Quality Assurance Methodology Refinement Series

IMPROVING QUALITY OF CARE IN EIGHT POLISH HOSPITALS

Jordan Gynecological -Obstetrical Hospital, Lodz-Baluty
Mother's Memorial Hospital, Lodz
Opthalmological Hospital, Krakow
John Paul II Specialist Hospital, Krakow
Solidarity Foundation Center for Oncological Diagnostics, Legnica
St. Luke's Hospital, Konskie
Provincial Hospital, Sieradz
Policemen's Hospital, Krakow

With Technical Assistance By:

The National Center for Quality Assessment, Krakow and
The Quality Assurance Project
Center for Human Services
Bethesda, Maryland, U.S.A.

CONTENTS

List of Figures and Tables 3

Executive Summary... 5

Introduction 9

Case One: Jordan Gynecological-Obstetrical Hospital, Łodz-Bałuty 13

Case Two: Mother's Memorial Hospital, Łodz 17

Case Three: Ophthalmological Hospital, Krakow..... 23

Case Four: John Paul II Specialist Hospital, Krakow 27

Case Five: Policeman's Hospital, Krakow..... 31

Case Six: Solidarity Center for Oncological Diagnostics, Legnica 35

Case Seven: St. Luke's Hospital, Konskie 41

Case Eight: Provincial Hospital, Sieradz 47

LIST OF FIGURES AND TABLES

Figure 1.1 Process of Admission to Surgery 13

Figure 1.2 Possible Causes of Delayed Surgery After Admission 14

Figure 1.3 Actual Causes of Delayed Surgery 14

Figure 1.4 Half-month Average Waiting Time in Hospital for Surgery 15

Figure 2.1 Timetable for Carrying out the Quality Improvement Activity 17

Figure 2.2 Lab Work Flowchart 18

Figure 2.3 Cause and Effect Diagram 19

Figure 3.1 Causes of Delay of Ambulatory Ophthalmologic Surgery 24

Figure 3.2 Waiting Days for Ambulatory Surgery Before/After Modified Process 26

Figure 4.1 Causes of Delay of Ambulatory Ophthalmologic Surgery 28

Figure 5.1 Ultrasound Referral Process 31

Figure 5.2 Causes of Delayed Ultrasound for Outpatients 32

Figure 5.3 Causes of Wasted Ultrasound Examination Time Slots 32

Figure 6.1 Flowchart of Detailed Process 36

Figure 6.2 Timed Flowchart 36

Figure 6.3 Potential Causes of Prolonged Waiting for Consultation 37

Figure 7.1 Patient Flow Through Admissions Unit 41

Figure 7.2 Causes of Delay in Admissions Unit 45

Figure 8.1 Echocardiogram Examination Process 47

Figure 8.2 Possible Causes of Inefficient Use of Ultrasound Equipment 48

Figure 8.3 Average Number of Echocardiograms Performed Daily Before and After Intervention 50

Table 2.1 Frequency by Error, by Type, Pre-/Post-Intervention 20

Table 4.1 Staff Vaccination Status Before/After Intervention..... 29

Table 5.1 Wasted Ultrasound Time-Slots Before and After Intervention by the Quality Improvement Team..... 33

Table 6.1 Waiting Times Prior to Intervention (113)..... 37

Table 6.2 Pre-/Post-Intervention Delay Between Mammography and Consultation with Physician..... 39

Table 7.1 Delays (in Minutes) Incurred at Five Points Between Patient Arrival and Completion of Services..... 43

Table 7.2 Relative Impact of Each Factor on Overall Duration of Period Prior to Decision 44

Table 8.1 Multiple Criteria Analysis: Selecting Strategies to Increase Number of Echocardiogram..... 49

EXECUTIVE SUMMARY

The Polish health care system is being transformed from its formerly centralized structure, financed and largely directed by the Ministry of Health, to a more decentralized structure which places emphasis on local direction, control, and financing. As a result, local governments and providers have a heightened interest both in the technical quality of the care they provide and in improving patient satisfaction.

In October 1995, with funding from USAID/Warsaw, the National Center for Quality Assessment (NCQA) and the Quality Assurance Project (QAP) entered into an agreement for QAP to provide technical assistance to the Center. The collaboration had two goals. One was to demonstrate to a larger audience in Poland the effectiveness of these methods and tools in improving service quality; the other was to help strengthen the capacity of the NCQA staff in training and coaching quality improvement activities by service providers in hospitals and clinics. USAID's mandate was to divide the collaboration into two phases. The first was to be a brief (six months) demonstration phase. This would be an intense exercise in which a number of hospital staffs would receive just the amount of training and coaching they needed to be able to apply basic QM methods and tools to resolve a real quality problem in their hospital. Also in this phase, QAP would provide targeted training to the NCQA staff in the use of key methods and tools of QM and in techniques of training and coaching quality improvement teams.

The short demonstration phase was recognized by USAID, NCQA, and QAP as not providing sufficient time or effort to institutionalize quality management in the participating hospitals. Assuming a successful demonstration, a second, longer phase would enable QAP to provide training to NCQA in more advanced skills and tools, while providing funds for NCQA to work with various hospitals to develop institutionalized QM cores rather than temporary quality improvement teams that accomplish their purpose and then dissolve. It was anticipated that as more of the country's hospitals institutionalize QM, this would lead in time to real integration of modern quality assurance philosophies and methods into the evolving healthcare system. (This trend is expected to be supported by the promotive efforts of such organizations as the Polish Association for Quality in Healthcare.)

During November and December, the NCQA staff recruited seven hospitals and one clinic to participate in this demonstration. In January, Dr. Stewart Blumenfeld and Ms. Jolee Reinke, both senior trainers on the QAP staff, provided a workshop on quality management principles, methods, and tools for half of the members of each of the eight participating teams. In February, NCQA staff replicated the workshop for the other members of each team. Each team selected a problem and, using the methods and tools in which they had been trained, identified the major causes of the problem, developed and implemented a solution, and measured for improvement. As they worked, each team was coached by an NCQA staff member. On April 26, 1996, the teams convened in Krakow to present their results to one another and to observers from the Ministry of Health and from several voivodships.

These reports describe the results of the first phase, demonstrating the effectiveness of the methods and tools of quality management in improving quality by solving one problem at a time. These activities did not focus on the longer term goals of institutionalized quality management, assuring quality by preventive management and by continuous quality improvement. This would be taken up in the second phase of the collaboration. The presentations were given in Polish. These reports are based on notes taken by Dr. Blumenfeld, who attended the conference on behalf of QAP, translations of the team's visual aid materials, and additional consultations with the NCQA coaches. The translations were done by Mrs. Barbara Kutryba, M.A., of the NCQA staff.

The results of each team's work are summarized below.

Jordan Hospital, Łodz-Bałuty, *Reducing In-Hospital Waiting Time for Elective Surgery*: Waiting time for surgery once a patient was admitted was averaging 5.8 days, resulting in wasted resources, increased costs, increased risk to the patient from nosocomial infection, and complaints from the patients. The team tracked 80 cases over a four-week period to discover where most time was lost. More than half of the delay was attributable to waiting for a specialist to see the patient. Waiting for the results of EKGs and lab tests also contributed significantly to the problem. Based on their analysis of causes for these delays, the team reorganized the admitting process by having the specialist who will do the surgery see the patient by appointment prior to admission. The specialist also specifies the tests that he or she wants done before surgery. In the six weeks following the changed procedure, the period between admission and surgery fell steadily to an average of 1.1 days and appeared to be leveling off at a point.

Mother's Memorial Hospital, Łodz*, Reducing Repeated Laboratory Tests Resulting From Procedural Errors*: Many blood tests and urinalyses were being done over due to procedural errors, causing delays in services to patients and additional costs. Analysis of the process from the time a test is requested to the moment when the results are given to the physician revealed at least 15 plausible sources of error. Measurement of nearly 1800 cases, however, revealed that 87% of the errors arose from just four causes: analytical apparatus deficiencies, mistakes made in the collection of samples, mistakes made in transporting and storing samples, and unclear requests from the physician. Analyzing the causes of apparatus deficiencies, the team determined that most were related to the age of much of the equipment and the unavailability of spare parts due to shortage of funds. Deciding there was little they could do to rectify the latter problem in the short run, they decided to work on the other three causes, which collectively amounted to about 48% of the problem. They developed some procedural standards which had not existed before, produced job aids, and provided staff training on both the magnitude and consequences of procedural mistakes. The result was a 35% reduction in errors in these three areas and an 18% reduction in total errors. The team calculated that the savings in this three-week period from unrepeated tests amounted to approximately $2,200. On an annual basis, this would come to about $36,000 in just two clinics of the hospital.

Ophthalmological Hospital, Krakow, *Reducing Waiting Time for Ambulatory Surgery*: Ambulatory surgery is one of the newer services provided by the hospital and is much in demand. Patients complained about the long wait and staff worried that in some cases the patient's condition worsened during the waiting period. An analysis of records to quantify the problem

found that in the previous three months, patients had averaged 71 days of waiting. Analysis of probable causes of delay led the team to increase the number of surgical time-slots available by reorganizing existing hospital staff, motivating surgeons to perform more surgeries per day (the fact that the Hospital Director was a member of the Quality Improvement team was helpful), and reducing the number of wasted slots due to no-show patients by introducing a better appointment scheme and developing a list of patients who would come in for surgery on short notice. In the three months following the intervention, the average wait for surgery declined to 10 days.

John Paul II Specialist Hospital, Krakow, *Improving Hepatitis B Vaccination Rate in Hospital Staff*: Although hospital policy is that all staff should be vaccinated against Hepatitis B, of the 82 staff (doctors, nurses, support staff) in two pulmonary units in the study 24% had never been vaccinated and 6% were only partially vaccinated. The team studied the reasons for this and developed an educational program for all staff emphasizing the incorrectness of the reasoning used by staff to avoid being vaccinated. They also set up a monitoring scheme to track the vaccination status of the staff. Of the 25 people who were unvaccinated or not current, all 5 of those who were due for boosters had gotten it. Of the 20 who had never been vaccinated, 14 had started their series. The remaining 6, 4 physicians (out of 17 on staff) and 2 nurses (out of 39 on staff) had not complied. In their follow-up, the team discovered that the 4 physicians simply did not view HBV as a threat, while the 2 nurses held the misconception that the vaccine itself could give them hepatitis. (Interestingly, there is no discernible penalty for not complying with this policy.)

Policemen's Hospital, Krakow, *Reducing Outpatient Waiting Time for Ultrasound Examination*: Inpatients, who have priority, were being served in a timely manner, but outpatients were forced to wait about two weeks for their examination. Cause-effect analysis led the team to believe that inefficient use of the equipment was the cause of this problem. As they probed deeper into the details of the inefficiency, they discovered that a startling 48% of all booked time-slots went unused. Half of these slots were due to rejection of the patient as an inappropriate candidate for ultrasound when the Unit doctor examined the patient on the proposed day of the procedure. These were categorized as incorrect diagnosis by the referring physician. In another 18% of unused slots, the patient simply did not come for the scheduled appointment. Also in 18% of unused time-slot cases the Unit physicians were able to ascertain that the patient essentially had "forced/pressured" the referral against the better judgment of his or her doctor. As its response, the team developed and promulgated very specific standards as to the conditions under which it would accept patients. Over the course of the six weeks following this intervention, referrals to the Unit declined by 41% and unused slots dropped from 48% to 19%. Most of the rejections still were due to incorrect diagnosis by the referring physicians, but overall, incorrect diagnosis as a category declined by 42%. A sample of 100 records after the intervention showed that the average wait for outpatient service had dropped from 14 days to 7 days.

Solidarity Center for Oncological Diagnostics, Legnica, *Reducing Waiting Time and Increasing Comfort for Mammography Patients*: Patients were complaining that they wait for a long time from the time a mammogram was taken to the time that they were examined and counseled by a physician. Tracking 113 patients, the team found that 36% of patients waited more than two hours and 18% patients waited more than three hours. Examining the process in

the clinic, the team found several reasons for the delay, including some shortage of equipment and doctors. They thought, however, that some problems were due to the way the staff was organized and to the propensity of Polish patients to come very early for appointments for fear they might not get served. They therefore reorganized the work-hours of the two mammography technicians and strengthened the appointment system by giving the patient an appointment for both the mammogram and the doctor's consultation. With these changes, the number of patients waiting more than three hours declined to 7%--although now 43% of patients were waiting more than two hours. The team decided to accept this trade-off.

St. Luke's Hospital, Konskie, *Reducing the Period of Stay in the Admissions Room Pending Admission or Discharge*: Patients complained that they had to wait too long in the admissions area before they were either treated on an outpatient basis or admitted as an inpatient. The staff agreed that the process took too long. Using a very elaborate process analysis, the team focused on five points in the process where major delays were incurred. They tracked 90 patients and measured the waiting period at each of these points. They found that a wait for test or x-ray results occurred in 70% of all cases and that in these cases 75% of the time this wait was the longest single wait in the entire process of that case. In addition, 48% of all patient-minutes (the total number of minutes spent in the admissions area by all 90 patients) were used waiting for these results. The only factor that occupied a larger amount of total patient-time was the observation hold-period following administration of some medical procedure. This occurred in 23% of all cases; nearly always, when it did, it was the longest factor in the patient's stay. However, the team felt that this is a delay that should not be shortened. The team reached the point of proposing some modifications in the system, but had not had a chance to implement them before the conference.

Provincial Hospital, Sieradz*, Increasing the Number of Daily Echocardiograms Performed by the Cardiology Diagnostic Unit*: The average daily number of echocardiograms performed by the Unit over the past six months was 10.1, although it had inched up to about 12 in the previous three months. However, the international benchmark for similarly equipped and staffed units is about 14 per day. Process analysis and cause-effect analysis helped identify six impediments to efficient use of the Unit's resources. The team developed a set of five strategies that could increase the Unit's output and four different weighted criteria through which to filter the utility of each strategy; the analysis was done in the form of a multiple criteria assessment matrix. As a result, they began to book more patients per day, maintain a list of patients who could come for the procedure on short notice when another patient cancels or doesn't show, developed common standards for the two subunits that constitute the overall unit and thereby make it easier to move patients from one to another, and make the doctors more responsible for finding a staff replacement if they could not come on schedule. After these changes were made, the Unit's daily average began to exceed the international standard slightly.

INTRODUCTION

The Polish health care system is being transformed from its formerly centralized structure, financed and largely directed by the Ministry of Health, to a more decentralized structure which places emphasis on local direction, control, and financing. As a result, local governments and providers have a heightened interest both in the technical quality of the care they provide and in improving patient satisfaction.

At the same time as this basic restructuring is occurring, Poland is participating in a world-wide movement toward applying quality management principles to quality assurance in healthcare. In 1992, Poland began participating in a European Union project aimed at improving quality of care in several hospitals. The following year a Polish Association for Promotion of Quality in Healthcare was formed, and in 1994 a National Center for Quality Assessment (NCQA) was established under the auspices of the Ministry of Health and directed by a senior member of the faculty of the Jagiellonian University School of Public Health, Rafał Nizankowski, MD, PhD. The National Center's purposes are to promote awareness of modern quality assurance technologies and to provide technical assistance to provider units that wish to improve quality by applying these methods. The Center was assisted in its development by USAID and by a Flemish (Belgian) cooperation project, both of which provided resources for training Center staff in the use of the methods and tools of modern quality assurance. In October 1995, NCQA, with financial assistance from USAID, held a two-day conference in Krakow at which nearly two-dozen managers and providers presented the results of recent quality improvement activities they had carried out.

In September 1995, USAID/Warsaw asked the Quality Assurance Project[1] (QAP) to assist in advancing the application of modern quality assurance methods in Poland's changing healthcare system. In October, a team comprising Dr. James Heiby, Global Bureau Project Manager for QAP, QAP Director, Dr. Stewart Blumenfeld, and a consultant, Dr. Robert Younes, visited Poland to review the status of quality assurance in the country, assess overall interest in expanding the use of more effective quality assurance approaches, and identify potential partners in the expansion of awareness and capacity for using these technologies. The assessment team found that interest in modern Quality Assurance is high, that national capacity is not yet very great, and that the National Center for Quality Assessment, having already started on a course of improving its own capacity to function as a national resource in quality management (QM), would be a natural partner.

With funding from USAID/Warsaw, NCQA and QAP entered into an agreement for QAP to provide technical assistance to the Center. The collaboration had two goals. One was to demonstrate to a larger audience in Poland the effectiveness of these methods and tools in improving service quality; the other was to help strengthen the capacity of the NCQA staff in

---

[1] The Quality Assurance Project is implemented by the Center for Human Services under Cooperative Agreement No. DPE-5922-A-00-0050-00 with the Office of Health and Nutrition, Global Bureau, United States Agency for International Development.

training and coaching quality improvement activities by service providers in hospitals and clinics. The original mandate divided this collaboration into two phases. The first was to be a brief (six months) demonstration phase. This would be an intense exercise in which a number of hospital staffs would receive just the amount of training and coaching they needed to be able to apply basic QM methods and tools to resolve a real quality problem in their hospital. Also in this phase, QAP would provide targeted training to the NCQA staff in the use of key methods and tools of QM and in techniques of training and coaching quality improvement teams.

Assuming a successful demonstration, a second, longer phase would enable QAP to provide training to NCQA in more advanced skills and tools, while providing funds for NCQA to work with various hospitals to institutionalize QM cores rather than rely on temporary quality improvement teams that accomplish their purpose and then dissolve. It was anticipated that as more of the country's hospitals institutionalize QM, this would lead in time to real integration of modern quality assurance philosophies and methods into the evolving healthcare system. (This trend is expected to be supported by the promotive efforts of such organizations as the Polish Association for Quality in Healthcare.)

This report describes the results of the first phase, demonstrating the effectiveness of the methods and tools of quality management in improving quality by solving one problem at a time. The short demonstration phase was recognized by USAID, NCQA, and QAP as not providing sufficient time or effort to institutionalize quality management in the participating hospitals. The activities described here do not focus on the longer term goals of institutionalized quality management, assuring quality by preventive management and by continuous quality improvement. This would have been taken up in the second phase of the collaboration which will no longer be executed, leaving the six-month phase as the main activity.

During November and December 1995, the NCQA staff recruited teams (each comprising 4-6 members) from eight hospitals to participate in the quality improvement exercise. The activity was to consist of two one-week workshops in January and February 1996, with half of each quality improvement team attending the first workshop, the other half, the second. Team members would learn some of the background philosophies that underlie modern quality assurance approaches, be trained to use basic tools for identifying problems, their causes, and their solutions, select a problem to work on from their own facility, and thereafter receive regular coaching visits from Center staff to assure that they continued to apply properly the skills they had learned in the workshop as they moved toward solving their quality problem. Dr. Blumenfeld spent a week in December working with the Center staff to prepare overheads and written training materials that used case examples that were relevant to the Polish health care system. Since cardiovascular accidents are among the leading causes of morbidity and mortality in Poland, a number of cases dealt with CVA.

The first (January) workshop presented an interesting problem. It had been agreed that it should be given by QAP staff (Dr. Blumenfeld and Ms. Jolee Reinke) so that NCQA staff would have an opportunity to observe the training techniques employed by veteran trainers in the QA field. Since QAP has no staff who can speak Polish, this meant that the workshop would be done in English, and although the initial batch of workshop participants were to be selected in part

because it was hoped they could cope with the level of English required, it was not anticipated that most would be strong in English. To assure that all the participants could learn the material they needed to despite didactic presentations in English, all overheads and supplemental written materials were translated into Polish by NCQA staff. While this was a difficult undertaking for the staff, the task had the benefit of ensuring thorough familiarity with the materials and the concepts they covered. Since the second (February) workshop was given entirely by NCQA staff, this exhaustive familiarity almost certainly improved the quality of the second workshop. In the week prior to the workshop, Ms. Reinke provided training in techniques of successful teamwork for the NCQA staff.

The first workshop was given by Dr. Blumenfeld and Ms. Reinke in Krakow January 15-19, 1996. There were 23 participants representing eight different institutions. NCQA staff provided occasional Polish-language elaboration as they deemed necessary. NCQA staff gave the workshop for the second batch of team members February 5-9.

At each workshop, the first two-and-a-half days were devoted to a discussion of the transition from traditional approaches to quality assurance to the modern approach based in quality management, the problem-solving process, and demonstrations of, and practice with, the basic methods and tools used in this approach. One particularly successful innovation in this workshop was hands-on use of affinity diagramming to produce a group-generated cause-effect diagram. Two participative exercises highlighted techniques and benefits of working in teams. The last two days of the workshop were designed to help launch the teams into a definition and analysis of the quality problems they had selected and to give the NCQA staff who would act as facilitators for these teams practice in serving in this capacity. As part of this process, each team developed a detailed flowchart of the activity that incorporated the problem they had chosen. A few of the teams generated a system model as a precursor to doing its flowchart. Each of the teams was given an opportunity to present its flowchart to the entire group for critiquing. Dr. Blumenfeld and Ms. Reinke observed and participated in this activity and were able to provide helpful hints for the coaches concerning how to interact with the team, how to diagnose problems should the team stall in its efforts, and what to suggest as a remedy in this case.

Prior to the first workshop, it had been expected that each quality improvement team would identify several problems of importance to the whole team and would delegate authority to the group coming to the first workshop to select a problem for the entire team to work on. This seems to have worked in some cases, but not in all. The teams that did not select a problem at the first workshop did so at the second.

A date was set in April 1996 for the teams to convene in Krakow under the auspices of NCQA to report on their activity and results. The conference date established a definite endpoint for the work and probably worked to enforce an unusually rapid pace of activity[2]. Each team was visited

[2] In actuality, these teams progressed more quickly than almost any other group with which the Quality Assurance Project has collaborated. This is a tribute to the sincerity of their desire to learn about this new technology and to the efforts of their NCQA coaches, Sabina Łyson, M.Soc., Anetta Pawlus, M.D., and Kinga Stanach, M.S.W.

by its NCQA coach every few weeks to check on progress and help clarify conceptual issues, correct use of tools, or teamwork issues. The coaches spoke to the team leaders by telephone between visits.

The conference was held on April 26, 1996. Most members of each team and representatives of the Ministry of Health and several voivodship health ministries participated. Each team presented a verbal report and in addition set up a storyboard[3]. The presentations were given in Polish. These reports are based on notes taken by Dr. Blumenfeld, who attended the conference on behalf of QAP, translations of the team's visual aid materials, and additional consultations by Dr. Blumenfeld with the NCQA coaches. The translations were done by Mrs. Barbara Kutryba, M.A., of the NCQA staff.

[3] For those not familiar with the storyboard tool used in quality management, a storyboard is a visual communications tool using pictures, graphics, and terse text to describe the nature of the problem, the members of the team and their roles, the analysis of the problem, the development and selection of solutions, and the results of implemented solutions.

CASE ONE: JORDAN GYNECOLOGICAL-OBSTETRICAL HOSPITAL ŁODZ-BAŁUTY

REDUCING IN-HOSPITAL WAITING TIME FOR ELECTIVE SURGERY

THE QUALITY IMPROVEMENT TEAM:

Barbara Jabłonska-Krasomska, MD, PhD, Chief Physician; Maria Olesiejuk, MD, PhD, Deputy Chief, Neonatal Ward; Mgr. Aleksandra Kociemska, Chief of Nursing; Agnieszka Kaniera, MD, Assistant Chief, Rehabilitation; Mgr. Magda Kedziera-Osuchowska,Health Educator; Ewa Kuziel, MD, Health Educator.

Coach/Facilitator: Sabina Łyson, M.Soc.
National Center for Quality Assessment

Edited by Stewart Blumenfeld, Dr.P.H., CPHQ
Quality Assurance Project
Center for Human Services

Problem Statement:

Both patients and staff agreed that the period between admission to the hospital and surgery was too long, on average 5.8 days. From the hospital's viewpoint, this resulted in wasted resources, increased costs, and additional risk to the patient. For their part, the patients complained that their time was wasted, that there was great inconvenience to the family, and that, moreover, the protracted anticipation of surgery was distressing. The team set a goal of having at least 90% of patients undergo their surgery within 24 hours of admission.

Problem Analysis:

To identify possible nodes in the system where significant delay may be incurred, the quality improvement team developed a flow chart of the process by which patients are admitted to the hospital and then proceed to surgery. Using the flowchart (Figure 1.1) to identify possible places in the process where time may be lost, the team developed a cause-effect diagram to speculate on how and why time might be lost at these points in the process.

Discussing the cause-effect diagram (Figure 1.2), the team decided to

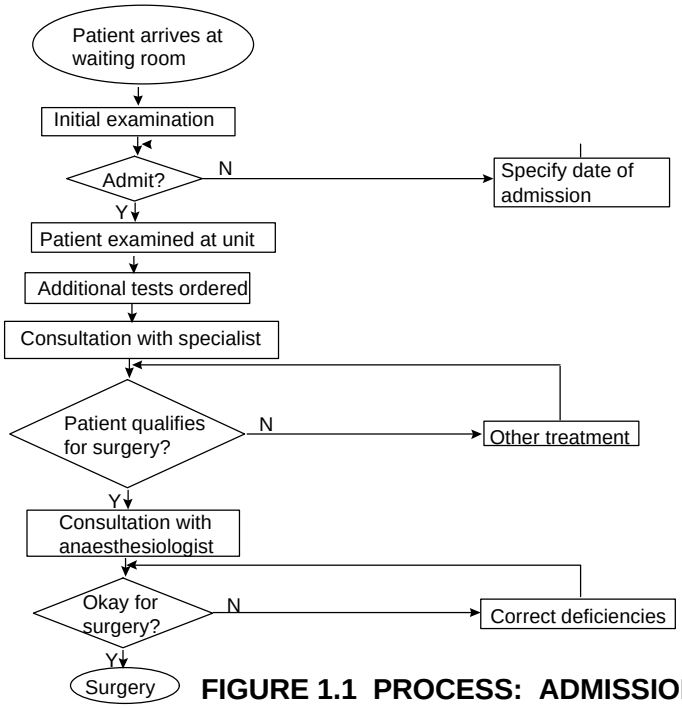

FIGURE 1.1 PROCESS: ADMISSION TO SURGERY

measure delays occurring at three different points in the process which they thought were likely to give rise to significant delays:

- waiting for lab tests to be done and reported
- waiting for EKG and ultrasound tests and results
- waiting for consultation by a specialist

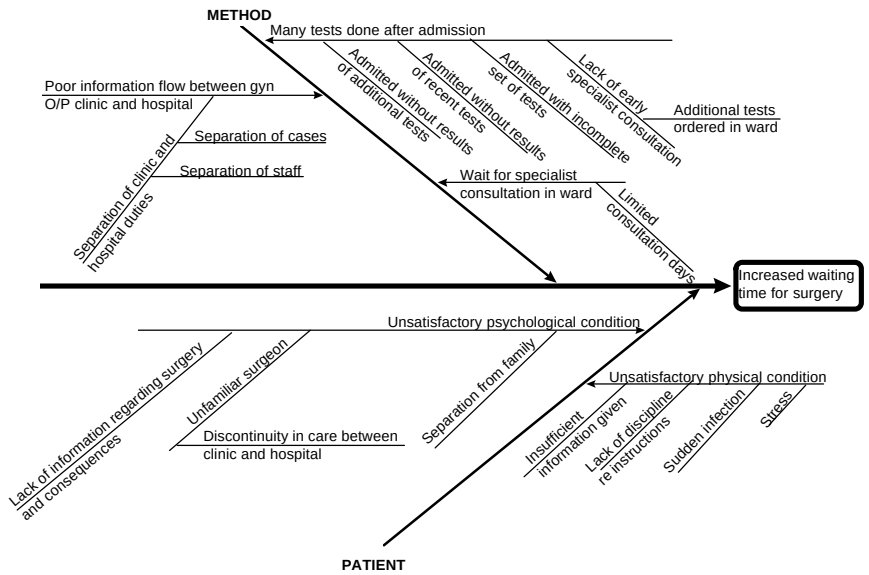

FIGURE 1.2 POSSIBLE CAUSES OF DELAYED SURGERY AFTER ADMISSION

This team noted that this problem had been on their minds for some time, and that participation in this quality improvement activity had given them the impetus and additional skills and tools to study the problem in a systematic way. They had progressed well into the analytical phase at the training workshops, developing their flowchart, cause-effect analysis, and data-collection approach and tools in near-final form before they finished, so that they were ready to start collecting data very early in the project. Data were collected by modifying the medical record to show delays in surgery and the reasons for the delay as noted by the attending staff.

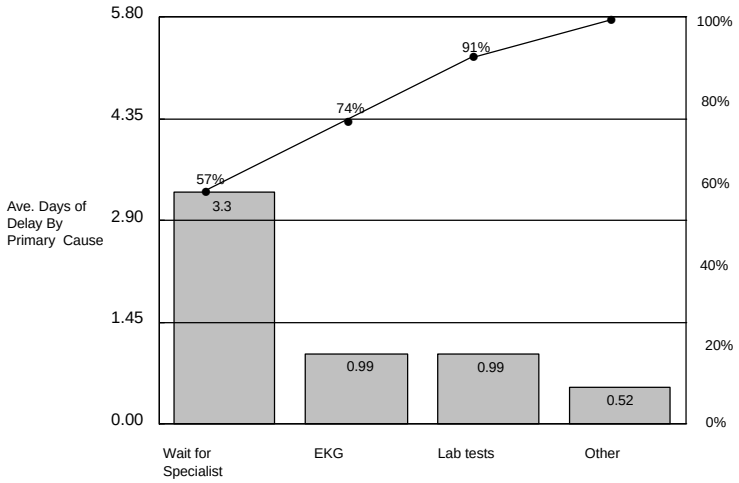

FIGURE 1.3 ACTUAL CAUSES OF DELAYED SURGERY

Using the modified medical record, the team collected data on 20 cases a week for four weeks and obtained results, shown in Figure 1.3. As indicated by the Pareto chart, the wait for consultation with a specialist (gynecologist) accounted for more than half the delays, but there also were substantial delays waiting for lab work to be reported and for the EKG unit to become available.

Solutions and Results

The cause-effect diagram had already provided the team with a number of potential solutions to the problem of long delay between admission and surgery. Once their suspicions were confirmed through use of the new information on the patient record, they reorganized their procedure fairly drastically. The major change was to establish a polyclinic within the hospital itself. Before, referrals for surgery came directly from the regional clinics. Now, referrals come from the regional clinic to the hospital polyclinic. There, the same doctors who will do the surgery see the patient order the tests that they demand prior to operating. Moreover, these surgeons set the operating room schedule for their own patients in conjunction with an integrated schedule for use of these theaters. Thus, they know when they are going to operate and therefore when they need to see their patient beforehand and what lab results they need to have in hand before the scheduled surgery. This enables then to take steps, such as reminders to the labs, to assure that they have these results on time. In many ways, the new procedure gives the surgeon more control over the flow of the process and seems to heighten a sense of obligation to assure that the patient moves smoothly through the process leading up to the surgery.

The result of these changes, as shown in Figure 1.4, is that, in the eight weeks following, the average number of days waiting in hospital for surgery dropped to about 1.5 days and appeared to be leveling off under the new system at about 1.1 days. This is compared to the average 5.8 days in the eight weeks preceding the changes. The team was quite gratified by this outcome, feeling that by reducing the time patients must spend in hospital before surgery to such a large degree, they obviously are saving hospital "hotel" costs, are reducing the patient's exposure to nosocomial infection, are reducing patient stress, and generally are producing a more satisfactory experience for the patient and the family.

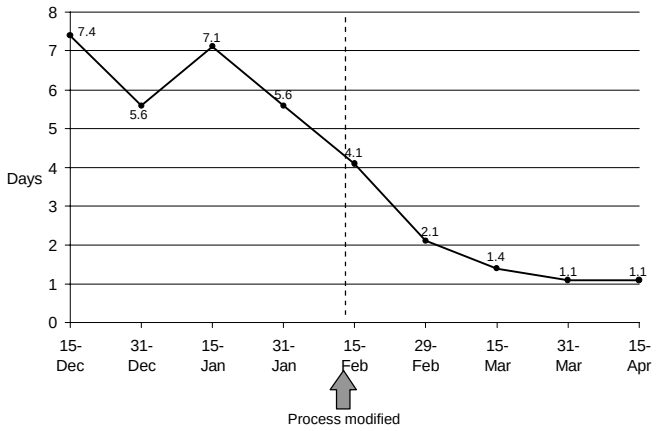

FIGURE 1.4 HALF-MONTH AVERAGE WAITING TIME IN HOSPITAL FOR SURGERY

CASE TWO: MOTHERS' MEMORIAL HOSPITAL, ŁODZ, POLAND

REDUCING REPEATED LABORATORY TESTS RESULTING FROM PROCEDURAL ERRORS

THE QUALITY IMPROVEMENT TEAM:

mgr. farm. Małgorzata Majer, Chief, Economics Section; mgr. pielgn. Anna Wisniewska, Nurse; lek. med. Michał Krekora, Physician; mgr. farm. Mirosław Szeligowski, Chief, ClinicalPharmacology Laboratory.

Coach/Facilitator: Sabina Łyson, M.Soc.
National Center for Quality Assessment

Edited by Stewart Blumenfeld, Dr.P.H., CPHQ
Quality Assurance Project
Center for Human Services

Problem Statement:

Many blood tests and urinalyses requested by physicians in the pediatric and obstetrics-gynecology wards must be repeated due to procedural errors. The result is delay in getting final results to the physician and unnecessary costs due to rework.

The team worked from the following timetable:

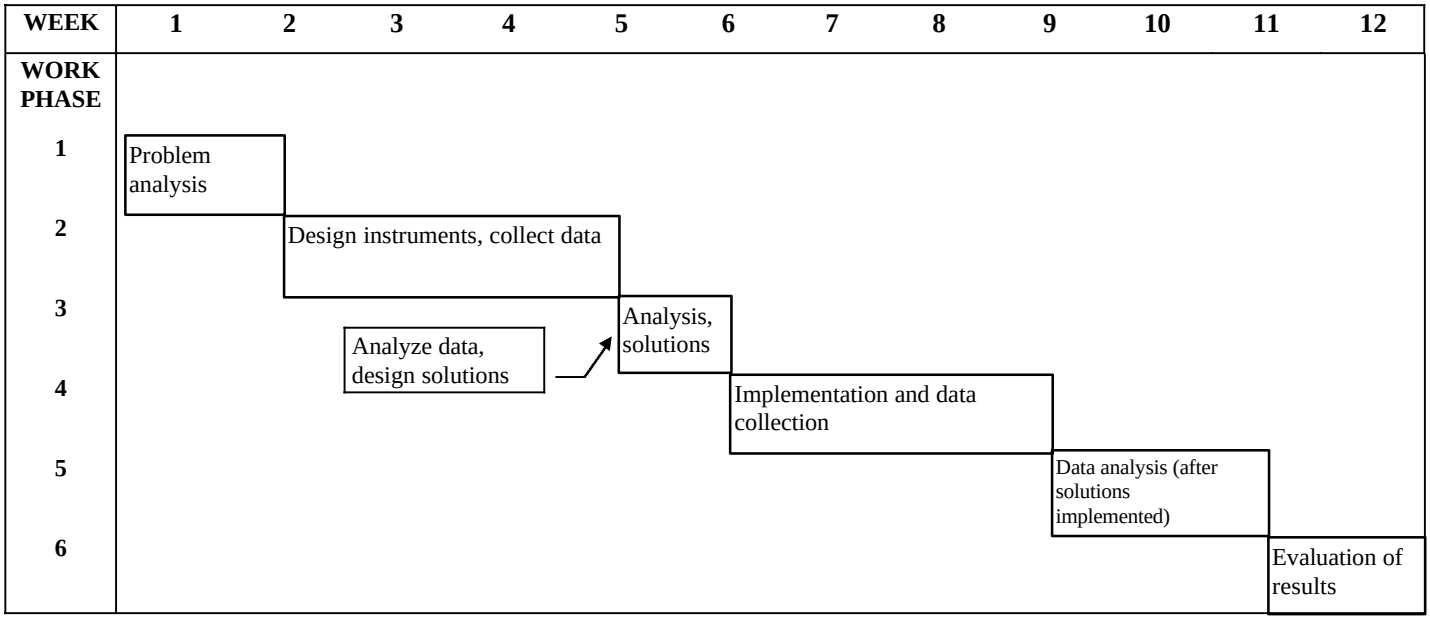

FIGURE 2.1 TIMETABLE FOR CARRYING OUT THE QUALITY IMPROVEMENT ACTIVITY

Problem Analysis:

The first part of the analysis comprised a flowchart to examine the current process, beginning with the ordering of a test by a physician all the way through to the reporting of the results to the doctor. The flowchart developed by the team is shown in Figure 2.2. This detailed analysis of the process by the team led to a much greater appreciation of the complexity of what is often regarded as a simple ("routine") process and the numerous places it can deviate from the assumed "standard procedure".

Once the process had been flowcharted, the team developed a cause-effect diagram to speculate on possible reasons for errors. This informed guessing then was used to guide a data-collection effort to measure the frequency of actual errors by type. The team focused on potential errors related to staff actions, equipment problems, and systemic procedural impediments to minimizing errors (Figure 2.3). The diagram allowed the team to reduce the number of variables to be measured to a manageable level.

Based on the cause-effect diagram, the team decided for its first quality improvement effort to focus on fifteen types of problems. These were:

- Unclear description of the test desired
- Poor quality of test tubes and capillary tubes
- Wrong timing of collection (e.g., non-fasting)
- Collection during IV infusion
- Insufficient blood taken
- Air in capillary tube
- Sample not mixed adequately
- Incorrect ratio of blood to anticoagulant
- Lipemia

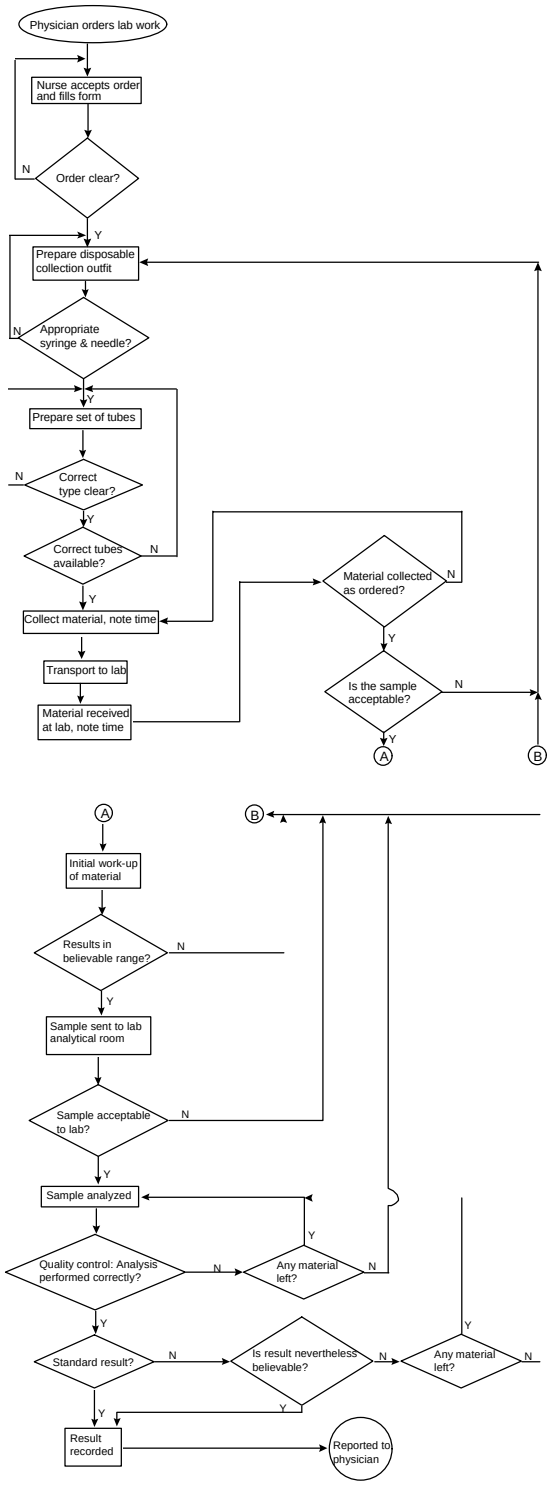

FIGURE 2.2 LAB WORK FLOWCHART

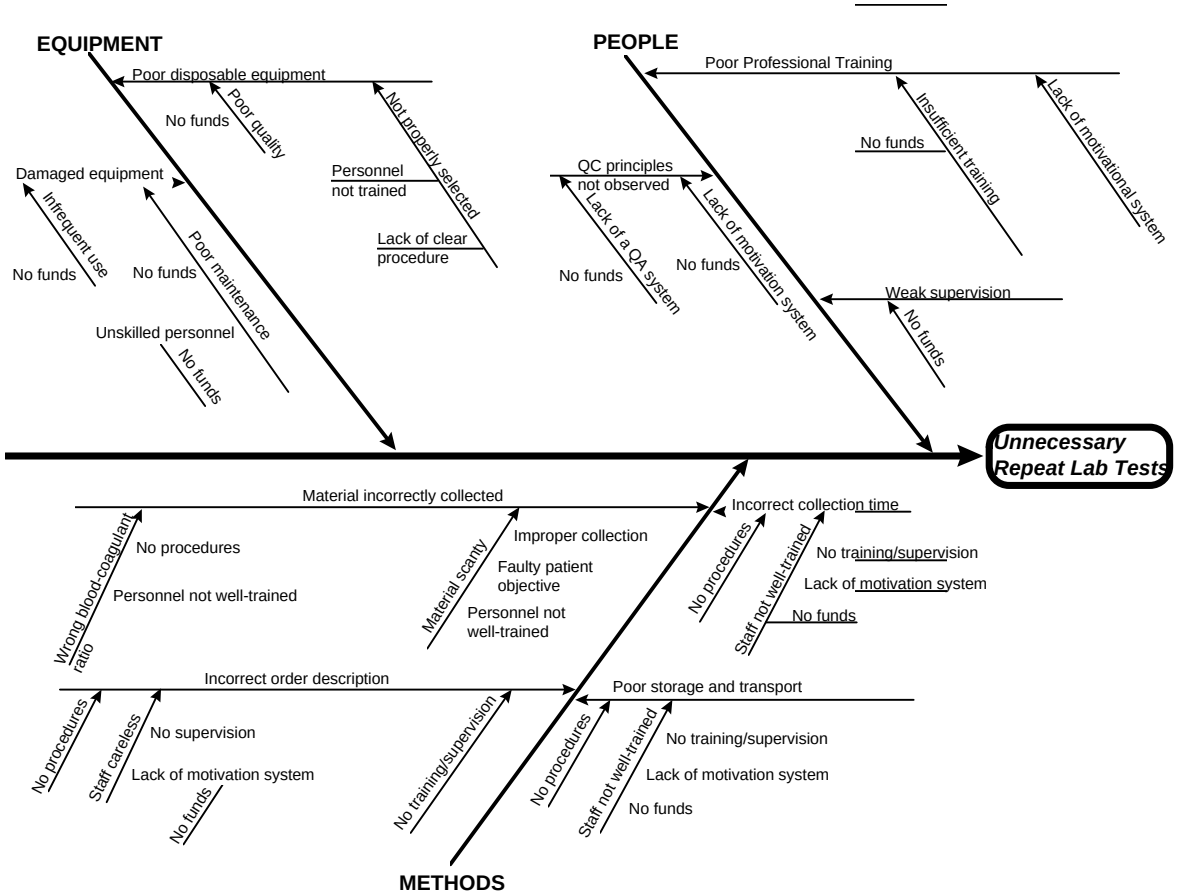

FIGURE 2.3 CAUSE AND EFFECT DIAGRAM

- Reagents out of date
- Repeating tests because of lack of confidence in equipment
- Apparatus out of calibration
- Apparatus otherwise broken
- Other causes

A data collection sheet was designed and the frequency of each problem was tracked over a three-week period. Once the data were in, the team decided that the problems could be condensed into seven categories, which were then cast as a Pareto chart. As may be seen, the team discovered that three classes of problems accounted for 80% of repeat tests. Because a fourth problem was almost as frequent as the third, the team hoped to tackle it as well. Thus, four problems were considered for improvement intervention activities: those related to malfunctioning analytical apparatus, to sample collection, to transport and/or storage of samples, and to documentation or writing of orders. Ultimately, they decided that in the short time available for the quality improvement exercise it would not be feasible to deal with the issue of malfunctioning equipment which, in good part, was attributable to old, somewhat worn out equipment that required replacement (and therefore the attendant funds—which are not available).

Solutions and Results

The interventions designed by the team consisted of development of very specific standards and job aids for collecting blood samples and for transporting and storing the samples, followed by a review and discussion of the standards with the nurses and technicians responsible for these activities. In keeping with the quality management principles the team had learned, they tried as much as possible to involve these workers in the discussions of why the standards were necessary, as opposed to simply declaring something like "these are the standards and they must be followed

After the training and indoctrination of the nurses and technicians, data were collected for the next three weeks on the same set of problems that had been tracked before. The results are shown in Table 2.1.

TABLE 2.1: FREQUENCY OF ERROR, BY TYPE, PRE-/POST-INTERVENTION

Cause	Number Pre-intervention	Number Post-intervention	Percentage Reduction (Increase)
Apparatus deficiencies	108	110	(2)
Collection errors	524	302	42
Transport/storage errors	165	112	32
Order clarity	154	138	10
Analyzer/reagent	108	110	(2)
Other causes	82	90	(10)
Quality of disposable outfit	6	9	(50)
Totals	1763	1437	Ave Change=18%

The three shaded problem areas were the subject of intervention. As may be seen, significant reductions in the numbers of re-works were accomplished in these areas, while the others were relatively unchanged. From these results, the quality improvement team concluded that (1) their targeted quality improvement efforts were effective, and (2) the QI process that they had learned and applied works well in their context.

The team went one step further. During the training sessions, the QAP advisory team had expressed its conviction that "quality does not cost, quality pays", i.e., that quality improvement often translates directly to cost reduction. The team therefore estimated the cost of the amount of potential re-work they had saved, using their pre-intervention frequency data as their baseline. On that basis, they estimated that in the three-week post-intervention period the two departments involved had saved approximately 5,714 zł, approximately US$2,200. Projecting this to a full

year yields an approximate saving of $36,000 in the first year alone. They did not estimate the cost of the QI exercise itself to see what the payoff ratio might be, but even if the time the team took for training, the cost of travel and subsistence for the team members in Krakow, and the cost of the Polish trainers/facilitators is taken into consideration, their investment would not come to half the saving in one year alone, to say nothing of succeeding years. Moreover, this team, while it might still benefit from continued facilitation by the NCQA staff, will not require anything comparable to the intensive--and relatively expensive--initial training it received. Thus, the payoff ratio for a future stream of benefits would be even greater.

CASE THREE: OPHTHALMOLOGICAL HOSPITAL OF KRAKOW

REDUCING WAITING TIME FOR AMBULATORY SURGERY

THE QUALITY IMPROVEMENT TEAM:

lek. med. Marta Kuczma, Ophthalmological Surgeon lek. med. Pawel Papee, Hospital Director lek. med. Teresa Wojowicz, Surgeon Joanna Werszler, Sr. Medical Statistician-Economist Marta Synal, Senior Nurse lek. med. Maria Pociej-Zero, Data Analyst Teresa Domagała, Sr. Surgical Nurse Assoc. Prof. Jan Pociej, Consultant

Coach/ Facilitator: Sabina Łyson, M.Soc.
National Center for Quality Assessment

Edited by Stewart Blumenfeld, Dr.P.H., CPHQ
Quality Assurance Project
Center for Human Services

Problem Statement:

The Ophthalmologic Hospital is a specialty hospital serving the populations of four voivodships, including Krakow itself. It is heavily used and as a result the staff receive many complaints from patients concerning the long wait for services. Ambulatory surgery is one of the newer services provided by the hospital, but there often is a long wait for this service. The clinic staff believe that it is possible to reduce this wait, both to increase the satisfaction of the patients and because delayed surgery in some conditions (severe corneal abrasion or ulceration, for example) may lead to complications and a worse situation for the patient.

Problem Analysis:

A review of records of all patients who received outpatient surgical services in three months (October and November 1995, January 1996—December was omitted because the holidays reduce the number of patients seeking service, as well as the number of surgeons available for service) preceding the quality improvement intervention showed a consistent pattern of waiting after the decision was made: 76, 69, and 67 days.

The team went directly to cause-effect analysis to help them think through probable causes for unnecessary delay. The cause-effect diagram is shown in Figure 3.1. Of the causes shown in the diagram, the ones the team thought most likely to cause delay were organizational—mainly a shortage of operating slots—and inefficiency—wasted slots due to problems with patients.

Solutions and Results:

The team chose four interventions:

- Increase the number of ambulatory surgery days from one to two;
- Increase the number of surgeons available to perform surgery;
- Increase the number of surgeries performed each day;

- Reduce patient - related wastage of available slots.

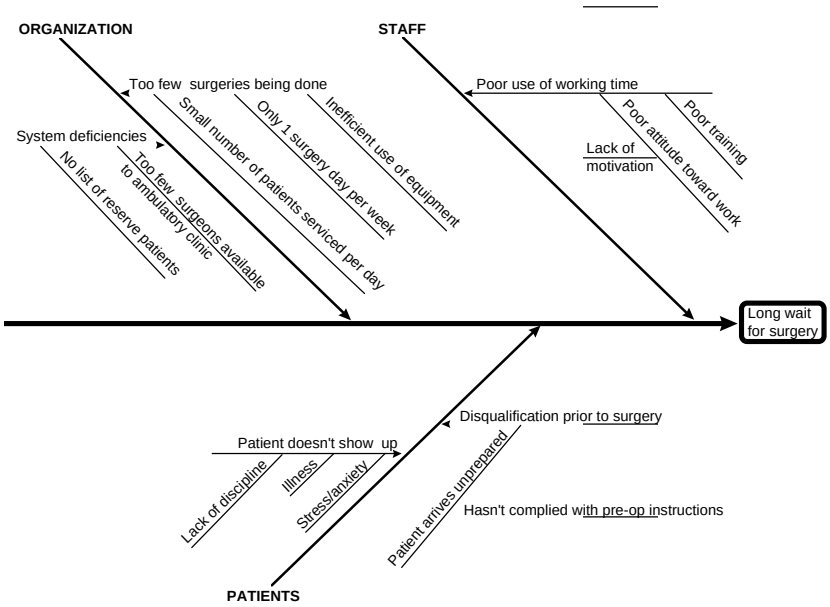

FIGURE 3.1 CAUSES OF DELAY OF AMBULATORY OPHTHALMOLOGIC SURGERY

The first two of these interventions were accomplished basically by fiat, clearly demonstrating the value of having top-level management closely involved in the quality improvement process. In this case, the Director of the hospital (Dr. Papee) was a co-leader of the team. He became convinced of the seriousness of the problem and simply authorized a reorientation of the hospital's assets, in this case, it's surgical staff. This enabled the outpatient surgery clinic to add more surgeons to its roles and to add a second day of surgery each week.

Increasing the number of surgeries done per day was a different problem. This was more a matter of motivation than increasing resources. It was pointed out to the head of the ambulatory surgery department that the surgeons did not receive any extra incentive for seeing more patients. It is not clear that this issue was resolved completely. Certainly, no extra compensation was provided. The team members do feel, however, that, once again, the presence and awareness by the Hospital Director of the problems caused by a relatively leisurely daily pace of surgery did have an impact. In any event, the degree of improvement suggests that the clinic now is turning out more surgeries than can be accounted for by simply doubling the potential number of surgery-hours available.

To help with the problem of patients either showing up for their surgery in a condition which makes surgery inappropriate or not coming for their appointment at all, standardized written instructions were produced to be given to the patient at the time the appointment was set up. These are reproduced on the following page.

INFORMATION FOR AMBULATORY SURGERY PATIENTS

Esteemed Patients!

Our hospital has begun ambulatory surgery for certain cases. A specialist determines the need for surgery during your visit to the polyclinic and schedules the day. We would like to provide you with the following information and remarks:

1. On the day of surgery, the patient should register at the clinic at 0930 and wait for surgery.

2. Surgery is performed under local anesthesia.

3. To qualify for surgery that day, the patient:

   A. If female, can not be menstruating;

   B. Must have a blood pressure in the normal range;

   C. Must bring standard pre-operatory laboratory results [N.B.: CBC and coagulation time—apparently a pre-op requirement in Poland widely known to medical personnel. –SNB]. These tests are available at the regional outpatient clinics or cooperatives.

4. If a need arises for additional histopathology tests arises, the patient must cover the additional cost of 6.60 Zl for the laboratory.

5. If, for personal reasons, you will be able to come as scheduled, please call us and arrange for time.

6. We have to apologize for lack of space and for all the inconvenience this brings. We hope for your indulgence and understanding.

7. We wish all our patients a speedy recovery and a good outcome.

The team also began developing and using a list of patients who stated they could come in for surgery on short notice.

The chart in Figure 3.2 compares the average waiting time for ambulatory surgery before and after the changes implemented by the quality improvement team. The three-month average before the change was 71 days; for the three months afterward the average declined to ten days.

In summing up their results, the team pointed out that before this exercise, many of the senior hospital staff were sure that no improvement could be obtained without some significant infusion of funds. (To his credit, the hospital director, reputedly a dynamic leader, although a little skeptical, was willing to try.) Now, according to the team's leader, there is a swelling of enthusiasm for this QA methodology which many, including the Director, would like to continue, seeing this first activity as a "prelude" to establishing a program of continuous quality improvement. The team has asked NCQA for continued assistance in this regard.

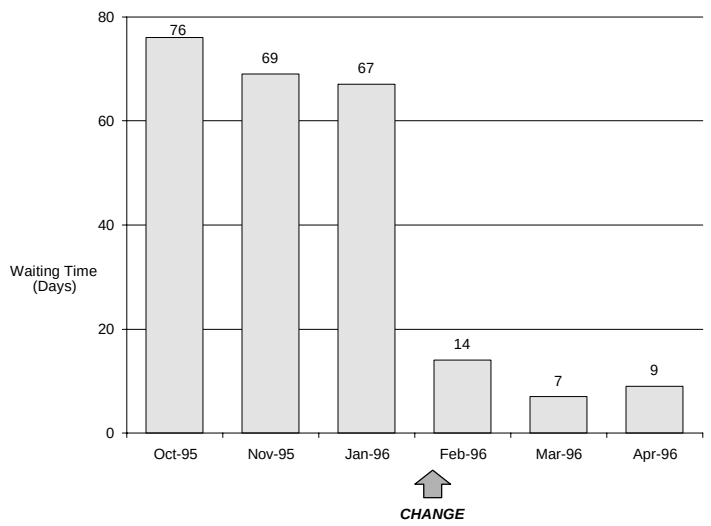

FIGURE 3.2 WAITING DAYS FOR AMBULATORY SURGERY BEFORE/AFTER MODIFIED PROCESS

CASE FOUR: JOHN PAUL II SPECIALIST HOSPITAL, KRAKOW

IMPROVING HEPATITIS B VACCINATION RATE IN HOSPITAL STAFF

THE QUALITY IMPROVEMENT TEAM:

lek. med. Barbara Baka-Cwierz, Chief,Hepatitis Outpatient Clinic; lek. med. Zbigniew Grochowski, Department Chief; lek. med. Małgorzata Kalinowska, Neurologist; mgr Grazyna Kwarciak, Chief, Bacteriology Unit; lek. med. Ewa Marek, Pulmonologist.

Coach/Facilitator: lek. med. Anetta Pawlus
National Center for Quality Assessment

Edited by Stewart Blumenfeld, Dr.P.H., CPHQ
Quality Assurance Project
Center for Human Services

Problem Statement

Hospital policy requires that all personnel shall have up-to-date vaccination against Hepatitis B virus[4]. The policy has not been enforced and as a result it was suspected that a substantial number of staff either never have been vaccinated, have not completed their series, or are not current on their booster. The subject staff work in the two pulmonary units of the hospital and comprise a total of 82 persons.

Problem Analysis:

Although recent vaccination is on an individual's medical record at the hospital's polyclinic, vaccinations are not a fixed part of personnel records in the hospital and it was therefore not possible to reliably ascertain the vaccination status of staff members simply by a review of those records. The team's approach, therefore, was a combination of identifying those staff who did have a record of vaccination in the polyclinic and interviewing all the others. The interviewees, whether they claimed they had been vaccinated in the past year or not (some said they had been vaccinated at some facility where they had worked before), underwent serotesting. Of the 82 staff, 57 either had had a recent vaccination or were shown by the lab to have a protective titer. Thus, 25 staff, or 30%, were out of compliance with the regulation.

Prior to selecting an intervention, the team did a cause-effect analysis to help understand why the policy was not being followed. They did not do a flowchart of the process because they felt that the process was so unsystematic as to be almost nonexistent. The cause effect diagram is shown on the next page.

---

[4] Poland uses a three-shot series at t_0, 1 month, and 6 months, with boosters thereafter at 5 year intervals.

Solution and Results:

The team felt the susceptible status of such a large proportion of staff called for rapid action. The solution chosen consisted of both an educational and a monitoring component. The entire was staff was called together and the hospital's policy requiring all staff to have been immunized was restated. The threat of HBV to clinical and support staff was pointed out and discussed at the same time. Thereafter, a plan was developed to individually contact the 25 staff who needed immunization and press them to arrange an appointment at the polyclinic to start their series. In addition, a scheme was set up to monitor the progress of these individuals through their series. Table 4.1 shows the immunization status of the staff by professional category before and after the intervention.

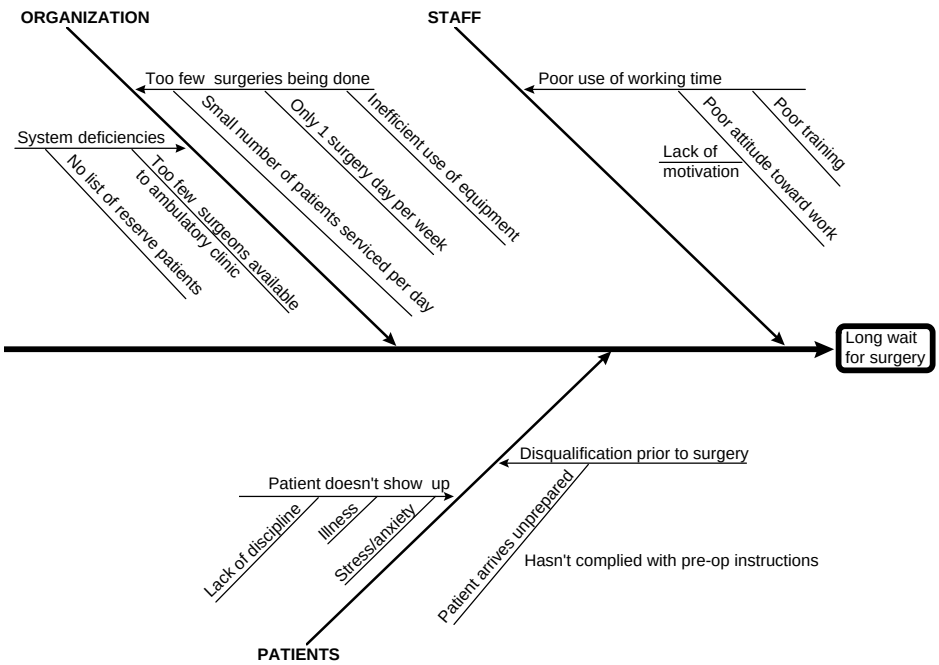

FIGURE 4.1 CAUSES OF DELAY OF AMBULATORY OPHTHALMOLOGIC SURGERY

As may be seen in Table 4.1, before the increased immunization action began, the physicians on the staff were proportionately the most non-compliant of the staff categories, with six out of the seventeen doctors either unvaccinated or overdue for a booster. At the end of the exercise, they still were. Among the physicians, the doctor who needed to get a booster had done so, and one of the doctors who needed to start the series from the beginning also had done so. That, of course, left four of the five doctors who needed to start the series having taken no action more than two months after being reminded of the hospital's policy on HBV immunization. Two nurses also had not begun their series.

In their follow-up attempts to move non-complying staff to take action, some team members discussed the situation with these staff. While they expected to hear excuses about not having time, to their surprise, they discovered that several of the six people (four doctors and two nurses) actually held considerable misconceptions about the threat and the vaccine itself. By and large, the doctors just did not view the likelihood of their contracting the virus as significant and thus not worth worrying about. Although the team did not present data on the frequency of HBV infection among unvaccinated hospital personnel in Poland, hepatitis B is not a particularly rare

disease in the country. The team even mentioned that one of the outcomes of this present activity might be to reduce lawsuits filed against the hospital by patients charging that they caught the disease during the course of a stay in the hospital.

While the feeling of very low risk by some medical staff is, if misguided, not very surprising, the responses of the two nurses is. They expressed concern that the vaccine might, in fact, give them hepatitis. It is not clear whether this fear is completely unfounded or if bad batches of vaccine have been released in the country in the past. The team members did seem to feel that the risk not being immunized is much greater than any threat from the vaccine.

TABLE 4.1 STAFF VACCINATION STATUS BEFORE/AFTER INTERVENTION

	Category	MD	Nurse	Ward Attendant	Other	Totals
	N=	17	39	19	7	82
Before	Fully Vaccinated	11	31	11	4	57 (70%)
	Partially Vaccinated	1	2	1	1	5 (6%)
	Unvaccinated	5	6	7	2	20 (24%)
After	Booster Obtained	1	2	1	1	5/5
	Started Series	1	4	7	2	14/20
	Noncompliant	4	2	0	0	6/25

Concerning those staff who have refused to comply with the hospital's policy, to date no effort has been made to force compliance through administrative sanctions.

Concluding their presentation, the team noted the need to continue the system that was set up to check on and track the immunization status of all staff in their unit, as well as to intensify staff education on the need for maintaining HBV immune status. They did not talk about installing enforcement measures to deal with knowledgeable, but recalcitrant, staff.

The team summed up what it saw as the benefits of their effort as follows:

- Increased staff awareness of the danger of HBV infection in the hospital
- Greater protection against HBV infection for the staff
- Greater protection for patients and families vis-a-vis the staff
- Reduced absence due to infection in staff

- Hospital costs saved by averting hospitalization of staff for HBV
- Costs of averted lawsuits by patients charging they contracted hepatitis in hospital.

They also stated that, while their quality improvement dealt only with the two pulmonology units, the Chief of Hospital is watching their work and has expressed an interest in applying the methodology to increasing compliance with hospital policy on all immunizations hospital-wide.

CASE FIVE: POLICEMEN'S HOSPITAL, KRAKOW

REDUCING OUTPATIENT WAITING TIME FOR ULTRASOUND EXAMINATION

THE QUALITY IMPROVEMENT TEAM:

Dr. Tadeusz Mazurkiewicz, Director of Medicine; Dr. Marek Rosa, Assistant Chief, Ultrasound Unit; Dr. Ewa Glinka, Sr. Assistant, Obstetrics and Gynecology; Henryka Szymanska, Chief of Nursing; Jan Joskiewicz, Chief of Diagnostic Laboratories; Dr. Katarzyna Kotuła, AssistantinInternal Medicine; Dr. Renata Saganowska, Assistant in Pediatrics.

Coach/Facilitator: Kinga Stanach, M.S.W.
National Center for Quality Assessment

Edited by Stewart Blumenfeld, Dr.P.H., CPHQ
Quality Assurance Project
Center for Human Services

Problem Statement:

It is in accordance to hospital policy to give inpatient needs priority over outpatients in order to minimize length of stay of the former. Although the ultrasound unit was able to accommodate inpatient requirements in a timely manner, outpatients were forced to wait approximately two weeks for their examination. Hospital management and the ultrasound clinic staff felt that even though inpatients should still receive priority, it might be possible to reduce the delay for ambulatory patients.

Problem Analysis:

The team started their analysis of the problem by flowcharting the process by which patients referred for ultrasound ultimately receive their examination. The flowchart is shown in Figure 5.1. The team next examined potential causes for delays in service by means of a cause-effect analysis; their fishbone diagram is shown in Figure 5.2. When the fishbone was completed, the consensus of the team was that inefficient use of the equipment was probably the major cause for delay. A review of the clinic's most recent 150 records did indeed show that a startling 48% of all booked outpatient ultrasound time-slots went unused. Prior to this quality improvement undertaking, the team sensed that

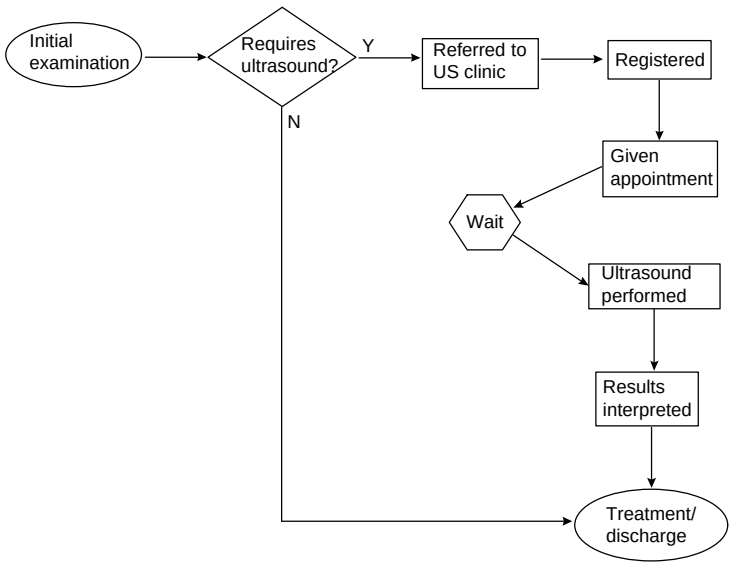

FIGURE 5.1 ULTRASOUND REFERRAL PROCESS

unused time-slots might be a major contributor to the clinic's delay in serving outpatients , but they were unaware of the magnitude of the problem.

Detailed examination of the records showed that an incorrect initial diagnosis ("incorrect" in the sense that an ultrasound examination could not contribute significantly to a correct diagnosis by the referring physician--gastric ulcer, duodenal ulcer, and colitis were the most common diagnoses) accounted for 50% of wasted referrals. Although these referrals were booked into time-slots, they were rejected when the patient registered at the clinic for his her examination.

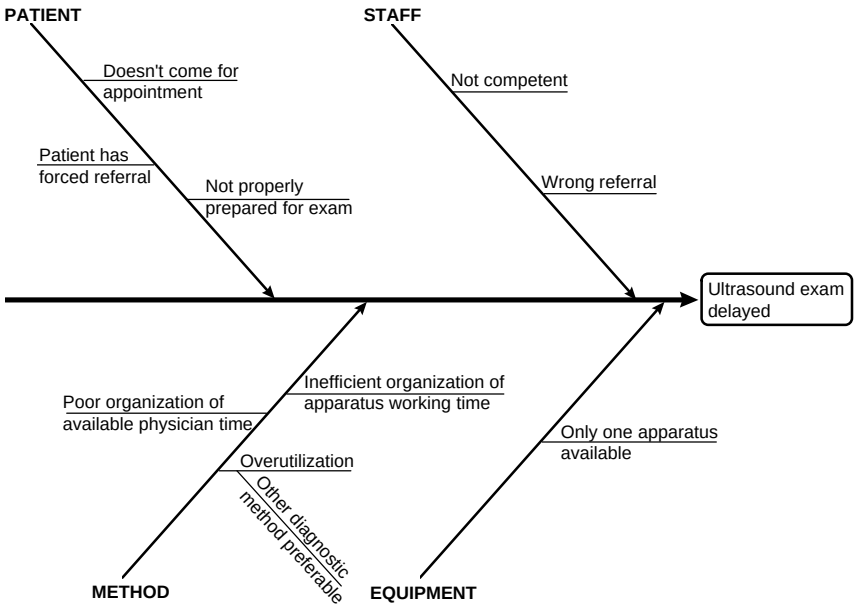

FIGURE 5.2 CAUSES OF DELAYED ULTRASOUND FOR OUTPATIENTS

In addition to unjustified referrals, team was able to identify several other high-frequency causes of booked time-slots not being used. As may be seen in the Pareto chart in Figure 5.3, patients who did not show up for their appointment accounted for another 18% of unused slots, and "forced" referrals, that is, cases in which the physician succumbs to pressure from the patient even though the provider is aware that an ultrasound is probably unnecessary, for yet another 18%. The latter was maintained as a separate category from the larger "incorrect diagnosis" category because the team felt that their solutions should deal with that problem separately from pure lack of knowledge of the applicability of ultrasound as a diagnostic tool.

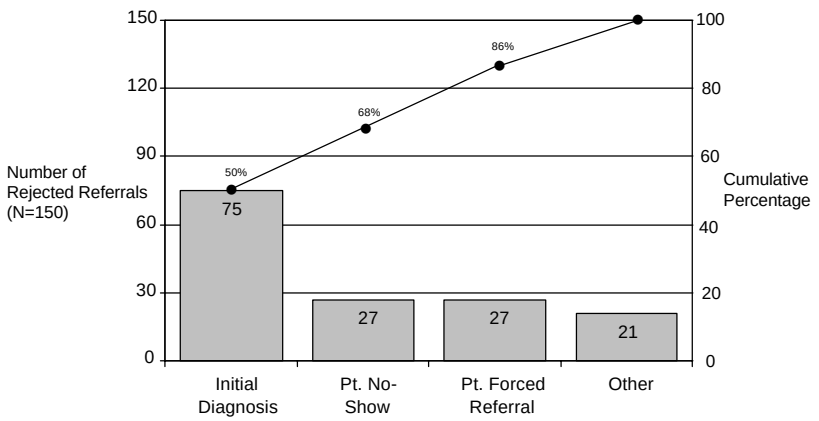

FIGURE 5.3 CAUSES OF WASTED ULTRASOUND EXAMINATION TIME SLOTS

Solution and Results:

The team decided to take an educative approach to solving a significant part of the problem. Up to that time, the ultrasound unit had relied upon the original training and experience of the various providers who referred to the clinic to use the service appropriately. Seeing that that approach allowed for too much variation, they decided to develop and promulgate very specific standards for referral to the ultrasound clinic. They did this and then held a series of meetings with the referring physicians to show the results of the analysis of incorrect referrals, the result of so many incorrect referrals (a protracted wait for service for outpatients), and thus the need for strict adherence to the new guidelines. Their feeling was that this intervention might affect not only the large number of incorrect diagnoses, but also the number of times the primary physician gives in to the demand of a patient that he or she receive an ultrasound when it really is not indicated. They then had six weeks to measure the result of their intervention before preparing their data for presentation.

Over the course of the six weeks, the number of total outpatient referrals for ultrasound procedures decreased by 41% and, tellingly, the percentage of unused slots declined from 48% to 19%. Table 5.1 shows the change in unused slots and major reasons. Examination of 100 patient records showed that the average wait declined from approximately 14 days to seven days.

TABLE 5.1 WASTED ULTRASOUND TIME-SLOTS BEFORE AND AFTER INTERVENTION BY THE QUALITY IMPROVEMENT TEAM

	Percent of All Booked Slots Going Unused	Percent of All Slots Unused Due to Incorrect Diagnosis	Percent of All Slots Unused Due to No-Show Patients	Percent of All Slots Unused Due to "Forced Referral"	Percent of All Slots Unused Due to Other Causes
Before	48%	24%	9%	9%	7%
After	19%	14%	2%	3%	

While the substantial drop in unjustified referrals and the subsequent reduction in waiting period was gratifying to the team, a review of records showed that incorrect initial diagnosis now accounted for 73% of incorrect referrals, or 14% of all referrals. Thus, the team feels that further investigation of the reasons for continuation of these errors would be useful, with possible reasons being lack of clarity of the guidelines, non-acceptance of these standards by some physicians, or culture-related inability of some physicians to resist pressure from some patients. In a significant move to continue reducing the problem of wasted time-slots, the ultrasound clinic is instituting a permanent mechanism to monitor unjustified referrals with the intent of feeding back this information periodically.

CASE SIX: SOLIDARITY FOUNDATION CENTER FOR ONCOLOGICAL DIAGNOSTICS, LEGNICA

REDUCING WAITING TIME AND INCREASING COMFORT FOR MAMMOGRAPHY PATIENTS

THE QUALITY IMPROVEMENT TEAM:

lek. med. Dorota Czudowska, Clinic Director
Czesława Kupec, Administrator;
Jozefa Staniszewska, Midwife and Staff Coordinator; Regina Styczen, X-ray Technician.

Coach/Facilitator: Kinga Stanach, M.S.W.
National Center for Quality Assessment

Edited by Stewart Blumenfeld, Dr.P.H., CPHQ
Quality Assurance Project
Center for Human Services

Problem Statement:

Many patients had to wait several hours after a mammogram was taken before they could be examined and counseled to complete their visit. Moreover, the area where they had to wait was not pleasant and did not facilitate the patient's productive use of this time, such as by receiving educational information regarding early recognition and self-diagnostic techniques. Patients often registered their dissatisfaction with the situation informally, and the clinic staff had to agree with them.

Timetable:

The quality improvement team worked from the following summarized timetable:

Phase I: January 15 - February 2

- Team training in QI techniques, patient flow analysis, cause-effect analysis, identification of required information

Phase II: February 2-23

- Develop patient survey instrument and survey plan

Phase III: February 23 - March 13

- Administer survey

Phase IV: March 13-23

- Analyze survey results, discuss with staff, propose and select interventions

Phase V: March 23-30

- Develop procedures for intervention

Phase VI: March 31 - April 1

- Implement changes

Phase VII: April 2-15

- Post-intervention survey of patients

Phase VIII: April 15-22

- Analysis of data, discussion of results with staff

Phase IX: April 22-25

- Preparation for 4/26 conference in Krakow (presentation and storyboard)

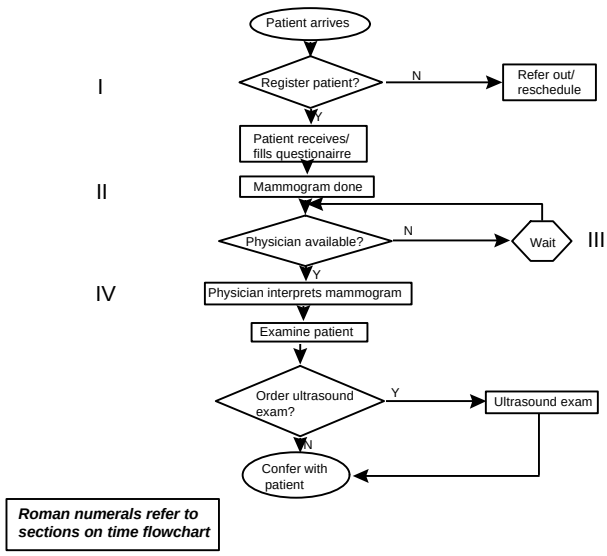

FIGURE 6.1 DETAILED PROCESS

Problem Analysis:

To begin the analytic process, the team did two flowcharts. The first flowchart traced the path of patients between their arrival and when they are seen for consultation following their mammogram. In order to understand the minimum time a patient might take in this process, a second flowchart was done of the same process, this time showing only its major steps, but adding the minimum time each step would take under ideal conditions, that is, as if no other patients were being served and a patient could travel through the system without any delay between steps. These two flowcharts are shown in Figures 6.1 and 6.2. Cursory examination of the two flowcharts led the team to believe that the system could be improved sufficiently so that most patients should not have to wait more than two hours for a doctor to see them after their mammogram had been taken.

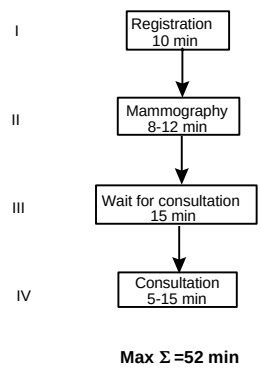

FIGURE 6.2 TIMED FLOWCHART

Before making any changes in the system, however, the team sought to achieve a clearer understanding of the problems that might be leading to delays through the use of a cause-effect diagram. The cause-effect diagram is shown in Figure 6.3.

In order to get quantitative data on the interval between mammography and meeting with the physician, the team developed a questionnaire which was administered to 200 patients coming to

the clinic for mammography. The questionnaire is shown on page 38. As may be seen, the team also felt that since some waiting is almost inevitable this time could be converted to a productive use, providing patients with educational information concerning breast cancer diagnosis, treatment, and prevention. As noted in the problem statement, the team also was concerned with the patients' perception of the comfort of the waiting area.

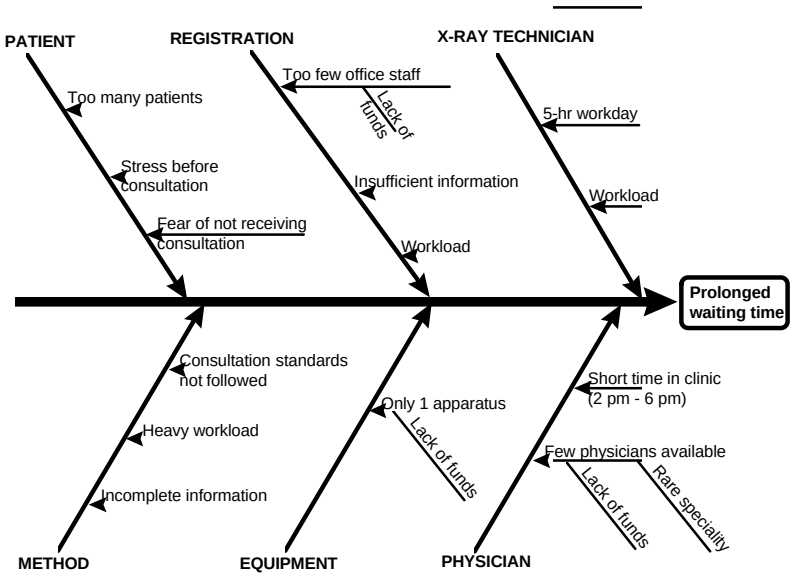

FIGURE 6.3 POTENTIAL CAUSES OF PRONGED WAITING FOR CONSULTATION

One hundred thirteen questionnaires were returned to the Centre. Waiting times are shown in the following table:

TABLE 6.1 WAITING TIMES PRIOR TO INTERVENTION (113)

Wait	Percentage	Cumulative Percentage
<1 hr	29	29
1-2 hrs	35	64
2-3 hrs	18	82
3-4 hrs	12	94
>4 hrs	6	100

Thus, the team discovered that 18% of patients had to wait at least three hours between their mammogram and their consultation with the gynecologist. Ninety-four percent of respondents said that they had been told that there would be a delay before the physician could examine them and talk with them. Eighty-one percent said that they had remained in the waiting room for that period, 9% said that they had waited at home, and another 5% said they had gone shopping.

Solutions and Results:

The team decided that, for the time being, a wait for service by a gynecologist of up to three hours was acceptable, but that few or none of their patients should have to wait longer than that. Studying the results of the cause-effect analysis, the team felt that the prolonged waiting time could reasonably be attributed to the following causes:

1. There is a single mammography machine to service a heavy demand for service;

2. There are relatively few gynecologists available to the clinic;

3. The mammography technicians tended to be available toward the morning hours, while the doctors were more available in the afternoon, so more mammograms were done in the morning and more consultations were done in the afternoon;

4. Clinic patients in Poland have a mind-set that causes them to arrive quite early for their appointments (apparently under the misapprehension that they are more likely to be served that day if they enter the queue early).

Following some brainstorming, the quality improvement team decided to take the following steps:

1. Reorganize the flow of work in the x-ray room by staggering working hours of the two technicians to make only one available early and one late in the day, with the two of them alternating rest and work during the middle part of the day (there being only one x-ray in the clinic);

2. Strengthen the appointment system by giving the patient a slip showing the time of her appointment, both for the mammogram and with the doctor;

3. Train the registration office staff to inform patients that there might be some waiting time to see the doctor and encourage them to come for the mammogram right at the appointed time;

4. Improve waiting room conditions by providing newspapers, magazines, and educational materials;

5. In 1997, move to a more convenient location and begin providing in the waiting room a taped presentation on self-examination and other preventive measures.

Except for item 5, these changes were effected in the first two weeks of April. During this period, 41 patients responded to the same survey as before.

As may be seen in Table 6.2, below, the appointment system and the work schedule reorganization were successful in helping to meet the target outcome: the percentage of patients who had to wait more than three hours for their consultation with a physician did indeed drop considerably, from 18% down to 7%. At the same, however, the percentage of patients waiting two hours or less *dropped* from 64% to 57%, and the percentage who passed through the system in the near-ideal time of less than an hour *dropped* from 29% to 13%.

TABLE 6.2 PRE-/POST-INTERVENTION DELAY BETWEEN MAMMOGRAPHY AND CONSULTATION WITH PHYSICIAN

Waiting Time	Percentage Before Intervention N=113	Cumulative	Percentage After Intervention N=41	Cumulative
<1 hr	29	29	13	13
1-2 hrs	35	64	44	57
2-3 hrs	18	82	36	93
3-4 hrs	12	94	2	95
>4 hrs	6	100	5	100

The quality improvement team learned a couple of valuable lessons from this result. First, that not all interventions produce unequivocal "improvements"; and second, that it is essential to check on the outcome of an intervention and not to assume that the problem analysis yields such perfect understanding of a problem that a correct solution is inescapable. Nevertheless, overall, for a first pass at the problem, the team was reasonably satisfied to reduce the especially-long wait time for many patients. Their confidence in their decision criterion (reduce the frequency of the 3-hour-plus wait) was bolstered by a drastic reduction of complaints in the patient complaint/suggestion box concerning waiting time following the change in the system. Still, the team realizes it has some distance to go because, among respondents to the questionnaire, the percentage of patients who said their wait for the physician was fairly short or about right increased only a little after the changes, from 45% to 51%. Because the mammography takes longer than the consultation, the team feels it is essential to have a reservoir of patients waiting for the doctor when she comes. At present, since the doctors work only in the afternoon, patients who come in the morning inevitably are going to have a wait reaching upwards of three hours. It is possible that, with more experience in tracking waiting time by time of arrival, the team could refine the appointment scheme further to reduce the percentage of patients who wait more than two hours. Two-thirds of the patients liked the appointment scheme, or at least the idea of one.

Concerning conditions in the waiting area, although the staff were not satisfied, the patients who responded to the survey before any changes were made apparently did not have too many complaints: none said that conditions were less than satisfactory, 25% said the conditions were satisfactory and the balance, 75%, said they were good or very good. The addition of newspapers and magazines and other materials moved those numbers up only to 21% and 79%, respectively.

PATIENT INFORMATION QUESTIONNAIRE

This anonymous questionnaire is designed to evaluate comfort of waiting for interpretation of mammogram with the intent of making improvements. Please tick your choices and in the open question do not share hesitate to share with us your opinions and suggestions.

1. Since your mammogram was taken, how long did you wait for your physician examination and consultation? Less than 1 hr 1-2 hrs 2-3 hrs 3-4 hrs Over 4 hrs

2. Did anyone inform you about the necessity of waiting for consultation after your mammogram?

   Yes No

3. If yes, was information provided Orally In writing Both

4. Do you consider the time of waiting

   Very long Fairly long About right Short Very short

5. Where did you spend your waiting time?

   In the waiting area Home Shopping At work Other

6. If you decided to spend your waiting time at the Centre, was that due to

   Fear of losing your turn It's a pleasant atmosphere Long distance from home
   Bad weather Other

7. How would you rate the waiting conditions at the Centre?

   Very good Good Satisfactory Poor Very poor

8. What changes do you suggest to make waiting more pleasant both for you and for other patients?

   _____
   _____
   _____

Personal Data

Year of birth: 19____

Education: Elementary Technical Secondary University

Residence: Legnica Less than 50 km from Legnica More than 50 km from Legnica

How long did it take to come from your home to the Centre: ____hrs ____min

THANK YOU FOR FILLING THIS QUESTIONAIRRE

CASE SEVEN: ST. LUKE'S HOSPITAL, KONSKIE

REDUCING THE PERIOD OF STAY IN THE ADMISSIONS ROOM PENDING ADMISSION OR DISCHARGE

THE QUALITY IMPROVEMENT TEAM:

lek. med. Wojciech Przybylski, Hospital Director dr. n. med. Jozef Gaweda, Chief of Rheumatology; lek. med. Rached Hadj Ali, Radiology Department mgr. Maria Łukomska, Administrator; mgr. Sabina Misztal, Chief Nurse, mgr. Roman Jaskolski, Director, Diagnostics Laboratory, piel. Anna Łos, Nurse, Dialysis and Nephrology Unit; piel. Ewa Niewegłoska, Nurse-Coordinator, Outpatient Clinics

Coach/Facilitator: lek. med. Anetta Pawlus National Center for Quality Assessment

Edited by Stewart Blumenfeld, Dr.P.H., CPHQ Quality Assurance Project Center for Human Services

---

Problem Statement:

Although no measurements had been taken, both patients and staff believed that the decision to treat on an inpatient or outpatient basis was taking considerably longer than it should.

Problem Analysis:

The first step in the analysis was to characterize the process through which patients were channeled before a treatment decision is made. The flowchart representing this process is shown in Figure 7.1. Since the total period of delay is composed of a multiplicity of smaller delays, once the flowchart was completed, the team tried to determine where in the system the largest units of lost time were most likely to occur. They settled on five areas that, in their judgment, seemed the most troublesome. These are:

- Waiting for an initial examination by the physician on duty
- Waiting for the results of ordered x-ray or lab work

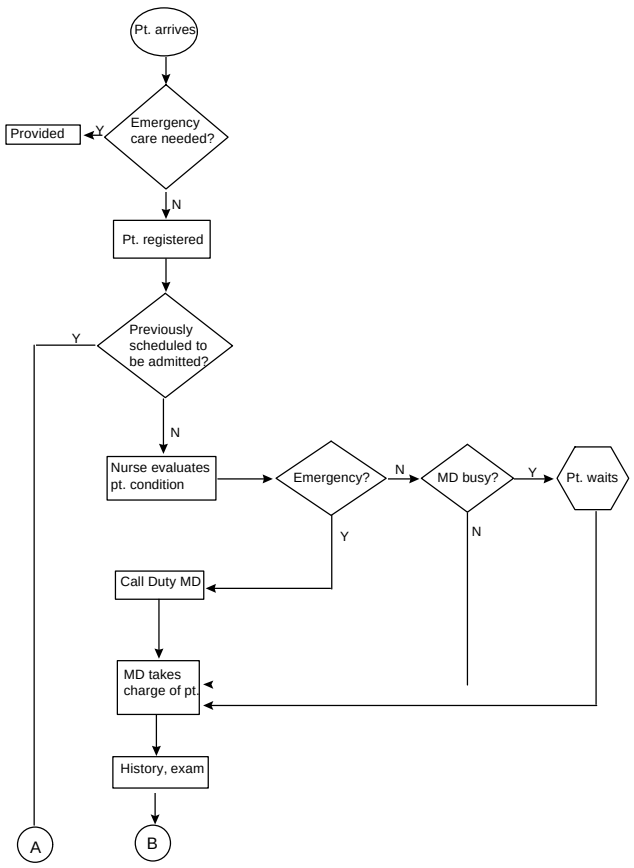

FIGURE 7.1 PATIENT FLOW THROUGH ADMISSIONS UNIT

- Waiting to see a specialist requested by the duty physician
- Waiting for some procedure (such as an EKG, casting, or suturing) to be carried out
- Observational period following some procedure such as suturing, i.m. injection, or i.v. infusion

Ninety patients were tracked over a period of three weeks and the delay each incurred at each of these points was measured. Table 7.1 shows the average waiting time and other data for all 90 of the cases, as well as for each of the five measured nodes in the process for the set of cases where that wait took place. Thus, the interpretation of "N" in the table is that, in all 90 cases the patient had to wait for the MD on duty to examine him, that in 63 cases there was a wait for lab test or x-ray results to come back to the clinic, that in 82 cases there was a wait for a specialist (in 9 cases, there was an additional wait while a second specialist was sent for), in 38 cases there was a wait for a specialist, and that 21 cases were held for a period of observation before a decision was made to release or admit[5].

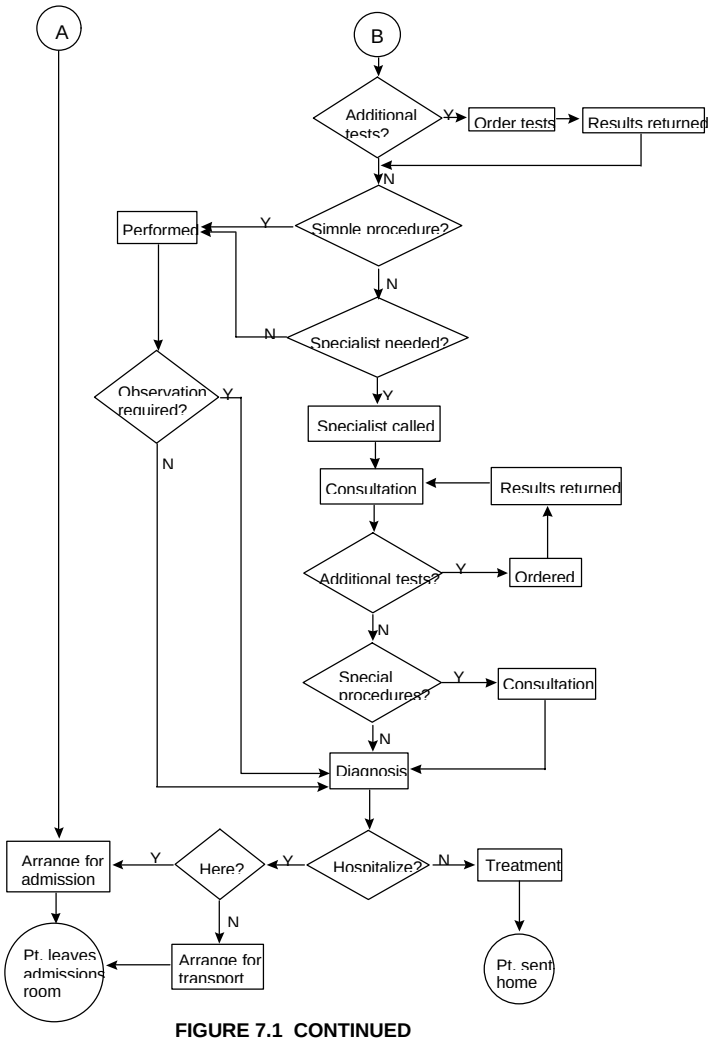

FIGURE 7.1 CONTINUED

[5] With the permission of the QI Team, data have been slightly reorganized and reanalyzed by Dr. Blumenfeld for clearer presentation and interpretation.

TABLE 7.1 DELAYS (IN MINUTES) INCURRED AT FIVE POINTS BETWEEN PATIENT ARRIVAL AND COMPLETION OF SERVICES

	All Cases	Wait for Duty MD	Wait for Tests/X-ray	Wait for Specialist	Wait for Procedure	Wait During Observation
N=	90	90	63	82	38	21
Ave=	85	6	37	14	22	87
S.D.=	52	4	17	16	31	56
Min=	20	3	15	3	3	25
Max=	275	25	85	100	120	255

After collecting the data on waiting time incurred, the next step was to compare the impact of each of these delays to see where intervention might gain the most leverage. One way to measure impact is simply to check the proportion of cases in which each factor is the largest cause of delay. In 7 cases, the wait for the duty physician was longer than any other factor or tied with one other factor. In 47 cases, the wait for test or x-ray results was the predominant factor (or tied with another). In 20 cases, waiting for a specialist took longer than anything else (or again tied). In 4 cases, the longest delay was incurred waiting for some procedure to be performed. And in 20 cases, an observation period was the longest delay. (Table 7.2 presents data related to relative impact.)

TABLE 7.2 RELATIVE IMPACT OF EACH FACTOR ON OVERALL DURATION OF PERIOD PRIOR TO DECISION

	Wait for Duty MD	Wait for Tests/X-ray	Wait for Specialist	Wait for Procedure	Wait During Observation
No. (%) Cases Factor Involved	90 (100%)	63 (70%)	82 (91%)	38 (42%)	21 (23%)
No. (%) Cases Factor is Longest Delay*	7/90 (8%)	47/63 (75%)	20/82 (24%)	4/38 (11%)	20/21 95%
Ave. Duration (min.) of Case Where Factor is Longest Delay	44	78	63	111	137
Ave. Percentage of Total Time Taken by Factor Where Factor is Longest	26%	48%	40%	35%	64%
Percentage of All Patient-Time (7671 min.) Taken by Factor	7%	30%	15%	11%	24%
*Total >90 because there were seven cases with a tie between two factors.					

As may be seen in Table 7.2, waiting for the doctor on duty occurs in all 90 cases. The team judged it not to be an important source of overall delay, however, because it was the longest factor in only 7 cases and those 7 cases had the shortest average total duration. By contrast, observation occurred in only 21 cases, but in 20 of them it was the longest factor. Moreover, the 21 cases involving observation had by far the longest average duration, 137 minutes. Also, in those cases the period of observation took up nearly two-thirds of the time those patients spent in the clinic. And the wait by patients in those 21 cases took up 24% of all patient-minutes at the clinic.

In terms of sheer numbers of cases, waiting for a specialist to come to the clinic and see the patient happened more often than any other factor. Twenty-four percent of the time was it the longest delay factor in the case. It did not account, however, for an exceptionally large block of overall patient time, either in the set of cases in which it was any factor or in the context of all patient waiting time.

Waiting for the results of tests and x-rays was the longest factor in 75% of the cases in which it played any role. Perhaps most significantly in terms of impact, waiting for these results contributed 30% to the total time patients spent in the clinic.

Solutions and Results:

The team constructed the cause-effect diagram (Figure 7.2) to help develop reasons for the delays that are incurred by patients as they await a decision to admit them or treat and discharge them. This, however, was far as they were able to go before they had to come to the conference. Thus, by the time of the conference time they had not definitely selected a specific target for intervention nor, of course, the intervention itself, although they had several tentative ideas based on the delay analysis and the cause-effect diagram.

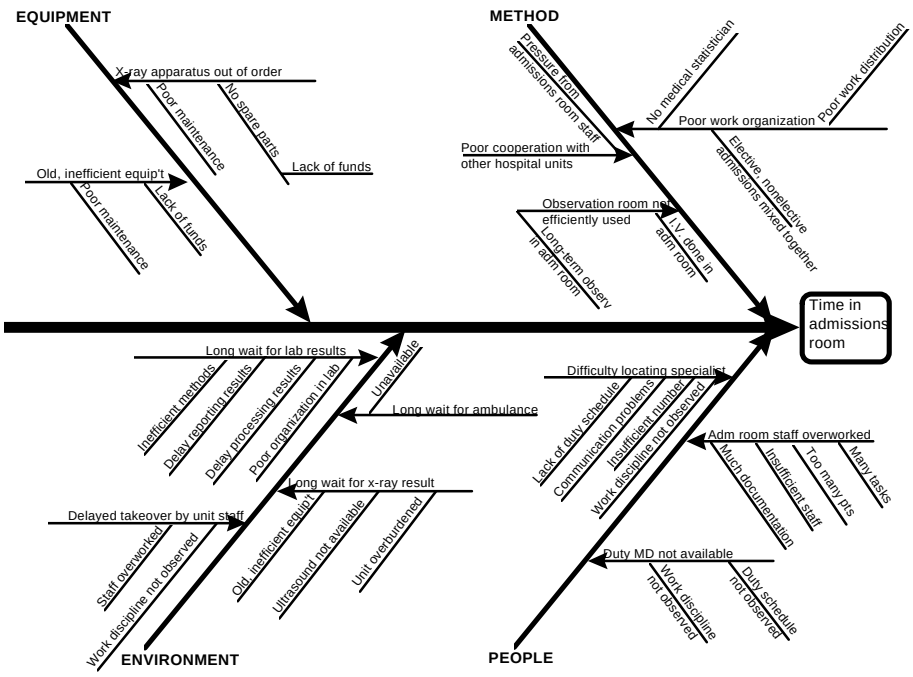

FIGURE 7.2 CAUSES OF DELAY IN ADMISSIONS UNIT

The immediate changes they contemplate (pending further consideration of the data) are:

- Obliging lab and x-ray personnel to report their results more quickly (although this requires analysis of the lab's process to make sure that delayed reporting is in fact the main cause of the overall delay in reporting results)
- Assuring that the duty physicians remain in the admissions area at all times.

The longer-term changes they propose are:

- Introduce a pager-call system for all medical staff, including specialists
- Repair of x-ray equipment in the area nearest the admissions area
- Introducing changes in the diagnostic labs to shorten the time taken to perform their work.

[The implications of these tentative solutions is that the team already has tacitly targeted waiting for lab results and for medical staff as their main improvements. There does, in fact, seem little the team could do to shorten the medical outcome-based procedure of observing the patient following some procedure. Targeting the wait for lab and x-ray results on the basis of the high percentage of total patient-time may be a perfectly valid criterion for a decision; the only

comment we would make is that the decision criterion should be made explicit and should be arrived at on the basis of some team value judgment such as nominal group or multiple criteria analysis. However, before a particular solution is selected and implemented, there needs to be some analysis of lab procedures (from ordering to implementing to reporting) to find out where in the process important amounts of time are lost. The same procedure should be followed for identifying inefficiencies in the specialist delay problem. ---SNB]

CASE EIGHT: PROVINCIAL HOSPITAL, SIERADZ

INCREASING THE NUMBER OF DAILY ECHOCARDIOGRAMS PERFORMED BY THE CARDIOLOGY DIAGNOSTIC UNIT

THE QUALITY IMPROVEMENT TEAM:

Dr. n. med. Marek Demczuk, Chief of Cardiology; Mgr. Janina Filipek, Chief of Nursing; Małgorzata Jackowska, Sr. Medical Statistician; Lek. Med. Jarosław Zuberek; Lek. Med. Anna Kanicka Lek. Med. Piotr Ruszkowska; Elzbieta Bobrowska.

Coach/ Facilitator: Sabina Łyson, M.Soc.
National Center for Quality Assessment

Edited by Stewart Blumenfeld, Dr.P.H., CPHQ
Quality Assurance Project
Center for Human Service

Problem Statement:

The average number of echocardiograms turned out by the Unit in the last few months was slightly over twelve per day, including both inpatients and outpatients. Taking into account the previous six months or so reduced that average nearer to ten per day. Benchmarking against the performance of other units with similar equipment and similar staffing patterns, the staff found that an international norm of approximately fourteen examinations per day existed. The staff felt that it could improve its performance to a level nearer this international norm and that, once it did so, the wait for service would be shortened.

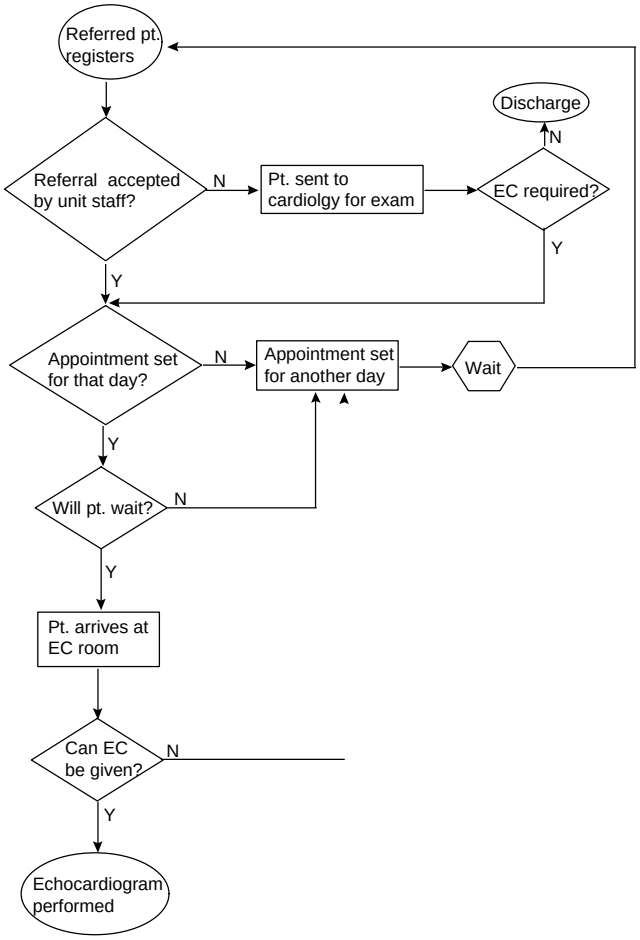

FIGURE 8.1 ECHOCARDIOGRAM EXAMINATION PROCESS

Problem Analysis:

To get a reliable idea of where reductions in the efficiency of the Unit's processing of patients might be occurring, the team first did a flowchart (Figure 8.1) to help visualize all the steps in the process. This was followed by a cause-effect diagram to help develop ideas about the causes of sub-par output levels (Figure 8.2). Based on the cause-effect analysis, the team selected six probable significant impediments to obtaining full use of the Unit's resources:

- An inefficient system for posting physicians to the Unit (no backup if an assigned physician does not show up)
- The Echocardiography Unit is divided into two separate units (A and B) and they do not coordinate very well with one another

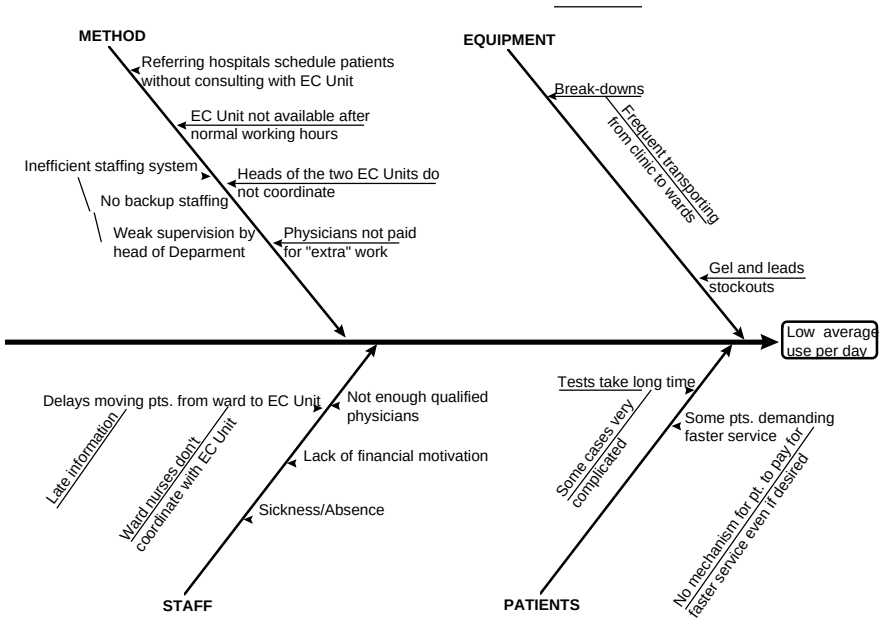

FIGURE 8.2 POSSIBLE CAUSES OF INEFFICIENT USE OF ULTRASOUND EQUIPMENT

- Referring hospitals refer a patient to a specific Unit (A or B) without knowledge of that Unit's existing case load
- Some patients do not show up for their appointment, while others come unscheduled and try to insist on being served
- There are too few physicians trained to do echocardiography
- There is no financial incentive for EC Unit physicians to work faster even though there may be a backlog of available patients waiting

Solutions and Results:

In a brainstorming session, the team listed a number of possible solutions and decided to do a comparative evaluation by means of a multiple criteria matrix. A consensus was obtained on four evaluative criteria:

- Minimal additional cost to the existing system
- How fast an improvement effect could reasonably be anticipated
- Probable impact on patient satisfaction
- Ease of introduction of the particular change

Once the evaluative criteria had been settled, the team was able to reach consensus on the weight to be given each criterion. The final step was to discuss the impact (effect), in terms of each criterion, that each strategy would have on the goal of increasing the number of echocardiograms performed. The final matrix is shown on the following page.

Based on this analysis, the team developed several concrete steps to be taken:

- That EC Units actually book appointments every day sufficient to fill their roster
- That a list of inpatients be maintained and used for replacement purposes if a time-slot becomes available
- That a common protocol for accepting patients be developed to make it easier to switch patients between the A and B units
- That a physician assigned on a particular day who finds that he or she can not make it to the clinic take more responsibility for finding a replacement
- That on Friday, a day normally reserved for chemical stress tests, echocardiograms be given if there is down-time

TABLE 8.1 MULTIPLE CRITERIA ANALYSIS: SELECTING STRATEGIES TO NUMBER OF ECHOCARDIOGRAMS

CRITERIA ➡ STRATEGIES ⬇	MINIMIZE COST WEIGHT=4	RAPID IMPROVEMENT WEIGHT=5	PATIENT SATISFACTION WEIGHT=3	EASY INTRODUCTION WEIGHT=2	SCORE
Register more patients	Effect=5 5 x 4 = 20	Effect=5 5 x 5 = 25	Effect=5 5 x 3 = 15	Effect=5 5 x 2 = 10	70
Organize replacements for absent physicians	Effect=3 3 x 4 = 12	Effect=3 3 x 5 = 15	Effect=4 4 x 3 = 12	Effect=3 3 x 2 = 6	45
Establish same examination protocol for both EC Units	Effect=5 5 x 4 = 20	Effect=1 1 x 5 = 5	Effect=1 1 x 3 = 3	Effect=2 2 x 2 = 4	32
Obtain immediate referral from wards when slot opens	Effect=5 5 x 4 = 20	Effect=5 5 x 5 = 25	Effect=2 2 x 3 = 6	Effect=4 4 x 2 = 8	59
Pay physicians for working after normal duty hours	Effect=1 1 x 4 = 4	Effect=2 2 x 5 = 10	Effect=1 1 x 3 = 3	Effect=2 2 x 2 = 4	21

The new measures were not started until mid-March, so their results were not fully evident over the few weeks before the Conference, although preliminary data showed an apparent improvement in the number of average daily echocardiograms performed. The team, however, was able to provide the National Center with additional data through early July. The chart below shows that the average daily performance now met the international standard of about fourteen procedures per day.

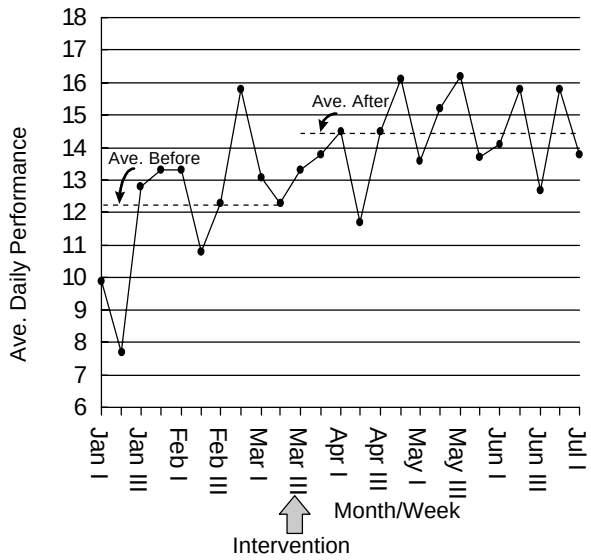

FIGURE 8.3 AVERAGE NUMBER OF ECHOCARDIOGRAMS PERFORMED DAILY BEFORE AND AFTER INTERVENTION