Implications Wheel®

# Total Quality and the Implications Wheel® Process

## Expanding Your TQM Tool Kit

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# TABLE OF CONTENTS

# Introduction

## Total Quality

## and

## The Implications Wheel® Process

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# *Total Quality Means a Commitment to Change*

An organization's commitment to a Total Quality culture is, first and foremost, a commitment to change.

Regardless of the theoretical foundation chosen (for example, Deming versus Crosby), or the problem solving model used (PDSA, for example), or the total quality tools used (Ishikawa Diagram or PDPC, for instance), the common issue organizations must face is change management. Whether the change is incremental, as in Continuous Process Improvement, or radical, as in Process Reengineering, understanding and managing the implications of the proposed change is essential for successful change.

# *Anticipating and Managing the Implications of Change*

A great deal of thought and research has gone towards understanding how change can best be managed. What is clear, is that coping with and managing the complex forces tied to change, as well as achieving the desired results is often viewed by many as threatening, overwhelming and perhaps uncontrollable.

This is precisely the situation in which the Implications Wheel® process can be used to explore and evaluate the potential consequences of the change plan *before it is implemented.* The information gained from this exploration can greatly reduce the resistance to change, clarify the benefits of the change and make the change process more manageable.

# *Reducing the Uncertainty of Change*

Organizations often invest enormous resources in change initiatives. Yet, even with their best efforts, the change may not produce the expected outcomes. One reason for this dilemma may be that the pathway of change toward any goal is filled with uncertainties and unanticipated variables.

Quality improvement efforts generally focus on eliminating or reducing this variation. Yet, in spite of efforts to find the "ideal" process or tool to apply, the variation still exists. Is it possible that this unanticipated variation is the result of the way we think about and attempt to deal with change? Peter Senge reflects on this issue in the opening comments of his book, *The Fifth Discipline: The Art and Practice of the Learning Organization*[1]. He notes that, "From a very early age we are taught to break apart problems, to fragment the world. This apparently makes complex tasks and subjects more manageable, *but we pay a hidden enormous price.* We can no longer see the consequences of our actions; we lose our intrinsic sense of connection to a larger whole ... thus, after a while, we give up trying to see the whole, altogether."

What may be happening with quality improvement efforts, as well as many other attempts at change, is that in our rush to achieve our goals, we focus solely on the outcome and, in the process, overlook the consequences, the implications of what we are trying to achieve.

The Implications Wheel® process is a powerful tool that helps us break away from the fragmented view of the world, as described by Peter Senge. The Implications Wheel process helps us see our world, our organizations and the processes within them, not as separate, unrelated entities, but as interdependent, connected forces which have rational, identifiable linkages. The Wheel process provides the structure and the scoring system which can help us to anticipate and evaluate the consequences of our quality improvement efforts.

For instance, The Implications Wheel process can be used early in a change initiative to test the change that is planned. The exploratory nature of the Wheel process may help you identify factors which might derail your efforts. This is where you may need to build Barriers.

On the other hand, you may also identify factors that could improve your chance of success. You might focus your energies on improving the likelihood of these factors (Build Bridges). The Wheel process may also help identify significant people, departments or agencies that could possibly be affected by the change you are planning.

Whether the Implications Wheel process helps you identify factors that will help or hinder your change initiatives, the important point is that *you will have identified the factors in advance, while there is still time to influence them.*

## USING THIS SPECIAL APPLICATION GUIDEBOOK

The Implications Wheel process is a versatile, decision-enhancing tool. Not only can it be used by itself, but more importantly, for those of us involved directly with Total Quality/Continuous Improvement efforts, it is a process that can complement existing total quality improvement tools we are already using successfully.

This Total Quality Special Application Guidebook highlights five of the most widely used quality improvement tools and techniques, along with the general area of data collection. It describes similarities, unique characteristics and some of the possible ways each tool can be expanded and enhanced by teaming it up with the Implications Wheel process. *This guide is designed to help you see that the Implications Wheel process has an important role to play in your Total Quality improvement efforts, because it can:*

- Contribute as an additional, unique, stand-alone quality improvement tool
- Be used to complement existing quality improvement tools
- Be used in conjunction with the existing tools to form hybrid tools with specific applications
- Be integrated into your quality improvement tool kit

**PLEASE NOTE:**

In order to properly benefit from this special application guidebook, your quality improvement team members and facilitators must possess working knowledge and hands-on experience with the Implications Wheel® process, and with the standard quality improvement tools and techniques discussed in this guidebook. The information and suggested exercises that follow assume this working knowledge and experience.

# *Start with a Beginner's Mind:*

# *... It Always Welcomes New Ideas!*

First impression may lead you and your team into thinking the Implications Wheel process is similar to, or may even duplicate existing TOM tools. While there are similarities, the Implications Wheel process actually integrates features of many of the standard quality improvement tools. We've chosen five of the most commonly used tools, along with the general area of data collection for our examination:

- Nominal Group Process
- Tree (or Systematic) Diagram
- Fishbone or Ishikawa Diagram
- Force Field Analysis Strategy
- Process Decision Program Chart
- General Data Collection

Your quality improvement efforts may include other TQM tools. The Implications Wheel process may enhance their value, work well in conjunction with them, or in some circumstances, may be just that new innovation to your TOM tool kit that you've been looking to find.

You are encouraged to experiment with the TQM tools you use. Dare to try a new technique! Substitute the Implications Wheel structure, rules, scoring system and interpretation guidelines for the TQM tool you are using. If you have the same experience as others using the Implications Wheel process, you will find it to be a more versatile, powerful and comprehensive instrument than any single quality improvement tool.

# The Nominal Group Process

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## WHAT IS THE NOMINAL GROUP PROCESS?

The Nominal Group Process is a team-based technique used to generate a prioritized list of items. The list of items is prioritized by giving a weighted value to each item; For example, the items in the list might relate to:

- A ranking of problems based on importance.
- A prioritized list of proposed actions to solve a problem.
- A progression of required actions for improvement of a process.

The principle elements of this process involve identification and ranking of items. The structure of the process enables each team member to participate. The process also facilitates a means of consensus decision-making.

During the Nominal Group Process, the identification of items flows from a brainstorming process. This produces an unorganized listing with no systematic relationship evident between items that are generated. This process might include a list of the most likely effects of a change, but generally the Nominal Group Process does not incorporate further exploration of the possible implications of the potential change.

The very nature of the Nominal Group process masks potential relationships between items generated, because the items are generally viewed discreetly with no opportunity for causal exploration.

## THE IMPLICATIONS WHEEL AND THE NOMINAL GROUP PROCESS

## WHAT'S THE SAME? WHAT'S DIFFERENT? WHAT'S BETTER?

Once you have experienced the Implications Wheel process, the benefits to be realized by using the Wheel process in place of or in addition to the Nominal Group Process are clear.

- The Implications Wheel process neither requires nor depends on Consensus
- The Implications Wheel process *honors all points of view* for consideration: if an implication is possible, it is entered into the Wheel chart without debate

A further validation of how different or multiple points of view are handled in distinctive ways by each tool is demonstrated by duplicate items or themes. During the Nominal Group Process, duplicate items or themes are generally truncated, consolidated, aggregated or eliminated. The Implications Wheel process instead considers duplicate items or themes as valuable indicators of the item's ultimate importance to the subject being examined or explored.

Both processes offer a quantitative component. The Nominal Group Process identifies relative priority of each item compared to the other items. The Implications Wheel process assigns both a desirability value and a likelihood value independent of all other implications.

## TEAMING THEM UP

## THE NOMINAL GROUP PROCESS AND THE IMPLICATIONS WHEEL PROCESS

The following exercise combines the strengths of the Nominal Group Process with the powerful analysis capabilities of the Implications Wheel process.

1. Have each team member generate a list of items (perceived problems) using the rules for the Nominal Group Process.
2. Rank the items generated.
3. Select the top five to eight items using the Nominal Group Process guidelines.
4. Enter the top ranked items into the First Order nodes on an Implications Wheel wall chart.
5. Explore and examine the problems or implications associated with each of the First Order problems. Place each associated problem or implication in a Second Order node on the Implications Wheel chart.
6. Consider the problems which flow from the Second Order. Enter them in the Third Order nodes of the Implications Wheel chart.
7. Using the Implications Wheel process, assign a desirability and likelihood score to each node on your chart.
8. Analyze each problem path (from First Order out to the rim of the Wheel chart) for its value relative to the other problem paths.

Once you have completed this process, you have generated a systematic presentation of the relationship between a set of First Order problems and the embedded problems within each of them. Through your exploration out to the Third Order, you've expanded your knowledge of the possible implications or embedded problems.

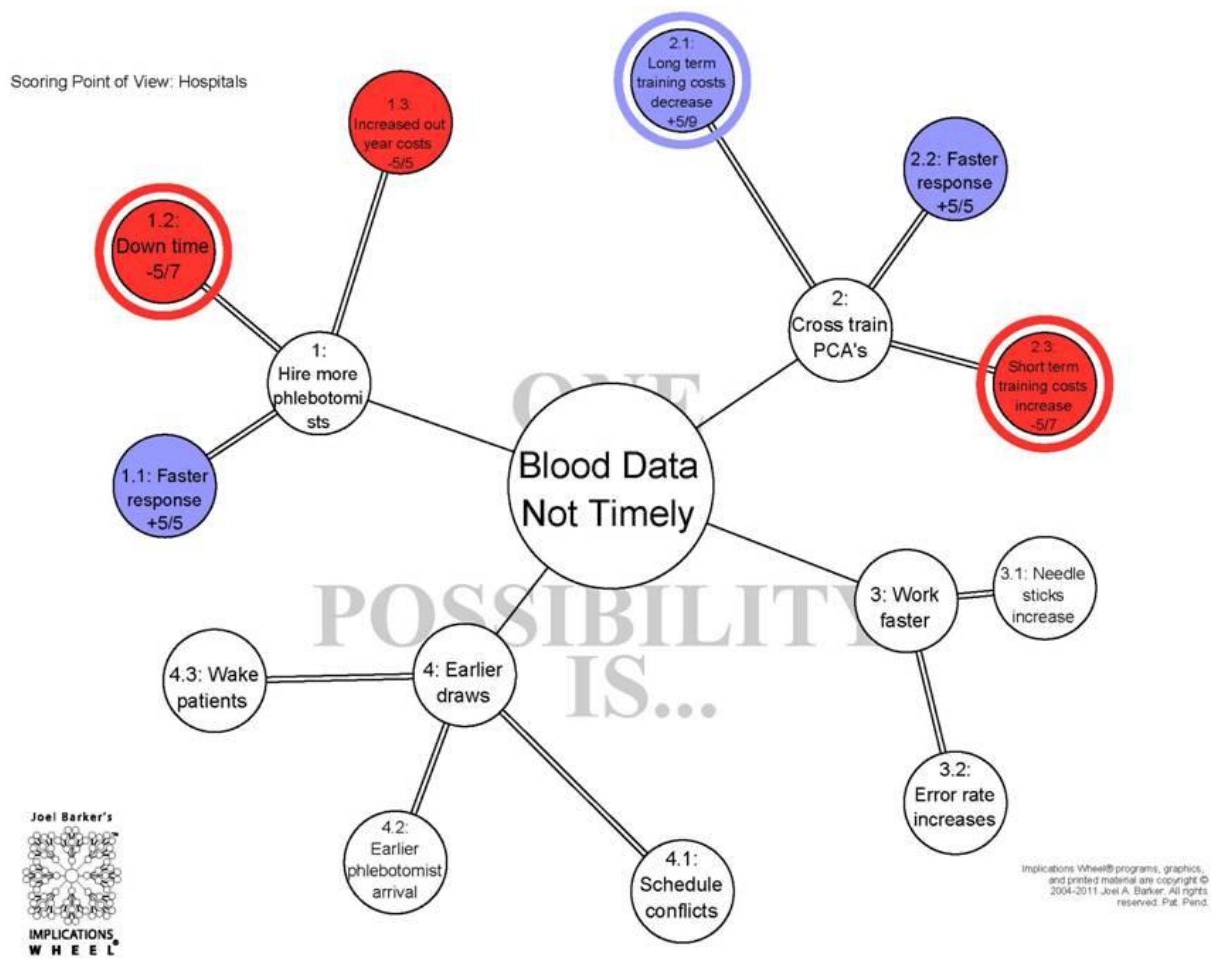
To demonstrate this application, consider a hospital quality improvement team dealing with the problem of "Physician dissatisfaction with timeliness of the analysis of blood samples." Simply stated, the turnaround time is not fast enough. In an attempt to address this dissatisfaction, the process action team might use the Nominal Group Process to establish candidate solutions to the problem.

Their brainstorming exercise would produce a list of candidates which would then be rank ordered. The top four (votes in parentheses) might be:

1. Hire more phlebotomists do blood draws so samples reach the lab sooner (9)
2. Have existing phlebotomists do blood draws earlier in the day (7)
3. Cross train PC As (Patient Care Assistants) to do blood draws (4)
4. Train phlebotomists to work faster (2)

Generally, the highest ranked candidate solution is addressed first, and the remaining items are initially ignored. By using the structure, metrics and interpretative rules of the Implications Wheel process, *all* of the highly ranked candidates can be explored in depth by examining the implications of each *within the context of the entire set of highly ranked candidates.* The following diagram illustrates the impact of teaming up the two processes:

**Figure #1**
**Teaming the Nominal Group Process**
**with the Implications Wheel Structure and Scoring**



When using the standard Nominal Group Process, the top ranked-problem is usually addressed first. However, with the additional information provided by an Implications Wheel exploration of the top five to ten ranked problems, you have a much more precise sense of the embedded problems and their relative complexities.

With this information, you may decide that the problem ranked first via the Nominal Group Process no longer represents the most compelling problem. It may, due to analysis of the implications pathways, be replaced by an activity far more critical to the achievement of the overall desired end result. This activity may have been camouflaged by the limitations of a Nominal Group Process exercise.

In the example provided, while the "Hire more phlebotomists" solution emerged from the Nominal Group Process as the highest ranked candidate, exploration of only the First and Second Order implications of the four highest ranked candidates reveals that *"Cross* training the PCAs" may be the most viable solution.

Teaming the Implications Wheel process with the Nominal Group Process gives more value to your investigation of issues in a variety of ways, including:

- Simultaneous exploration of up to 10 First Order items derived from the Nominal Group Process
- Exploration of "embedded" issues
- Adds quantitative dimensions (Desirability, Likelihood, and I scores)
- Indicates true priority more clearly than the Nominal Group Process ranking

# The Tree (or Systematic) Diagram

and

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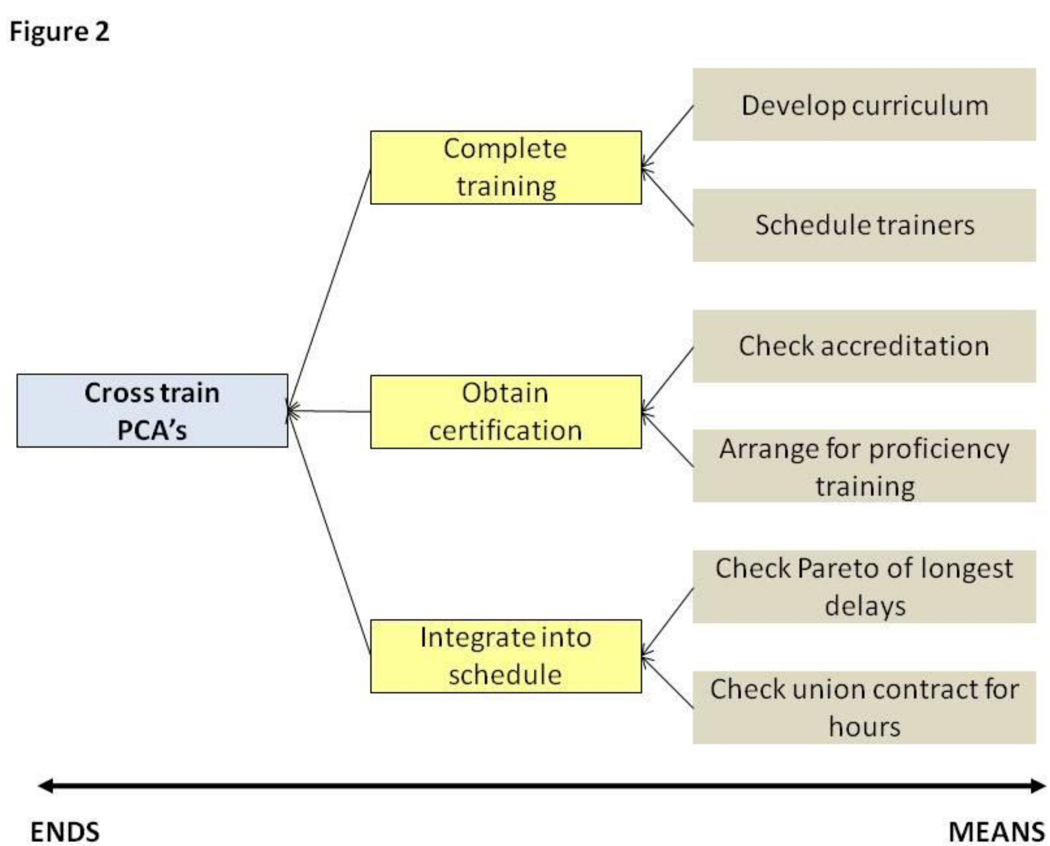
# WHAT IS THE TREE (OR SYSTEMATIC) DIAGRAM?

The Tree (or Systematic) Diagram is a visual tool which represents the different levels of actions or means to accomplish an overall goal. The design of the Tree Diagram helps guard against the tendency to move from a broad goal to action items without examining what happens intermediately. The process includes:

- Stating the overall goal or objective
- Listing the immediately preceding actions which will facilitate achievement of the goal
- Proceeding by considering the second level items as goals themselves
- Listing the immediately preceding actions which will facilitate achievement of the secondary goals

This iterative process is continued until all action items have been considered. To complete the process, due dates are established and owners identified for each action item. Using the hospital example from the previous section, the Systematic Diagram might look this:

**Figure #2**
**Systematic Diagram – Cross train PCA s**



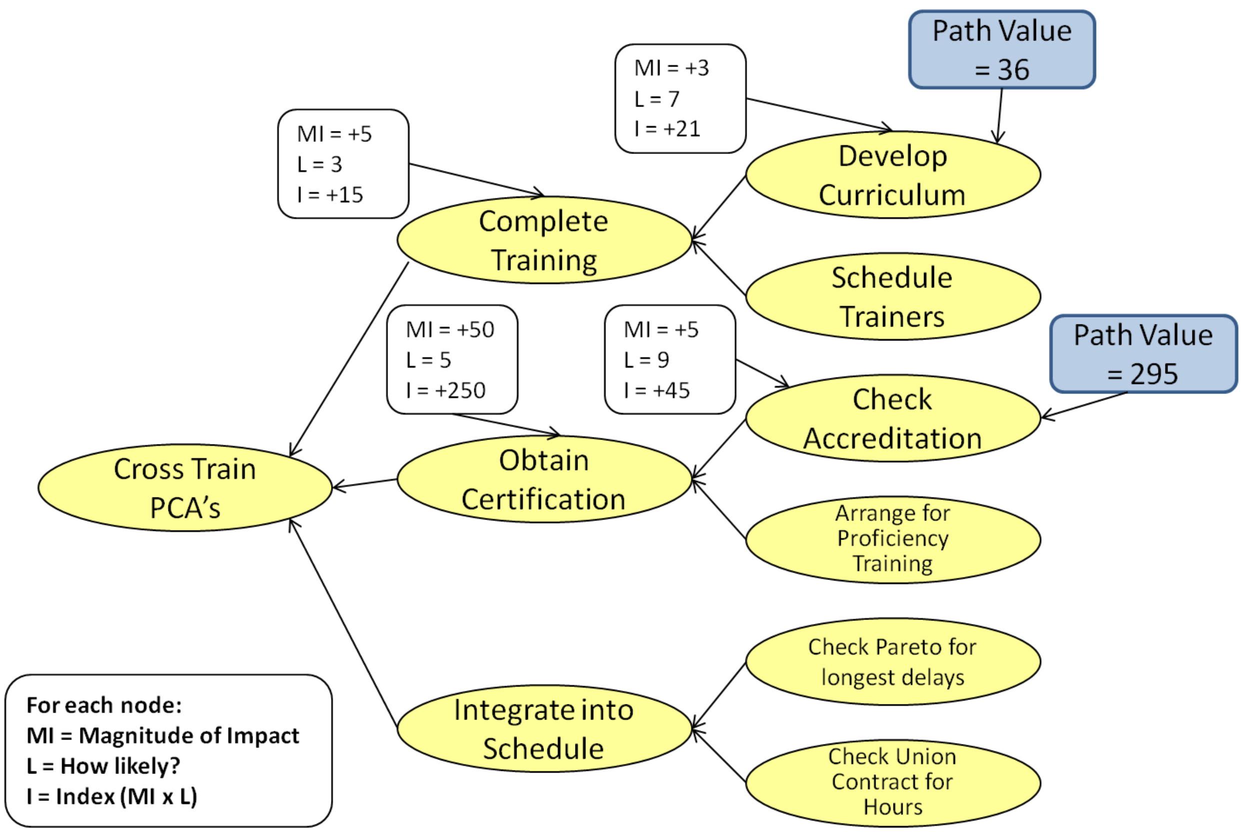
The Systematic Diagram generates a visual display of different levels of action to accomplish a broad goal, and produces a set of time-dependent actions with increasing specificity. However, once the branches are generated, there is no indication where the process action team should begin. Nor is there a manner of determining in which branches might be problems, or the elative significance of those problems.

A Systematic Diagram does not indicate which branches have the higher priority for resources, nor does it guide the process action team to build Bridges or Barriers.

Using the actions and sequence identified in the Systematic Diagram, add the Implications Wheel metrics and interpretive scoring.

- Use the same scale as "Desirability" ( -50 through + 50) but name it "Magnitude of Impact".
- Use the "Likelihood", "Index" and "Rim Value" path scores.

**Figure #3:**
**Implications Wheel Elements Applied To the Systematic Diagram**




After applying the Implications Wheel metrics, modified for "Magnitude of Impact", the path containing the "accreditation/certification" actions emerges as the most important and should signal the process action team for resource expenditure and priority of action.

# THE IMPLICATION WHEEL AND THE SYSTEMATIC DIAGRAM

## WHAT'S THE SAME? WHAT'S DIFFERENT? WHAT'S BETTER?

The Tree (or Systematic) Diagram appears to have similar properties as the Implications Wheel process. However, a closer examination shows some distinct differences. Some of the differences include:

The Tree Diagram begins with a stated goal, and facilitates specifying the actions to achieve the goal. The Implications Wheel process begins with a Center Statement, and identifies and explores the possible implications that might occur if the action embodied in the Center Statement takes place.

The Tree Diagram asks: "What must be done?" The Implications Wheel process asks: "What might occur, if ...?”

The Tree Diagram does involve considering first, second and third levels of intermediate goals. In this sense, these appear similar to exploring the first, second and Third Order implications with the Wheel process. But the Tree Diagram demands linear thinking, because using it usually requires dealing with one branch of the tree at a time. The Tree Diagram is inherently a means/ends, cause/effect tool. It is designed to establish this type of relationship.

The Tree Diagram does not have a quantitative component or a systematic means by which to analyze the relative importance of each goal or branch to the achievement of the overall goal. This quantitative component, as well as the systematic relative importance diagnostic process offered by the Implications Wheel, adds value to any strategic exploration.

Field use of the Tree Diagram suggests that, while it is intended to provide a detailed "road map" for achieving a major goal or objective, it rarely does, because often intermediate actions are inadvertently overlooked. The Tree Diagram has no mechanism built into the process to assess the relative merits of any of the branches generated in the process.

The exploratory Implications Wheel process will generate a significantly larger set of actions than the Tree Diagram process.

## TEAMING THEM UP

## THE SYSTEMATIC DIAGRAM AND THE IMPLICATIONS WHEEL PROCESS

The following exercise combines the strengths of the Tree (or Systematic) Diagram with the powerful analysis capabilities of the Implications Wheel process.

1. Determine the problem to address, or the goal to consider (perhaps as a result of using the Implications Wheel process in conjunction with the Nominal Group Process, as described earlier).
2. Enter the problem as the Center Statement in an Implications Wheel Center node, instead of using the Tree Diagram.
3. Then ask, as you would for the Tree Diagram: "What are the immediately preceding First Order actions necessary to alleviate this problem?"
4. After exhausting all possible First Order actions, proceed to the Second Order actions.
5. Repeat the process for Third Order actions.
6. After generating the First through Third Order actions, go back through the Wheel chart and assign Likelihood and Magnitude of Impact scores.
7. Using the standard Implications Wheel Scoring Rules, score each path (branch) out to the rim of the Wheel chart.

**PLEASE NOTE:**

*Likelihood* can be based on the availability of resources, investment required, and time to complete or other important dimensions.

*Magnitude of Impact* can be based on effects of taking the actions, such as effect on morale, acceptability to the union, threat to middle management, change in capital expenditure, etc.

What will emerge through this exercise is a clear picture of the implications of all possible courses of action deemed necessary to solve the core problem or to achieve the overall goal. Barriers to solving the problem or to achieving the desired goal will be more clearly highlighted. Individual actions and entire pathways will be differentiated based upon resources required. Additionally, collateral effects expected and the entire array of actions will be substantially richer compared to a similar exercise using the Tree (or Systematic) Diagram.

# The Fishbone Diagram

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## WHAT IS THE FISHBONE DIAGRAM?

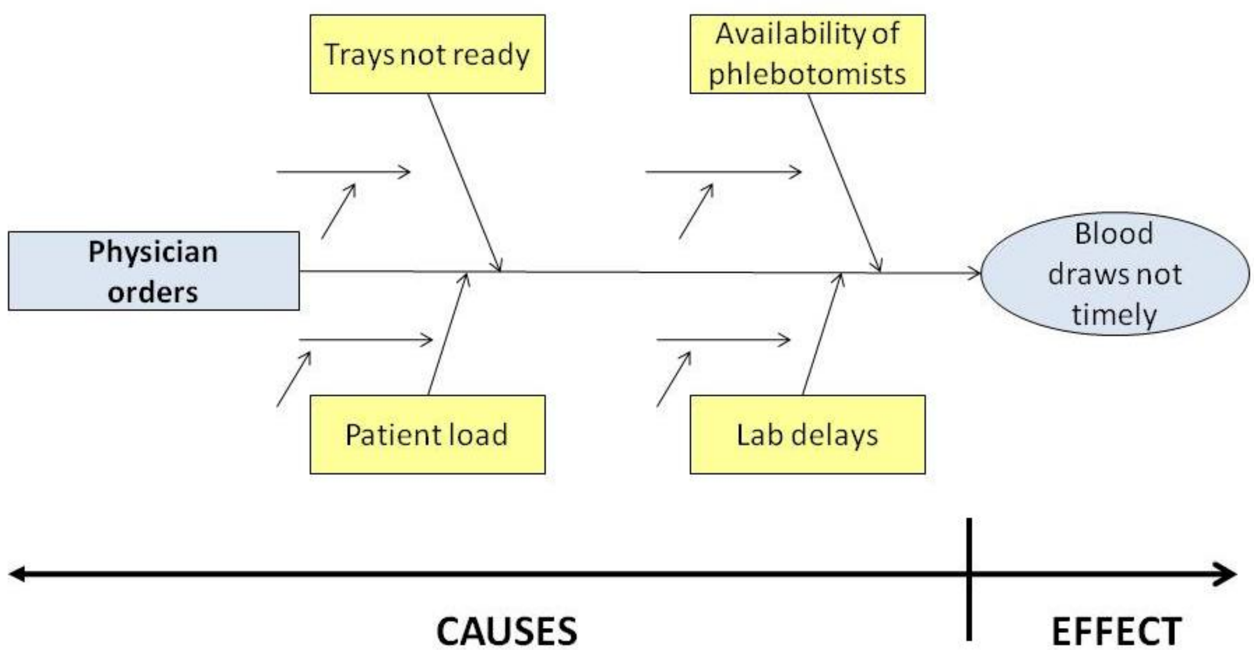
The Fishbone (or Ishikawa) Diagram is the principle team tool for investigating root causes. Root Cause Analysis is an essential feature of the quality improvement process and a building block for the FOCUS-PDCA problem-solving cycle.

The most commonly-used strategy for generating cause statements for inclusion in the Fishbone Diagram is brainstorming. First level causes (main bones) for the Fishbone Diagram are usually categorized as:

1. Materials
2. People
3. Equipment
4. Methods
5. Environment
6. Information

When the standard Ishikawa Diagram rules are applied to the blood draw timeliness problem, the following might result:

**Figure #4**
**Ishikawa and Blood Draw Timeliness**



The cause statements resulting from the Fishbone Diagram brainstorming exercise are assigned to major (main bone) categories, as shown in the illustration. One of the guiding principles of Root Cause Analysis is to "ask why five times." This five level search for underlying causes is the essence of Root Cause Analysis.

The Fishbone Diagram process generates candidate causes. Cause statements are the result of educated guesses and must be verified with additional data. Prior to additional data collection, the guidelines of the Fishbone Diagram process requires narrowing cause statements to the most likely causes. Clearly, this exercise of narrowing the list to the most likely causes is quite subjective.

## TEAMING THEM UP

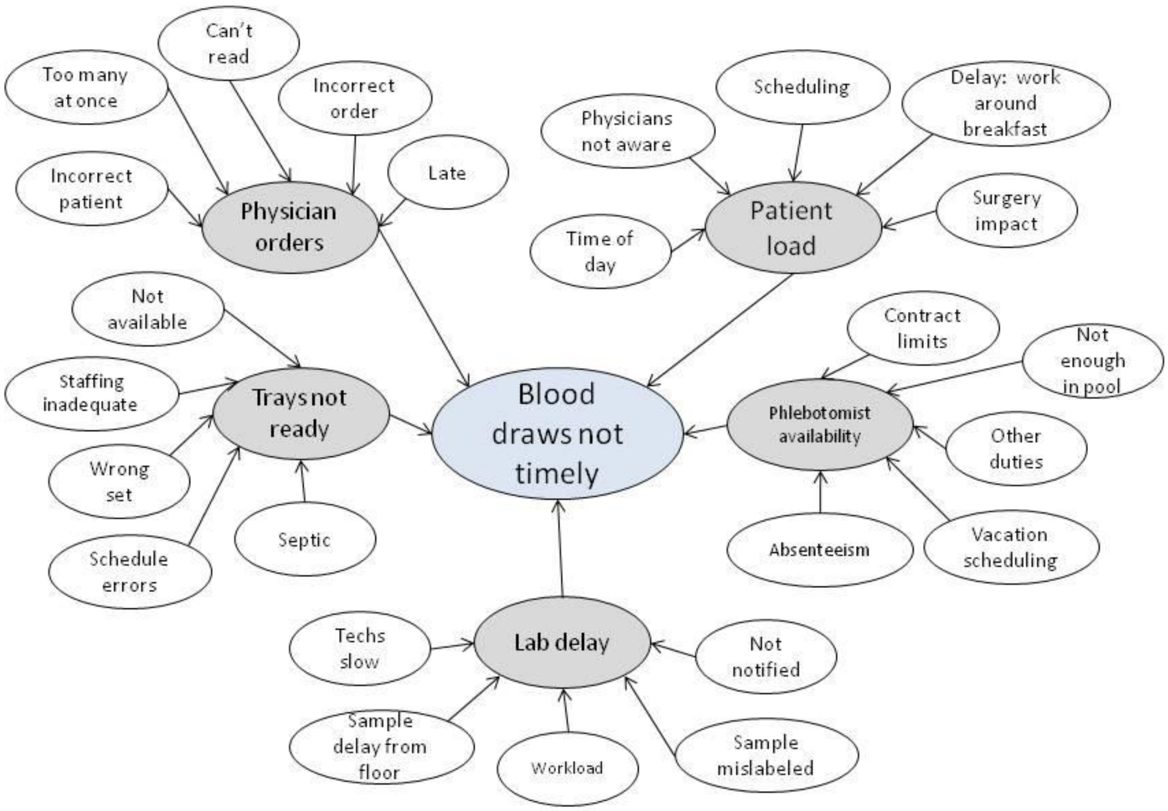
## THE FISHBONE DIAGRAM AND THE IMPLICATION WHEEL PROCESS

As previously stated, one Root Cause Analysis principle is "ask why five times." You can apply this principle along with the graphic structure and exploratory depth of the Implications Wheel process with effective results.

For example, you can place a problem in the Center node of an Implications Wheel chart. Then ask "Why?" five times. This will give you five First Order causes that can be placed in the First Order nodes. Then ask "Why?" five times for each of the First Order causes. This will produce 25 Second Order causes. Then ask "Why?" five times for each of these Second Order causes. From the problem at the Center you will have examined five causes at three levels and identified 1 25 causal pathways.

Applying the structure, exploratory power and the scoring of the Implications Wheel process can help reduce the ambiguity and subjectivity of the standard Fishbone Diagram process.

**Figure #5**
**The Implications Wheel Structure and Root Cause Analysis**
**(Showing First and Second Orders)**




**Examine:**

1. Rim values
2. Repetition of themes

**Metrics:**

1. Likelihood: Use 1,3,5,7,9 based on data collection and pareto analysis.
2. Magnitude of Impact: Same as "D" Scale.
3. Index Score
4. Rim Value

By combining the graphic structure, methodology and scoring of the Implications Wheel process with the causal analysis of the Fishbone Diagram, you will, in a sense, be creating a hybrid tool. Below are some of the nearly interchangeable properties of the Fishbone Diagram and the Implications Wheel process, as well as some of the distinguishing characteristics of each process.

1. The major categories determined as first level causes using the Fishbone Diagram process can be viewed as First Order implications and entered into an Implications Wheel chart. From this, second, third, fourth and fifth order causes can now be more efficiently determined. This also maintains one of the guiding principles of Root Cause Analysis, which is to "ask why five times."

2. In assessing the most likely causes, the Implications Wheel structure and scoring process can bring a value-added quantitative dimension to the Fishbone Diagram process. This is accomplished by:

    - Substituting the Implications Wheel structure.

    - Scoring the causal paths by assigning likelihood scores from the Center problem or statement to the rim of any path. (Likelihood, in this case, is that the item is, in fact, the cause of the immediately preceding symptom.)

This process will provide a quantitative description of the most likely cause(s) as indicated by the relative weights of each path.

The Implications Wheel Desirability scores are not particularly useful in this specific application. However, additional scales could be generated to reflect dimensions other than Desirability. For example, in addition to assigning a Likelihood score to each cause, values could be assigned to represent the level of resources to be expended in order to "fix" each cause. This could be scaled as hard dollars, person hours required to remedy *f* etc.

The outcome of using the structure and some of the scoring elements of the Implications Wheel process as a Root Cause Analysis instrument results in the examination of five causes at three levels. One hundred twenty-five causal paths are identified. Each of these causal paths is assigned a value, which immediately signals the relative importance of that causal path. Not only have root causes been identified in this process, but the most important root causes in terms of the scoring scales are now unambiguously displayed. The most important candidates for quality improvement efforts are highlighted by the values assigned to each root cause. Using elements of the Implications Wheel process in this fashion removes a great deal of the ambiguity and subjectivity from the standard Fishbone exercise.

# Force Field Analysis

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# WHAT IS FORCE FIELD ANALYSIS?

Force Field Analysis is a team problem solving tool, which grew out of Kurt Lewin's research during World War II. His research was focused on the meat buying habits of Americans. At that time, Americans had to have ration stamps in order to obtain steaks, roasts and hamburger. Other types of meat, such as, liver, tongue and kidneys, required no ration stamps. The research was designed to uncover the factors which would permit the government to influence Americans to buy the cuts of meat which did not require ration stamps.

One contribution of Lewin's research has helped us understand the forces which effect change. He made these identifications:

- Restraining forces are those which block change.
- Driving forces are those which enable change.

When using Force Field Analysis, three change strategies are possible:

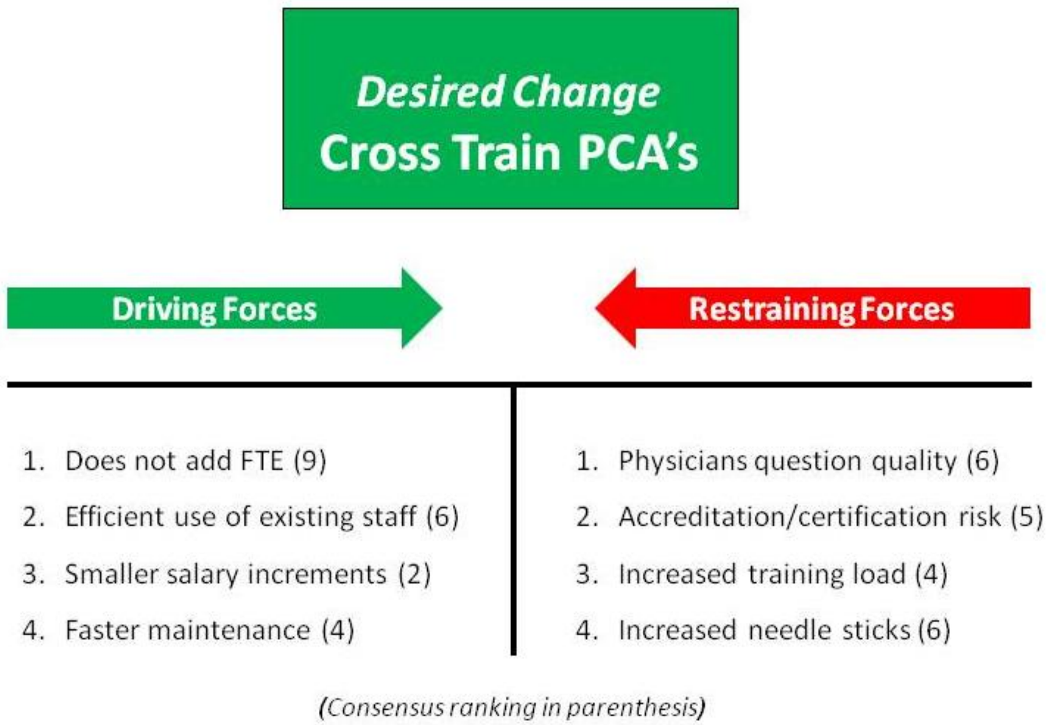
1. Increase the driving forces.
2. Decrease the restraining forces.
3. Enable both 1 and 2 above.

For process action teams, there can be inherent problems when using Force Field Analysis for process improvement activities. These usually occur because, embedded in the nature of human behavior are the observations that *increasing the driving forces sometimes leads to reinforcing the restrainers.* Conversely, *decreasing a restraining force can sometimes result in it becoming a driving force.*

Unless the team looks beyond the simple, First Order listing of drivers and restrainers, these subtle dynamics can be missed, and significant potential leverage is overlooked. Therefore, the team must systematically explore longer term implications of each of the forces.

Force Field Analysis strategy applied to our "Cross Train PCAs" solution might result in the following display:

**Figure #6**
**Force Field Analysis**




This presentation results from a team brainstorming driving and restraining forces, along with a consensus ranking of the forces. At this level of analysis, the team would probably try to capitalize on the most highly 'ranked driver, "Does not add FTE" and develop a strategy to deal with the highest ranked restrainer, "Physicians question quality."

Without a longer term analysis of the implications of each of these, which could be generated with the Implications Wheel process, the team might miss the embedded nature of Lewin's caution that increasing drivers reinforces restrainers and decreased restrainers can become drivers. Lewin's strategy, therefore, was to attempt to decrease restrainers because of the two-fold nature of the outcome.

## THE IMPLICATIONS WHEEL AND FORCE FIELD ANALYSIS

## WHAT'S THE SAME? WHAT'S DIFFERENT? WHAT'S BETTER?

The principle use of the Implications Wheel process is to explore the possible Implications of a change. The Implications Wheel process is therefore a logical choice as a complementary tool when using Force Field Analysis. The strengths of each tool provide Quality Improvement teams with a powerful new approach for the analysis and understanding of forces affecting changes required for continuous improvement. With only a small inferential leap, one can make the connection between these Force Field Analysis change strategies and the comparable Implications Wheel Strategies.

For example:

**Decrease restraining forces = Building Barriers**

(to inhibit the occurrence of highly undesirable, but highly likely implications.)

**Increasing driving forces = Building Bridges**

(to facilitate the occurrence of highly desirable, but low likelihood implications.)

In other words, either increase their desirability or reduce their likelihood or both.

## TEAMING THEM UP

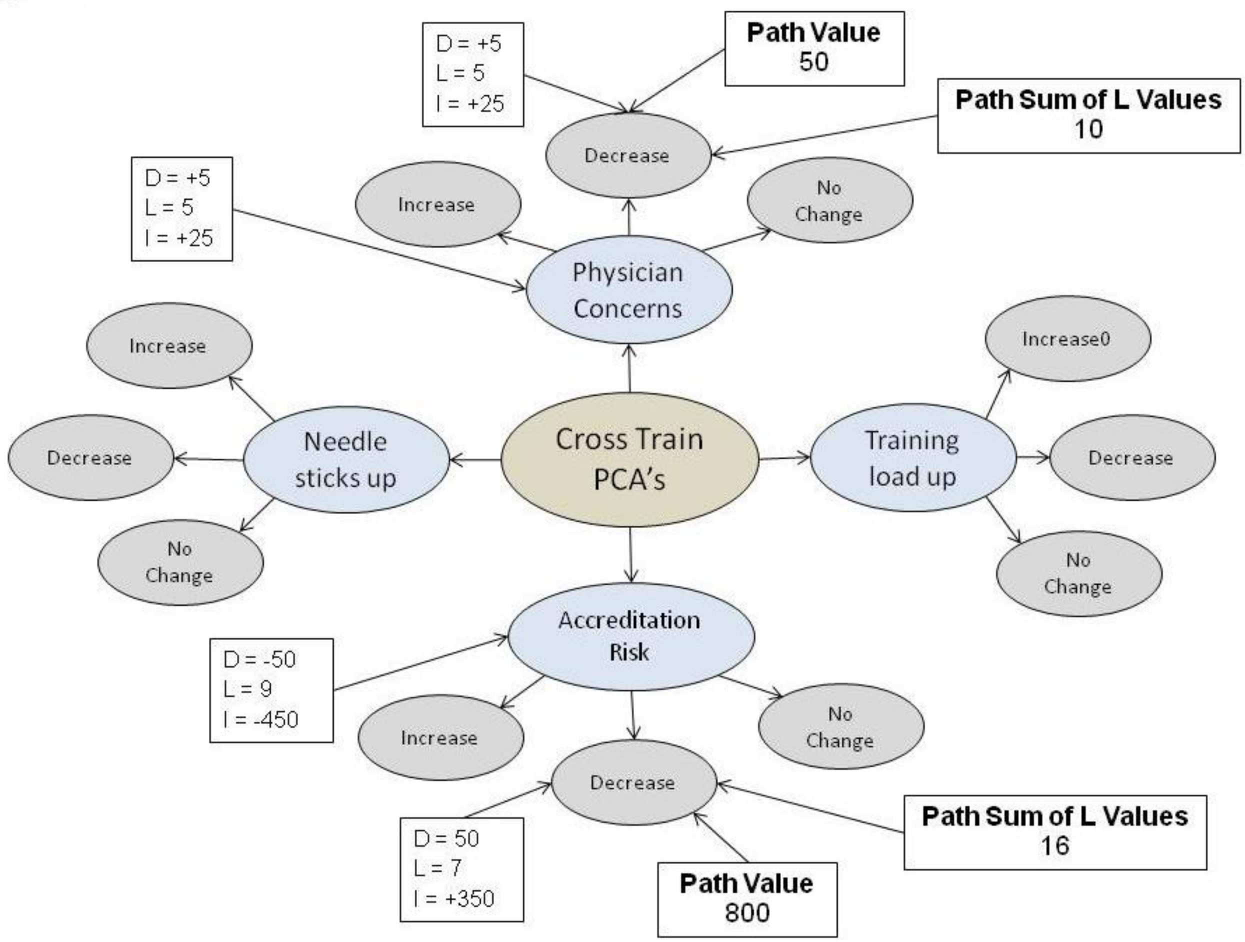
## FORCE FIELD ANALYSIS AND THE IMPLICATIONS WHEEL PROCESS

The graphic structural element of the Implications Wheel can be used to generate both driving forces and restraining forces. A separate Wheel is recommended for each. Here is a possible process to follow using restraining forces:

1. Write a Center statement (Center node) on the Implications Wheel chart containing the desired change.
2. For First Order nodes, enter the four or five highest ranked restraining forces.
3. For the Second Order nodes for each First Order restrainer, simply add the nodes, "increase," "decrease," and "no change."
4. Score each node and restrainer path using the D, L and I scores.

Following this procedure for restrainers might result in the diagram on the following page.

**Figure #7**
**Restraining Forces and the Implications Wheel Structure**




The object is to uncover those restrainer paths which, if the restrainer forces can be reduced, have the potential to become drivers. For the First Order nodes, which contain the highest ranked restraining forces, ask "How *undesirable* is the force? (Assign -50 through -1). Then ask, "How *likely* is it that this is, in fact a restrainer?" (Assign 1,3,5,7 or 9).

For Second Order nodes, ask "How *desirable* is it to increase, decrease or not address (no change) the force?" Then ask "How likely is it that each of these change dimensions can occur?" That is: "How likely is it that the impact of the restrainer:

- Can be decreased?
- Will be increased?
- Will not or cannot be changed?

Sum the Likelihood Scores for each "decrease" path. This now informs the team of the restrainer which is *most likely to occur and can most likely be reduced,* and thereby might become a **driver.**

For the purposes of explanation, only two paths have been analyzed. For this scenario however, the "accreditation risk" restrainer clearly emerges as the most powerful and the most likely restrainer. It is also the one most likely to respond to manipulation.

The process may be repeated to examine driving forces. Follow the process as described above.

When this exercise is complete, the result is a very detailed analysis of the drivers and restrainers, ranked for "strength" or "importance", a combination of *desirability* and *likelihood.* Based on the relative scores for both drivers' and restrainers' paths, an action plan can be developed to address the two or three most influential drivers and restrainers.

**Using The Implications Wheel Process With Force Field Analysis:**

1. Provides the process improvement team a mechanism for systematically looking beyond first level drivers and restrainers.

2. Exposes the embedded leverage available by reducing the restraining forces so they may become drivers.

3. Uncovers embedded problems associated with increasing the driving forces.

4. Permits the process improvement team to more fully understand the inherent complexity of the driver/restrainer system of forces.

# Process Decision Program Chart

and

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## WHAT IS THE PROCESS DECISION PROGRAM CHART (PDPC)?

A Process Decision Program Chart is a management/planning tool. It is a very useful tool for systematically exploring the "what ifs" with respect to process activities. "It is a method which maps out conceivable events and contingencies that can occur in any implementation plan. 2" Use of the PDPC permits identification of countermeasures in response to uncontrolled variation.

The PDPC is formatted as a Tree (Systematic) Diagram with each branch containing the actions necessary for implementation of the immediately preceding step. At each level of action, the PDPC requires asking "What if?" regarding the implementing of actions. Some examples are:

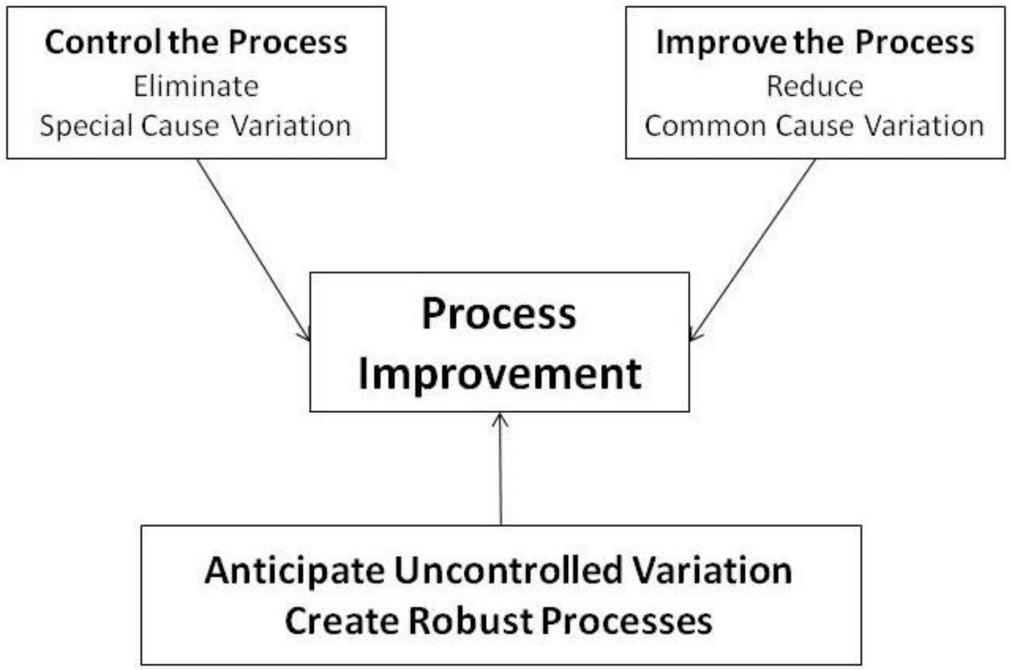
- What if the action is not available?
- What if the action is not feasible?
- What if resources do not exist?

The PDPC identifies ( and therefore anticipates) contingencies, and provides the structure for planning countermeasures for the identified contingencies. In this context, contingencies are:

1. Unanticipated/uncontrolled process variation.
2. A process presumption/assumption which:
   a. Does not work.
   b. Is not available.
   c. Operates counter to the presumption/assumption.

Anticipation of uncontrolled process variation is a necessary adjunct to quality improvement efforts. Systematically, the relationships look like this:

**Figure #8**
**Relationship of Uncontrolled Variation to Quality Improvement Initiatives**




**When is a Process "Robust?"**

A process is considered to be "Robust" when it produces essentially the same outcome even in the presence of violation of the assumption (uncontrolled variation) upon which the process depends.[3,4] For example:

1. A hospital quality improvement team designs a clinical path which ensures patient recovery even if the patient deviates from the post-hospital, self care directions.

2. A manufacturing production line produces essentially the same quality product in the same numbers even in the presence of uncontrolled variations in staffing levels.

3. An herbicide performs as desired when applied under different conditions, using different equipment, in different locations.

4. A manufacturing company designs a bonding process which is insensitive to variation in raw materials, ambient temperature and humidity.

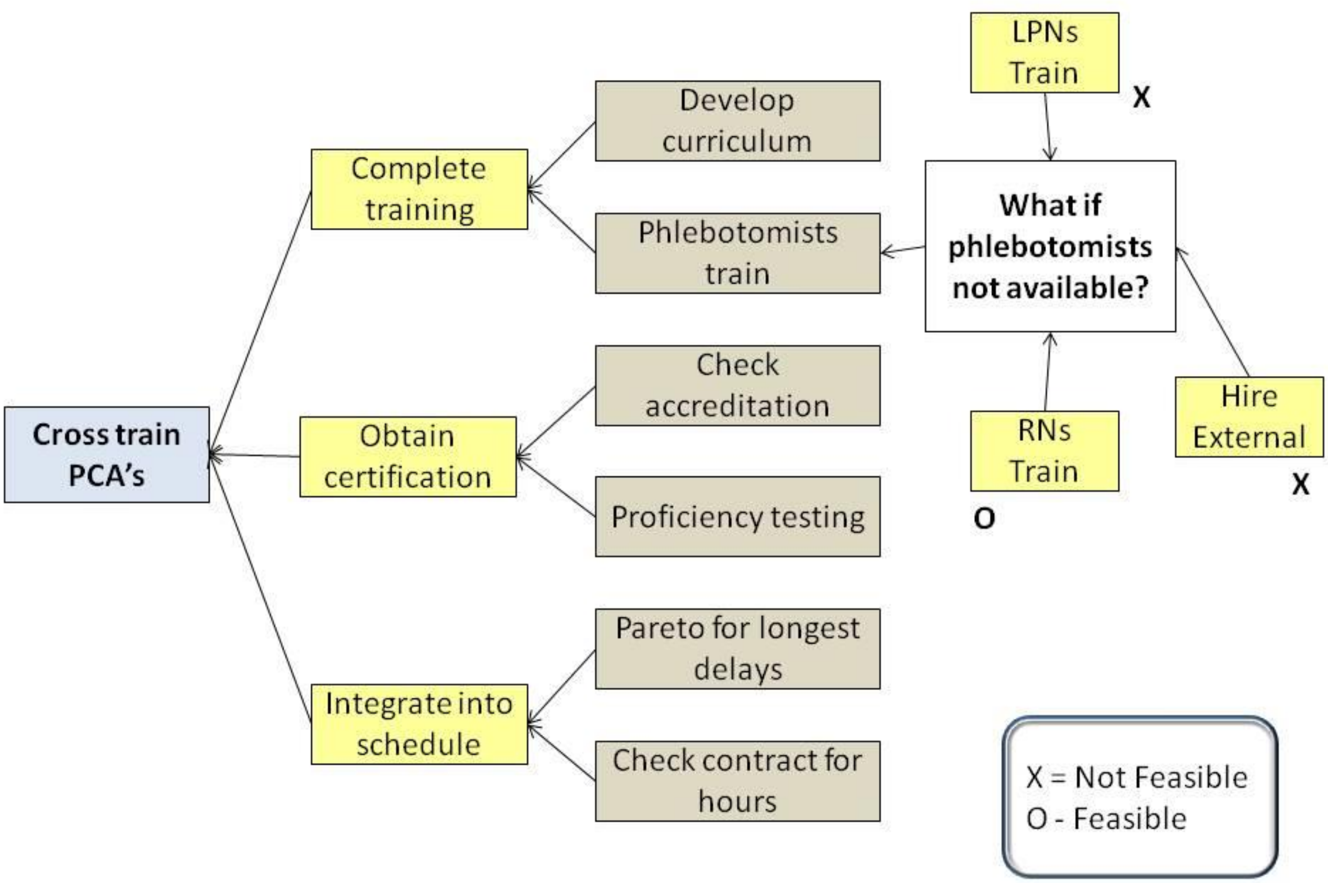
The key to developing a Robust Process is to *anticipate uncontrolled variation* because the path to any goal is filled with uncertainty. If you can anticipate process component failure, then you can explore the implications of these failures and rationally plan for the most likely failures by developing effective countermeasures.

Anticipation of uncontrolled process variation and the development of Robust Processes is becoming increasingly important in processes where error rates must approach the theoretical minimum because of the catastrophic nature of individual errors. This is because the removal of special cause variation and the reduction of common cause variation depend heavily on Statistical Process Control techniques, which require time-consuming gathering of data. (See Hutchinson, *Quality Progress,* November 1 994)[5].

Use of the Process Decision Program Chart, complemented by elements of the Implications Wheel process, provides a powerful new tool for discovering uncontrolled process variation.

For example, a Process Decision Program Chart developed for the "cross train PCAs" goal might look like this:

**Figure #9**
**Process Decision Program Chart – Cross Train PCA's**



Following this part of the PDPC activity, the next step is to map out countermeasures to lessen the impact on the controlled "what if." The implementation path with the fewest or least serious "what ifs" is generally chosen as the best alternative. In the example, only one "what if" path is shown with the associated countermeasures listed.

## THE IMPLICATIONS WHEEL AND PROCESS DECISION PROGRAM CHART

## WHAT'S THE SAME? WHAT'S DIFFERENT? WHAT'S BETTER?

The relationship of the Implications Wheel process to the Process Decision Program Chart is of particular importance, because of the power of these tools to deal with the critical area of anticipation. Anticipation, as it relates to process improvement initiatives, is now being characterized by experts [3,4] as the development of "Robust Processes." As previously discussed, "Robust" refers to the capability of a process to successfully produce, even in the presence of unanticipated influences. In other words, a Robust process is unaffected by uncontrolled variation.

The quality of "robustness" is only possible if quality improvement initiatives include looking ahead and anticipating where, what, and how things might be altered, so that even in the presence of this uncontrolled variation the process can generate acceptable outputs.

The key to building a Robust Process is anticipation of what can go wrong, or making sure that the implications of uncontrolled variation are explored. The combined strengths of the Implications Wheel process and the PDPC management/planning tool can bring a value-added dimension to your efforts to build "Robust" Processes.

## TEAMING THEM UP

## PROCESS DECISION PROGRAM CHART AND THE IMPLICATIONS WHEEL PROCESS

In order to explore the implications of "uncontrolled variation," one can immediately see the benefits of using the Implications Wheel process in conjunction with or in place of the Process Decision Program Chart. Here's a possible process to consider (for the purpose of illustration, we will draw upon the Process Decision Program Chart for "Cross Train PCA's").

1. Place the goal, "Cross Train PCA's" in the Center node of an Implications Wheel chart.

2. Continue to use the Implications Wheel graphic structure, placing all "What if" statements from the PDPC in First Order nodes. In the *"Cross* Train PCA's" example, one First Order node would contain the "What if" statement, "Phlebotomists not available". By looking at the previous illustration, other First Order "What if" statements might be:

   - "What if curriculum can't be developed in-house?"
   - "What if proficiency testing is cost prohibitive?"
   - "What if increased time requirements create contract conflicts?"

3. For each First Order node, answer the question "What If" by listing all possible countermeasures to counteract the "What If". These become the Second Order nodes.

4. Third Order nodes are generated by asking, "What are the implications of each countermeasure listed"? Subsequent order nodes can be generated by repeating this "What If" process and listing counter measures for subsequent layers of nodes.

> *What emerges is a structure similar to an Implications Wheel structure, with multiple paths showing many possible sources of uncontrolled variation, which could affect the implementing actions addressed in the Center node. ('Cross Train PCA 's" in this example}.*

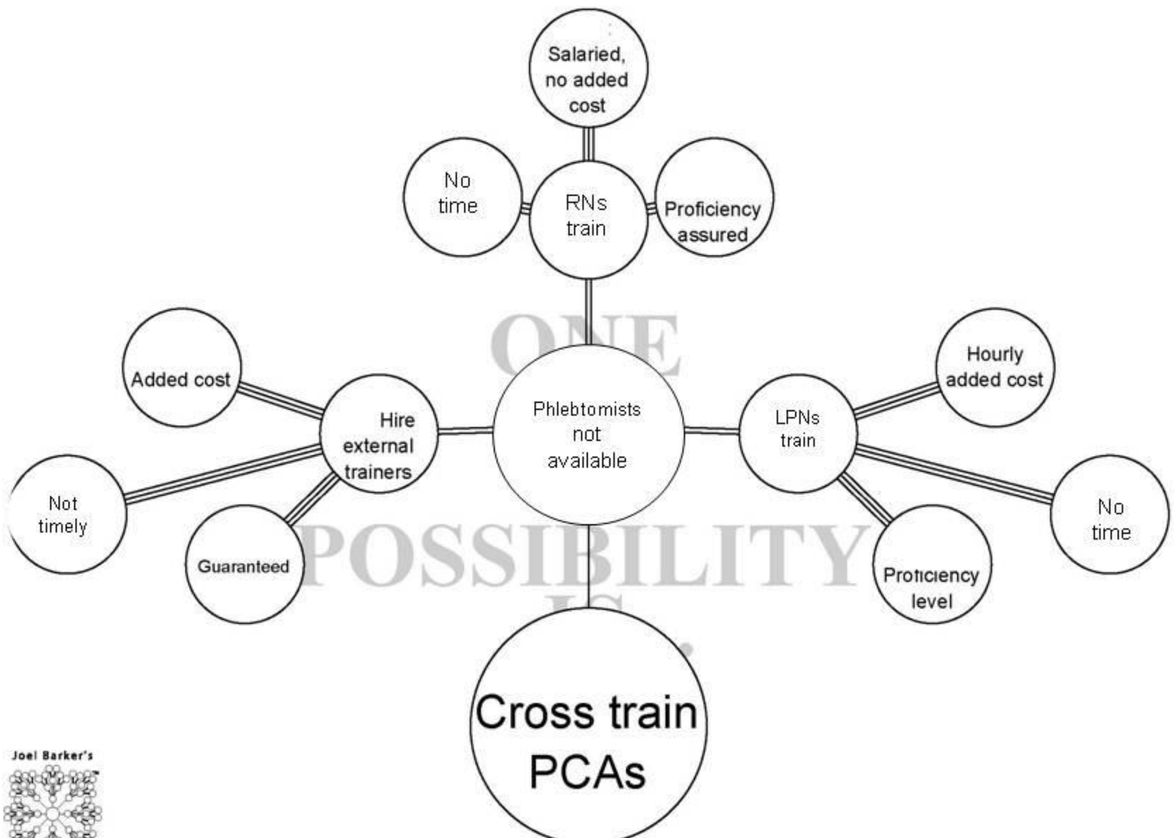
5. Each path can then be scored using both the Likelihood scale and the Desirability scale.

6. Determine those paths with the highest absolute values. These represent the uncontrolled variation scenarios, which are most likely to occur.

7. Develop alternative strategies for those paths identified, in #6 above, as the uncontrolled variation scenarios most likely to occur.

One section of the resulting structure might look like the following illustration. In this case, we are looking at one First Order node, "Phlebotomists not available" and the resulting Second and Third Order nodes.

**Figure #10**
**Contingency Planning with the Implications Wheel Structure**
**(First, Second, Third Order Nodes)**




Joel Barker's IMPLICATIONS WHEEL

## VALUE ADDED DIMENSIONS

## THE IMPLICATIONS WHEEL PROCESS AND THE PROCESS DECISION PROGRAM CHART

Using elements of the Implications Wheel in conjunction with and as a follow-on to the Process Decision Program Chart provides a powerful strategy for anticipation of uncontrolled variation and forms the basis for development of Robust Processes. Use of the Implications Wheel process drives the process action team to multi-level exploration of countermeasures and permits identification of the most likely and desirable countermeasure paths. Identification of those nodes with low desirability signals those countermeasure implications for which Barriers must be erected. In a similar fashion, identification of high desirability but low likelihood countermeasures signal those to which Bridges must be built.

# General Data Collection

## and

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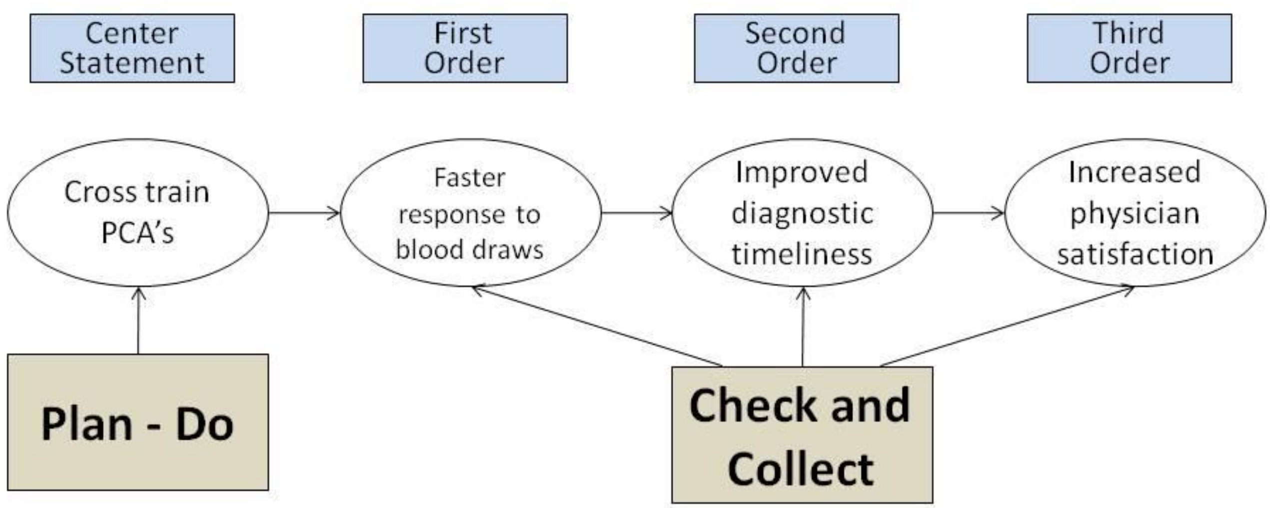
## GENERAL DATA COLLECTION

Many quality improvement teams report difficulty in determining what data to collect in order to establish the existence of a problem, or to assess the effects of a process improvement action. One of the major advantages of the Implications Wheel is that each node tells you what data to collect. For example, if a Second Order implication is "improved employee morale," then collecting data on employee morale will tell you whether or not improved employee morale was a valid implication of the associated First Order implication. As you examine each node on the Implications Wheel, the data collection stream becomes quite obvious. When making your data collection choices, you'll find it particularly helpful to follow the implications path from the First Order out to the rim of the Wheel.

For example, select the path which emerged as the highest priority from the use of the Implications Wheel in conjunction with the Nominal Group Process - "Cross train PCAs."

**Figure #11**
**General Data Collection**



The Implications Wheel process gives more value to data collection in a variety of ways, including:

- Beginning with the Center Statement and extending through each node to the rim of the Wheel chart, each node becomes a hypothesis to test for its effect on the succeeding node.

- Use of the Implications Wheel results in this fashion now signals the Process Improvement Team regarding the data to collect first and in what order the data should be collected.

- This application fits rationally with the PDCA cycle and significantly reduces the Process Improvement Team's labor regarding the data collection effort.

# Summary

## Total Quality

## and

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# SUMMARY
# TOTAL QUALITY AND THE IMPLICATIONS WHEEL

This Special Application Guide contains a discussion and possibilities for using the Implications Wheel process in conjunction with, or in place of, some of the widely used quality improvement tools. The discussion and possibilities are by no means exhaustive but represent options to explore.

What is quite evident is that the Implications Wheel process has a significant place in the future of quality improvement initiatives. The Implications Wheel process may, in fact, be the partner you've been looking for to "kaizen" your current TOM knowledge.

***Remember to explore the possibilities!***

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