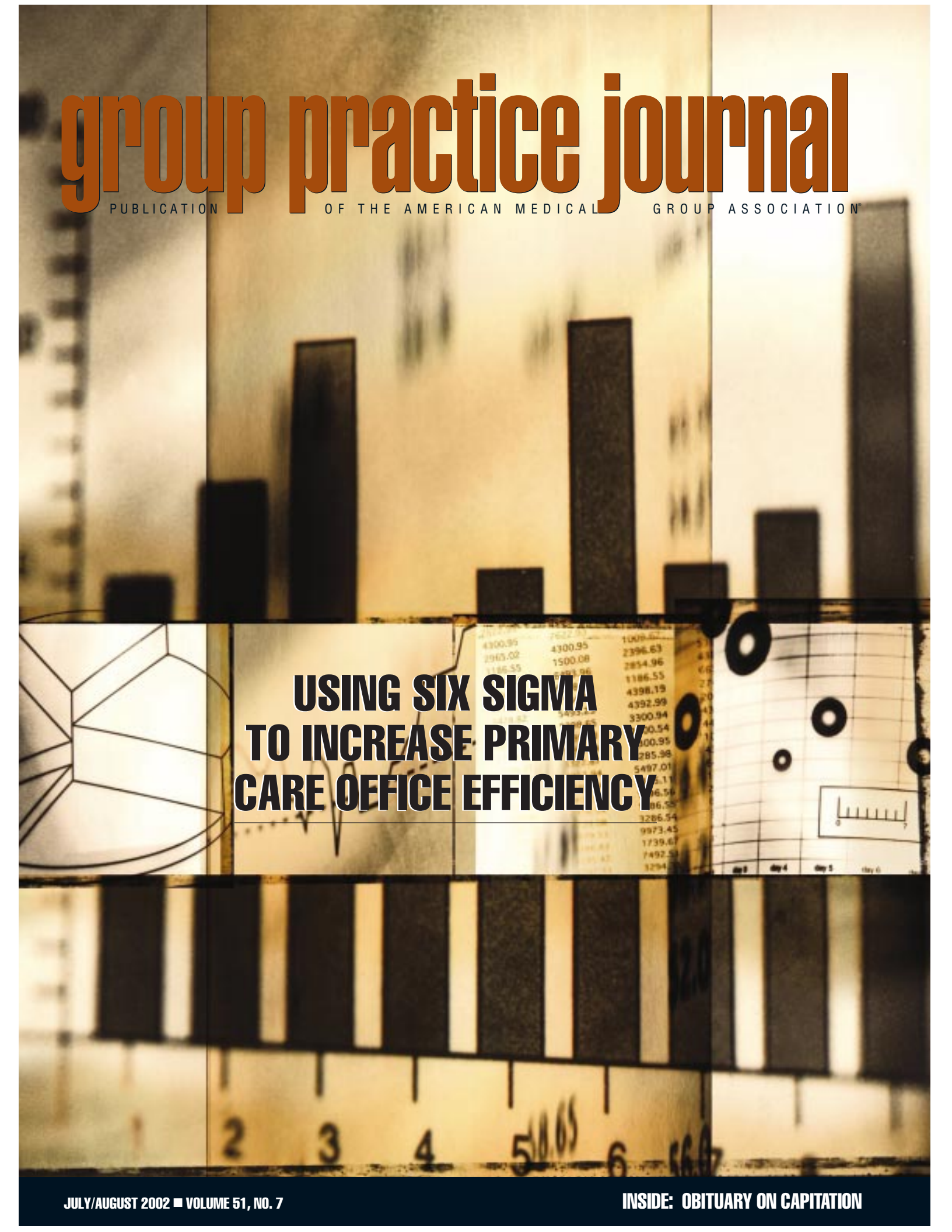


group practice journal

PUBLICATION OF THE AMERICAN MEDICAL GROUP ASSOCIATION



USING SIX SIGMA TO INCREASE PRIMARY CARE OFFICE EFFICIENCY

Using the Six Sigma Management System to Increase Primary Care Office Efficiency

BY PAUL SCHUTTE, CPA

Editor's Note: This article is based on remarks made by the author at AMGA's National Conference on Physician Directed Health Care, February 21-23, 2002. The presentation provided a high level overview of the Six Sigma Management System, including case studies of successful Six Sigma projects that have increased the efficiency of primary care office operations for Mount Carmel HealthProviders.

This article will start with a little background about Mount Carmel HealthProviders and why we got involved with Six Sigma. It will discuss our whole deployment strategy, as well as some basic concepts of the Six Sigma Management System. It will look at three projects that we have: one of which is in what we call the "realization" phase and the other two of which are in the "improvement" stage. It will also give you a flavor for some of the areas where we've been successful across the whole health system, and not just with health providers.

Mount Carmel Background

Mount Carmel HealthProviders is

based in Columbus, Ohio, and is part of the Mount Carmel Health System. Columbus is the state capital with a population of approximately 1.2 million in the metro area. The health care landscape in Columbus is made up of two major health systems—Mount Carmel and OhioHealth—and the Ohio State University Medical Center. Because of geographic dispersion, both of these systems are really considered indispensable, in that if you're a managed care player you basically need both of

them. Our East Hospital is the only hospital on the east side, and up in the northwest quadrant, there's Riverside Methodist, the

flagship hospital of OhioHealth. There is heavy managed care concentration in this market with the result being that primary care physician fee schedules for the major plans are at or below Medicare. There's also a significant labor shortage, so it's a tough health care market. Mount Carmel Health System services are detailed in Figure 1. The total operating budget for Mount Carmel for fiscal 2002 is about \$675 million.

Six Sigma

To give you an idea of why

Mount Carmel got involved in Six Sigma, it is helpful to take a look at our operating margin in 1999 and 2000, as demonstrated in Figure 2. In the spring of 2000, Mount Carmel leadership said, "We need to do something." With reimbursements flat and costs going up, just with inflation, we decided that we needed to address financial performance from the cost side. During this time period, a couple members of senior management independently became aware of the Six Sigma management system. After investigating the system and attending a seminar, senior management decided that this was something that we needed to do. They made a commitment.

The management commitment statement was as follows:

We will select from among our best performing employees, give them four months of intense problem-solving training, assign them full time to lead teams to solve our toughest problems, and provide the necessary infrastructure and support to achieve breakthrough results. The Six Sigma Management System will enable us to continue and enhance our Mission through our Four Areas of Focus:

- Financial Performance
- Service Excellence (patient, employee, and physician satisfaction)
- Clinical Excellence
- Responsible Growth

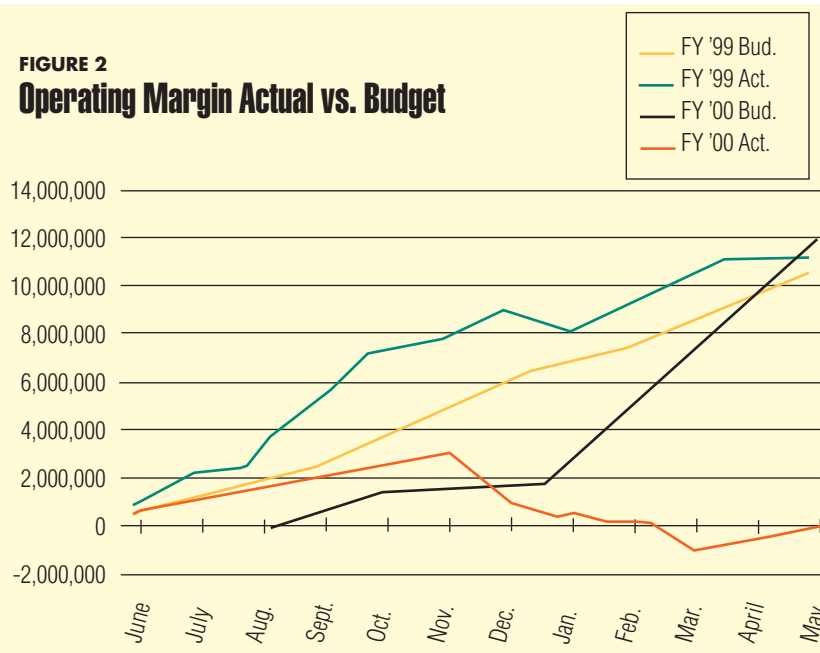
Six Sigma will be implemented in a manner that exemplifies Mount Carmel's C.A.R.E. values and upholds the sacredness of every soul."

The Six Sigma Management Model (see Figure 3) outlined how the deployment was going to work. We needed to select the right people and there are multiple roles within the Six Sigma system. At Mount

FIGURE 1
MCHS Services

Service	Product	Volume	Budget (Thousands)
Acute	3 campuses	46,654 admits	\$558,631
Home Health	DME, Home Health Ambulance	44,700 visits	21,818
Health Plan	Medicare HMO	18,000 lives	98,483
Primary care	26 sites 62 physicians	292,000 visits	22,755
Other	Behavior Health College of Nursing	MSO, PHO Foundation	25,701
			<hr/> \$675,986

FIGURE 2
Operating Margin Actual vs. Budget



Carmel, we decided that we didn't like the language of "black belts" and "green belts," so we called our black belts "guides" and "master Six Sigma guides." Green belts became "assistant guides," somebody who has been trained in the methods but does not devote full time to Six Sigma. "Champions" are those who are responsible for identifying projects and overseeing the guides and assistant guides and are accountable for results. And finally "scouts," who have received intensive training and are instrumental in helping to baseline and scope projects.

Six Sigma Roles and Responsibilities

Leadership Team

At Mount Carmel, we have a leadership team, which is made up of the functional leaders, the CEOs, CFOs, CIOs, etc. Within the leadership team, we had the programmatic leaders—the head of the employed physicians, of the health plan, of the home medical equipment, of home care, etc. All were basically considered the "executive team." Their role was to be the sponsor and to set the vision and expectations. In terms of leadership buy-in,

successful implementation of Six Sigma has to be supported from the top down. If your senior leadership is not buying into this concept, you're going to have problems. Some things that Six Sigma does are a lot more rigorous and a lot more disciplined, and you have to do things a little bit differently. If senior leadership is not buying in, they're probably not going to support some of the things that need to be done. But our executive leadership really bought into this.

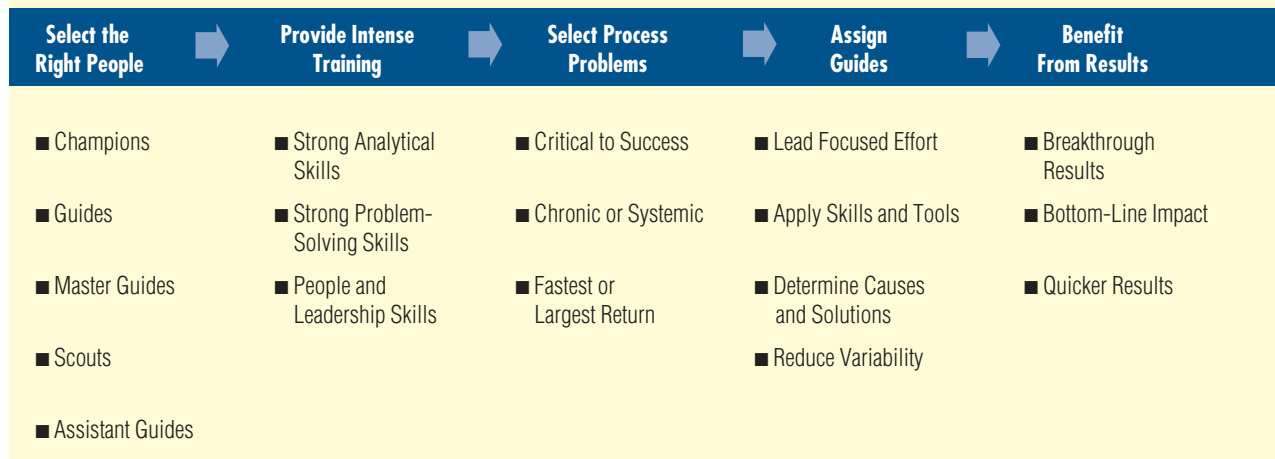
There were Six Sigma goals built into the variable compensation formula for Mount Carmel management for fiscal 2001 and 2002. The executive team and senior leadership team spent a full week in training in August 2000, and then we had some two-day refreshers just so that we could understand the concepts and could be the champions and help lead this effort. We also developed a lot of talking points. There was a very rigorous effort to get this message out to the Mount Carmel community: what we're doing, why we're doing it, and why this was going to be different. This wasn't just a management fad like some of the other things which had been done in the past.

Development of Infrastructure

The Six Sigma core team developed the infrastructure for the whole Six Sigma effort. Human resources had to develop policies. We created a whole new class of employee, Six Sigma guides. These people came out of their regular positions and made a two-year commitment, so we had to develop human resource policies around those folks—how they're going to be paid, what happens at the end of the two years, etc. Obviously, the training people were involved with putting together training, both coordinating with the consultants and getting the whole training effort together. We had to provide information resources. All the guides had

FIGURE 3

Six Sigma Management System Model



laptops. That was a pretty heavy effort. You can imagine going to your information systems department and saying, “Okay, we need 24 laptops for next Monday, and we need all this software for them.” We also had a public relations team to provide information to employees, developing communications to get out to the masses.

The finance team was also heavily involved. There is rigorous and disciplined financial verification for every project—if it can’t be measured, then it’s not hard savings. For finance verification, we had to develop templates, policies, and financial reps. Every Six Sigma project has a financial rep assigned to it.

Champions and Guides

Six Sigma champions have the primary objectives of identifying projects, managing the guides, and negotiating turf issues. Health care is a transactional business. It’s not like manufacturing where you’ve got an assembly line, you’re having a problem with a machine, and you’re using these techniques to fix that process. We’re looking at transactional processes across multiple lines in terms of who is responsible for those areas. So there is

a lot of negotiation and discussion at the champion level when you have problems at the different levels. Champions are also accountable for the results.

THE PHASES OF THE SIX SIGMA PROCESS ARE DEFINE, MEASURE, ANALYZE, IMPROVE, AND CONTROL.

Within each project, there is also a process owner. The core team in this process is the Six Sigma guides, assistant guides, and scouts. Guides are responsible for four to six projects a year, lead project teams, and find solutions to process problems. In the process of identifying guides, there were a lot of issues since they are asked to make a two-year commitment to the Six Sigma program with no real guarantee of their old job back. The original idea was not to have replacements for the old positions. In other words, we had to find somebody, take them out of our workforce, and assign them to the Six Sigma process project without replacing them within our areas. There are not that many people whom you can pull out and not replace, so it was difficult to find 44 guides to get into this program. We built an extensive list of desired competencies for guides: 32 competencies on which you had to rate people—things like customer focus, passion, enthusiasm, analytical and technical skills, empow-

erment, and ability to be a change agent. We were basically looking for the best people. The philosophy is that you find the best people in your operation, give them the training, and send them out to work on the projects. Recruitment was difficult. This was an unknown program, and a lot of people who were approached to be involved thought that this was just the latest management fad.

The final group is the financial reps, who evaluate and validate financial values and track projects. We have what is called “hard” versus “soft” savings. The idea was that we wanted 75 percent of the projects to create hard savings, something that’s measurable and can be tracked by the finance staff. Our vice president of finance is pretty tough about what’s hard and what’s soft. There’s a lot of work just making sure that we found projects that had real savings we could measure.

Deployment

The deployment strategy was get leadership buy-in, develop of the infrastructure, identify guides, and select projects. We developed a system definition document that spells out how we’re going to accomplish our goal. The main points within that document are as follows:

FIGURE 4
Six Sigma Project Roadmap

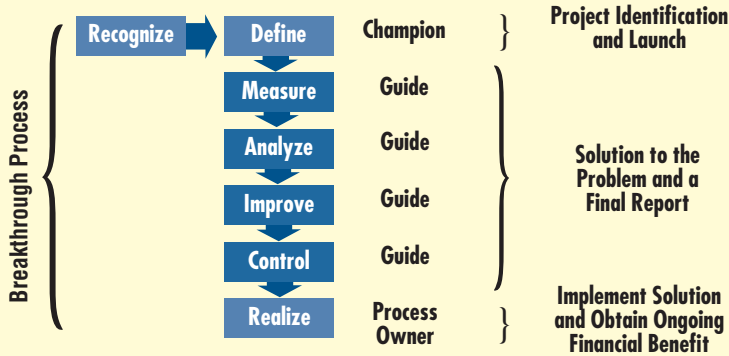
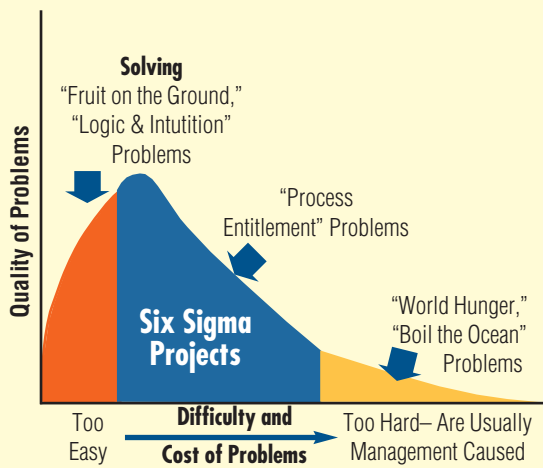


FIGURE 5
Selecting Six Sigma Projects



- Purpose
- Document Approval
- Key Success Factors
- System Overview and Expectations
- Deployment Strategy
- Selection of Six Sigma Positions
- Identification of Other Six Sigma Contributors
- Rewards, Recognition, and Compensation
- Roles and Responsibilities
- Goals
- Training Process
- Financial Expectations and Analysis
- Reviews and Reporting System

Phases

The phases of the Six Sigma process are Define, Measure, Analyze, Improve, and Control. Figure 4 outlines a Sigma Six roadmap. In the define phase, you look at the baseline, who are your customers, what are the benefits, what are the objectives, and who is going to be assigned to the project. You want “smart” objective statements: Specific, Measurable, Aggressive yet achievable, Relevant,

time-bounded, and Targeted. In the measure phase, you examine the key process variables, your current process capability, what are the metrics you’re going to use, the deliverables, and the schedule. You need to complete process maps and to look at key output variable contributions, cause and effect, and the financial forecast. The analyze phase gets into a lot of the statistical analysis, looking at the confidence levels, and performing hypothesis testing. During the improve phase, you use that data to make improvements in the process, run appropriate experiments to prove that the solution you will recommend will indeed produce the process results you desire. In terms of the control phase, before any project is considered complete and in realization, we have to complete a control plan that specifies the primary variables we’re looking at, what our specification for success is, what we expect the performance to be, and how we’re going to monitor it. It has to be signed off by everybody involved in the project—the champions, the process owners, the team members, etc.

The champions are in charge of recognizing projects and defining the project, setting objectives and the problem statement. Then the guides get involved with the measure phase to analyze and improve and then control. Once it’s in realization, a process owner’s job is to implement the solution and to obtain ongoing financial benefit to really monitor the process.

Selecting the Projects

In the beginning, projects were selected without a lot of knowledge of what the whole Six Sigma process was like. Some of the first projects were great, and some of them were difficult. Figure 5 gives a visual representation of the kinds of projects best suited to Six Sigma. Some projects are too easy. You don’t want to waste the time of a Six

Sigma guide on them. And sometimes they're too difficult, what we would term "world hunger." You basically want to be in a middle ground, where the quantity of problems is high, the difficulty and cost are in the middle, and there's a lot of good to be had out of the projects.

Project Selection Ground Rules

Following were the ground rules we used in selecting a project:

1. Targeted defect reduction of 70 percent
2. Annualized annual savings of \$175,000 per project
3. Ability to achieve 70 percent improvement
4. Complete 4-6 projects a year (2-4 months per project)
5. Review projects for duplication and application

We had some problems early on. Some of the early projects were a little bit too big, or were scoped much larger than was realistic. Selection was completed by the senior leadership team with little or no input from the champions. Many times what appeared to be an obvious problem was not the problem at all. And, some of the problems did not consider financial verification.

There were multiple projects within the whole Six Sigma program where what people thought was the obvious problem was not the problem at all. For example, just like everybody else, we were having problems with ER diversions and getting rooms ready for patients. This problem was selected as a Six Sigma project. Everybody assumed that laundry was the problem. But once the analysis was done, they actually

found out the problem was not keeping the room clean; the problem was communicating to people when a room was ready to be cleaned. One of the really great things about the Six Sigma system is that through this very rigorous

WHEN YOU DO A DESIGN OF EXPERIMENT, YOU HAVE TO KEEP EVERYTHING THE SAME EXCEPT FOR ONE VARIABLE. IT'S DIFFICULT TO DO IN A TRANSACTION ENVIRONMENT.

lock-step analysis, you have the ability to really identify what the real problem is, through analysis and data collection.

Physician Documentation Project

Our initial project for HealthProviders was physician documentation. The initial problem statement was, "Time spent documenting billable and other non-billable service activities negatively impacts time available for patient encounters. Also, documentation levels billed do not always reflect the level of service provided and this can impact revenue generated."

In the measure phase, what we want to do is refine the project. We want to identify inputs and outputs, analyze the measurement systems, and determine the process capability. Process capability basically means that if a process cannot be controlled at all, it's totally random, there's no process capability. There's no way that you can fix it. So in the measure phase, probably one of the first things you do is a process flow diagram. You need detailed knowledge of the process required. In this project, we had some M.A.s and office managers, and we did a lot of interviewing with physicians. We identified all of the process steps, all the branches, and decisions points.

Our initial observation from this project was, the average time spent per encounter by physician was about 7 minutes. The methods of documentation of encounters did not impact time spent. The interviews

with physicians show a high level of frustration with documentation of non-billable services. We did our process flow diagram—what we thought versus what really is. We looked at the whole process, and we came up with a revised problem statement: "Time spent documenting non-billable service activities negatively impacts time available for patient encounters, which impacts revenue generated."

So our project goal was to develop procedures, tools, and training that would enable a physician to decrease time spent on documentation while still providing quality care to the patient. This will increase the ability to generate average daily revenue. After variable supply, billing, and physician compensation costs, we expected to make about \$29.71 per average visit. What we wanted to do is increase physician production by 2 visits a day. If we could increase physician production by 2 visits a day, it would be worth about a quarter of a million dollars to us. In our system, we pay our physicians 44 percent of receipts, which would be \$27.72.

In the measure phase, you look at measurements, materials, personnel, methods, machines, and environment to find what's causing problems. For instance, we identified patient on hold for too long, call takes longer, inconsistent messages, etc. We looked at physicians' call-backs to patients or pharmacy/other physician, because what was identified as the problem was the amount of time the physicians had to use to make phone calls instead of seeing patients.

We did some data collection on calls. We have more than 60 physicians in our network, but we wanted to look at physicians who had a full practice, because physicians still building their practice would naturally be seeing more patients per day anyway. So we

concentrated on those physicians who pretty much had a full practice. We got 18 physicians, and we looked at phone calls and said, okay, what were the calls for? Scripts, medical requests, results, referrals, physician calls, etc. And we also put in percent of Medicare populations, because we made an assumption going in that the Medicare patients would probably result in more phone calls back than non-Medicare patients.

In the analyze phase, which is the next step, we need to identify the variations and the different components. So we need to do an exploratory analysis, statistical analysis, identify variation, and plan for a design of experiment. One of the first things we did, we looked at a Pareto chart that showed the different types of calls. The most prevalent were prescription calls, medical questions, return for results, and miscellaneous. The bulk of the calls were really for prescriptions and medical questions. The bulk of prescription calls were from patients with chronic problems.

We did analysis of the calls by physician as well as the number of calls for the different things. Prescriptions were the biggest, and medical advice requests were also very big. We did a comparison of the number of calls to the Medicare population, and found no correlation. The ones with the least number of Medicare patients had the most number of calls, so one of our original premise was wrong. In terms of the amount of time during the day that physicians spent reviewing telephone messages, we found that all of the physicians were spending at least 30 minutes to an hour on the phone each day with telephone messages. So if we could reduce that by 70 percent, then there's more time available for seeing patients.

PERFORMANCE IMPROVEMENT IN UNPAID ACCOUNTS AS A PERCENT OF REVENUE HAS BEEN PHENOMENAL.

Next, one of the things you need to do in the Six Sigma process is a design of experiment (DOE). The DOE answers "what's the best combination of the Xs, input variables, for producing the best output or Y variable." One of the real problems when

you're doing Six Sigma in a transactional type environment is that,

theoretically, when you do a design of experiment, you have to keep everything the same except for one variable. That's easy to do in a manufacturing environment. It's difficult to do in a transaction environment.

For example, when we were involved in the AR project (detailed below), we wanted to do follow-up with insurance companies for accounts 90 days or older. To do it strictly within the DOE, the people in the business office should only be calling accounts that are 90 days and older and not calling about other accounts. But that's not the way you do business in the business office. If Suzie Smith has an account and one claim is 90 days old and one is 60 and one is 40, when you call the insurance company, you ask about all three. So that causes huge problems, because the guides had been going to these classes and saying that you can't vary from the DOE. And the people in the business office are saying, we've got to run a business here.

Our alternate hypothesis statement for the physician documentation project was as follows: The time spent documenting physician question and prescription calls negatively impacts the number of patients the physician can see in an average day. Our objective was to test different solutions in offices to determine the best way to reduce the number of calls the physician must review and then document.

The DOE is really to screen critical inputs, search for interactions, and define $Y = f(X)$, or what function of X creates Y. For this DOE, we developed some telephone triage protocols, basically a set of questions that leads you to a response to the call, for instance "you're real sick, go to the emergency room," "we need to see you today, make an appointment," etc. We looked at two sites and we did a test, one with protocols and one without. The number of physician call-backs was significantly lower with the protocol.

We developed potential causes for failure and recommended actions for this project. One of the causes was inconsistent training for receptionists, for which we suggested developing online training for new hires and implementing some telephone triage algorithms. We're working on both of those: we have online training on our Web site and have implemented the telephone triage algorithms in two or three of the offices. It has taken time, but we're hoping that we can show that in those offices where we've implemented this, the physicians are making less call-backs.

Another issue was that patients were calling in and wanting the physician to prescribe medications without being seen. So a potential cause for failure was that patients were not educated on the office policies and procedures regarding prescription refills. We put together some practice brochures explaining policies and procedures for many of the sites.

Accounts Receivable Project

We went to look at insurance accounts receivable unpaid at 90 days after the date of service. Our original idea was, we've got all these account receivables over 90 days or over 120 days, and we want to figure out some way to reduce that number.

FIGURE 6

Macro Map for AR Project



The problem statement was as follows:

Baseline analysis charges billed to insurance companies shows that the average collection rate on charges that have not been paid by 90 days past the date of service is about 34.5 percent compared to the overall average collection rate of 76 percent. This has been a long-standing problem. A review of the aging balance summary of March 7th revealed 10,404 charges over 90 days not paid, totaling \$413,811 in gross revenue.

The objective statement is “to reduce insurance claims with no activity at 90 days by 70 percent from a baseline of 4.77 percent of gross revenue to 1.43 percent by December 1, 2001.”

Basically, after doing a lot of analysis, the metric that we identified was if an insurance account hits 90 days without being paid or without the insurance company saying that it is not their responsibility, then the likelihood of that getting paid basically falls by half.

We did a Macro Map, as seen in Figure 6. Then we looked at the cause and effect—what were some of the reasons that claims are not received and not paid? We found the usual reasons: sent to the wrong insurance company, electronic address entered

incorrectly, confirmation reports not checked, errors in transmitting claims, hard copy claims lost, rejected claims not re-submitted, insurance company not called, error in dialing, etc.

As part of the measure process, we looked at approximately 400 claims, called the insurance company up, and identified the problem. In 63 percent of the cases, the insurance company said the claim was not received. Other defects included that the claim had bad insurance information and got rejected through the electronic claims process, the patient was responsible for payment, the wrong insurance company was billed, additional information requested, and others.

So we looked at this information and we put together multiple action plans:

- Create adjustment code specifically for Past Timely Filing write-offs.
- Central Billing employees cross-trained to work unpaid claims.
- Central Billing staff to work claims with no activity on a daily basis.
- Central Billing to follow up on electronic claims rejected through EDI.
- Central Billing to prepare a detailed report showing results of

follow-up on claims with no activity on a monthly basis for training purposes.

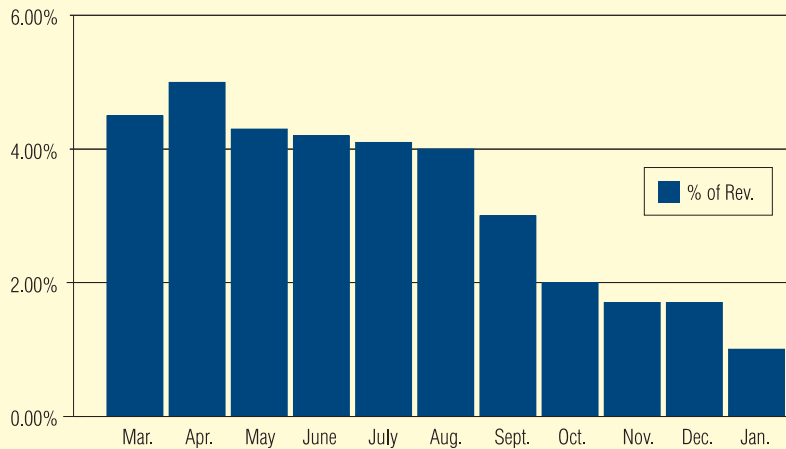
- Create Standard Operating Procedures for each process step to eliminate system failure.
- Implement the use of a control form (Form 99) to obtain correct insurance company name and address to eliminate claims denied for wrong insurance company.
- Implement auto re-bill utility to resubmit claims not paid by 45 days past date of service.

Figures 7 and 8 graphically depict our performance improvement. Performance improvement in unpaid accounts as a percent of revenue (Figure 7) has been phenomenal. Back in March, April, and May, those insurance accounts that were between 90 and 120 days old average about 4.77 percent of the revenue for the month that the services were generated. And at the end of January, we were down to 0.67 percent of the revenue for the month. In October, we had \$2.1 million of revenue. Insurance accounts between 90 and 120 days old at the end of January were \$16,000. In terms of days in accounts receivable (Figure 8), we were at 28 days at the end of December, down from over 45 days in March. We're pretty proud of that accomplishment.

Typically when you look at accounts receivable, you say what's it worth for us to reduce our receivable by X percent or X number of

FIGURE 7

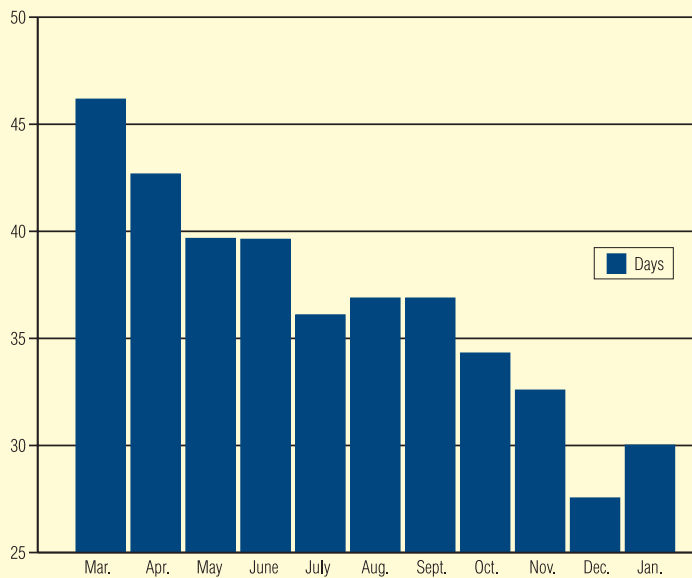
Performance Improvement: Unpaid Accounts Percent of Revenue



Insurance accounts reaching 90 days without payment averaged 4.77% of revenue (in the month service was provided) in the base period March through June. In November and December the average was 1.63%, an improvement of 65.8%. In January the average was .67%, an improvement of 86%

FIGURE 8

Performance Improvement: Days in Accounts Receivable



days? We tried to figure out how we could measure the financial impact—look at those accounts that have reached 90 days and see how collectible they are. We went back 5 or 6 months, did a random sample of 30 accounts that were over 90 days old at that point, and then followed them up in the

system over the next 4 or 5 months to see what was actually collected. We found that our overall collection rate was about 76 percent. If these accounts got to 90 days with nothing happening, we were only collecting about 35 percent. So we determined that if we can get these accounts collected before they hit

90 days, we're going to get the 76 percent. If we let it go past 90 days, the likelihood is we're only getting about half of that. So we've improved our collections. Instead of losing approximately \$351,000, we're only losing \$120,000. This project was basically worth \$230,000 to the bottom line for us. Again, we share this information with the physicians because they're getting paid a percentage of receipts.

Support Staff Hours Theme Project

In theme projects, you look at a theme and then break it down to get multiple smaller projects within the theme. The problem statement in the support staff hours project is as follows:

Total staff time per office visit billed varies greatly; from 1.07 to 1.95 hours between the centers within HealthProviders. Physician productivity is not consistent when comparing staff to physician ratios.

We have 26 sites. One of the metrics we looked at is support staff hours per visit. When we look across the sites, we found that that varies from 1.07 to 1.95 among the sites. This is not a factor of physician productivity—at the site with 1.95, the physicians are as productive as the ones at the site with 1.07. It's not consistent with staff-to-physician ratios either. We developed a business objective statement:

To analyze and find ways to streamline patient flow. Guide will find ways to make the current process more efficient in order to decrease staff time per office visit billed by .1 hour by 6/30/02, without eliminating current staff, decreasing quality of care, or increasing physician time in the office.

Basically, what we want to do is reduce our average across the system, currently at about 1.45 hours, to 1.35 hours. The impact

was calculated: if we're doing 275,000 visits, and decrease support staff hours 0.1, that's 27,000 hours. At about \$15 an hour, that's \$413,000—and we don't have to share this with the physicians.

In the measurement phase we picked six sites, ranging from the best on this metric to the worst. We went to each one of these sites and we looked at things that we thought might be variables. We looked at the number of physicians and mid-level providers. Are they using the Mount Carmel lab? Do they perform X-rays there? How many nursing visits are being charged? Do they have staggered staffing schedules? And the last thing was staff hours per visit. When we looked at the variables, nothing jumped out.

We started looking at some of the variances of staff time for office visit billed. Again, multiple different variables were looked at during this whole process. We started with: How many referrals are processed in your office per week? We started focusing on the whole referral process and found that about half of them were doing more than 40 referrals a week.

Who is currently doing the referrals? About half of them were using a referral coordinator, clinical staff,

Six Sigma

The term "Six Sigma" defines an optimum measurement of quality: 3.4 defects per million events. The Greek letter "sigma" is a mathematical term that simply represents a measure of variation, the distribution or spread around the mean or average of any process or procedure in manufacturing, engineering, services, or transactions. The sigma value, or standard deviation, indicates how well any process is performing. The higher the value, the fewer defects per million opportunities.

Six Sigma is the disciplined application of statistical problem-solving tools that show where wasteful costs are and points toward precise steps to take for improvement. These tools apply a refined methodology of measurement and discovery to gain a comprehensive understanding of performance and key variables affecting the quality of an organization's products and services. A level of Six Sigma represents the peak of quality—the virtual elimination of defects from every product and process within an organization. As sigma increases, customer satisfaction goes up while at the same time cycle time goes down and costs plummet.

Six Sigma is a continuous improvement strategy and process that uses a structured systems approach to problem solving and strongly links initial improvement goal targets to bottom-line results. Six Sigma can be applied to all business processes in a company. Firms that are progressing to or have achieved Six Sigma include GE, Motorola, Allied Signal, Polaroid, and Sony, among others.

Goal of Six Sigma: Bottom-line financial improvement.

Benefits of Six Sigma: Productivity increases, cycle time reduction, higher throughput, reduced defects, high levels of outgoing quality, standardized improvement methodology across the organization, a set of techniques and tools to simplify improvement efforts, greater customer satisfaction, and dramatic improvement in the bottom line.

Six Sigma Levels

Black Belt: An individual trained in the Six Sigma methodology and experienced leading process improvement teams.

Green Belt: An individual trained in the Six Sigma methodology who is a team member of Six Sigma process improvement teams or who works projects of lesser complexity.

Master Black Belt: An individual trained in the Six Sigma methodology who acts as the organization-wide Six Sigma program manager, overseeing black belts and process improvement projects and providing guidance to black belts as required. A master black belt teaches other Six Sigma students and helps them achieve green belt and black belt status.

Six Sigma Champion: Usually a top executive or senior manager who is the catalyst and driving force behind the organization's Six Sigma implementation.

Elements of Six Sigma Methodology

1. Standardized process improvement methodology
2. Use of descriptive statistics to describe and analyze process data
3. Measurement systems analysis to identify measurement system contributions to total process variation
4. Six Sigma measures (metrics) to standardize the improvement methodology across an organization
5. Design of experiments (DOE) to screen for important factors and optimize process performance
6. Process control and capability

the front desk, and office manager. Then we created a flow chart for the referral process and found a lot of variation. We think there's a real opportunity for some improvement.

So, we made some changes in the process. We took a test site for performing online referrals. At this site, they were doing an average of one referral per minute versus one

referral per 15 minutes at the average site. We did some research on major carriers to determine whether referrals could be done online. We found that we can do referrals online for almost all our carriers. Through this process, we discovered that we could significantly improve some of these offices by using the online processes for referrals.

Another thing we looked at was time spent looking for charts. Again, there was significant variation among the sites, and we found that an electronic medical record may have an impact. We have an EMR at a third of our sites. We started implementing an EMR last year, at a rate of one site per month.

Other Projects

Other projects at Mount Carmel have been successful, including the following ones:

- Correct improper status codes and reduce reconciling items on HCFA member roster for Health Plan: identified additional revenue \$1,415,000
- Reduce defects in registration, documentation, coding, and billing processes related to cath lab: identified additional reimbursement \$620,000
- Reduction of discrepancies in patient type between pre-certification and admission status: identified additional reimbursement \$329,000
- Reduction of first-year employee turnover from 39 percent to 29 percent of total turnover: identified savings \$306,000
- Reduction of processing errors related to Certificate of Medical Necessity for HME: identified additional reimbursement \$178,000
- Improved documentation of complicating conditions for DRG 497: identified additional

reimbursement \$156,000

These projects are in the realization phase, which means that the control plans are completed and signed off, and everybody agrees on the financial verification, what the control plan is. We're reaping the benefits for these Six Sigma projects.

Acknowledgement

The author wishes to thank Tammy Weidner, who is responsible for Six Sigma deployment at Mount Carmel, for her assistance with this article.

Paul Schutte, CPA, is the chief operating officer for Mount Carmel HealthProviders, Inc. based in Columbus, Ohio.