

CARE PROCESS REENGINEERINGSM

MERCY HOSPITAL AND
MEDICAL CENTER
CASE STUDY

J&J

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CARE PROCESS REENGINEERING

MERCY HOSPITAL AND MEDICAL CENTER CASE STUDY

Executive Summary

Background

The \$750 billion health care industry has been under unprecedented scrutiny for several years due to:

- Political awareness of the national health care bill with respect to the budget deficit.
- Public awareness of increased premiums and reductions in coverage.
- Runaway costs escalating at twice the rate of inflation.

Health care providers face a myriad of strategic and tactical dilemmas as they strive to remain viable in the health care reform movement. Their most fundamental concern is to reduce costs while improving the quality of health care.

Most providers are reacting to the cost/quality challenge by focusing on several potential areas of improvement:

- Reduced treatment variances through critical pathways and clinical outcomes analysis.
- Improved treatment effectiveness through case management and patient-focused care efforts.
- Reduced operating costs through continued analysis of supply, capital, and overhead costs.

One element, generally overlooked by providers, is quantified bottom-line savings, which not only create reductions in health care cost, but also ensure the viability of existing health care providers.

By establishing health care partnerships with experienced and knowledgeable health care industry leaders, such as Johnson & Johnson, providers are able to gain assistance and support in reengineering care processes to improve resource utilization, while achieving significant and measurable cost savings. This case study documents a recent cooperative effort between Mercy Hospital, Johnson & Johnson and its *INSIGHT*® Partner Branson, Inc., to measure specific clinical, economic and patient outcomes resulting from a Care Process Reengineering initiative.

Case Study Description

Mercy Hospital and Medical Center, located in San Diego, was interested in undertaking a Care Process Reengineering initiative which would not only improve the quality of care, but also would quantify and ensure bottom-line results. Working

together Mercy, Johnson & Johnson, and consultants from Branson, Inc., developed a pilot project designed to improve the utilization of the resources required to support business and clinical processes. The Care Process Reengineering initiative focused on training members of Mercy's organization to document, measure, analyze, and reengineer processes supporting the clinical functions. This case study is a detailed report, which discusses:

- Project organization.
- Process analysis using contemporary tools and techniques.
- Opportunities and recommendations.
- Strategic impact of this effort.

Benefits

The project team completed the project redesigns in three months and recommended care process enhancements which would improve resource utilization and conservatively save in excess of \$750,000 per year. Additional benefits, already realized, include:

- Empowered and enthusiastic employees capable of replicating the reengineering techniques throughout Mercy.
- Physician support and involvement in provider improvement efforts.
- Improvements in clinical outcomes through the assessment of business process interfaces.
- Verification of a methodology to reengineer business processes within the health care industry.

Mercy is now moving forward with these recommendations to achieve significant savings, and Johnson & Johnson has formalized this model to offer *Delivered Value*SM to other providers in partnership with Branson, Inc.

CARE PROCESS REENGINEERING

MERCY HOSPITAL AND MEDICAL CENTER CASE STUDY

I. Background

Mercy Hospital and Medical Center, located in San Diego, is a non-profit, 523-bed, acute care facility. Part of the Catholic Healthcare West System, this teaching center is the largest private provider in San Diego, a very competitive market with 50% occupancy rates. Other local providers now offer HMOs and have acquired physician practices.

Mercy remains committed to: partnering with independent physician practices; developing a strong primary care base; and offering an integrated delivery system. At the same time, Mercy's mission is to provide care to the surrounding population regardless of the ability to pay. To ensure long-term viability, however, Mercy must address basic business issues: competition for beds and operating effectiveness. Mercy has focused on effectively reducing its FTE per adjusted occupied bed (AOB) and its cost per unit of service. To do this, Mercy continually works to improve its workforce and facility capability.

To upgrade operating performance, Mercy has actively embraced the following programs: Continuous Quality Improvement (CQI), Patient Focused Care, Employee Empowerment, and Critical Pathways. Patient Focused Care, pioneered at Mercy and in operation on four floors, has effectively improved patient outcomes and satisfaction by consolidating responsibilities and streamlining some key activities with patient interfaces. Cross-training of floor personnel has not realized all anticipated non value-added savings, calling for a more directed effort to achieve an acceptable, measurable bottom-line impact on personnel costs.

We have over 150 people associated with medical records, billing, and collection due to processes which were established to support health care industry interfaces. These processes must also be streamlined with bottom-line results in order for us to ensure long-term competitiveness.

Shirley Savage, Process Reengineering Facilitator

Critical Pathways, developed and implemented for several Diagnostic Related Groups (DRGs), have established consistent procedure service delivery, providing Mercy management with clinical benefits, such as reduced lengths of stay and streamlined record documentation. Several Mercy administra-

tors encouraged movement of Critical Pathways to "the next level," by addressing issues and improvements which have a direct bottom-line impact.

The critical pathway is a very effective management tool to improve care by defining what has to be done, when to do it, and who should do it. The missing element for fundamental improvement is to assess how a process is performed, measure its components, and challenge its effectiveness.

Dr. William Davidson, Chief of Staff

Mercy asked Johnson & Johnson for its support to identify and quantify process opportunities to achieve bottom-line improvements without compromising patient outcomes. Johnson & Johnson proposed a Care Process Reengineering initiative and, in partnership with Mercy and management consultants from Branson, Inc., entered a project designed to :

- Improve Mercy's business and clinical processes.
- Provide project team members with the technical skills to improve other processes, following completion of the initial project.

This project was aimed at teaching us to fish instead of just bringing us a fish home for dinner. We could build a permanent skill base instead of continuing to rely on outside resources to keep us in a competitive position.

**Jolene Tornabeni,
Senior Vice President of Inpatient Services**

The procedure selected for project redesign was total knee replacement, because:

1. The orthopedic unit was the first unit to reorganize under the Patient Focused Care concept.
2. The Critical Pathway was in place.
3. The team responsible for this procedure were the most seasoned resources within Mercy to go to "the next level."

II. Project Objectives, Scope, and Organization

Objectives

Mercy's objectives were to:

- Quantify improvement opportunities in the knee replacement process.
- Develop a team capable of applying the tools and techniques to other procedures and business processes.
- Utilize these techniques to support the cost competitiveness goals in the strategic plan.

Johnson & Johnson's objectives were to:

- Assist Mercy in developing opportunities to reduce the total "delivered cost" of the knee replacement process.
- Develop a process improvement model which could be offered to other providers.

Scope

The Care Process Reengineering initiative included all primary supporting processes within the knee replacement procedure, from admission to discharge. (Refer to Figure 1 for the departments and functions involved.) This case study examines the admissions, recovery room, and physical therapy processes, which satisfactorily represent the issues and opportunities found throughout the entire process.

Organization

A cross-functional team was created, representing each of the departments/functions involved in the knee replacement process. (Refer to Figure 2 for the project organization chart.) The sponsor of the project was the Vice President, Support and Outpatient Services, who was responsible for Mercy's CQI effort.

We typically initiate a CQI Process Action Team after recognition of a documented problem by someone in the organization. This effort was the first time we looked at a process without a glaring problem. Our knee replacement process was perceived to be doing just fine, but all processes have improvement opportunities.

Robert Cooley, Vice President of Support and Outpatient Services

A Steering Committee would provide all the necessary resources, support, and organizational communication required by the team. Each team member reported to a Steering Committee member in his or her primary job in Mercy.

Two additional Steering Committee members included a CQI facilitator and an orthopedic surgeon from one of the group practices. The CQI facilitator attended all training classes and team meetings and coordinated the new tools and techniques into future CQI training. The physician informed the orthopedic groups about project activities and solicited their support when necessary.

Team leadership was shared by the administrative nurse of the orthopedic floor and the finance director. All team members were to learn the new tools and techniques and to apply them to the knee replacement aspects of their respective departments. In addition, they would also quantify opportunities for improvement and develop recommendations for improved processes.

The Care Process Reengineering initiative schedule, completed over a three-month period, is shown in Figure 3. The team utilized a "train-do" technique to train on specific tools

Figure 1
Project Boundary

PATIENT PATH

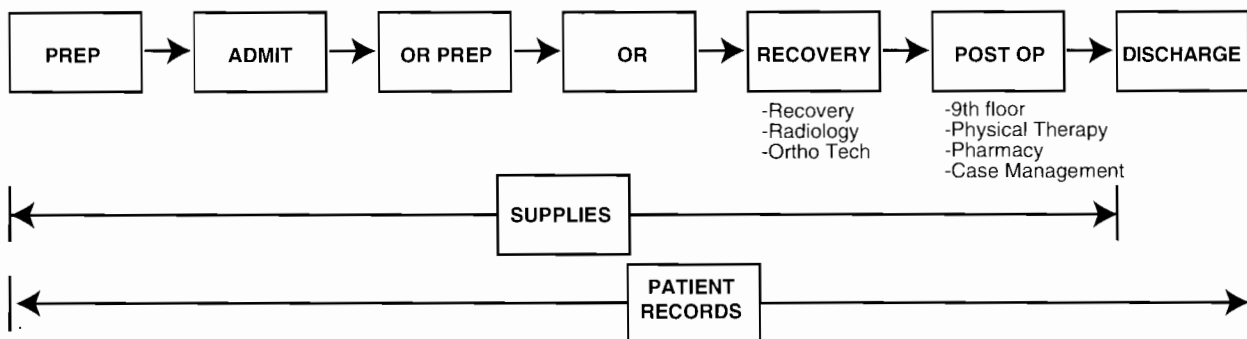
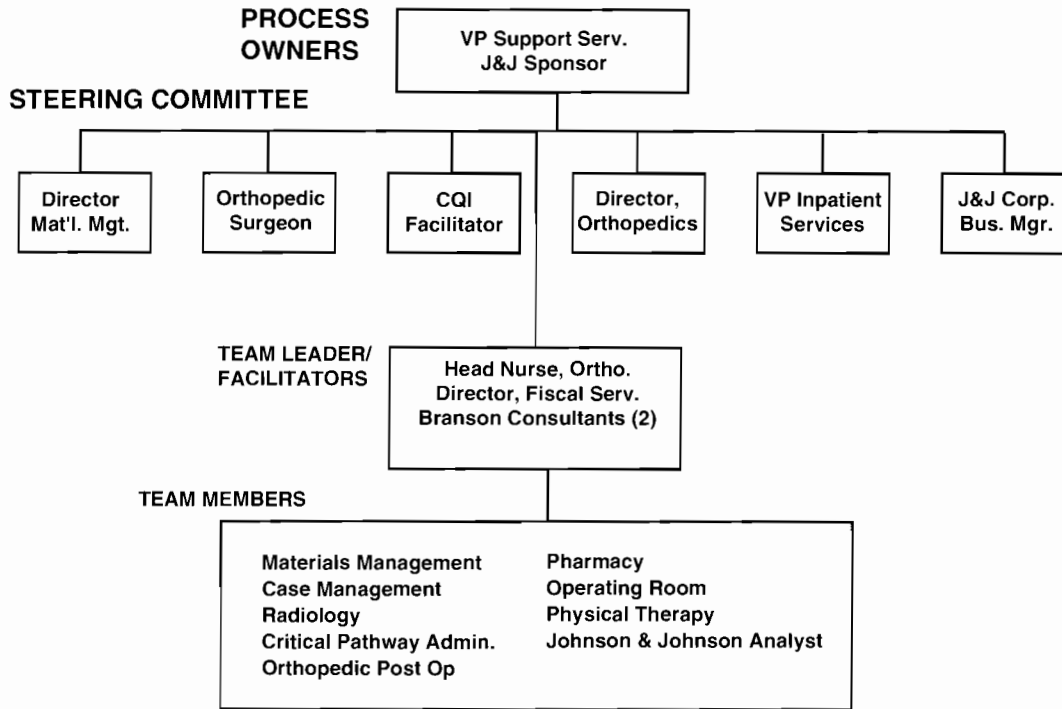


Figure 2
Project Organization



("train") and immediately apply the learned tools ("do") for a two-week period within the knee replacement process. Branson consultants then returned to Mercy to train the team on additional tools ("train"), which were also immediately applied ("do").

III. Baseline Process Performance

Care Process Reengineering is based upon process reengineering, a management technique which provides "fundamental rethinking and radical design of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service, and speed" (*Reengineering the Corporation*, Michael Hammer and James Champy). This approach currently differs from other providers' improvement efforts, which focus primarily on the clinical aspects, physician fees, and product costs. Both the business processes and the clinical processes figured into Mercy's improvement efforts in this project.

As a beginning step, the team measured the "as is," or baseline, process performance by documenting and understanding the way the process currently operates, including the interface with physicians. This was the most time-intensive aspect of the Care Process Reengineering initiative, requiring the team to develop contemporary data which quantified the cost, quality, service, and speed of the knee replacement process. As the team analyzed the process in a new way, they recognized

reengineering opportunities to improve both economic and clinical outcomes.

A detailed approach and analysis of the knee replacement process now follows.

Approach

The team believed that any changes to the knee replacement process must include input and support from the orthopedic surgeons involved in knee replacements. When the team leaders approached the orthopedic surgeons for project input, the physicians identified the following issues regarding the project:

- Improvement efforts should have no negative impact on patient outcome.
- Physicians should be integrated as partners in the improvement process.
- Administrative support is cumbersome, requiring too much time due to:
 - unresponsive insurance companies.
 - lack of communication of patient and insurance data.
 - duplication of tasks between the physician's office and the hospital.
 - unmanageable paperwork.

As they evaluated process changes, the team developed a formal communication network with the physicians and incorporated their expressed issues within the process redesign. This effort ensured continued support of the processes that were reengineered.

The team continued to document the processes, utilizing process maps which highlighted the:

- Sequence of all tasks in a process.
- Organizations and people involved.
- Time necessary to complete the tasks.
- Non value-added activity.
- Process bottlenecks.

These maps, developed to promote a common understanding of the processes among all team members, served as a communication tool throughout the project. A sample process map appears in Figure 4.

Measures

Once they completed the process maps, the team utilized measures which identify problems in a process. The measures included:

- **Cycle time:** actual calendar time required to complete a process.
- **Value-added time:** optimal process time, if no time is lost to waiting, travel, reviews/approvals, problem correction, or storage time.

Comparison of cycle to value-added time identifies and quantifies the amount of wasted effort in the process.

The remaining measures were:

- **First run yield, or FRY: correct process performance without "exception activity"** such as corrective action or rework. FRY locates and quantifies reasons for exception.
- **Process cost: total cost of resources consumed by each of the process activities.** It identifies activities requiring resources and quantifies costs associated with those resources.

Process costs driven by non value-added time and first run yield exceptions are opportunities for cost reduction.

The activity-based process cost could differ substantially from a provider's budgeted costs of charges due to the underlying budget assumptions which may not reflect actual process activities. The process cost quantified in this project was limited to the direct labor process cost. The other portions of the overall process cost will be addressed by the team as they roll out the improvement efforts.

Figure 3
Project Timeline

Activity	Responsibility	Calendar Week														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Pilot On-Site Kick Off Presentation To All Team Members Customized Process Example Data Collection To Incorporate Into Training	Branson/ Team	█														
Day 1 Training And Team Facilitation Process Flow Mapping, Process Measures; Cycle Time And Case Study Review Facilitation Schedule Development	Branson/ Team			█												
Team Assignments	Team				█											
Day 2 Training And Team Facilitation Process Flow And Cycle Time Review First Run Yield Introduction And Case Study Review Facilitation Schedule Development	Branson/ Team						█									
Team Assignments	Team							█								
Day 3 Training And Team Facilitation First Run Yield Review Process Cost Introduction And Case Study Review Facilitation Schedule Development	Branson/ Team									█						
Team Assignments	Team										█					
Day 4 Training And Implementation Plan Process Cost ReviewTeam Process Baseline Performance Summary Review Implementation Plan Development	Branson/ Team												█			
Team Assignments	Team														█	
Presentation Preparation	Branson/ Team															█
Presentation To Steering Committee	Team															█

Measurement and Analysis

As previously mentioned, this case study considers only three processes: admissions, recovery room and physical therapy. The analysis of these processes demonstrates the techniques used in the reengineering project and highlights representative issues and opportunities found throughout the remaining processes.

Specific justification for selection appears at the beginning of each process analysis. These processes are documented through their process maps with a brief analysis to highlight potential issues, then measured and analyzed for cycle versus value-added time, first run yield, and process cost to quantify the opportunities with data collected by the team. Finally, an opportunity summary sets the stage for recommended actions.

Admissions Process Summary

The admissions process, initial control point for many provider activities, includes: procedure confirmation, payment verification, patient demographics, and discharge planning initiation. Many patients see this as an unnecessary evil due to the evident bureaucracy within the health care system. Health care reform initiatives can easily focus on this duplication of effort, involving several separate health care entities: physicians, payors, providers, and patients.

Mercy has begun to streamline this process through its Patient Focused Care effort. Analysis of this process within this Care Process Reengineering initiative, however, revealed substantial opportunities overlooked with other approaches.

The Mercy admissions process is the same process followed for all orthopedic procedures performed at the center. The analysis of the process map (refer to Figure 4) indicated that many tasks within this process develop and/or generate data already documented elsewhere in the health care system. Demographics and insurance information, for instance, is already on file at the physician's office and the insurance company. In conducted conversations, physician office workers indicated that they must call insurance companies for verification and provide the verification number to Mercy when scheduling the operating rooms. The Mercy registration method duplicates verification, thereby creating needless work for the registrar and the insurance company.

The cycle time for a single patient admission was measured and categorized as follows:

Value-Added Time	62	minutes
Waiting Time	13	
Travel Time	7	
Review Time	20	
Correction Time	10	
<u>Other Non Value-Added Time</u>	<u>4</u>	
Total Cycle Time	116	minutes

The analysis of non value-added time indicated that almost half of the cycle time (116 minutes – 62 minutes, or 54 minutes) of the admissions process was non value-added. Of the non value-

added portion, 30 minutes per patient were spent reviewing and correcting information. This activity would not be necessary, if the information, typically on file at the physician's office or the insurance company, was made available to the provider.

Next, the first run yield was measured for 22 patients who registered for orthopedic surgery during the sample period of the project. Of these, 7 lacked an insurance card – the only fallout noted.

Therefore, the first run yield of this process ((22-7)/22) was 67%: only two-thirds of the patients were admitted without a problem in the process. Since an insurance company and physician's office already have all the required insurance information offered on an insurance card, this step in the process quantifies an exception pointing to task duplication in the health care system.

The process cost for admissions was quantified as \$43.55 for the salaries associated with registering a patient, of which \$23.27 was value-added cost. The other costs associated with non value-added tasks and activities (\$43.55 - \$23.27, or \$20.28) represent opportunities for improvement if the process was reengineered with better coordination of information.

Recovery Room Process Summary

Although a recovery room serves as a critical component of a patient's stay, it typically receives little focus on improvements because patients cannot easily express satisfaction or dissatisfaction with the process. While many components of the health care system are only involved in this process on an exceptional basis, the recovery room uniquely represents the transition from a purely clinical process to a clinical/business process, as this analysis will demonstrate.

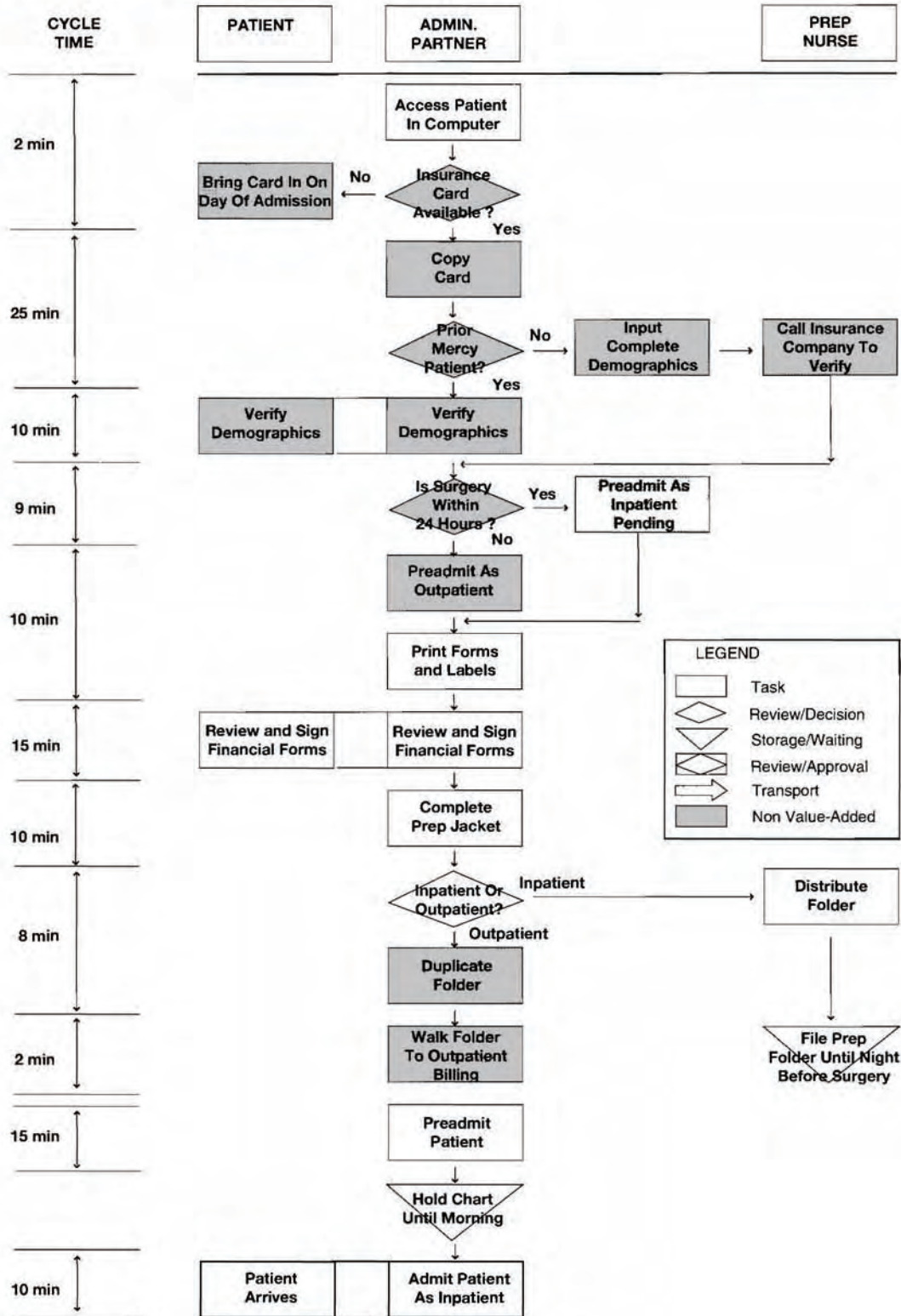
The Mercy recovery process was evaluated for total knee replacement patients only. The process is much more clinically focused than most of the other processes in this project. The process map (refer to Figure 5) indicates that most recovery room activities are primarily designed to monitor the patient and coordinate recovery requirements from other departments.

The cycle time for this process was measured and categorized as follows:

Value-Added Time	85	minutes
Waiting Time	60	
Travel Time	28	
Review Time	12	
<u>Storage Time</u>	<u>145</u>	
Total Cycle Time	330	minutes

Data analysis revealed that the buffer time was the time the patient spent in the recovery room without specific nurse attendance. Waiting time was due in part to the amount of time required for Radiology and the Orthopedic Floor to respond for support, i.e., if the patient requires an X-ray of the knee prior to applying a Continuous Passive Motion (CPM) device, stored on the Orthopedic Floor.

Figure 4
Admissions Process Map



A team review of the cycle time information revealed that the waiting time for the X-ray and CPM *directly affects the patient outcome: the longer it takes to apply the CPM machine to the patient, the more blood is lost and must be transfused.* This waiting time is a direct result of how the Recovery Nurse, the Radiology Technologist, and the Orthopedic Technologist (who delivers the CPM machine) independently prioritize the request for these services. Before analysis, these three departments never compared notes regarding the response time impact on the patient. While focusing primarily on the business processes supporting a clinical procedure, this project *documented opportunities to improve patient outcome by reengineering the business processes surrounding the clinical aspects of a procedure.*

The first run yield was measured by reviewing 12 knee replacement patients. While this sample size is considered quite low, additional patients could not be included due to the time frame of the project. The team, however, felt that the issues identified in this sample were representative of the issues seen in the recovery of all knee replacement patients.

There was no exception activity due to non-clinical issues. However, one patient suffered a cardiac arrhythmia and one patient had sedation problems, leading the team member to calculate a first run yield ((12-2)/12) of 83%. The exceptions, considered clinical in nature, had no subsequent opportunities for improvement without detailed clinical assessment.

The team chose not to include detailed clinical assessments as a part of this project. The process analysis of the recovery room was used, however, to improve patient outcomes affected by the supporting activities such as Radiology and CPM delivery.

The process cost of the recovery room was \$147.73, which represented the salaries of personnel involved in the process. The cost of the additional transfusions was not calculated as no data was available to benchmark blood loss within an improved process. Again, no opportunities were identified due to team consensus.

Physical Therapy Process Summary

Many published articles have identified post-op disconnects, such as when technicians/clinicians arrive at a patient's room and discover that the patient is not available or treatment is unnecessary. Like many post-op/rehabilitation processes, physical therapy illustrates the difficulties of patient care without clear communication and planning by all concerned parties.

The analysis of the Mercy physical therapy process map (refer to Figure 6) indicated that more than half of the steps did not add value primarily due to the rework associated with lack of scheduling data and unclear physician orders. This process occurs over 5 days, the average length of stay for total knee replacements. When measured in further detail, the cycle time was categorized as described next:

Value-Added Time	381 minutes
Waiting Time	180
Review Time	122
<u>Correction Time</u>	<u>22</u>
Total Cycle Time (excluding storage)	705 minutes

An analysis of non value-added time indicated that therapists spent about 50% of their time (excluding storage) rescheduling missed appointments and clarifying physician orders. These problems were further affected by Mercy's pattern of employing part-time therapists to continuously support the orthopedic requirements. This incremental manning may not be necessary if the full-time therapists could spend their time more effectively.

The first run yield information supported the cycle time by quantifying the number of times there was exception activity in the process. The therapist team member evaluated 45 orthopedic patients and calculated a first run yield of 36% ((45-29)/45), which meant that only 36% of the patients went through the process without the therapist experiencing a problem. The first run yield analysis showed that:

- 7 orders were unexpected (no prior communication or planning).
- 9 orders required clarification.
- 13 appointments were postponed due to the patients not being available when the therapist arrived.

The process cost for physical therapy was \$445.50, which reflected salary costs of the full- and part-time therapists, of which \$145.67 added value to the process. The other costs (\$445.50 - \$145.67, or \$299.83) reflected the disconnects identified in the other baseline process measures.

Opportunity Summary

Each of the remaining eight processes within the project scope were analyzed in the same way. The baseline summary was then developed as a combination of all the individual processes. Figure 7 represents the baseline summary for the three processes described in this study.

Analysis indicated that the majority of opportunities for improvement were driven by a lack of:

- Comprehensive planning from the time the patient elects to have surgery to the time the patient is discharged.
- Data collecting and sharing among and between health care providers and payors.
- Coordination of activities involved in the delivery of patient care.

These issues were responsible for nearly 50% of the salary costs associated with the processes.

Excluded from the cost opportunities were processes external to the provider such as:

- Physician office administration.
- Insurance company customer support.
- Home health/rehabilitation center support.
- Patient involvement.

Figure 5
Recovery Room Process Map

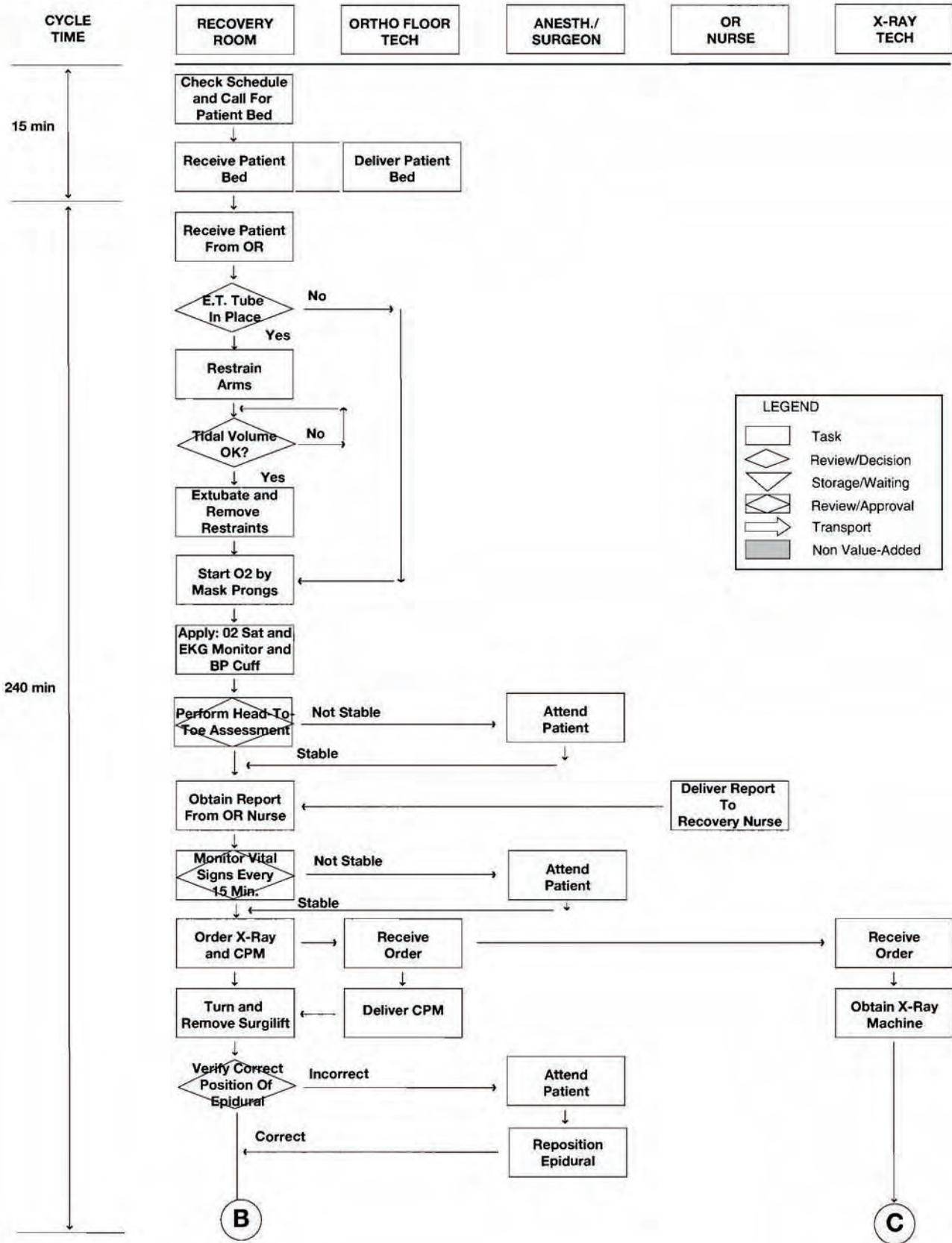
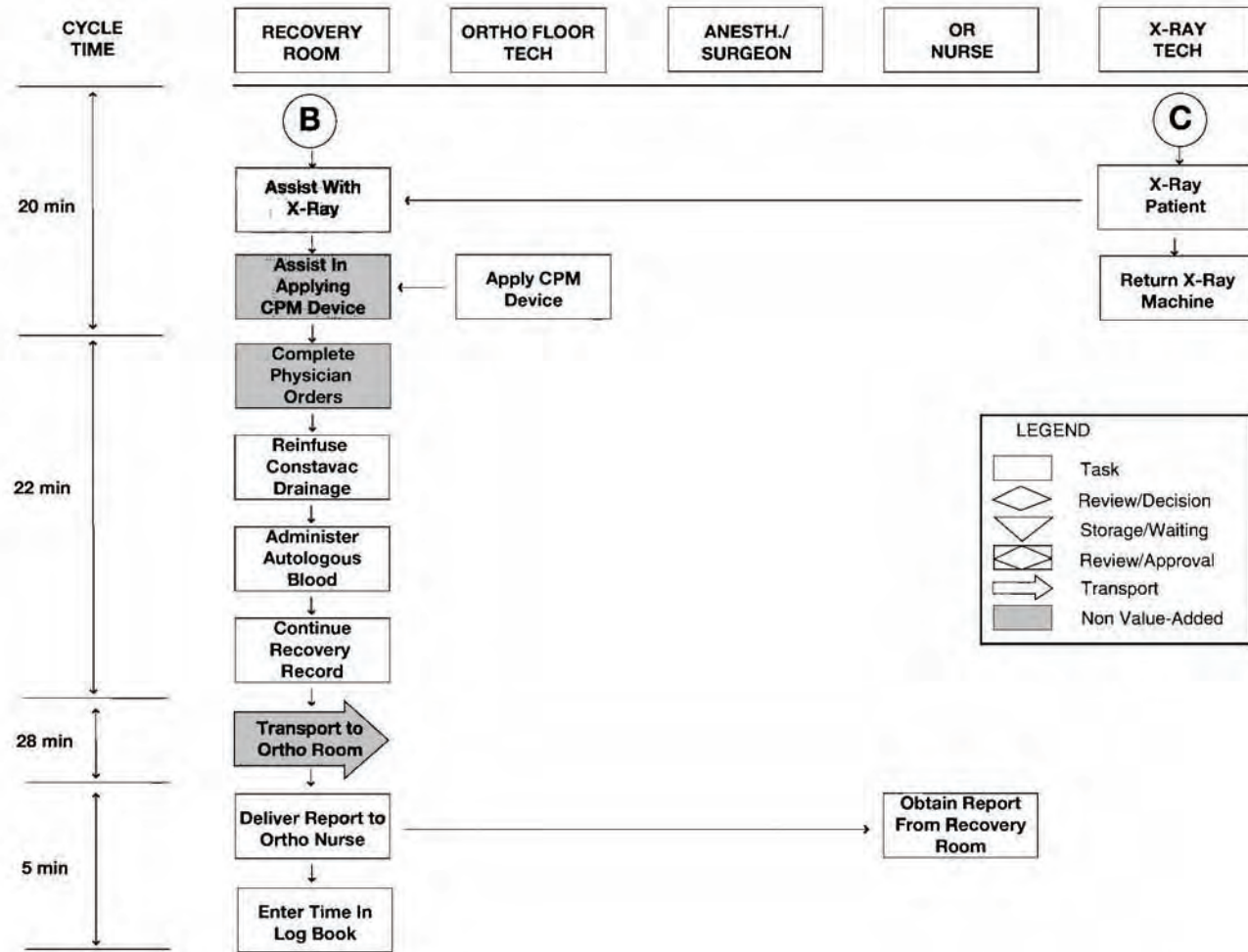


Figure 5 (continued)

Recovery Room Process Map



These costs were in interface processes, which were beyond the scope of the original project.

The impact of these opportunities in Mercy's over-saturated market is profound. As health care evolves, a provider's formula for success lies in its responsiveness not only to patient outcomes, but also to the business process supporting the health care delivery continuum. As it simplifies and improves its unresponsive and ineffective processes, a provider becomes more cost-effective and obtains a competitive advantage to gain additional market share. By reengineering processes, a provider tactically secures a successful business strategy and ensures long-term viability.

As Mercy expands its Care Process Reengineering initiative, its interfaces with physician administrators and insurance companies also will be simplified. In turn, these health care partners will experience reduced costs due to less time and data duplication necessary to complete their own business processes. Each year Mercy personnel, for instance, place approximately 6,000 phone calls to insurance companies to obtain information or authorization for 2,000 orthopedic procedures. Reengineering the processes responsible for these calls would result in a short-

term reduction of 4,000 calls. Long-term redesigns would eliminate the need for any calls, thereby reducing administrative costs for insurance companies.

IV. Recommendations and Results

The team used the baseline data to envision improved processes that potentially would:

- Provide bottom-line cost reduction.
- Improve physician interfaces and relations.
- Improve patient outcomes and satisfaction.

The team used the baseline data as its core vision to identify the disconnects in the processes. As improvements were suggested, the team referred to the process maps and baseline data to see how the suggestion would affect the process measures. Suggestions that passed this test not only strengthened the recommendations but also drove the goals for process performance. For instance, by eliminating the admissions-phase review and

Figure 6
Physical Therapy Process Map

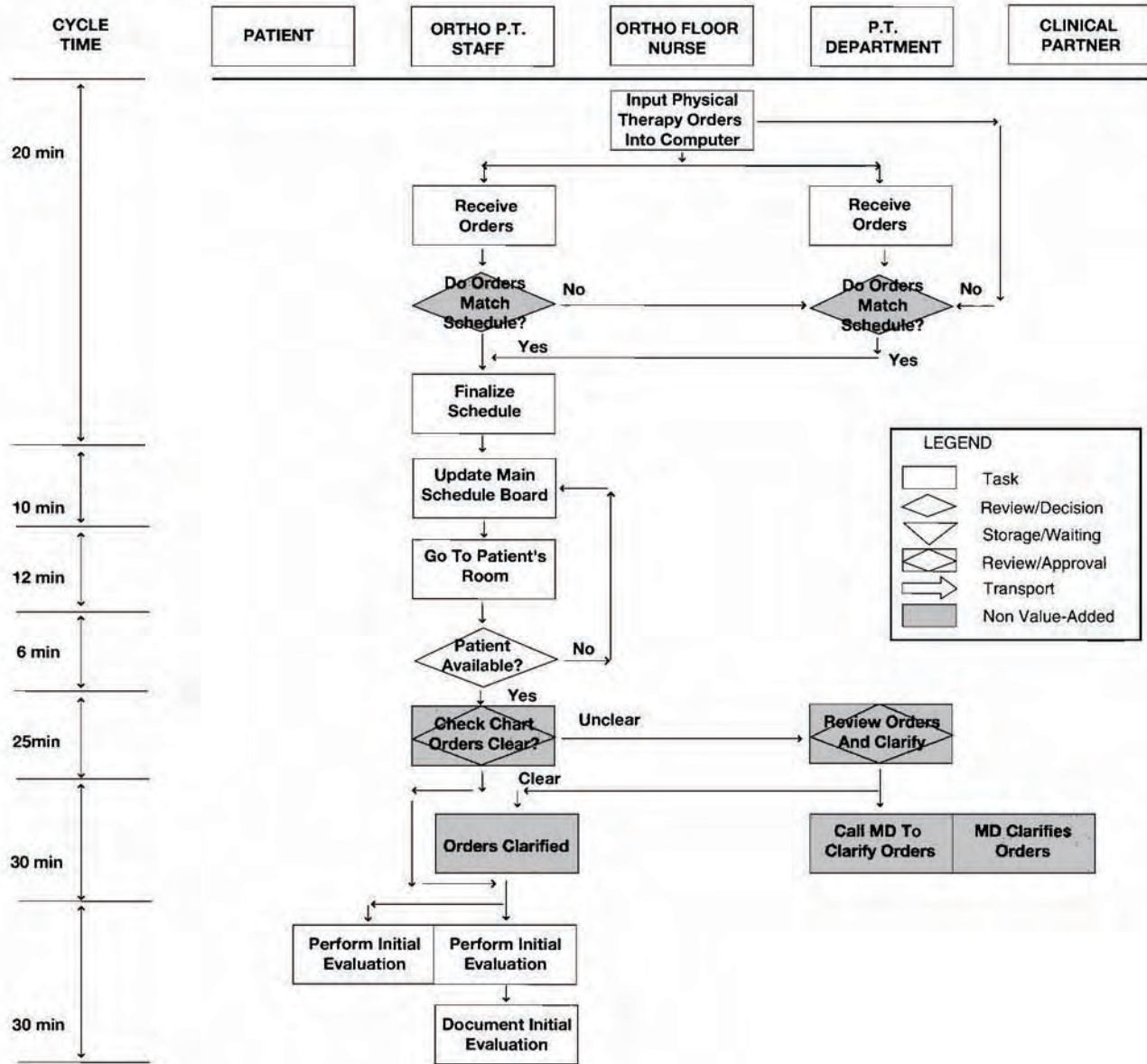


Figure 7

Process Analysis Details

Process Measure	Admissions	Recovery Room	Physical Therapy
Cycle Time Average (minutes):	116	330	1165
Value-Added	62	85	381
Wait	13	60	180
Travel	7	28	
Review	20	12	122
Correct	10	0	22
Storage		145	460
Other Non Value-Added:	4	0	
Cycle Time Range (minutes):	103-129	330	925-1340
First Run Yield:	67%	83%	36%
# Cases or Patients	22	12	45
Reason for Exceptions:	Insurance Card	Cardiac Arrhythmia Sedation	Initial Eval: Order Clarification Not Available Unexpected Orders
Process Cost Drivers:			
Total 9th Floor Patients	439		
DRG 209 Patients	46		
% of DRG 209 Patients	10%		
Total Average Hourly Rate	\$22.52	\$26.86	\$22.94
Process Cost	\$43.55	\$147.73	\$445.50
Value-Added Cost	\$23.27	\$38.05	\$145.67

correction of patient demographic and insurance data, baseline process performance would be impacted as follows:

- Non value-added time would be reduced by 30 minutes (according to the cycle time analysis).
- First run yield would be increased to 100% (according to the first run yield analysis).
- Process cost would be reduced by \$9.02 (according to the process cost activity analysis).

Figure 8 summarizes the improvement goals for the three processes discussed in this study.

Suggested modifications revolved around several core process changes. Proposed redesigns associated with issues discussed in this study include:

1. Enhance pre-admissions patient contact activity, or patient liaison, through increased partnering with the physician offices and insurance companies, to achieve comprehensive contact and coordination for all scheduled patients. This would eliminate duplicative, ineffective hospital activities in: admissions, patient prep, surgery prep, case management, discharge planning, radiology and pharmacy.
2. Improve recovery room support activities by cross-training personnel and modifying procedures as follows:
 - X-rays ordered by the operating nurse from the OR would save several minutes.

- Portable X-ray machine stationed in the recovery room would minimize travel time for the Radiology Technician (saving travel time once an order is called in).
- CPM machines traveling to the recovery room with the first surgery patient, and applied by the Recovery Room Nurse, would eliminate any waiting time for the CPM.

Under this new procedure, improvement in patient outcomes will be measured by comparing historical blood losses and transfusion times for knee patients. Costs of this activity will then be determined.

3. Improve coordination of physical therapy, enabling:
 - Physician offices to schedule patients for therapy and to provide therapy orders after scheduling the patient for surgery (short-term, using a manual system; long-term, using an automated system).
 - The physical therapy and the orthopedic floors to develop a scheduling system to ensure patient availability for therapists (short-term, using a manual system; long-term, an automated system).

By implementing these basic, straightforward recommendations, along with others, Mercy anticipates annual savings of over \$750,000 within the next 12-15 months. Since resources recommended are primarily associated with team time needed to organize and implement these improvements, virtually no capital expenditures will be necessary to support these changes.

Mercy has organized and empowered four cross-functional process teams to reengineer the processes associated with the pilot effort. The orthopedic physicians' office workers are also included in these teams. A roll-out plan has also been established and supported by the Steering Committee, which not only incorporates the tools and techniques within Mercy's CQI training program, but also selects a new process for reengineering once recommended improvements have demonstrated bottom-line savings.

V. Keys to Success

Any provider process, including supporting processes such as medical records or pharmacy, can be analyzed using these tools and techniques. The most important principals are to train internal people to document, measure, and analyze processes and to empower these people to implement the required changes.

Care Process Reengineering can be implemented with minimal expense and can result in significant cost reductions, but not without a management team committed to supporting the cultural change necessary to break down the organizational silos created by decades of management. Mercy will realize significant savings if it continues to support its employees in this effort.

Figure 8

Process Improvement Impact

Process Measure	Cycle Time (min)	Non Value-Added Time (min)	First Run Yield	Process Cost
Admissions:				
Baseline	116	53	67%	\$43.55
Redesign	93	30	100%	\$34.53
% Improvement	20%	43%	33%	21%
Recovery Room:				
Baseline	330	100	83%	\$147.73
Redesign	330	100	83%	\$147.73
% Improvement	0%	0%	0%	0%
Physical Therapy:				
Baseline	1165	324	36%	\$445.50
Redesign	970	129	65%	\$194.99
% Improvement	17%	60%	45%	56%

It is important to remember that successful analysis and implementation of Care Process Reengineering projects are driven by the following factors:

Provider management

- Identified strategic need.
- Ability to support cultural change.
- Demonstrated commitment to project and team efforts.
- Effective communication to internal and external organizations affected by changes.

Physicians and payors

- Buy-in of improvement objectives and efforts.
- Support of provider employees during cultural changes.
- Team participation by administrators throughout implementation projects.

Project team members

- Cross-functional organization.
- Working knowledge of the processes under analysis.
- Attendance and participation during the formal training sessions.
- Teamwork within the project team.

Mercy Hospital has taken its first step in reengineering by analyzing a process and developing fundamentally different business approaches. It has established measures of cost (process cost), quality (first run yield), service (patient and physician interfaces), and speed (cycle time versus value-added time) to remain viable within the health care reform movement. These techniques can be used throughout the health care system, in partnership with several system components or by individual organizations, to create an effective system to provide improved health care across the country.