General Concepts
How can I design a hospital-wide DVT clinical practice improvement project?

1. Document the need for a clinical practice improvement program related to DVT prophylaxis
The key factor in the success of any clinical practice improvement program is the buy-in of staff affected by the program. A clear sense of mission and goals is essential. If clinicians do not see a real problem to be solved, an organized process and plan to reach a solution, and a high level of respect for their time and expertise, they may leave after the first team meeting and ignore your recommendations.

To begin, communicate the importance of the problem of DVT. Faced with doubts that DVT prophylaxis is a problem at your hospital, you may be tempted to start without some physicians and hospital administrators. We advise against this. Instead, you might conduct a retrospective medical record review to document problems with prophylaxis use in your hospital, then share that credible local data with key opinion leaders. This process usually stimulates interest and motivates clinicians to enact practice changes. You might also suggest that an outside expert on DVT prophylaxis present medical or surgical rounds as a focal point for starting this project. Unfortunately, the death of a patient from pulmonary embolism is often the event that calls attention to the importance of DVT prophylaxis.

2. Establish a clinical practice improvement team.
A multidisciplinary team approach is essential to fostering clinical practice improvement. There is no formal rule about whom to include on the team. Experience suggests that over-inclusion is better than not including a key individual. A good rule of thumb is that representatives of all staff who may be affected by changes in the processes of care should be invited to join the team. To ensure commitment to the team, roles and expectations should be explicitly stated at the first team meeting. It is also a good idea to have this information in writing and made available to all participants. An example of a team roster is provided in Figure 4.1. A blank copy of this form is provided in Chapter-5 (Figure 5.1).

Another useful guideline is to limit the number of team meetings. Keep meetings focused and brief. After an initial planning meeting, you should be able to divide tasks among small working groups (sometimes a group of one) who will accept responsibility for them. For example, medical record review might be done by nurses, while pharmacists review their databases for drug utilization. Set deadlines for each working group. Don’t expect physicians to attend weekly progress meetings. Look for opportunities to keep the process efficient. For example, use e-mail, memos, or letter surveys to share information and ask specific questions. If you decide that you need a particular physician at a team meeting, ask that person to present something. For example, ask an orthopaedic surgeon to comment on his/her experience with DVT prophylaxis, including concerns with bleeding complications, or to present a literature review on the risk of PE following hip fracture.
3. Set specific goals

Set goals through specific statements. Vague and broad statements such as “the goal of the clinical practice improvement program is to improve DVT prophylaxis in surgical and medical patients” should be avoided since these are non-specific and difficult, if not impossible, to measure. Some examples of more specific statements are provided in Table 4.2. A blank worksheet for listing your goals is provided in Chapter-5 (Figure 5.2).

![Table 4.1 Clinical Practice Improvement Team Roster](image)

**Table 4.1 Clinical Practice Improvement Team Roster**

<table>
<thead>
<tr>
<th>Names and titles of team members</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. M. Katz, MD</td>
<td>Surgery Representative</td>
</tr>
<tr>
<td>2. R. Bunting, MD</td>
<td>Medicine Representative</td>
</tr>
<tr>
<td>3. B. Humphries, PharmD</td>
<td>Pharmacy Representative</td>
</tr>
<tr>
<td>4. C. Jones, BSN</td>
<td>QA/Nursing Representative</td>
</tr>
<tr>
<td>5. D. O’Brien, MBA</td>
<td>Hospital Administration</td>
</tr>
</tbody>
</table>

**Table 4.2 Example of Project Goals Worksheet**

**Program Goals**

- List the primary goals of the clinical practice improvement program. Be specific.

1. Increase the use of DVT prophylaxis to 85 percent of ICU patients in the next month.

2. Achieve therapeutic aPTT in less than 12 hours in 80 percent of patients in the next 6 months.

3. Develop a DVT risk assessment form to be completed on all elective surgical patients upon admission to the hospital within the next 6 months.

4. Reduce the incidence of major and minor bleeding complications from heparin therapy by 50 percent within the next year.

The Nominal Group Process technique provides an effective method to identify goals and, at the same time, builds ownership of this project among team members.
Nominal Group Process

STAGES

• **Silent generation of ideas**
  Quiet note taking for five minutes
  Ask team members to list the most important...
  (e.g., the most important things that could be done to increase the use of IPC in gynecologic surgery by 50%)
  Post-it® notes can be very helpful

• **Round-robin listing of ideas (20 minutes)**
  Start with one person
  Get one idea from each person
  Post on the flip chart
  Go to next person and do the same
  Continue around the table until all ideas are posted on the chart
  Don’t duplicate ideas
  No criticism of any ideas at this stage

• **Discussion (30 minutes)**
  Don’t cluster into groups
  Simply get clarification about an idea
  Argue in favor or against an idea

• **Vote (15 minutes)**
  Count the total number of items and divide by 5. Call that N.
  Each person individually selects the N best ideas on the chart.
  Individuals reverse rank order the items (e.g., if N= 7, then 7 is the most important item, 6 the next most important)
  Individuals post their scores on same score sheet on flip chart
  Add up the total votes

• **Re-Vote (optional, 20 minutes)**
  After the vote, it might be helpful to talk about conclusions
  Go through the voting again
  This helps people be more thoughtful about voting

4. **Perform a literature review**
A selected bibliography of recent papers on prevention of DVT is provided in Chapter 8. In addition, a comprehensive review of the literature is available in the 4th ACCP Consensus Conference on Antithrombotic Therapy (see reprint in Chapter-2). To help you to perform your own literature search, the National Library of Medicine has established an Internet literature resource at the web address [www3.ncbi.nlm.nih.gov/pubmed/](http://www3.ncbi.nlm.nih.gov/pubmed/). This free service is up-to-date, powerful and easy to use.
5. Develop local practice guidelines for DVT prophylaxis
Although some indications for DVT prophylaxis are essentially standards of care, several areas exist for which scientific evidence is inadequate to guide practice. For several patient groups, no definitive data identify who should receive what prophylaxis and for how long. In such cases, it is recommended that each institution
1. review the literature
2. develop a local consensus on appropriate clinical management
3. monitor the effect of any practice change to ensure it has a positive effect
4. evaluate and modify protocols as needed

6. Develop quality measures to assess prophylactic practices - data collection and analytic strategies
Before embarking on a data collection journey, develop a specific plan that follows the who, what, when, where approach. The data collection and analysis team can be a subgroup of the CPI team. The key question is why are we collecting these data? It may be helpful to ask the team to reconsider the points in the sidebar at several points during the data collection process to ensure that you are on track. At the end of the process the team will have generated an explicit set of data elements to collect, and the group will have a clear understanding of how each data element will be used to evaluate prophylactic practices. A blank worksheet based on Table 4.3 is provided in Chapter-5 (Figure 5.3).

Table 4.3  Quality Measures to Describe Prophylactic Practices: Selecting Data Elements - Sample Worksheet

<table>
<thead>
<tr>
<th>Data Element</th>
<th>Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Risk factors for DVT</td>
<td>Patient’s history</td>
</tr>
<tr>
<td>2. Type of surgery</td>
<td>Operative reports, billing records</td>
</tr>
<tr>
<td>3. Use of prophylaxis</td>
<td>Pharmacy database, medication sheets</td>
</tr>
<tr>
<td>4. Bleeding complications</td>
<td>Incident reports, progress notes</td>
</tr>
<tr>
<td>5. Duration of prophylaxis</td>
<td>Medication sheets</td>
</tr>
<tr>
<td>6. Contraindications to prophylaxis</td>
<td>Patient’s history, progress notes</td>
</tr>
</tbody>
</table>
Quality Measure Development
How does one translate what is known about prophylaxis from the scientific literature to clinical practice? In other words, how can we determine how we are doing, where we excel and where we need to improve? Given the scientific evidence that suggests clinicians overestimate the proportion of their patients who receive prophylaxis, getting objective information is important.

Indicator Development - Description
Ideally, quality indicators should be based on the strongest available scientific evidence. For example, in the MassPRO Study, specific guidelines were adopted from the 1995 American College of Chest Physicians Consensus Panel recommendations, which were derived from a structured review of the scientific literature. Quality indicators should be agreed upon by a consensus of your steering committee.

The check list in Table 4.4 may be helpful in developing your list of quality indicators. Evaluate your indicators against each of these criteria. Indicators must be able to drive decision making and behavior and should be developed with involvement of those doing the work.

Table 4.4 Characteristics of Good Measurements

- Relevant
- Valid
- Timely
- Specific
- Practical
- Understandable

Example
Specify Quality Indicators - percentage of patients undergoing total knee replacement who receive intermittent pneumatic compression or low-molecular-weight heparin prophylaxis.
Other questions to consider in selecting measurements that lead to clinical practice improvement are

- How do we know that this aspect of the care process leads to significant improvement in outcomes? What does the literature say? What do our staff think? What is our experience?

- Who cares about this aspect of healthcare? What financial, political, or emotional power do they have? What is the likelihood of our tapping that power in a useful way?

- Are there specific, internal organizational champions for this project? What credibility do they have?

- Who needs to be involved to bring about these improvements? Do they believe that the issues are important? What is the likelihood that we can involve them in a constructive way? Can we redefine the objective and goals to get more constructive participation?

Posing these questions to your team should lead to an open discussion that will help you to understand and anticipate barriers and to develop plans to minimize or avoid problems.

Thinking About Data Collection

The typical process that a clinical practice improvement team goes through begins with the thought: “We need some data.” The recognition of the information need is triggered, followed by a discussion of details of medical record or billing form review and the design of data sheets, log books, or survey forms.

A better thought process is to begin with the statement: “We need to generate information.” This approach will lead to a new thinking path and to a series of different questions:

- “Well, since information is the answer to a question, what is the question we are trying to answer?” (The beginning of the new thinking path.)

- “What data would I need to answer that question?”

- “If I had that data, how would I analyze it and communicate the answer to others; that is, what graphical and analytical tools would I use?” (This might lead to further insights about specific pieces of data to gather.)

- “Now that I know what specific pieces of data I want, what source (for example, log book, data sheet, survey) could I use to get that data?” (Now we are back to the original thinking path.)

Data and Information are Different

- Data = Facts
- Information = Answers to questions
- “Information” includes “data”
- “Data” do not necessarily include “information”
Summary
Learning to ask the right questions is a key skill in data collection. Accurate, precise data, collected through an elaborately designed statistical sampling plan, is useless if it does not clearly address a question that someone cares about.

Exercise - Which of these questions will result in the most successful data collection?
1. Are our surgical patients getting appropriate prophylaxis?
2. When a patient scheduled for TKA is called to the OR, in what percentage of cases are IPC boots available and ready to be put on the patient before the procedure?

Designing Effective Data Collection Forms
The design of data collection forms should be guided by these considerations

- Recording must be easy (design the form with the collector’s needs in mind).
- Errors must be minimized (provide clear, unambiguous directions).
- Allowance must be made to capture additional information. Think carefully about what you may need for future analysis, reference, and traceability.

Explicit data abstraction instructions should also be developed to increase the reliability of data abstraction. A model chart abstraction instrument and instruction set are provided in Chapter-5. Abstractors should meet regularly with team leaders to review progress and answer questions related to data abstraction.

7. Define the available sources of data
Data may be available from a variety of sources. Explore the possible sources of data before starting collection.

Useful information may come from several sources: administrative databases (LOS, readmissions, diagnostic and procedural codes), pharmacy databases, state or national databases, medical records, and patient surveys. You will need to develop custom data collection tools for information not otherwise available.

8. Select a sample of cases for review
How many charts will we need to review? This is one of those questions that returns with every project. The art in the decision process is to find a compromise between collecting clinically relevant and valid data, and the time and resources available. Defining a sample size should follow scientific (statistical) rules, with the understanding that the final number is likely to reflect the resources available.

For example a preliminary study might involve obtaining an estimate of the rate of use of DVT prophylaxis in patients who had major surgical procedures during
the past 12 months. The data collection form in this manual (page 5.7) could be used by nurse abstractors to review medical records to ascertain this rate. But how many records should you review?

First of all, it may seem obvious, but you can only review as many cases as you have. So, if hip or knee replacement is not done in your hospital, or only done infrequently, you will be limited by the number of records available and you may end up reviewing 100 percent of available data. On the other hand, if several hundred hip replacements are performed each year, you probably will not need to review all of your records to assess your performance in DVT prevention.

If the goal is to estimate the rate of prophylaxis use from a sample of medical records, when a large number of records are available for the patient population of interest, then you must consider the trade-off between the resources required to review these records and the precision of your estimate of rates. Reviewing more records gives you a better (more precise) estimate of the true rate. It may also give you a headache and cost time and money.

As a rule, most hospital DVT study groups can be satisfied with a sample of 30 records for each type of at risk population (e.g. THA, TKA, hysterectomy). A precision of ± 10 percent to 20 percent should be enough to let you know if you have a major quality problem with prophylaxis use. You probably don’t care whether your true rate is 40 percent or 60 percent, because in either case you know you have a problem.

### Table 4.5 Sample Size Estimation for Simple Proportions at 95% Confidence

<table>
<thead>
<tr>
<th>Expected Percentage of Prophylaxis Use</th>
<th>Total Number of Patients in Population Under Study</th>
<th>±5 Percent Precision</th>
<th>±10 Percent Precision</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10% or 90%</td>
<td>37</td>
<td>58</td>
<td>82</td>
</tr>
<tr>
<td>20% or 80%</td>
<td>43</td>
<td>73</td>
<td>100</td>
</tr>
<tr>
<td>30% or 70%</td>
<td>46</td>
<td>79</td>
<td>129</td>
</tr>
<tr>
<td>40% or 60%</td>
<td>50</td>
<td>81</td>
<td>133</td>
</tr>
<tr>
<td>50%</td>
<td>50</td>
<td>82</td>
<td>135</td>
</tr>
</tbody>
</table>
Example: You want to estimate your rate of DVT prophylaxis in patients who underwent THA in 1996. You guess that your rate was 50 percent. You are willing to settle for a precision of ± 10 percent. In other words, you will be satisfied to know whether the rate is between 40 percent and 60 percent. You know that 216 THA operations were performed in your hospital in 1996. Look at the bottom section of the Table 4.5, which gives minimum sample sizes required to reach a precision of ± 10 percent. Now look under the column marked Total number of patients in population under study-200. Now find the row marked 50 percent. The number of medical records that must be reviewed to estimate your rate of prophylaxis use is 65 records.

If your goal is to perform an intervention to improve practices and you want to document a statistically significant improvement in practice, you will need somewhat larger sample sizes to measure a significant difference in prophylaxis use (see Table 4.6).

| Study Population |

It is important to define the patient population as specifically as possible, so that data collected over time are comparable and comparisons are meaningful. For example, you may chose to categorize patients according to type of condition. Each group could be specified by listing ICD-9-CM codes, as shown in the following example:

- **Hysterectomy**: 68.4, 68.5, 68.6, 68.7, 68.8
- **Total Hip Arthroplasty**: 81.51, 81.52, 81.53
- **Total Knee Arthroplasty**: 81.54, 81.55
- **Hip fracture**: 820.00, 820.01, 820.02, 820.03, 820.09, 820.10, 820.11, 820.12, 820.13, 820.19, 820.20, 820.21, 820.22, 820.30, 820.31, 820.32, 820.8, 820.9
- **Colectomy**: 45.71, 45.72, 45.73, 45.74, 45.75, 45.76, 45.79, 45.8
Sampling Strategy
The time frame for sampling will vary depending on the volume of patients who undergo surgery, the resources available for data abstraction, and the type of data available such as chart-based, administrative databases, or pharmacy databases.

Ongoing data collection is a strategy that has been extremely successful in hospital-based studies. The concept of a time series can be very powerful, and the required resources may be less than that required for a single large annual data collection effort. Time series are also a valid method to perform an analysis of change.

For example, if you wish to determine the percentage of patients who undergo major abdominal surgery who receive appropriate DVT prophylaxis, you might go through the exercise of sample size determination, and conclude that you will need to review 100 charts to get a precise estimate of this rate. This could be done in a week or two of intensive chart review, as a one-day-per-quarter update, or as a regular scheduled activity, such as a few hours of chart review once or twice a month. To evaluate the impact of any clinical practice improvement initiative, you will need multiple points to track your performance.

Figure 4.1  DVT Prophylaxis in Major Abdominal Surgery
Example of Time Series

9. Develop practice and outcomes reports
Another useful strategy is to collect data more frequently and to develop a time series analysis. You can begin with a small sample of cases (e.g. 10). The information you collect will be timely and will allow your team to problem solve on a timely basis. There are no hard and fast rules on how to do this. Again, it will depend on your caseload and your resources. For example, you might decide to review all of the charts of patients who undergo THA on the first Monday and the second Tuesday of every month. You could then calculate an average monthly rate. Data about the use of prophylaxis would be displayed on a time chart, sometimes called a run chart (Figure 4.1). The power of run charts is that they allow you to monitor the ongoing process of care and see where the process goes “out of control”. In the example in Figure 4.1, the rate of use of DVT prophylaxis
in major surgical cases is stable at about 60 percent in the first quarter. Practices improve to above 90 percent by the third quarter. In the fourth quarter, practices decrease significantly. This leads the CPI team to look at the details, and identify the cause of the change in practice. In this case, there was some staff turnover. The problem was quickly recognized and resolved by feedback from this ongoing monitoring system.

**Figure 4.2 Sample Practice Monitoring Report**

<table>
<thead>
<tr>
<th>Month</th>
<th>% Patients with Prophylaxis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
<td>40%</td>
</tr>
<tr>
<td>April</td>
<td>60%</td>
</tr>
<tr>
<td>Aug</td>
<td>90%</td>
</tr>
<tr>
<td>Dec</td>
<td>55%</td>
</tr>
</tbody>
</table>

10. **Implement changes in clinical practices**

Once you have finished one round of data collection, and have answered the questions posed, you have a better understanding of prophylactic practices at your institution. You will have identified one or more areas as opportunities to improve. The next step is to develop an implementation strategy.

**What changes can be made that will lead to improvement?**

It is useful to begin by generating a list of change concepts (*see definition on page 4.12). This can be done by the CPI team, using a nominal group process (see page 4.3).

**Change Concept**

A list of change concepts can guide your CPI team in developing effective solutions at the level of the system of care. It is helpful to sketch out the process of care, in this case, the “journey” that a surgical patient will follow. This will allow the team to identify the key areas that may affect which patients will receive prophylaxis. This process review may allow your team to identify opportunities for improvement. Minimizing the number of people and steps involved can be an excellent way to increase the probability that each patient will receive prophylaxis (it may also reduce the cost of care). Another example of a change concept is adjusting to meet peak demand periods. This is illustrated by case study #1 in Chapter-6.

It is also important to set timelines for change. Always try to tighten deadlines, e.g. if you think it can be done in one month, try doing it in one week. If in one week, could it be done in 2 days, and if in one day, would two hours suffice?
Cycles of Change:
Any changes in processes of care should be seen as occurring in cycles. First, a change is made. Next the effect of the change is measured. A new cycle begins depending on the results of the first cycle. Bear in mind that change is unlikely to occur in one cycle. Small cycles of change are more likely to come to fruition than big changes. Small tests of change are less threatening to staff. If you can demonstrate success on a small scale, then your proposed change can be more easily “sold” for adoption on a larger scale. For example, you might decide to develop a risk assessment form and provide DVT risk scores to clinicians as an aid to decision making. The process of implementation will consist of several steps: developing forms, getting them accepted, deciding who will get the information, and deciding where it will be stored (in the record, at nurse stations, other). The test could be done on a hospital ward that supports the idea and will spearhead the cycle of change. Results can then be presented to other staff who were initially reluctant to adopt a risk assessment system.

The concept of cycles of change is provided on the next page in graphic format. It follows the traditional PDSA cycle. You may want to refer to your “Goals Worksheet” to select one of the goals that your team identified and begin working on the first cycle of change as it applies to that goal. Using a nominal group process, the next step is to generate a series of changes in the processes of care that could lead you to achieve your goal. Examples of a cycle of improvement and a cycle of improvement report form are provided in Tables 4.7 and 4.8. Also, blank forms that can be used by your CPI team are provided in Chapter-5 (see Figures 5.4 and 5.5).

Once you have a list of potential changes, your team needs to prioritize them and select the most important ones for which to develop a detailed plan of action. For example, if one of the potential changes to increase the use of DVT prophylaxis is to have preprinted orders, a detailed plan for developing, implementing and assessing the effect of those preprinted orders needs to be outlined. Who will do what, by when, and how. You will need to assign responsibilities, set time tables and deadlines, and come up with a way to measure the effect either qualitatively or quantitatively. For example, you may decide to collect the risk assessment forms on high-risk surgical patients in Ward A at the end of the week to determine the percentage of patients for whom the form was actually filled out. If the response has not been very favorable, an informal survey of clinicians might reveal the source of the problem, e.g. the risk assessment information was not easy to find as it was not placed in the medical record consistently. Perhaps a more effective location would be to place it on the order sheets so that it is immediately available to the clinician at the time of decision making regarding prophylaxis.

Listing of Change Concepts
Changes to Improve Work Flow
• Synchronization
• Schedule into Multiple Processes
• Minimize Hand-offs
• Move Steps in the Process Close Together
• Find and Remove Bottlenecks
• Use Automation
• Smooth Work Flow
• Do Tasks in Parallel
• Consider People as in the Same System
• Use Multiple Processing Units
• Adjust to Peak Demand
• Change the Order of Process Steps
Model for Improvement

What are we trying to accomplish?
What change can we make that will result in an improvement?
How will we know that a change is an improvement?

The PDSA Cycle for Learning and Improvement

Repeated Use of the Cycle

Changes That Result in Improvement
Best Practices
Preventing DVT & PE
Center for Outcomes Research
Page 4.14

Table 4.7
Example: Cycle of Improvement Worksheet

Refer to the “Project Goals Worksheet.” (see Table 4.2) Select one goal and, using a nominal group process, develop a list of possible changes or ways to achieve this goal.

Goal #1

Increase the use of DVT Prophylaxis to 95 percent of patients undergoing total hip arthroplasty.

Possible Changes

a. Form a team to develop local practice guidelines
b. Provide DVT Prophylaxis guidelines to surgical residents
c. Quarterly review IPC or heparin use in a sample of high-risk cases
d. Risk assessment scores at time of admission
e. Risk assessment scores to be included in the medical record
f. Preprinted orders in orthopaedic wards

Other


TABLE 4.8

EXAMPLE: ACHIEVING EXCELLENCE IN HOSPITAL-BASED DVT PROPHYLAXIS PROJECT

CYCLE REPORT FORM

Organization: USA Hospital

Day-to-Day Leader: Tom Ward

Overall Goal: Develop and pilot a “user-friendly” patient risk assessment form

Cycle# 1 Date Initiated: 9-1-97 Date Completed: 10-1-97

Aim of Cycle (Select one of the possible changes described on The Cycle of Improvement Worksheet)

Record patients’ DVT risk score at time of admission

Plan

Hypothesis (Why do you think your plan will create an improvement?)

1. Record patients’ DVT risk score at admission.

The importance of this information is that we would like to maximize the percentage of patients who receive DVT prophylaxis.

If a risk score is made available and explicit to nurses, surgeons and pharmacists, this information can trigger the decision making process by reminding clinicians of risks for DVT, and the need for prophylaxis.

Detailed plans for cycle (Who, What, Where, When and How cycle will be run.)

Who: The orthopedic surgical team will be responsible for adapting the nursing admission forms to include a DVT risk score and to determine where to record this score.
What: The data to be collected include:

- Age
- Sex
- Surgical procedure
- Previous DVT/PE
- History of stroke
- Obesity
- Cancer
- Hypercoagulable state
- CHF
- Acute MI
- Acute major trauma

Where: Nursing admission notes or pre-admission testing documents.

When: At the time of admission (or pre-admission testing).

How: For the next 4 weeks, the assessment will be conducted on every patient admitted to ward A on Mondays and Thursdays. A risk score will be computed and charted so that it is available to nurses, surgeons and pharmacists. At the end of the month, data will be collected to determine:

1) How many scores were obtained (%)?
2) Percent of patients who received prophylaxis for those who had a risk score vs. percent of patients who received prophylaxis in Ward B, where scores were not obtained.

**Do**

List problems encountered or unexpected observations you identified after your plan was implemented.

Consistency in detailing risk factors was low initially. Training was necessary to increase reliability of information and the ability to compute a risk score.

**Study**

Show and interpret your data (include graphs and additional pages as necessary).

Scores were actually charted in 40% of cases of all of whom had pre-admission testing; no scores were obtained in patients admitted on a semi-urgent/urgent basis.
Compare the results to your predictions and summarize the learning.

Act

Given these results, what changes are to be made.

1. Formal educational sessions to all staff re-definitions of risk factors, and how to calculate risk scores.

2. Discussion regarding how to efficiently deal with urgent cases.

Describe the next cycle.

1. Modify the risk form into a checklist to make it easier to compute a risk score (and increase its reliability).

2. Team to develop a system for assessing risks in non-elective patients.
11. Develop an ongoing monitoring program

This is an integral part of any clinical practice improvement program. At this point in the development of the program, specific goals and approaches to measurement have been selected. Data have been collected and areas for improvement identified. Change cycles have been defined and implemented.

The next step is to collect data to assess success in reaching the set goals. Any change in systems may inadvertently create problems that had not been anticipated in the problem-solving stage. This monitoring phase is an opportunity to uncover problems to be solved in the next cycle of change.

The questions that you might bring to the CPI team, relating to ongoing monitoring include

- What quality characteristics need to be routinely monitored?
- What specific pieces of data do we need to collect?
- Where in the process can we get the data?
- How will we collect the data?
- How frequently should we collect the data?
- Who is responsible for collecting the data?
- Who is responsible for compiling the data and issuing a report?
- Who is responsible for ensuring that the monitoring system continues to function?
- How will individuals in the process get timely and accurate feedback about problems and trends?

The key to creating such reports is to ensure that the information will be immediately relevant to those who will receive them, and that they will allow everyone to better understand problems and to design the appropriate solutions.