiscal year 1991-92.</td>
</tr>
<tr>
<td>Nancy Durance</td>
<td>Contacted about Charge Processing Errors QIT and Pediatric Billing Group.</td>
</tr>
<tr>
<td>Pat Lyons</td>
<td>Provided files from previous study and guidance on project.</td>
</tr>
<tr>
<td>Hilda Allen</td>
<td>Helped obtain centralized costs/benefits and helped with e-mail responses.</td>
</tr>
<tr>
<td>Lynne Clevenger</td>
<td>Contacted about informal/unofficial QIT's.</td>
</tr>
<tr>
<td>Carol Wesolowski</td>
<td>Contacted about informal/unofficial QIT's.</td>
</tr>
<tr>
<td>Larry Price</td>
<td>Contacted about informal/unofficial QIT's.</td>
</tr>
<tr>
<td>Mindy Eisenberg</td>
<td>Contacted about informal/unofficial QIT's.</td>
</tr>
<tr>
<td>Cliff Arnott</td>
<td>Contacted about cost reduction in fiscal year 1991-92 for Security Services QIT.</td>
</tr>
<tr>
<td>Amy Perry</td>
<td>Contacted about informal/unofficial QIT's.</td>
</tr>
<tr>
<td>Rose Ramey</td>
<td>Contacted about printing costs for Clinician Communication team.</td>
</tr>
<tr>
<td>Susan Critz</td>
<td>Contacted about Ambulatory Care Improvement Team</td>
</tr>
<tr>
<td>Phyllis Baldwin</td>
<td>Contacted about Pediatric Broviac Blood Draw Team</td>
</tr>
<tr>
<td>Tom Biggs</td>
<td>Contacted about Healthquest implementation and cash collections for accounts receivable teams.</td>
</tr>
<tr>
<td>Sue Vaughn</td>
<td>Contacted about informal/unofficial QIT's.</td>
</tr>
<tr>
<td>Lillie Carter</td>
<td>Contacted about informal/unofficial QIT's.</td>
</tr>
<tr>
<td>JoAnne Miano</td>
<td>Contacted about Adult Admissions/Appointments.</td>
</tr>
<tr>
<td>Name</td>
<td>Contacted about</td>
</tr>
<tr>
<td>-----------------------</td>
<td>---------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Ronda Stoner</td>
<td>informal/unofficial QIT's.</td>
</tr>
<tr>
<td>Robert Reske</td>
<td>Charge Processing QIT</td>
</tr>
<tr>
<td>Kathleen Fischer</td>
<td>informal/unofficial QIT's.</td>
</tr>
<tr>
<td>Mike Ryan</td>
<td>Drug Usage Evaluation QIT.</td>
</tr>
<tr>
<td>Jennifer Holmes</td>
<td>informal/unofficial QIT's.</td>
</tr>
<tr>
<td>Michael Kremm</td>
<td>informal/unofficial QIT's.</td>
</tr>
<tr>
<td>Kelly Catrell</td>
<td>Empowerment Design Team.</td>
</tr>
<tr>
<td>Kenna Gainer</td>
<td>&quot;DUCK&quot; Group.</td>
</tr>
<tr>
<td>Joyce Kerestes-Smith</td>
<td>Patient Menu Task Force</td>
</tr>
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</table>
### Appendix D
Contacts for Future Reports

<table>
<thead>
<tr>
<th>Contact Name</th>
<th>Activity</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ronda Stoner</td>
<td>3 teams in Pediatrics</td>
<td>Started Fall 1992.</td>
</tr>
<tr>
<td>Norma Grills</td>
<td>Q-Scope</td>
<td>N/A</td>
</tr>
<tr>
<td>Steve Raymond</td>
<td>Maintenance RICE Document</td>
<td>N/A</td>
</tr>
</tbody>
</table>
References