Modular *kaizen:* Dealing with Disruptions

Ron Bialek, Grace L. Duffy, and John W. Moran

Modular *kaizen*: Dealing with Disruptions is a publication of the Public Health Foundation, with a limited first printing in March 2011.

Suggested Citation

Bialek, R, Duffy, G, Moran, J. *Modular kaizen: Dealing with Disruptions*. Washington, DC: the Public Health Foundation; 2011.

Additional Resources

To find other Quality Improvement publications, please visit the Public Health Foundation bookstore at: http://bookstore.phf.org/

To explore free tools, resources and samples, please visit the Public Health Foundation website at: http://www.phf.org/Pages/default.aspx

Modular *kaizen*

Table of Contents

Acknowledgements

This book represents an important new tool that health departments can use as they work to improve performance and outcomes under the National Public Health Improvement Initiative (NPHII).

Preface and Overview

Dr. W. Edwards Deming, the twentieth century quality leader, is quoted as saying "A bad system will defeat a good person every time."[1] People who have struggled with a poorly designed process can probably relate to that situation. The bad system grinds people down until they no longer care about the quality of the product or service delivered to the customer. People using a bad system take out their frustration on the customers who complain about the poor quality that they are receiving. This destructive cycle affects both the person using the bad process and those receiving the poor quality product or service.

Public health budgets have taken a significant hit during the recent economic downturn, causing a reduction in workforce and increase in workload to meet community needs. This two-edged sword of forced change has encouraged an interruptive crisis approach to daily work. The increasing use of mobile communications has further exacerbated this short-term, "quickly-respond-to-crises" culture. Constantly responding to crises takes a toll on the employees involved. Frequent crises increase employee stress levels by constantly pulling staff away from daily work which must be accomplished to meet long-term customer needs.

The authors have experimented with numerous quality improvement (QI) approaches to improve working environments which generate a "bad system." Over the years we have encountered many different types of organizational problems. We are always intrigued with the way organizations handle a major crisis disruption to their day-to-day environment. The usual response is a rapid, reactive, non-data-driven approach which usually makes the problem worse. Organizations that get into a crisis rarely take the time to check before doing anything. Rather than spend the time to check the reality of their current situation, they quickly take action on very limited information. Many times these quick responses make the situation worse and harder to correct.

The authors have developed a concept called Modular *kaizen* to address the need for continuous improvement within public health's highly interruptive environment. All of the components of an effective Kaizen event are planned; however, the activities are scheduled in small segments that fit the rapidly changing calendar of team members and subject matter experts. This approach is complimentary to both the Plan-Do-Check-Act (PDCA) and Define, Measure, Analyze, Improve, Control (DMAIC) models of QI. The basic PDCA approach, using tools designed for Modular *kaizen*, is introduced in Chapter 2, The House of Modular *kaizen*. The more robust approach based on the DMAIC structure of Lean Six Sigma is offered in Chapter 6, Modular Flow/Rapid Cycle.

---

[1] The Quote Garden: A Harvest of Quotes for Word Lovers. http://www.quotegarden.com/lean-manufacturing.html. Updated February 27, 2011. Accessed May 28, 2010. Appendix A has an introduction to Dr. W. Edwards Deming.

The Modular *kaizen* model starts with "check" to investigate and understand the situation to see if the disruption has a special cause or whether it is a normal variation of a standard process. Once the disruption is identified, the Limited Information Collection Principle[2] guides data collection of performance measures to establish the severity and urgency of the disruption, estimate who and what is impacted, and estimate the disruption timeline. The Limited Information Collection Principle is based on the premise that a problem cannot be solved by throwing data at it. Instead, it is important to gather information that is useful and relevant, continually questioning "what purpose does this information serve?"[3]

The next step is "act." Based on the data gathered in "check," the response team does one of the following:

- Do nothing – continue to monitor the disruption until it has either dissipated or needs more attention. If more analysis is required, investigate by establishing a team to investigate the disruption and report back. The report back is in the form of a high-level scope document.

- Respond by taking short-term actions that apply all available resources to stabilize the process. A PDCA cycle is employed to solve the disruption and bring it under control.

In Chapter 3, Implementing Performance Management through Modular *kaizen*, the beginning of this approach is documented when a major disruption hit a hospital unexpectedly.

Modular *kaizen* is effectively structured to take advantage of an assessment of the eight Lean Wastes (Table 2.1) during process improvement activities. Pre-project planning provides a platform for identifying potential areas of waste before resources are expended on early measurement activities. This priority setting encourages experiments designed to identify effective data gathering based on operational feedback. Because project milestones are often set more widely apart than normal Kaizen events, less pressure is placed on teams to rush sampling or other observational activities during the assessment phase.

The word Kaizen comes from the Japanese words "kai" which means change and "zen" which means good. Today Kaizen means good change or continuous improvement towards a standard of excellence. A traditional Kaizen event is a problem-solving approach that requires training and facilitation to analyze and re-orient a process. The overall concept of Kaizen is a system that encourages everyone to suggest incremental changes, eliminating "one time" improvement events. Under Kaizen the organization is

---

[2] Hoffherr G, Moran J, Nadler G. *Breakthrough Thinking in Total Quality Management*. Englewood Cliffs, NJ: PTR Prentice Hall; 1994.

[3] Hoffherr G, Moran J, Nadler G. *Breakthrough Thinking in Total Quality Management*. Englewood Cliffs, NJ: PTR Prentice Hall; 1994.

constantly improving. Kaizen does well in an organization that encourages and rewards teamwork and a customer-centric culture, using daily work management at all levels to make individual improvement.

Two of the most common uses of Kaizen are:

- Kaizen Event –a problem-solving approach that requires training and facilitation to analyze and re-orient a process.

- Kaizen Blitz – same as an event but is focused on a short activity of two to eight days to improve a process and requires substantial use of human resources for this time period.

This book is about the use of Modular *kaizen,* defined as the improvement or redesign project planned along a timeline that recognizes the highly volatile nature of the public health organization's core business processes. High-priority projects are planned at the senior leadership level to establish realistic milestones, resources, and measurements to ensure a return on investment that includes not only financial commitment but also the involvement of highly skilled facilitators and subject matter experts.

Modular *kaizen* is not a training event but is an interactive, consultant-led, problem-solving process that utilizes in-house subject matter experts to minimize disruption to regularly scheduled organizational activities. The Modular *kaizen* flow is shown in Figure 1.
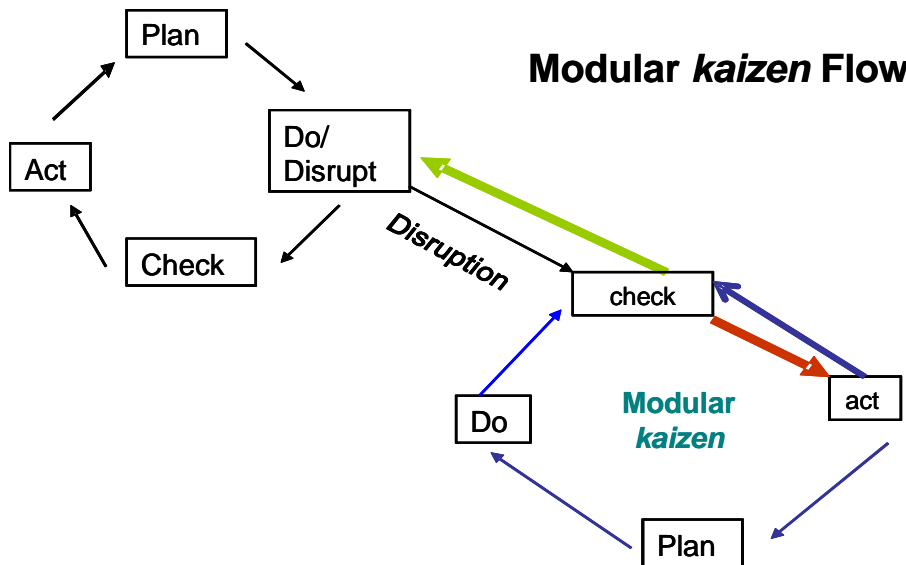
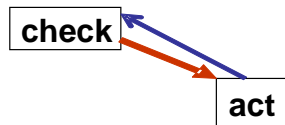**Figure 1: Modular *kaizen* improvement cycle flow**

A Modular *kaizen* approach minimizes disruptions by making sure no "act" is executed until "check" has been done to establish the baseline measurement of where a disruption begins. When any action is taken, it is taken in an informed manner and is short-term in nature. Once the disruption is fully understood, it is appropriate to charter a team to

develop a plan using the complete PDCA cycle that can then be implemented. This second cycle of "check" and "act" validates (checks) the final improved outcome and acts to document the changes for future sustainability.

This small c and a cycle is the basis of Modular *kaizen,* as shown in Figure 2. The iterative nature of rapid cycle improvement, as described in Chapter 6, Modular Flow/Rapid Cycle, is the key to sustaining and improving the integrated set of core processes which comprise the organization as a whole.

Figure 2: Check-act iterative improvement cycle

The Modular *kaizen* approach minimizes disruption by making sure no "action" is executed until "check" has been done and data has been analyzed to identify the reality of the current situation. Modular *kaizen* is an approach that resists the urge to respond to a disruption with panic. Once the process is stabilized, a full PDCA cycle is undertaken to develop a plan and action steps to minimize the recurrence of the disruption proactively. The final step at the end of any Modular *kaizen* activity is to document successes and lessons learned. Sharing the benefit of this planned modular improvement approach to crisis strengthens the total organizational leadership system.

Modular *kaizen*: Dealing with Disruptions

Chapter 1: The Value of Performance Management

Performance Management as a Driver for Modular *kaizen* activities

Performance management is the practice of actively using performance data to improve the public's health. This practice involves strategic use of performance measures and standards to establish performance targets and goals. Performance management practices can be used to prioritize and allocate resources; to inform managers about necessary adjustments or changes in policies or programs; to frame reports on success in meeting performance goals; and to improve the quality of public health practice. Performance management uses a set of management and analytic processes supported by technology that enables an organization to define strategic goals and then measure and manage performance against those goals. Core performance management processes include goal setting, financial planning, operational planning, consolidation of data, reporting, data analysis, quality improvement (QI), evaluation of results, and monitoring of key performance indicators. The focus of these performance management activities is to ensure that goals are consistently met in an effective and efficient manner by an organization, a department, or an employee.

Modular *kaizen* is an approach to help performance managers reach the goals that they have set for their public health agency. Modular *kaizen* ties key performance indicators to priority process improvement activities. Performance management maintains the ongoing monitoring of critical operations within the organization. Strategic planning based upon customer requirements establishes essential outcomes that define organizational success and optimum results. Strategic business assessment on at least an annual basis provides feedback on what outcomes are being met and where gaps are within critical outcomes.

Performance management uses both leading and lagging indicators[1] to anticipate and track performance relative to internal and external customer requirements. The planning and milestone design of improvement efforts reflected through Modular *kaizen* aligns activities to key performance indicators which support priority outcomes of the organization.

The Importance of Performance Management

Applying performance management techniques has measurably improved quality, outputs, and outcomes of public health services. The coordinated efforts of performance management strategies can impact an agency in a number of ways. Some of the ways performance management can positively influence a public health agency include:

- better return on dollars invested in health;
- greater accountability for funding and increases in the public's trust;

---

[1] Bialek R, Duffy G, Moran J. *The Public Health Quality Improvement Handbook.* Milwaukee, WI: Quality Press; 2009.

- reduced duplication of efforts;

- better understanding of public health accomplishments and priorities among employees;

- partners, and the public;

- increased sense of cooperation and teamwork;

- increased emphasis on quality, rather than quantity; and

- improved problem-solving.

The Accountable Government Initiative - an Update on Our Performance Management Agenda states that performance management efforts for 2011 are focused on six strategies that have the highest potential for achieving meaningful performance improvement within and across Federal agencies.[2]

1. Driving agency top priorities;
2. Cutting waste;
3. Reforming contracting;
4. Closing the Information Technology gap;
5. Promoting accountability and innovation through open government;
6. Attracting and motivating top talent.

The President's Management Council (PMC) – a group of agency deputy secretaries chaired by Jeffrey Zients – is overseeing the effort to achieve these goals. Working with partners in Congress, the PMC is pursuing a management agenda that embraces technological innovations and management best practices to improve effectiveness, efficiency, and customer service. This updated directive from 2010 gives more specific definition to the concept of performance management than was available in previous initiatives.

Effective PM Drives Modular *kaizen* Project Design

Performance management involves quantitative and qualitative measures which accurately reflect the true achievement of operations against established standards. Health departments are governed by local, state, regional or federal standards, based upon legislation, funding bodies, or community objectives. These standards usually specify outcomes such as percentage of population served, number of tests completed, vaccinations administered, or rate of disease encountered within a representative sample.

Figure 1.1 illustrates the sequence generally employed to establish effective performance measures for critical health department processes. The health agency senior staff document leadership direction through mission, vision, and overall department objectives. Based upon this operational foundation, an annual to 3-year strategic plan is

---

[2] Zients, JD. (2010, September 14) *The Accountable Government Initiative – an Update on Our Performance Management Agenda*. Memorandum for the senior executive service, Washington, DC.

generated. This strategic plan is validated based upon an assessment of needs, reflecting customer requirements, as identified by target populations, stakeholders, community partners, funding sources, and other priority inputs.

Once critical outcomes are identified, measures are established to monitor activities which support the necessary outcomes related to each priority. Measures may be interim milestones which track ongoing activities to enable long-term achievements or terminal measures documenting the final achievement of required outcomes. The Turning Point Model, developed by The Turning Point Performance Management National Excellence Collaborative,[3] is an effective approach for both interim and outcome measures for performance management within health departments.

Focus effective performance measures through alignment to organizational objectives

Leadership
- S - Skills/Style
- W – Risks
- O – Opportunity
- T – Barriers (Individual)

Strategic Plan
- Organization Design
- Infrastructure
- High Level Process Map
- Org. Level SWOT

Customers
- Needs/Profiles
- Direct interviews
- Best practices
- Complaints
- Industry research
- Competitive analysis
- QFD

Measures
- Key Performance Indicators
- Regulations/Standards
- Outcomes
- Outputs
- Interim milestones
- Monitor & control

Figure 1.1: Performance Management measures must align with organizational objectives

Performance Management Results in Public Health

According to the February 2002 *Performance Management National Excellence Collaborative (PMC) Survey on Performance Management Practices in States: Results of a*

---

[3] The Turning Point Performance Management National Excellence Collaborative. *From Silos to Systems: Using Performance Management to Improve the Public's Health*. Washington, DC: Public Health Foundation; 2002.

Baseline Assessment of State Health Agencies,[4] 76 percent of responding state health agencies reported that their performance management efforts resulted in improved performance. Most reported that performance improvement pertained to:

- improved delivery of services (program, clinical, preventive) and the ten Essential Public Health Services;

- improved administration/management, contracting, tracking/reporting, coordination; and

- improved policies or legislation.

More current activities continue to support the use of performance management to prioritize and drive efficient improvements within local, state, tribal, and territorial health departments. During the second half of the last decade, driven by the vision of Healthy People 2010, many health departments became involved in self-assessments through initiatives such as the National Public Health Performance Standards Program and began identifying formal processes and measures to meet requirements set by federal, state, or other funding organizations.

On the local level in Florida, one of the authors has been involved with the Orange County Health Department (OCHD) since 2006 in a series of process improvement team efforts focused on improving testing processes for sexually transmitted diseases (STD) and immunology, reducing cycle time of Septic System Permitting and implementing an Integrated Quality System across the total health department. A case study of the OCHD STD 2006 project is available through the Public Health Foundation website.[5] Additional process improvement and redesign activities were undertaken during 2008 and 2009, using the Lean Six Sigma approach to QI.[6]

The Orange County Health Department in Florida chartered a QI team to reduce total time for administering child immunizations. Figure 1.2 is a Value Stream Map measuring how long each major step in the immunization process took before the process was improved. The QI team identified a number of disruptions to the process, including times when patients' families were waiting to be interviewed and times for children to receive their immunizations. Note the triangle shapes, indicating that between 8 and 12 patients were waiting at each clinic "station" during the complete flow of the process. Once the inefficiencies in the process were identified, the QI team and the immunization nurse manager redesigned the clinic flow. As a result, all waiting was removed. Patient time was reduced from 33 to 4 minutes, while overall process time was reduced from 16 to 11 minutes.

---

[4] The Turning Point National Excellence Collaborative. *Turning Point Survey on Performance Management Practices in States: Results of a Baseline Assessment of State Health Agencies.* Seattle, WA: Turning Point National Program Office at the University of Washington; 2002.
[5] Public Health Foundation. Orange County Quality Improvement Project. http://www.phf.org/programs/PMQI/Pages/Orange_County_Quality_Improvement_Project.aspx. Updated 2011. Accessed February 19, 2011.
[6] Duffy G, Moran J, Riley W. *Quality Function Deployment and Lean-Six Sigma Applications in Public Health.* Milwaukee, WI: Quality Press; 2010.

4

Additional efficiency gained through correcting inaccurate and missing client data resolved significant disruption to the immunization team as well as to the billing department. Reliability of information within the customer record allowed asynchronous access to the information by billing and expedited checkout so that it could be collapsed into the previous process step. Reducing the patient time required to go through the immunization process increased the reputation of the clinic. Word of mouth among the customer base encouraged more of the population to use child immunization services.

How Departments Can Use Performance Management

QI efforts are critical at all levels of the organization. Certainly the commitment of senior management in setting and maintaining a culture of performance and quality is imperative to long-term success. Involving the direct workforce in the identification and resolution of performance problems on a daily basis is also imperative for effectiveness. Line and staff management are in a good position to see both the strategic direction coming from senior officers as well as the individual contribution of the line worker.
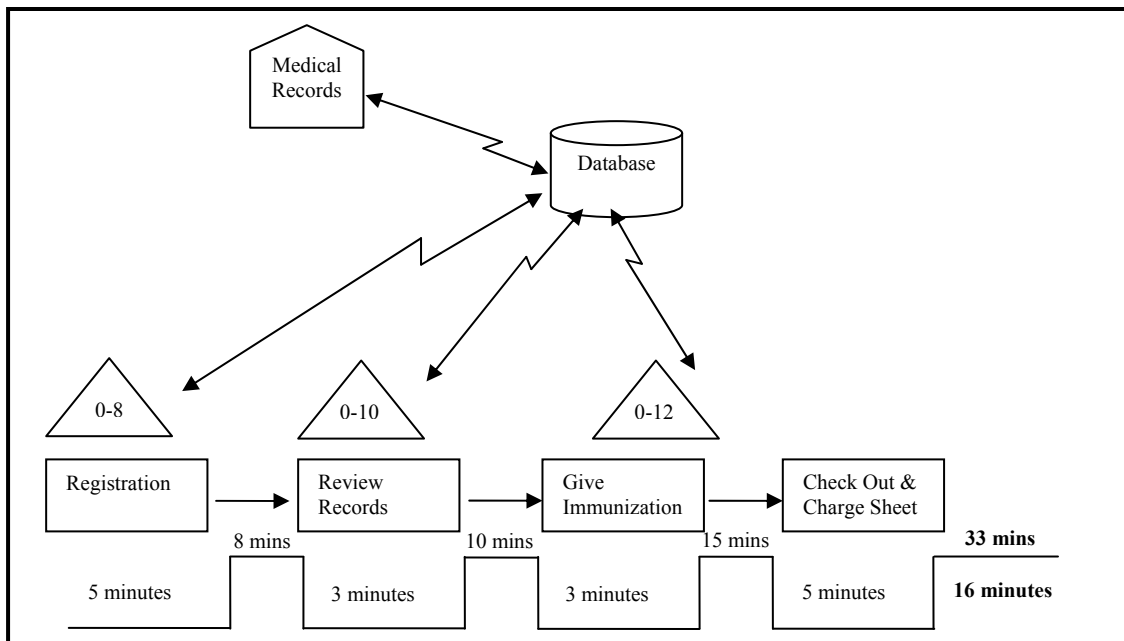
Figure 1.2: Value Stream Map for performance of child immunization process

Some of the important contributions of middle managers in performance management are:

- Identify aspects of the work that has and has not resulted in satisfactory results;

- Identify trends;

- Further investigate the nature of particular problems;

- Set targets for future periods;

- Motivate managers and staff to improve performance; increase their interest in

5

better serving customers;

- Hold managers and staff accountable;

- Develop and improve programs and policies; and

- Help design policies and budgets and explain these to stakeholders.[7]

Improving Performance is About Using Data

Performance management is the practice of actively using performance data to improve the public's health. This practice involves strategic use of performance measures and standards to establish performance targets and goals. Performance management practices can also be used to prioritize and allocate resources; to inform managers about needed adjustments or changes in policy or program directions to meet goals; to frame reports on the success in meeting performance goals; and to improve the quality of public health practice.

Performance management includes the following components evident in Figure 1.3:

1. Performance standards—establishment of organizational or system performance standards, targets, and goals to improve public health practices.

2. Performance measures—development, application, and use of performance measures to assess achievement of such standards.

3. Reporting progress—documentation and reporting progress in meeting standards and targets and sharing this information through feedback.

4. Quality improvement (QI)—establishment of a program or process to manage change and achieve QI in public health policies, programs, or infrastructure based on performance standards, measurements, and reports.

The four components of Performance Management can be applied to:

- Human Resource Development;

- Data and Information Systems;

- Customer Focus and Satisfaction;

- Financial Systems;

- Management Practices;

- Public Health Programs and Services; and

- Health Status Improvement

---

[7] Lichiello P. *Guidebook for Performance Measurement*. Seattle, WA: Turning Point National Program Office, 1999: 48. www.turningpointprogram.org/Pages/lichello.pdf - Based on Hatry HP, Fall M, Singer TO, and Liner EB. *Monitoring the Outcomes of Economic Development Programs*. Washington, DC: The Urban Institute Press; 1990.

A performance management system is the continuous use of all of the above practices so that they are integrated into an agency's core operations. Performance management can be carried out at multiple levels, including the programmatic, organizational, and local, state, tribal, and territorial levels.
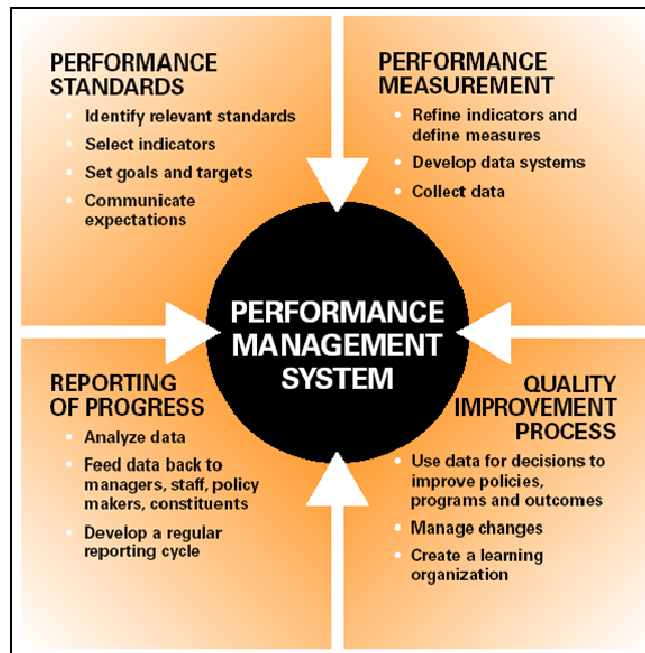
Figure 1.3: Performance Management Framework and Components[8]

Integrating Performance Management Techniques into Operations using Modular *kaizen*

Figure 1.3 is a high-level sequence for establishing performance management. Modular *kaizen* is designed to focus on the strategic priorities of the organization. Once leadership has identified a strategic direction for the organization, properly collected customer requirements drive the highest priority objectives. Once key objectives are known, the next step is to set specific <u>performance standards</u>, targets, and goals to meet these objectives. Development, application, and use of <u>performance measures</u> make it possible to assess achievement of such standards. Measures designed to drive and assess progress toward high-priority objectives or outcomes are called key performance indicators.

Modular *kaizen* depends upon the performance management system to measure the capacity, process, or outcomes of established performance standards and targets. It is most efficient for QI projects to use the same standards and measures which drive key

---

[8] The Turning Point Performance Management National Excellence Collaborative. *From Silos to Systems: Using Performance Management to Improve the Public's Health.* Washington, DC: Public Health Foundation; 2002.

7

priorities within the organization. This approach ensures that QI activities are most closely aligned with the most important outcomes.

Reporting progress of improvement efforts is a critical component of Modular *kaizen*. Interim reporting is crucial for communicating milestones, validating findings, verifying assumptions, and escalating the resolution of obstacles to success. Reporting provides formal documentation for future improvement, archival, recognition, and best practice sharing. Reports and information should regularly be made available to managers, staff, and others, including community partners and funding providers.

Finally, the fourth quadrant in the Turning Point model is the quality improvement (QI) process. Modular *kaizen* is part of the lean family of improvement models. Lean supports the establishment of a program or process to manage change and achieve QI in public health policies, programs, or infrastructure based on performance standards, measurements, and reports.

The use of QI processes emphasizes the importance of the information included in a progress report or other document. A critical ending step for any effective QI effort is the development of a control plan for monitoring and sustaining the gains achieved by the improvement team. Modular *kaizen* uses the organization's existing documentation process to manage changes in policies, programs, or infrastructure based on performance standards, measurements, and reports. If documentation processes do not yet exist for the organization, Modular *kaizen* is a valid approach for creating these processes. Chapter 4, The House of Modular *kaizen,* introduces a number of tools and techniques designed to guide a QI team through establishing efficient processes for improvement, measurement, and documentation.

Examples of the Four Components

A successful performance management system is driven by jurisdictional needs and is designed to align closely with a public health agency's mission and strategic plans. Public health agencies have applied the four components in a variety of ways.

Performance Standards

Public health agencies and their partners can benefit from using national standards, state-specific standards, benchmarks from other jurisdictions, or agency-specific targets to define performance expectations. The National Public Health Performance Standards Program (NPHPSP) defines performance in each of the ten Essential Public Health Services for state and local public health systems and governing bodies. The NPHPSP supports users of the national standards with a variety of technical assistance products, including online data submission and an analytic report for the user jurisdiction. Some states have developed their own performance standards for local health departments. These state standards serve a variety of purposes, such as to provide a benchmark for continuous QI, to determine eligibility for state subsidies, or for self-assessments in meeting established standards.

The Public Health Accreditation Board (PHAB) has developed a national voluntary accreditation program for state, tribal, local, and territorial health departments. The goal of the accreditation program is to improve and protect the health of every community by advancing the quality and performance of health departments.[9]

It is important to set challenging but achievable targets. Achieving performance targets should require concerted efforts, resources, and managerial action. If targets can be achieved easily despite budget cuts and limited efforts, little motivation to improve performance or to invest in additional agency efforts is generated.

Performance Measures

To select specific performance measures, public health agencies may consult national and other sources as well as develop their own procedures to help them determine how to best assess and measure their organizations' performance. Performance measures typically reflect jurisdictional needs and the feasibility of collecting the necessary data for measurement purposes.

Reporting of Progress

How a public health agency tracks and reports progress depends upon the purposes of its performance management system and the intended users of performance data. In Ohio, the Department of Health publishes periodic reports on key measures identified by Department staff, which are used by the agency for making improvements. Relevant state and national performance indicators are reviewed by representatives of all interested parties. Casting a wider net for reporting and accountability, the Virginia Department of Health established resources at www.vdh.state.va.us[10] to make performance reports and planning information accessible to policy makers, public health partners, agency employees, and citizens.

Donabedian's[11] assessment framework of structures, processes, and outcomes can help public health agencies examine performance in distinct aspects of their system. An optimal performance management approach creates feedback loops around all three aspects. Public health performance should be managed for:

1. structures such as financial and information resources

2. processes such as health promotion and epidemiology services

3. outcomes such as health status and cost savings

For an illustration of a continuous performance feedback loop involving structural capacity, processes, and outcomes related to public health, refer to the performance

---

[9] Public Health Accreditation Board. www.phaboard.org. Accessed March 2, 2011.
[10] Virginia Department of Health. www.vdh.state.va.us. Accessed February 28, 2011.
[11] Donabedian, A. The quality of care. How can it be assessed? *Journal of the American Medical Association*. 1988; 260:1743-8.

9

measurement model in Figure 1.4. In the model, the macro or community context of public health translates into an integrated system of structural capacity and process guided by the public health system's mission and purpose. This integrated system drives the effectiveness, efficiency, and equity of the outcomes of the local public health system.
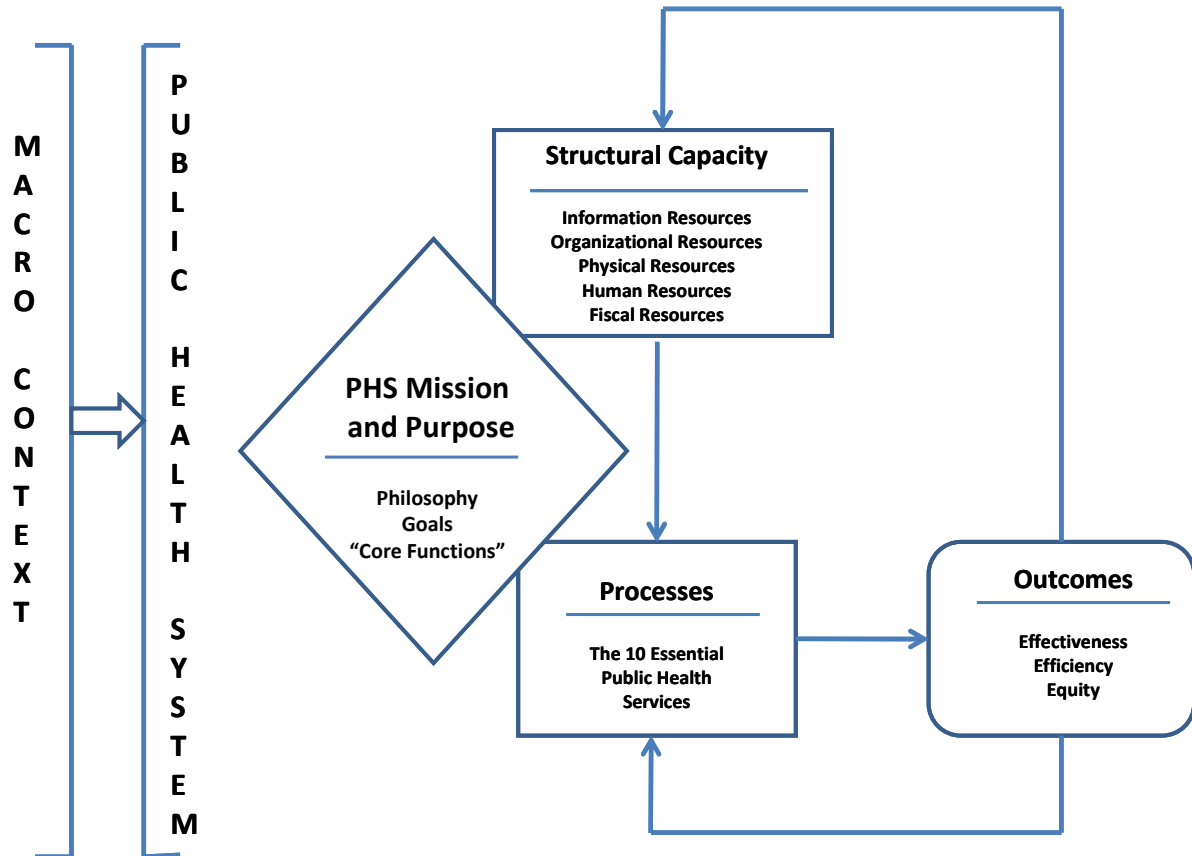
Figure 1.4: Conceptual Framework of the Public Health System as a Basis for Measuring Systems Performance[12]

Performance management, through setting standards, identifying efficient and effective measures, reporting progress and continuously improving based upon key performance indicators, establishes a foundation for QI. Modular *kaizen* uses this performance management system to focus on the highest impact improvements while integrating improvement activities into the daily management of the organization. The activity-oriented format of Modular *kaizen* recognizes the systemic integration of critical health department processes while allowing for interruption of improvement efforts based upon the priority of department outcomes. Key performance indicators are the foundation for organizing improvement activities in tasks which can be accomplished in tandem with daily management.

---

[12] Handler A, Issel M, and Turnock B. A conceptual framework to measure performance of the public health system. *American Journal of Public Health*. 2001, 91: 1235–1239.

Modular *kaizen*: Dealing with Disruptions   Chapter 1

Quality Improvement Process

An established QI process brings consistency to the agency's approach to managing performance, motivates improvement, and helps capture lessons learned. An established QI process may focus on an aspect of performance, such as customer satisfaction, or cut across the entire health agency. Rather than leave the use of performance data to chance, some health departments have instituted processes to ensure that they continually take actions to improve performance and accountability. In its highly dynamic process for system-wide improvement, the Florida Department of Health charges its Performance Improvement Office with coordinating resources and efforts to perform regular performance management reviews and provide feedback to managers and local county administrators. As part of the state's QI process, state and local staff develop collaborative agreements that specify what each party will do to help improve performance in identified areas.

Chapter 2: The House of Modular *kaizen*

Introduction

Modular *kaizen* is based on the concept of Lean Enterprise[1], which uses tools for efficient use of resources across the whole system of interrelated processes. Traditional lean tools grew out of the automotive and industrial sectors and over time were modified to support service and other transactional environments. Modular *kaizen* modifies many of the same tools for a highly interruptive, fast-paced workplace.

Figure 2.1 lists the major tools of Modular *kaizen*. These tools are designed to assess current state performance, identify process disruptions, and reduce or eliminate any waste which reduces the efficiency of the overall flow of operations.
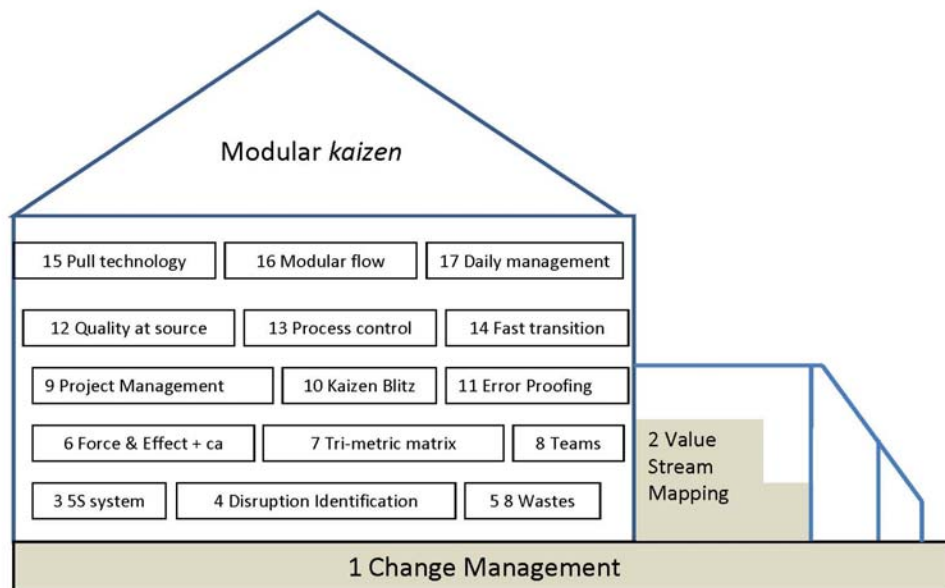
Figure 2.1: The House of Modular *kaizen*

As shown in Figure 2.1, the foundation for any improvement effort is Change Management. Chapter 9 describes the basic requirements for managing change. Modular *kaizen* uses change management to anticipate potential change to the organization.

---

[1] Beecroft GD. Duffy G. Moran J. *The Executive Guide to Improvement and Change*. Milwaukee, WI: Quality Press; 2002.

Change creates an opportunity for improvement. The entry into the House of Modular *kaizen* is Value Stream Mapping, the technique for identifying opportunities for efficiency and elimination of process waste.

PDCA: Use of the Modular *kaizen* basic tools

Plan
2: Value stream mapping
4: Disruption identification
7: Tri-metric dashboard
13: Process control

Act
7: Tri-metric dashboard
13: Process control

Act **Plan**

Check **Do**

Check
3: 5S
5: 8-Wastes
6: Force & Effect + ca
7: Tri-metric dashboard
13: Process control

Structure
1: Change management
8: Teams
9: Project management
17: Daily work management

Do
10: Kaizen blitz
11: Error proofing
12: Quality at source
14: Fast transition
16: Modular flow

Figure 2.2: Sequence of Modular *kaizen* tools by PDCA phase

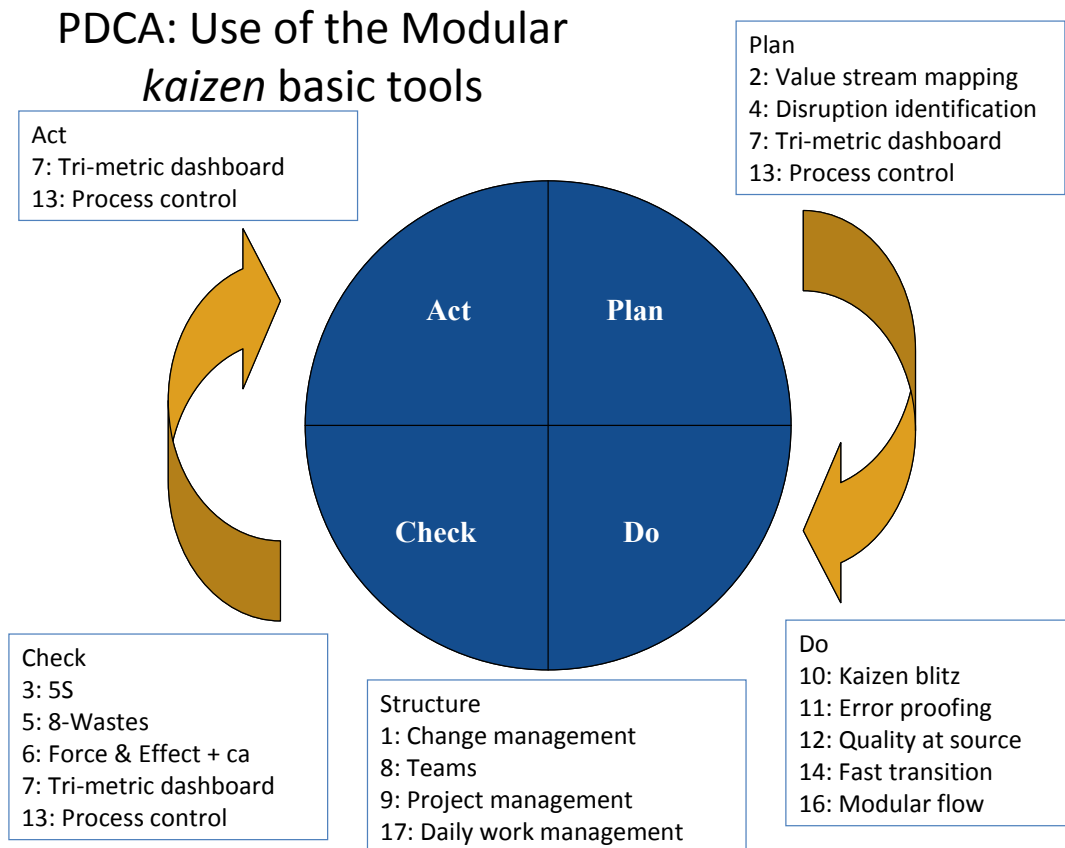Figure 2.2 suggests a sequence for using the tools of Modular *kaizen* within the Plan–Do–Check–Act (PDCA) cycle for process improvement. Strategic tools are used to establish an overall structure to support PDCA activities. During the **Plan** phase of the PDCA cycle, measures are used to identify any disruption to the expected process flow. Opportunities for improvement are prioritized based upon an integrated performance management system, tracking key objectives of the organization. Chapter 3 describes the value of alignment to organizational priorities using performance management. The **Do** phase uses tools to test improvement options for the best alternative, based upon resources available in the time allowed. The Modular *kaizen* tools suggested during the **Check** phase focus attention on specific areas of disruption, while performance management again is the basis of the **Act** phase, where updated processes are standardized for ongoing sustainment of efficiencies.

The Evolution of the House of Modular *kaizen*

The Modular *kaizen* set of tools is closely related to the traditional Lean Enterprise tool bag. Figure 2.3 is the traditional House of Lean as described by George Alukal and Anthony Manos.[2] The terminology describing the individual tools in the traditional House is based upon manufacturing applications. Success using the lean tools within manufacturing created interest by other industries in realizing the same efficiencies. Early work by Michael George[3] using lean combined with Six Sigma tools within the service industry encouraged many organizations to modify the initial manufacturing tools to a broad range of industries, including healthcare, non-profit, government, and others.

Kaizen-Continuous Improvement

Pull/Kanban	Cellular/Flow	Total Productive Maintenance
Quality at Source	Point-of-Use-Storage	Quick Changeover
Standardized Work	Batch Reduction	Teams
5S System	Visual Controls	Streamlined Layout

Value Stream Mapping
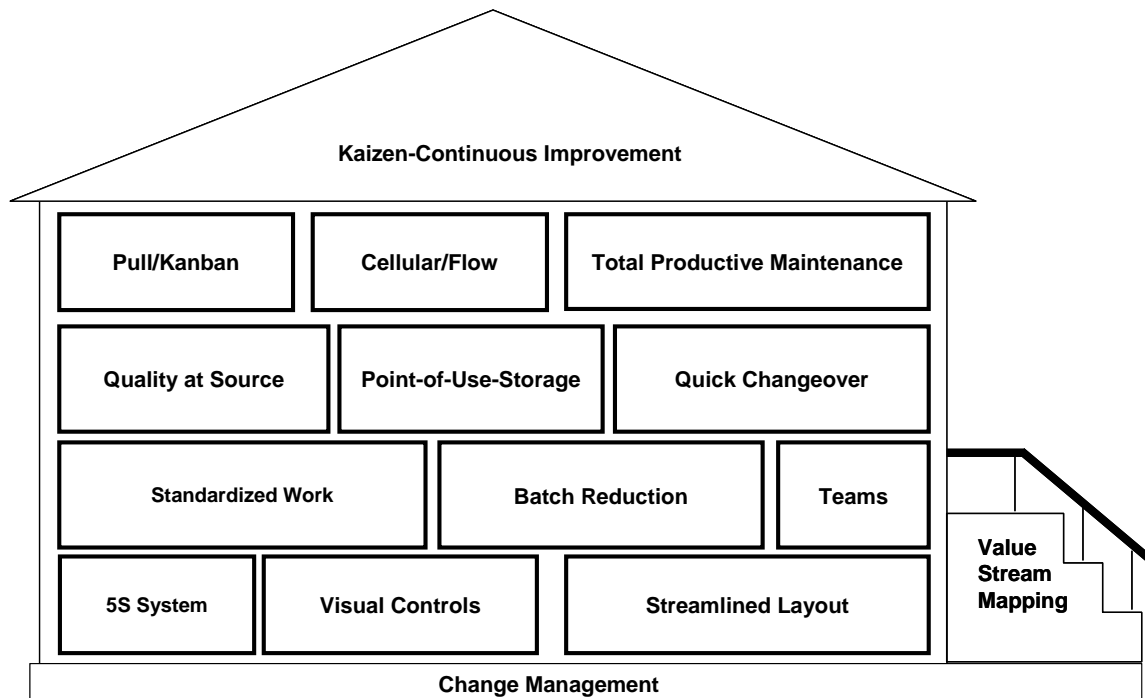
Change Management

Figure 2.3: Traditional House of Lean

The building blocks of the traditional "House of Lean" include:

Change Management: Change management is a process which helps to define the step[s necessary to achieve a desired outcome.

Value Stream Mapping (VSM): VSM is a special type of process map that examines flow within a process with the intent of maximizing efficiency and eliminating waste or non-value added steps.

---

[2]Beecroft GD. Duffy G. Moran J. *The Executive Guide to Improvement and Change*. Milwaukee, WI: Quality Press; 2002.
[3]George M. *Lean Six Sigma for Service*. New York: McGraw-Hill; 2003.

15

5S System: 5S is a visual method of setting the workplace in order. It is a system for workplace organization and standardization. The five steps that go into this technique all start with the letter S in Japanese (*seiri, seiton, seison, seiketsu* and *shitsuke*). These five terms are loosely translated as *Sort, Set in order*, *Shine*, *Standardize*, and *Sustain* in English. This Lean Six Sigma (LSS) tool is used often in both front and back office applications. Clean, orderly workplaces reduce both aural and visual noise.

Visual Controls: The placement in plain view of all tooling, parts, production activities and indicators so that everyone involved can understand the status of the system at a glance is crucial. Labeling of storage cabinets, closets, and other workstation resources is an example of this tool, along with diagrams of frequently performed activities for either customers or staff.

Streamlined Layout: A workplace needs to be designed according to optimum operational sequence. Value stream mapping is a means of representing flow of the product or service through the process. A few of the important components of this flow include value-added activities, non-value-added activities, non-value-added but necessary activities, work in process (WIP), inventory (queues), processing time, and lead time.

Standardized Work: The consistent performance of a task according to prescribed methods without waste and focused on ergonomic movement is important. Spaghetti diagrams are a visual representation, using a continuous flow line to trace the path of a task or activity through a process.

Batch Reduction: The best batch size is one-piece flow. If one-piece flow is not appropriate, the batch size should be reduced to the smallest size possible.

Teams: In the lean environment, emphasis is on working in teams, whether they are process improvement teams or daily work teams. Lean Six Sigma incorporates the use of teams whenever possible to provide multiple perspectives for decision-making and problem-solving.

Quality at Source: Inspection and process control by front line employees helps them to be certain that the product or service that is passed on to the next process is of acceptable quality. Since staffing is usually tight, having the skills readily available by more than one person in the office saves time and provides backup within the office.

Point-of-Use-Storage: Raw material, parts, information, tools, work standards, procedures, etc. should be stored where needed. Natural work teams within a department often design a common work area to maximize availability of supplies and work stations for effectiveness of staff within the office.

Quick Changeover: The ability to change staff or equipment rapidly, usually in minutes, so that multiple products in smaller batches can be run on the same equipment is crucial. Another common application is the consolidation of computerized data input systems so

16

that staff does not have to take one program down and bring up another to input different forms when working with the same customer.

Pull/Kanban: This system of cascading production and delivery instructions from downstream to upstream activities directs that the upstream supplier does not produce until the downstream customer signals a need, using a "Kanban" system.

Cellular/Flow: Physically linking and arranging manual and machine process steps into the most efficient combination to maximize value-added content while minimizing waste leads to single-piece flow.

Total Productive Maintenance: This lean equipment maintenance strategy maximizes overall equipment effectiveness. Although the title of this tool seems complex, it is really quite simple. Every office has equipment such as copiers, printers, or shredders that require scheduled maintenance, calibration, new release updates, etc. A preprinted checklist or electronic reminder system for when administrative, technical, or other programmatic updates are required minimizes downtime or lack of availability of equipment when needed.

Figure 2.1 uses the format of the traditional House of Lean to identify the major tools adjusted for the Modular *kaizen* application appropriate for highly "interruption-driven" organizations. Some of the tools are pulled directly from the traditional lean techniques. Others have been slightly modified to support the modular nature of the planned improvement steps of Modular *kaizen*. Change management remains the foundation for Modular *kaizen*, just as it supports the traditional lean concepts. A Culture of QI requires the adoption of change on a continuous basis to maximize resources based upon flexibility and agility to meet customer requirements. The tool which identifies opportunities to employ the tools of Modular *kaizen* is also consistent with traditional lean concepts. Value Stream Mapping, as follow-on to flowcharting and process-mapping, remains a robust vehicle for identifying disruptions and opportunities for improvement within existing processes or those under initial design.

The tools within the House of Modular *kaizen* are:

1. **Change Management**: A process which helps to define the steps necessary to achieve a desired outcome.

2. **Value Stream Mapping (VSM)**: A special type of process map that examines flow within a process with the intent of maximizing efficiency and eliminating waste of non-value added steps.

3. **5S System**: A visual method of setting the workplace in order. The use of 5S is no different under the concept of Modular *kaizen* or traditional lean. Although first documented for organizational effectiveness within manufacturing and assembly operations, 5S is successfully used in health department, hospitals, front offices of small businesses, non-profits, and organizations of all types. Some simple examples of each of the five organizing activities are:

17

a. Sort – Separate items, documents, or ideas. Distinguish the necessary from the unnecessary. Get rid of what no longer holds value. Free up space for other materials and ideas that support the organization more effectively.

b. Straighten – "A place for everything and everything in its place" is applicable for this step. Pegboards with locations clearly marked in a home garage or workshop, the numbering and proper placement of books in a library, or organization of the supply cabinet in the office so that it is neat and easy to use would exemplify the result of straightening.

c. Shine – Tidying the copier room, washing and waxing the reception area, keeping oil and grease off of the automobile service bay floor, or keeping equipment clean in the laboratory exemplify this step.

d. Standardize – It is helpful to have as few different ways to perform frequent activities as possible. Monitor and maintain the first three S's. Standardized processes, workflows, documentation and equipment, where possible, simplify the workplace. This element facilitates cross-training, providing backup for tasks and minimizing work procedures.

e. Sustain – Exert the discipline to stick to the 5S procedures for the long-term. Set a schedule to Sort, Straighten, Shine, Standardize and Sustain so that this iterative set of activities perpetually re-invigorates the workplace and the staff who populate it. Clean, orderly workplaces reduce noise, both aural and visual.

5S can be instituted in any location. An environmental health department used 5S to:

- Sort in-process applications for Septic System Permits;

- Set-in-Order all applications by placing them in "Green Folders" for visual recognition;

- Shine the desks and work areas, thereby locating all "lost" in-process applications that were causing the average turn-around time for processing to be extended;

- Standardize the Septic System Permit application process by flowcharting and documenting the steps for consistency and ease of training new employees; and

- Sustain the process by including measures and review points for the office's senior coordinator and first-line supervisor.

4. **Disruption identification**: Identifying the places where work is interrupted or where the process breaks down provides excellent opportunities for improvement. Disruptions identify either organizational bottlenecks or specific breaks in the flow of daily operations and procedures that waste time or other resources.

5. **8 Wastes**: If an activity consumes resource time or capital but does not add value, it must be wasteful and should be eliminated. The idea is to eliminate as many of these wastes as possible in daily work activities. Removing waste makes additional time and resources available for higher priority outcomes of the department. An explanation of the Eight Types of Waste is shown in Table 2.1.

6. **Force & Effect + ca**: The Force & Effect Chart is designed to identify barriers to agreement among team members concerning a specific situation. Once barriers are identified, Check and Act (c + a) phases of the improvement cycle are used to resolve disruptions and return stable operation.

7. **Tri-metric dashboard**: The Tri-metric dashboard helps the decision maker measure important aspects of a process's capacity, process capability, and outcomes.

8. **Teams**: In the lean environment, the emphasis is on working in teams, whether they are process improvement teams or daily work teams. Modular *kaizen* employs teams not only for the traditional purposes but also for backup when subject matter experts are interrupted from their improvement efforts to address other key business priorities.

9. **Project management**: This tool involves all activities associated with planning, scheduling, and controlling projects. Good project management ensures that an organization's resources are used efficiently and effectively.[4]

10. **Kaizen blitz**: Kaizens, or blitzes, are improvement events where people work only on improvement for a few days, up to a full week. In a traditional Kaizen project, the people from a particular work area come together with a few experts for four or five consecutive days and complete most or all of a Define-Measure-Analyze-Improve-Control (DMAIC) cycle on a narrowly targeted, high-priority issue. The model has been so successful that this basic approach has been adapted to other uses such as service design sessions.

11. **Error proofing**: Error-proofing refers to the implementation of failsafe mechanisms to prevent a process from producing defects.

12. **Quality at source**: Inspection and process control by front-line employees ensures that the product or service that is passed on to the next process is of acceptable quality. Since staffing is usually tight, having the skills readily available by more than one person in the office saves time and provides backup within the office.

---

[4] Evans J, Lindsay W. *The Management and Control of Quality*, 6th Ed. Mason, OH: Thomson Southwestern; 2005.

19

Waste	Description	Public Health Example
Over-processing	Spending more time than necessary to produce the product or service.	Combining customer survey instruments into one form rather than developing specific instruments for each program.
Transportation Handling	Unnecessary movement of materials or double handling.	Department vehicles stored in central facility, requiring constant movement of vehicles to and from other high- traffic locations.
Unnecessary Motion	Extra steps taken by employees and equipment to accommodate inefficient process layouts.	Immunology testing equipment stored in cabinets far from specialist work area.
Unnecessary Inventory	Any excess inventory that is not directly required for the current customer's order.	Overestimating vaccination support materials, requiring additional locked storage cases, inventory counting, and reconciliation.
Waiting	Periods of inactivity in a downstream process that occur because an upstream activity does not produce or deliver on time.	Paperwork waiting for management signature or review.
Defects	Errors produced during a service transaction or while developing a product.	Ineffective scripts for initial intake applications. Unclear directions for filling out required forms.
Overproduction	Items produced in excess quantity and products made before the customer needs them.	Insurance filing or immunization record opened before all required information is received.
People	Not fully using people's abilities (mental, creative, skills, experience, and so on) under/overutilization of resources.	Poor job design, ineffective process design within business functions, lack of empowerment, maintaining a staffing complement not in balance with workload demand.

Table 2.1: Eight Types of Wastes

13. **Process control**: This tool is used to monitor, control, and improve process performance over time by studying variation and its source. Modular *kaizen* uses a combination of run, control, and Paynter Charts to track and represent process performance visually.

14. **Fast transition**: This tool is translated from Quick Changeover in a production to a service environment by providing cross training for staff to allow quick movement from one project or customer requirement to another within a small office.

15. **Pull technology**: This system of cascading procedures and instructions from downstream to upstream activities ensures that the upstream supplier does not perform activity related to a specific transaction or service until the downstream customer signals a need.

16. **Modular flow**: Organizations often empower an improvement team of cross-functional clerical staff, specialists, and management to create a seamless sequence of steps from customer application through processing to delivery and final review. Modular *kaizen* designs these sequenced steps into segments that can be efficiently performed within the time frames allowed by a highly interruptive workplace.

17. **Daily work management**: The utilization of the tools and techniques of quality improvement (QI) in day-to-day work activities by those doing the work is crucial. Daily work management puts control and change at the lowest level possible within the organization. QI in daily work is called "daily work management" (DWM) because it uses the tools and techniques of QI to make daily work better, more customer-focused, and more manageable.

Use of the tools contained within the House of Modular *kaizen* is not limited to the PDCA phase in which they are listed in Figure 2.2. Although the tools strongly support the phase identified, in Figure 2.2, like all tools, they are to be used when conditions are appropriate. A subsequent chapter suggests the sequence of tool usage under the DMAIC cycle of lean Six Sigma. Modular *kaizen* facilitates designing and implementing process improvement activities in a series of tasks which can be accomplished within the normal work flow of assigned team members and subject matter experts.

21

Chapter 3: Implementing Performance Improvement through Modular *kaizen*

Modular *kaizen* supports performance improvement across a timeline that recognizes the highly volatile nature of core business processes. The pace of business has increased rapidly over recent years. No longer can leadership rip critical resources away from front line operations to focus on parallel improvement efforts. Improvement activities must be integrated into existing workloads, using scarce resources when they are most available.

Modular *kaizen* is driven by the existing key performance measures established throughout the organization. Where measures are not yet identified, Modular *kaizen* techniques identify metrics supporting top priorities for customer service and internal efficiencies. Pre-project planning identifies priority areas of improvement for rapid results. By using the performance measurement system already integrated into daily operations, process improvement activities are targeted on effective outcomes and ongoing reduction of waste. Existing technology and information system resources are exploited as much as possible, while identifying potential areas for consolidation of data systems and improved functionality.

The inclusive nature of a Modular *kaizen* team addresses the needs of both internal and external customers. Since project milestones may be set more widely apart than normal Kaizen events, less pressure is placed on teams to rush sampling or other activities during the assessment phase. Analysis and decision-making are data-driven, using both interim and outcome effectiveness measures. Milestone reviews are built into the Modular *kaizen* timeline for senior management approval and adjustment. Project documentation creates an archive of empirical evidence to be shared with other agencies and public health system partners.

Modular *kaizen* is not a training event but is a hands-on, facilitator-led, problem-solving process that utilizes in-house subject matter experts to customize the improvement effort and develop exacting performance evaluation instruments. Highly visible Modular *kaizen* improvement efforts draw and retain top talent through challenging involvement with critical processes. Margaret J. Wheatley, bestselling author and researcher of living systems within human organizations, writes;

> "I don't believe that organizations are ever changed by imposing a model developed elsewhere. So little transfers to, or inspires, those trying to work at change in their own organization. In every organization, we need to look internally, to see one another as the critical resources on this voyage of discovery."[1]

Off-the-shelf improvement models are rarely effective tools for successful operational implementation. Improvement must be based upon the needs of the specific organization.

---

[1] Wheatley M. *Leadership and the New Science – Discovering Order in a Chaotic World,* 2nd Ed. San Francisco, CA: Berrett-Koehler Publishers, Inc; 1999.

Modular *kaizen* is a concept within the family of Kaizen approaches that recognizes the reality of the environment and culture in which organizations function. Each organization evolves as a result of decisions made by leaders as they:

- define the strategic plan;

- identify target customer populations;

- develop core processes;

- identify areas to cut waste; and

- establish performance measures.

The hands-on facilitated performance improvement cycle involves management and staff at all levels of the organization. Since no two organizations are exactly the same, each Modular *kaizen* event varies depending on culture, leadership, and critical performance requirements. Modular *kaizen* design teams may be comprised of internal personnel, subject matter experts, customers, cross-functional partners/agencies or others familiar with the process targeted for improvement. Since each Modular *kaizen* project is customized to address top organizational goals, the use of skilled contract resources is usually well within the scope of regulatory limitations.

A traditional Kaizen event is a problem-solving approach that requires training and facilitation to analyze and re-orient a process. The overall concept of Kaizen is a system that encourages everyone to suggest incremental changes. No "one time" event to improve occurs. Under Kaizen the organization is constantly improving. Kaizen does well in an organization that encourages and rewards teamwork and a customer-centric culture, using daily work management at all levels to make individual improvement.

Most Kaizen improvements are designed as fast-track events which pull leaders and subject matter experts out of the day-to-day activities to focus solely on the desired result. More recently, the quality community has put even more focus on separating the improvement activity from daily operations by initiating the Kaizen Blitz, which is the same as a Kaizen event but is focused on a short spurt of between two and eight days to improve a process. The Blitz requires substantial use of human resources for this time period. The Blitz configuration totally removes the strongest members of the organization for the duration of the improvement effort.

Modular *kaizen* is a modification of the traditional Kaizen improvement process, designed to provide the same rapid results without removing critical personnel from daily operations. Modular *kaizen* uses a step-function approach by breaking the improvement cycle into blocks of action plans and tasks which support the highly interruptive environment of today's organization. Effective use of data, leadership, and communication provide ongoing accountability so that tasks are initiated or paused without losing improvement gains. Existing resources are coordinated with other top priority programs, seeking to maximize effectiveness while eliminating waste.

24

If an organization can improve from the inside by changing processes, reducing waste, and improving efficiency, capacity, and quality, it will be in a better position to absorb the change and continue to do business. As quality improves, disruptions to the system are reduced. As efficiency improves, the ability to satisfy customers improves. As resources are more efficiently used, costs can be kept under control.

Bringing a Quality Improvement (QI) philosophy to an organization takes time. It requires building a culture that says, "Everyone, everywhere in the organization, will improve every day." Leadership, creative thinking, and problem solving must occur at all levels. All stakeholders must understand why something is done, what services the organization provides, and how they can best deliver those services. Training in the tools and techniques of lean are necessary. A change in culture requires a change in the underlying organizational processes since culture follows process.

It sounds like a daunting undertaking, but when an organization gets involved in improvement and change, momentum starts to build, and everyone in the organization can see the weaknesses in the processes and are equipped and empowered to correct them. Then, an organization can make quantum leaps in quality, efficiency, customer/client access, and staff satisfaction. Customers are happier and more satisfied. Employees are freed from mundane and wasteful tasks and can spend more time performing vital functions and serving their customers. Overall, financial statements and overall performance improve substantially.

The tools of QI are easy to learn. It is one of the best features of QI. With a little training, everyone can apply these tools. Once people are taught how to see the waste in a process, they will see it everywhere. The challenge is to apply leadership, priorities, and resources to the identified problems to ensure that the right tools are used to find and fix the root cause of a problem and then organize the work to eliminate the problem.

Two of the most common uses of Kaizen are:

- Kaizen Event –a problem-solving approach that requires training and facilitation to analyze and re-orient a process.

- Kaizen Blitz – same as an event but focused on a short period of two to eight days to improve a process, requiring substantial use of human resources.

This book is about the use of Modular *kaizen*. Modular *kaizen* is defined as the improvement or redesign project planned along a timeline that recognizes the highly volatile nature of the customer's core business processes. High-priority projects are planned at the senior leadership level to establish realistic milestones, resources, and measurements to ensure a return on investment that includes not only financial commitment but also the involvement of highly skilled facilitators and subject matter experts.

Modular *kaizen* is effectively structured to take advantage of an assessment of the eight Lean Wastes during process improvement activities. Pre-project planning provides a platform for identifying potential areas of waste before resources are expended on early measurement activities. We focus on the Limited Information Collection Principle[2] to determine where the most likely areas are located for waste reduction. This priority setting of tasks encourages experiments designed to identify effective data gathering based on operational feedback.

Modular *kaizen* is not a training event but is instead an interactive, consultant/facilitator-led, problem-solving process that utilizes in-house subject matter experts using the Modular *kaizen* model shown below in Figure 3.1.
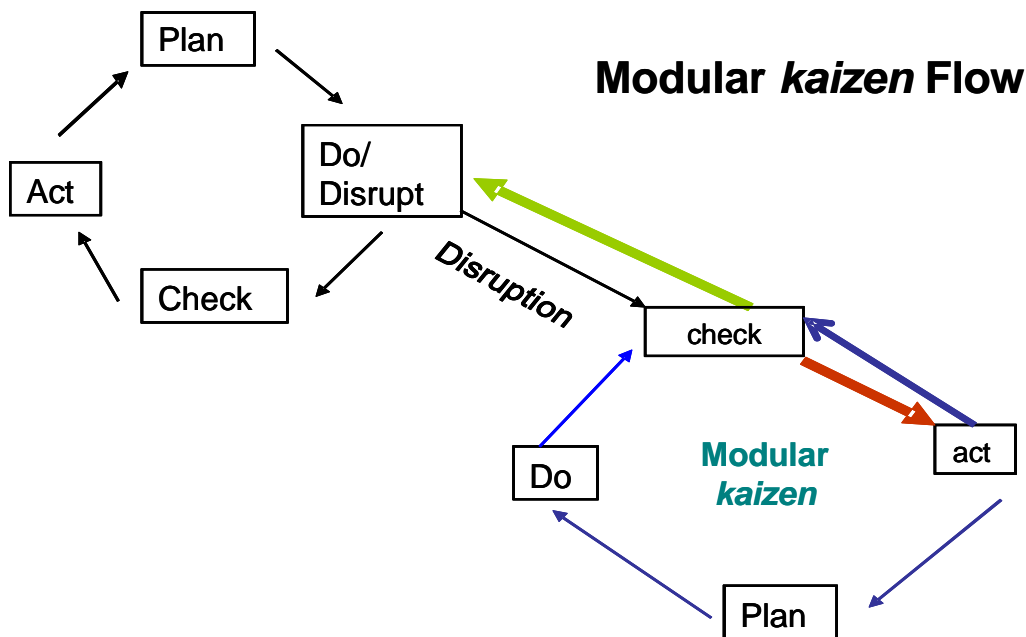
Figure 3.1: Modular *kaizen* flow

The Modular *kaizen* model starts with **Check** where it is crucial to investigate and understand the disruption and see if it has a special cause, understand what the severity/urgency is, estimate who/what is impacted, estimate the length of the disruption timeline and use the Limited Information Collection Principle to guide data collection.

The next step is **Act.** Based on the data gathered in **Check**, the response team would:

1. Do nothing – continue to monitor the disruption until they feel it has either dissipated or needs more attention. If more attention is needed, then establishing an investigative team to analyze the disruption and report back is important. The report back would be a high- level scope document.

---

[2] Hoffherr G, Moran J, and Nadler, G. *Breakthrough Thinking In Total Quality Management*. Englewood Cliffs, NJ: PTR Prentice Hall; 1994.

26

2. Respond by taking short-term actions to stabilize the process while the team allocates time to use the PDCA Cycle to solve the problem and bring the process back under control.

After the **Do** phase of the PDCA Cycle, it is time to evaluate and determine when disruption is under control. Resources can now be returned to departments to resume regular activities. This action is represented by the green line on the model shown in Figure 3.1. At this point, the team documents lessons learned, knowledge gained, and any surprising results that emerged. It is important to continue to monitor activities and hold the gains so that the disruption remains under control.

If the disruption is not under control, activity follows the red line in Figure 3.1. The improvement team must modify the approach taken or repeat the Plan/Do phase to make new improvements and then check to see how the disruption responds to the new approach.

A Modular *kaizen* example:

One day in the early morning hours in July 2001, a major power outage happened in a major city, and it impacted a hospital that was filled with patients, an active operating room with a full schedule, and a rehabilitation unit that was filled to capacity. The temperature that day was expected to reach 98 degrees. First reports were that power would not be returned to service for a week.

The senior staff quickly assembled at 6:30 AM. Rather than going into a panicked planning mode, they calmly realized that this was an unplanned disruption to their regularly scheduled activities.

The first thing that they did was "Check." What was the real status of the power outage and what were the conditions within the hospital? The president of the hospital called the mayor and president of the utility company to explain the immediate needs of the hospital. It was explained to the president of the utility company that a press conference with the mayor was scheduled at the hospital at 9:00 AM. He was invited to attend to explain why the hospital would have to close for a week. Board members were notified to see where they could put pressure on the system to get the power on and what recourse the hospital may have to recover any losses. Again, no action was taken; they simply "Checked" to see what leverage resources were available.

The medical and nursing staff did a "Check" on patient status to determine who could withstand a temperature increase and who could not. Those patients who could not would be transferred. What surgeries could be postponed and which ones had to happen? What rehabilitation activities could take place and what should be postponed if power could not be restored?

27

The maintenance staff did a "Check" on the status of the standby generators, secured regular fuel deliveries, and had the in-house electrical system checked to ensure that no potential problems occurred. In addition, they developed a power diagram to show what systems could be handled on internal generators and what would stay down.

Housekeeping "Checked" on how many sizes and types of fans were available. Then they deployed and acquired additional large fans to keep the air moving throughout the hospital.

A patient letter was developed by public relations and distributed to all patients, staff, and relatives explaining the situation. Nursing staff checked in regularly with patients to keep them informed.

These various activities occurred between 6:00 and 9:00 AM. At the press conference, the utility president stated that he would have a large mobile generator at the hospital by 12:00 PM; it was 200 miles away. The mayor called the governor and had a state police escort arranged to transport it more quickly, if possible. The mayor would have all of the roads open when it reached the city limits so that it could move through any potential traffic backups without any delays. The hospital senior staff "Checked" first, understood what they were facing, and then did small "Act" steps to make short-term responses that were grounded in fact and not emotion.
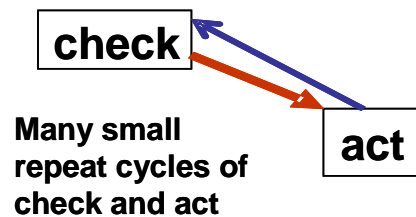
Figure 3.2: The check/act repeating improvement cycle

After the 9:00 AM press conference, "check" of Modular *kaizen* went back into effect. From each of the checks, small actions were taken to stabilize the situation and make the hospital ready for additional generator power. This process is shown in Figure 3.2.

First, maintenance worked with the utility company to determine where the generator would be located and how it would hook in. They determined that a new box was required, and it was installed before the generator arrived. They measured and decided how long a feed was required to reach the new box and what fuel was required. A truck was on site at 11:00 AM, ready to fuel the generator. The utility company and maintenance staff checked the hospital electric distribution system to look for potential failure areas when the new generator was turned on. What could potentially fail was pinpointed, and a fix was determined and ready to go. The hospital leaders understood what they were facing and did "Act" as appropriate to rectify problems that could arise when the generator was being hooked up and power would be transmitted.

28

Leaders then conducted a temperature check, and it was up to 80 degrees. More fans were acquired and deployed; window shades were shut. At 10:30 AM a few elderly patients were transferred to a sister hospital because they needed a cooler environment.

By 11:00 AM, the temperature was still in the bearable 80 degree range. The generator arrived at 12:00 PM and was ready to transmit power at 12:30 PM. By 2:00 PM the temperature was decreasing, and by 5:00 PM it was cool in the hospital.

This situation lasted for three more days, but panic did not ensue. Constant check was the rule throughout this crisis with no panicked planning or arbitrary actions taken. Out of each check came a logical small action plan which was executed. If further follow-up was required, it was acted upon. Staff continued their regular routine in the hospital with occasional update meetings, causing a disruption to their regular schedule. Subject matter experts were called upon as necessary and again they could resume their regular routine with minor interruptions. The hospital operated in a normal mode with a major disruption occurring because they **Check**ed before **Act**ing.

A Modular *kaizen* approach minimized the disruption and made sure that no "action" was executed until "check" had been done to establish the beginning point. Once the situation stabilized, the senior staff did a full PDCA cycle, documenting lessons learned and making plans to ensure that if this situation or crisis impacting the hospital happened again, actions could be taken in advance to minimize the situation.

29

Chapter 4: A System View of the Disrupted Process

Introduction

An organization is a system of activities composed of a web of regularly occurring inter-relationships. A system dovetails and drives excellence across the organization. This system of inter-relationships has common patterns, behaviors, and properties that can be understood through measurement. Measurement is used to develop greater insight into the behavior of these interrelated groups of activities. Measures are gathered from tasks and activities which form complex, goal-oriented processes. Activity level measures are rolled up to department and division levels until consolidated measures finally summarize operations for the health department as a whole.

A system is an organized collection of parts, functions, or subsystems that are integrated to accomplish an overall goal. The system has various inputs which are acted upon by certain processes to produce outputs, which together accomplish the overall desired goal for the system. A system is usually made up of smaller systems or subsystems. For example, an organization is made up of many administrative and management functions, products, services, groups, and individuals. If one part of the system is changed, the nature of the overall system is often changed.[1]

The goal of any organization is to build a highly functioning system that continually exchanges measurement feedback among its various parts. This constant exchange of measures ensures that activities remain closely aligned and focused on achieving the goals of the organization. If any of the parts or activities in the system seems misaligned through its measurement monitoring program, the system must make necessary adjustments to achieve its goals more efficiently.[2]

Work Processes Integrate to Form a System

Both a systems view and a functional view of work processes are important to understand how the subsystems, or functions, are interrelated. The interrelationship usually is in the form of inputs and outputs which are delivered to internal or external customers. These inputs and outputs can be measured both quantitatively and qualitatively to determine how the parts and the system are functioning and where improvements should be made. Figure 4.1 shows a system and functional view of work processes. Big "Q," at the left of Figure 4.1, relates to the quality functions required to sustain the overall performance of

---

[1] McNamara C. Free Management Library. http://managementhelp.org/systems/systems.htm. Accessed February 5, 2011.

[2] McNamara C. Free Management Library. http://managementhelp.org/systems/systems.htm, Accessed February 5,2011.

the organization as it relates to its environment of suppliers and customers. The system level functions of quality are decompressed into smaller functions related to individual programs or departments at the tactical and operating levels of the organization. Little "q" improvements, at the right of the figure, are tasks that create change.
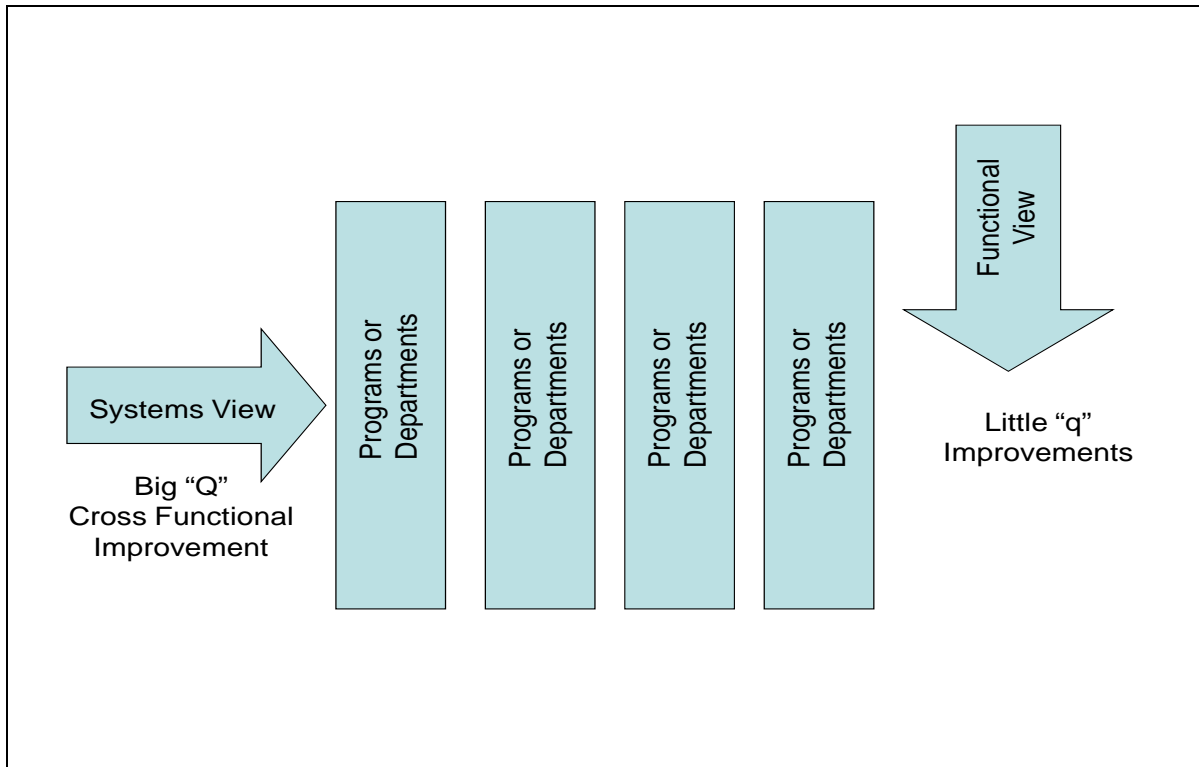
Figure 4.1: Big "Q" drives to little "q"

Quality improvement (QI) in public health is a never-ending process that pervades the organization when fully implemented. Top organizational leaders address the quality of the system at a macro level (*Big "Q"*). In the middle, professional staff attack problems in programs or service areas by improving particular processes *(little "q").* At the individual level, staff seek ways of improving their own behaviors and environments *(individual "q").*[3] Figure 4.2 is a comparison of the strategic, tactical, and operational levels of Big "Q," little "q," and individual "q" within an organization. Modular *kaizen* uses the focusing effect of measurement to translate the performance management strategies identified by leadership (Big "Q") down to the functional or departmental activities (little "q").

---

[3] Duffy G, Moran J, Riley W. *Quality Function Deployment and Lean-Six Sigma Applications in Public Health*. Milwaukee, WI: Quality Press; 2010.

Topic	Big 'Q' – organization-wide	Little 'q' – program/unit	Individual 'q'
Improvement	Specific project focus	System focus	Daily work level focus
Quality Improvement Planning	Program/unit level	Tied to the strategic plan	Tied to yearly individual performance
Evaluation of Quality	Performance of a process over time	Responsiveness to a community need	Performance of daily work
Processes	Delivery of a service	Cut across all programs and activities	Daily work
Quality Improvement Goals	Individual program/unit level plans	Strategic Plan	Individual performance plans

Figure 4.2: Contrasting Big "Q," Little "q," and Individual "q"

When starting their quality journey, public health organizations tend to embrace little "q**,**" which means striving for quality in a limited or specific improvement project or area. This endeavor is accomplished by utilizing an integrated set of QI methods and techniques that help to create a value map,[4] identify the key quality characteristics, analyze process performance, reengineer the process if needed, and provide methods to lock in improvements. Little "q" can be viewed as a tactical approach to implementing quality and beginning to generate a culture of QI within the organization.[5]

Involve People in Describing Processes

The overall concept of managing a complete system of organizational processes includes designing, executing, and optimizing cross-functional business activities that incorporate people, technology, processes, and often community partners. Health departments are expert at involving the community in utilizing scarce resources in innovative ways to resolve problems. Many successful improvement teams involve a combination of staff, community partners, subject matter experts, and specialized consultants who share their expertise for the most efficient resolution to a problem.

---

[4] A value map is a specialized process map which identifies monetary or other quantitative measures of where value is added by the activities performed within a process.
[5] Beitsch L, Bialek R, Cofsky A, Corso L, Moran J, Riley W. Defining Quality Improvement in Public Health. *Journal of Public Health Management and Practice*, 2009; 16(1): 5-7.
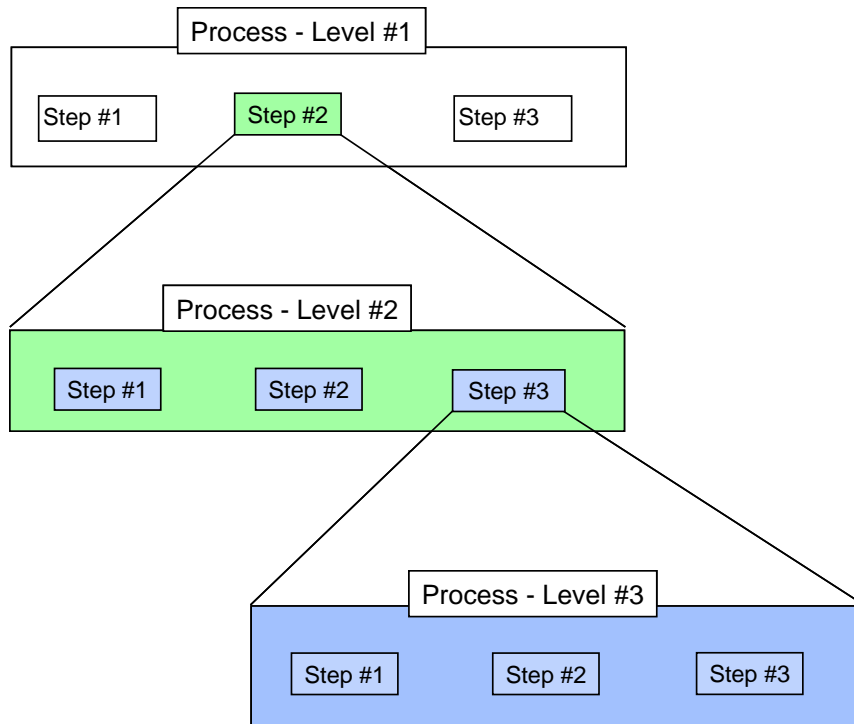
Figure 4.3: Example of the hierarchy of processes from organizational to individual task level

Figure 4.3 illustrates the categorization of a high-level process into steps which can be further categorized into processes at a more detailed level. As the process is expanded from a strategic design to actual work instructions, the level of detail within each process becomes greater until finally the process is equivalent to a work instruction for an individual performing the work. Chapter 10, Daily Work Management, describes this task level and the importance of the individual in identifying disruptions and other opportunities for improving efficiencies within the organization.

Analyze System Disruption

When a disruption occurs in a stable system, the impact it has caused must be defined. One way to analyze the disruption is to identify what has been impacted in the overall system using a Disruption and Impact Matrix as shown in Figure 4.4. The first thing to understand is what areas were impacted in the current stable state. These impacted areas are called Areas of Concern (AoC). AoCs can be functional as well as system-level concerns. Once the AoCs are documented, a broad sense of how they are impacted is determined. The next step is to analyze whether the impacted areas are under the control or influence of the organization. If the organization controls the process under study, action can be taken directly to minimize the impact. If the organization can only

influence the AoC, taking action might be slower since others may need to be involved before making decisions to stabilize the current state. Once we begin to analyze the AoC over which we have control, the Force and Effect Diagram + ca, described in Chapter 6, is a very useful tool to help a response team begin to check and then take small action steps to stabilize the situation.
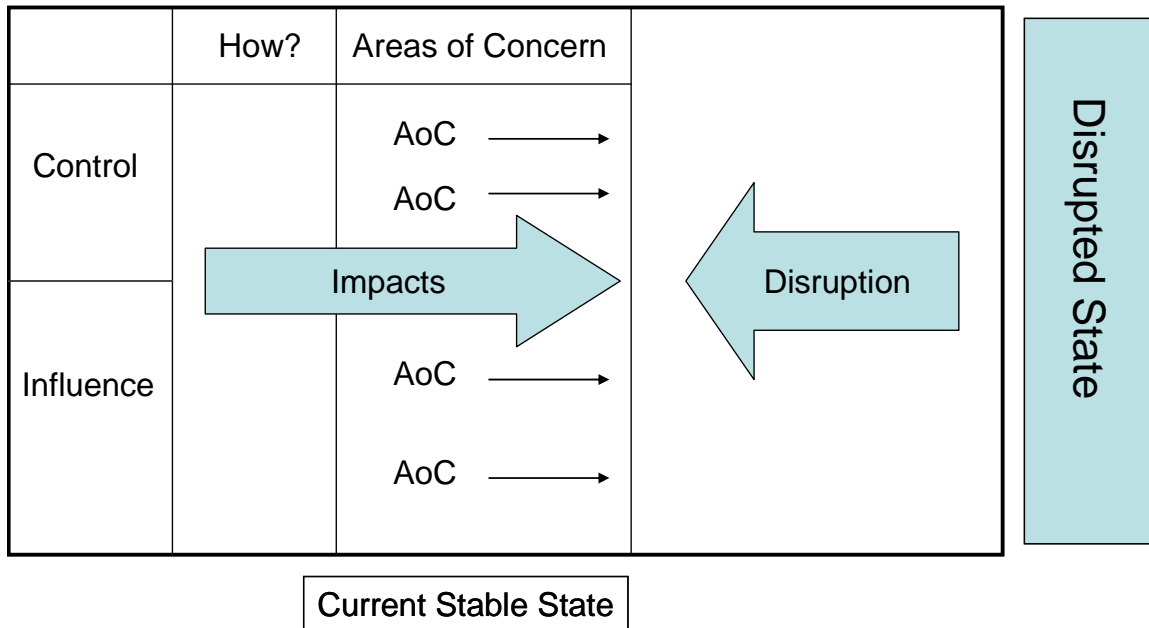
Figure 4.4: Disruption and Impact Matrix

The AoCs should be prioritized within both control and influence categories. It is best to start with the AoCs that have been most strongly impacted since these are usually the ones upon which to focus limited resources.

Modular *kaizen,* as an approach based on the lean family of improvement tools, views the interaction among processes within the organization from an efficiency perspective. Figure 4.5 illustrates methods by which lean activities seek to reduce waste and eliminate redundancies as work is performed. A typical process is shown in Figure 4.5 on the left with embedded error correction, unnecessary tasks, and queuing or waiting before outcomes are realized. The more efficient process flow on the right shows a very direct flow to the desired outcome.

35
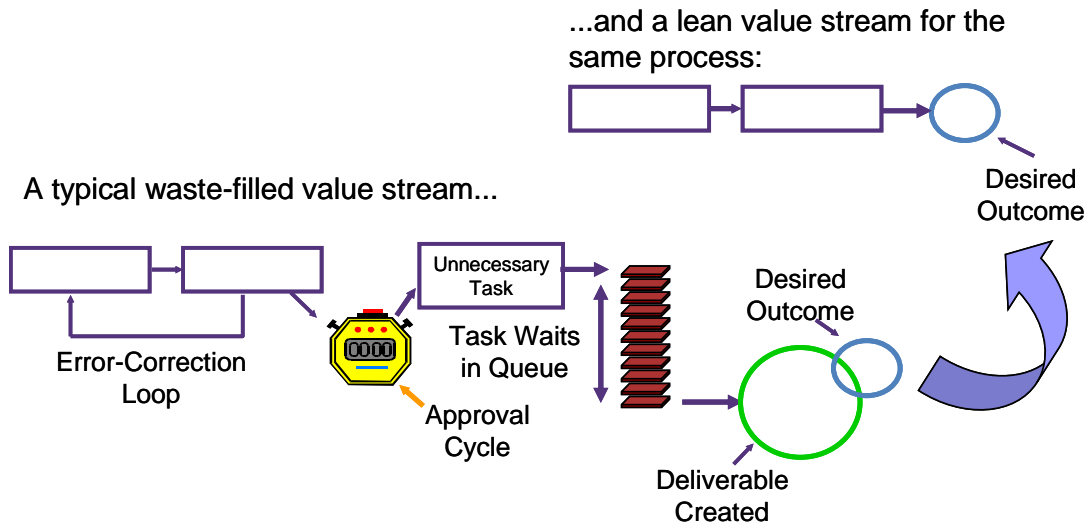
Figure 4.5: Comparison of typical process waste and the efficiency of a lean process

Modular *kaizen* uses the existing pace of the organization to plan improvement activities based upon the highest priority areas of impact. Figure 4.6 illustrates the concept of Kaizen activity as a series of improvement steps interspersed with standard operations. When a problem is encountered, a Kaizen activity is planned and implemented, thus raising the standard of performance for the impacted process. As actual performance is improved, the standard is raised.
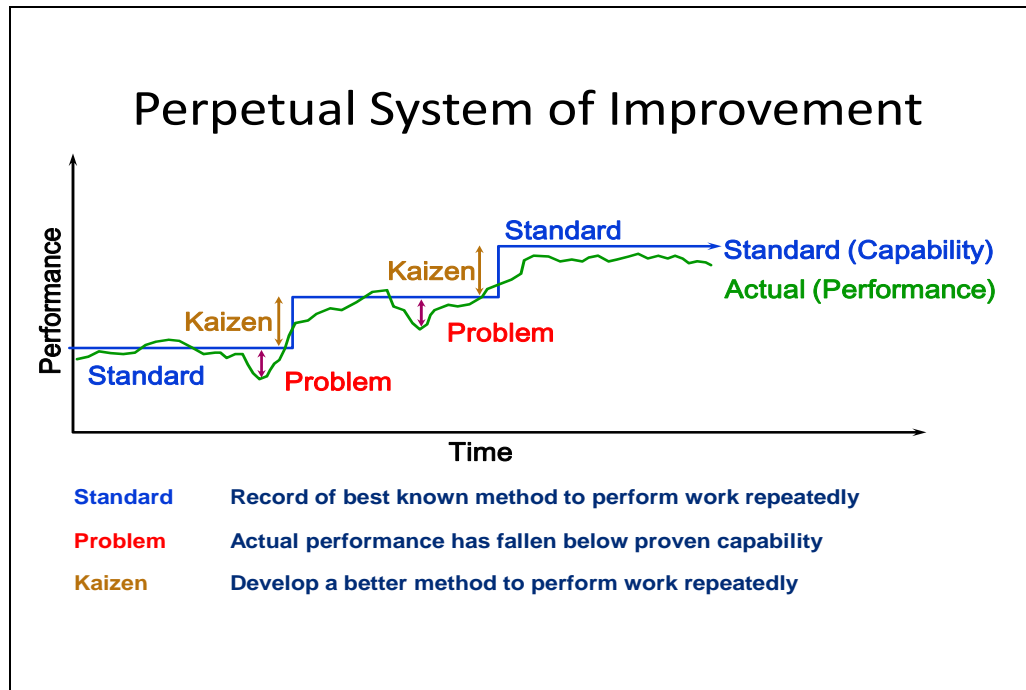
Figure 4.6: The Kaizen method of perpetual improvement

Figure 4.6 is a generic illustration of continuous lean Kaizen process improvement. Traditional Kaizen approaches are designed to group improvements into short, intense bursts of activity which remove the response team from normal operations. An even more focused approach is the Kaizen Blitz, which sequesters the response team until the improvement is defined, piloted, and initially implemented. Although the Kaizen Blitz is an effective approach for high severity situations where work cannot continue until the problem is resolved, not all improvement situations require such drastic means. The benefit of Modular *kaizen* is that improvements are integrated into daily work activities, based upon the impact of the disruption, resources, and personnel available. Detailed examples of integrated improvement are shared in subsequent chapters.

Once the focus of analysis efforts is understood, the next step is to define the disrupted process at a high level. The tool for either a system or functional view of a process is a SIPOC + CM Form shown in Figure 4.7 and a completed SIPOC + CM in Figure 4.8.

S I P O C + CM Form

Constraints:	Ends With:
Begins With:	
Process/Activities:	
	Measures
Inputs:	Outputs:
Suppliers:	Customers:
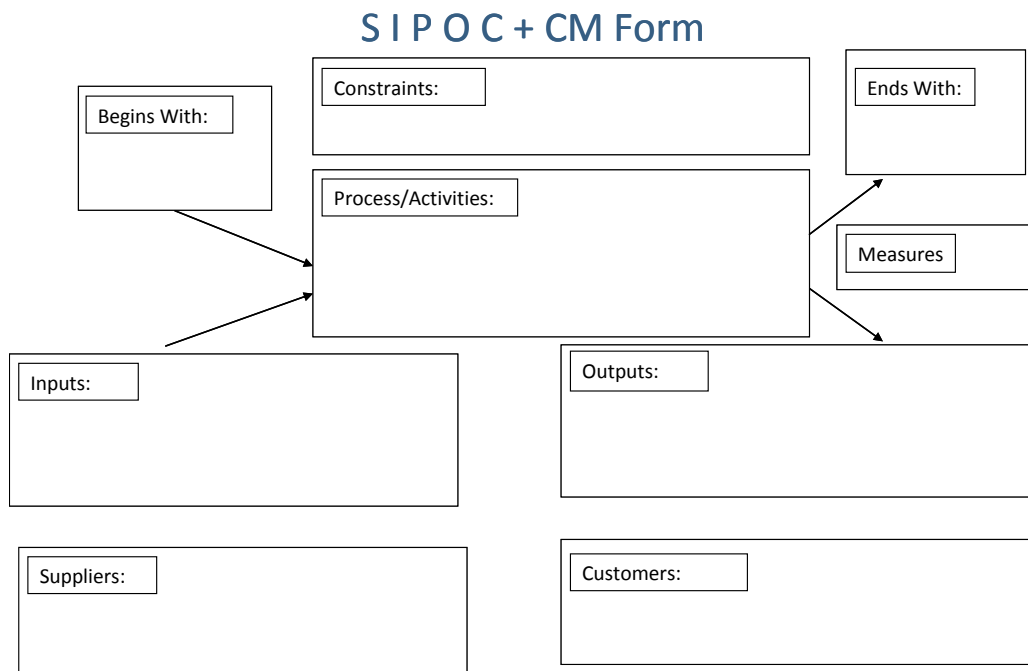
Figure 4.7: SIPOC + CM Form

The SIPOC + CM Form is a data collection form employed to illustrate a system or functional view of a process. It helps the response team gather relevant information about the process, including suppliers, inputs, the high-level process steps, outputs, and customers. The SIPOC + CM Form also prompts the user to identify key measures that assure alignment with organizational priorities, along with constraints that impact the process in its current state. The SIPOC + CM Form is a high-level view of the "As Is" state of a process under investigation.

SIPOC + CM
TITLE V MH

BEGINS WITH:
Local implementation of Iowa's title V Maternal Health Program

ENDS WITH:
Improved childbirth outcomes

CONSTRAINTS:
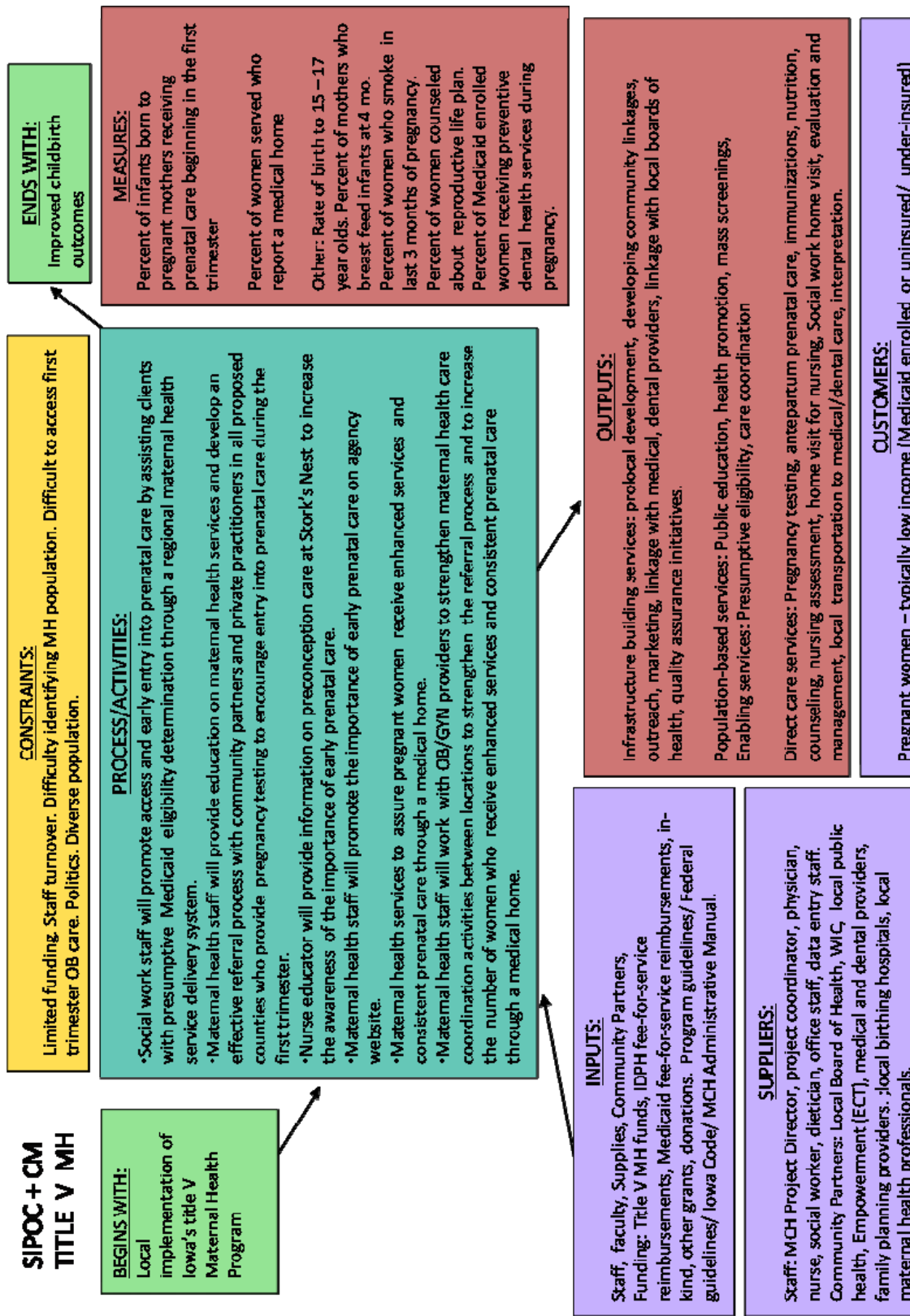Limited funding. Staff turnover. Difficulty identifying MH population. Difficult to access first trimester OB care. Politics. Diverse population.

PROCESS/ACTIVITIES:
- Social work staff will promote access and early entry into prenatal care by assisting clients with presumptive Medicaid eligibility determination through a regional maternal health service delivery system.
- Maternal health staff will provide education on maternal health services and develop an effective referral process with community partners and private practitioners in all proposed counties who provide pregnancy testing to encourage entry into prenatal care during the first trimester.
- Nurse educator will provide information on preconception care at Stork's Nest to increase the awareness of the importance of early prenatal care.
- Maternal health staff will promote the importance of early prenatal care on agency website.
- Maternal health services to assure pregnant women receive enhanced services and consistent prenatal care through a medical home.
- Maternal health staff will work with OB/GYN providers to strengthen maternal health care coordination activities between locations to strengthen the referral process and to increase the number of women who receive enhanced services and consistent prenatal care through a medical home.

MEASURES:
Percent of infants born to pregnant mothers receiving prenatal care beginning in the first trimester

Percent of women served who report a medical home

Other: Rate of birth to 15 – 17 year olds. Percent of mothers who breast feed infants at 4 mo. Percent of women who smoke in last 3 months of pregnancy. Percent of women counseled about reproductive life plan. Percent of Medicaid enrolled women receiving preventive dental health services during pregnancy.

INPUTS:
Staff, faculty, Supplies, Community Partners; Funding: Title V MH funds, IDPH fee-for-service reimbursements, Medicaid fee-for-service reimbursements, in-kind, other grants, donations. Program guidelines/ Federal guidelines/ Iowa Code/ MCH Administrative Manual.

SUPPLIERS:
Staff: MCH Project Director, project coordinator, physician, nurse, social worker, dietician, office staff, data entry staff. Community Partners: Local Board of Health, WIC, local public health, Empowerment (ECI), medical and dental providers, family planning providers. ;local birthing hospitals, local maternal health professionals.

OUTPUTS:
Infrastructure building services: protocol development, developing community linkages, outreach, marketing, linkage with medical, dental providers, linkage with local boards of health, quality assurance initiatives.

Population-based services: Public education, health promotion, mass screenings,

Enabling services: Presumptive eligibility, care coordination

Direct care services: Pregnancy testing, antepartum prenatal care, immunizations, nutrition, counseling, nursing assessment, home visit for nursing, Social work home visit, evaluation and management, local transportation to medical/dental care, interpretation.

CUSTOMERS:
Pregnant women – typically low income (Medicaid enrolled or uninsured/ under-insured]

Figure 4.8: Completed SIPOC + CM Form[6]

---

[6] SIPOC + CM form completed by the Iowa Department of Public Health, Bureau of Family Health for Title V Maternal Health Program. Contributed by Ms. Janet Beaman, Iowa Department of Public Health, 2011.

A SIPOC + CM Form is useful to capture the basics of the process under study. Using the SIPOC + CM Form is a vehicle to get the collective knowledge of team members about a process recorded in an easily viewable format or when concise communication about the process must be conveyed to others.

The process to develop a SIPOC + CM is:
- On a piece of flip chart paper, draw the SIPOC + CM diagram with seven blocks indicating the components of SIPOC.
- Clearly identify the process under study and define the process boundaries (start and end points) so that all participants understand the scope of the analysis.

On the SIPOC+CM form, identify the data available for each of the following major categories:
- **S**uppliers – who or what (internal or external) provides the raw materials, information, or technology to the process
- **I**nputs – what material or information specifications are needed by the process
- **P**rocess – a high-level Flow Chart of the key five to seven core activities that comprise the process, offering a 35,000 foot view of the process. The detail steps will be developed in a flowchart.
- **O**utputs – what the process produces as products, services, or technology
- **C**ustomers – the main users of the process's output
- **+ C** – constraints facing the system or process
- **+ M** – measures being used or to be used to manage the performance of the process

Review the form for accuracy with relevant stakeholders, sponsors, and other interested parties.

The SIPOC + CM is the initial picture of a process. Once the general expectations of the process are agreed upon, the next step is to define the process at the level of individual steps and tasks. Depending on the purpose of the map, one of three major categories of maps may be used.

Process Maps Provide Different Views of the System

Figure 4.9 provides an overview of the three major types of process mapping tools: value map, process map, and flowchart.

A value map is a high-level representation of the process which guides the team through identification of where activities increase the value of the process output in the eyes of the customer or final user. This tool, often called a value stream map, is a system-level instrument, since value is often added through a series of interrelated processes. The result of changing one process in the stream of activities may negatively impact the

39

efficiency of another process within the system. The intent of the value map is to remove all activities which add no value to the end product or service and to reduce any waste which makes those process steps that add value less efficient.

Value Map, Process Map & Flowchart

| Value Map (Value Stream Map)	Process Map	Flow Chart
Starts with first process block	Starts with inputs	Starts with start block
Focuses on one service from beginning to end	Identifies individual process of a larger process	Identifies each step of a process
Does not use decision boxes	Has very few decision boxes	Has many decision boxes
Ends with last process block	Ends with outputs	Ends with end block
Encompasses the complete set of processes and/or steps representing a defined value stream	May be part of a procedure	Is usually a procedure on its own
Illustrates value versus non-value added process activities	Helps paint a high level picture	Helps paint a detail picture

Figure 4.9: Value Map, Process Map, & Flowchart characteristics compared

The process map is a symbolic representation of a single process without a lot of detail. The intent is to provide a high-level picture of the steps within a process. This picture provides a strategic view of how one process may impact others and assists in the overall balancing of resources across a set of interrelated processes.

A flowchart is a detailed picture of a process at the procedural level. This version of a process map includes steps, decisions, inputs from outside the process, and outputs or interchanges with resources or other activities outside the process. The flowchart provides enough information about the process to establish working measures for monitoring and improving outcomes or interim milestones.

**"As Is" Value Stream Map – Access Process Flow**
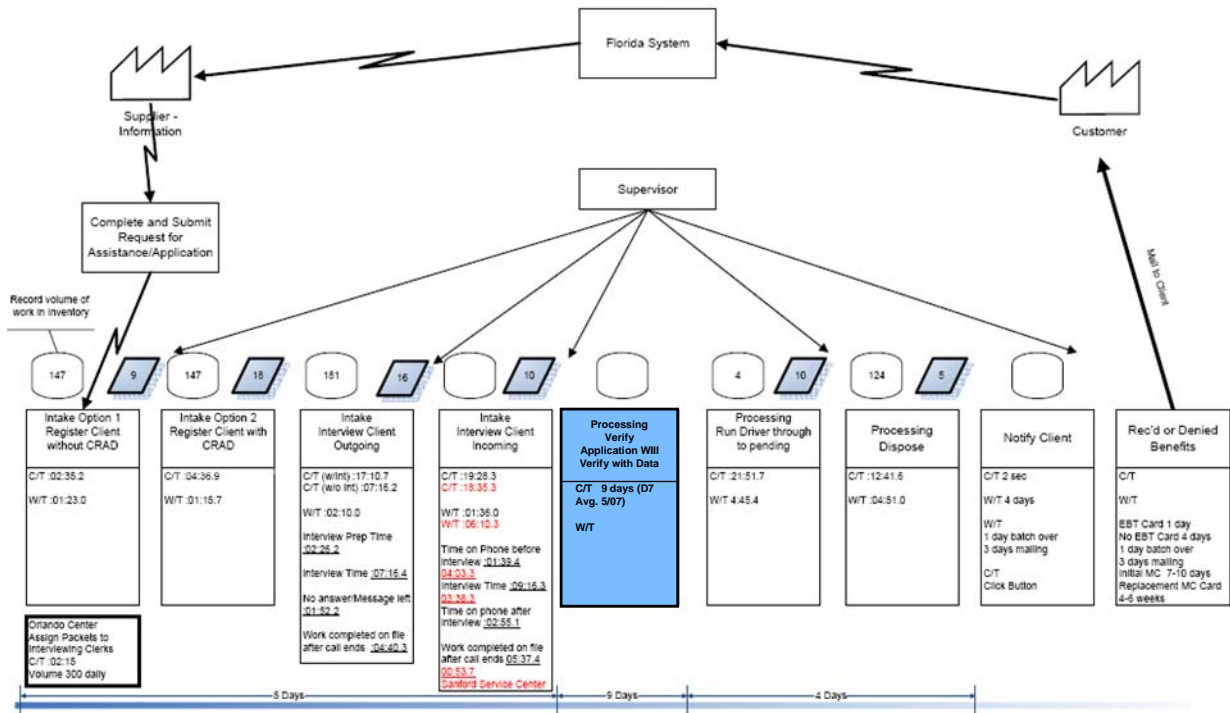
Figure 4.10: As-Is Value (Stream) Map of Florida agency customer intake process – 2008[7]

The example in Figure 4.10 illustrates the output of a value stream map. Each step of the series of processes is measured for wait times, number of persons waiting, cycle time for each step, and total elapsed time. Also included is use of resources (procedures, materials, personnel, etc.). This example does not convert time values into dollar amounts, although many value maps do. The intent of using this version of process map is to reduce disruption and time through the total flow of the overall system comprised of interrelated processes.

Figure 4.11 is a basic process map of a health department childhood immunization clinic. This high-level picture of clinic flow provides enough information for communication about the general operation of the activity. Little detailed information is available from this map type. The intent here is to focus the scope of discussion around a particular activity.

---

[7] SIPOC + CM form completed by the Florida Department of Public Health.

41
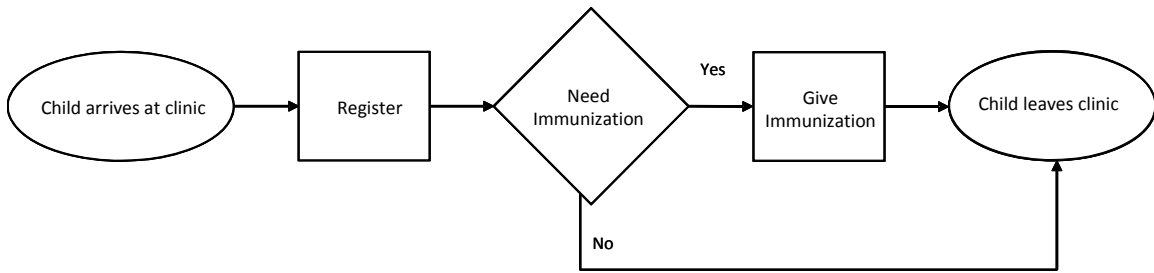
Figure 4.11: Basic Process Map for Childhood Immunization Clinic

The detailed flowchart reflected in Figure 4.12 shows enough detail to identify activity and some outcome measures. The level of each block or decision symbol in the example Septic Systems Permitting flowchart is at the point where a work instruction or procedure could be the next level of granularity if more detail were desired.
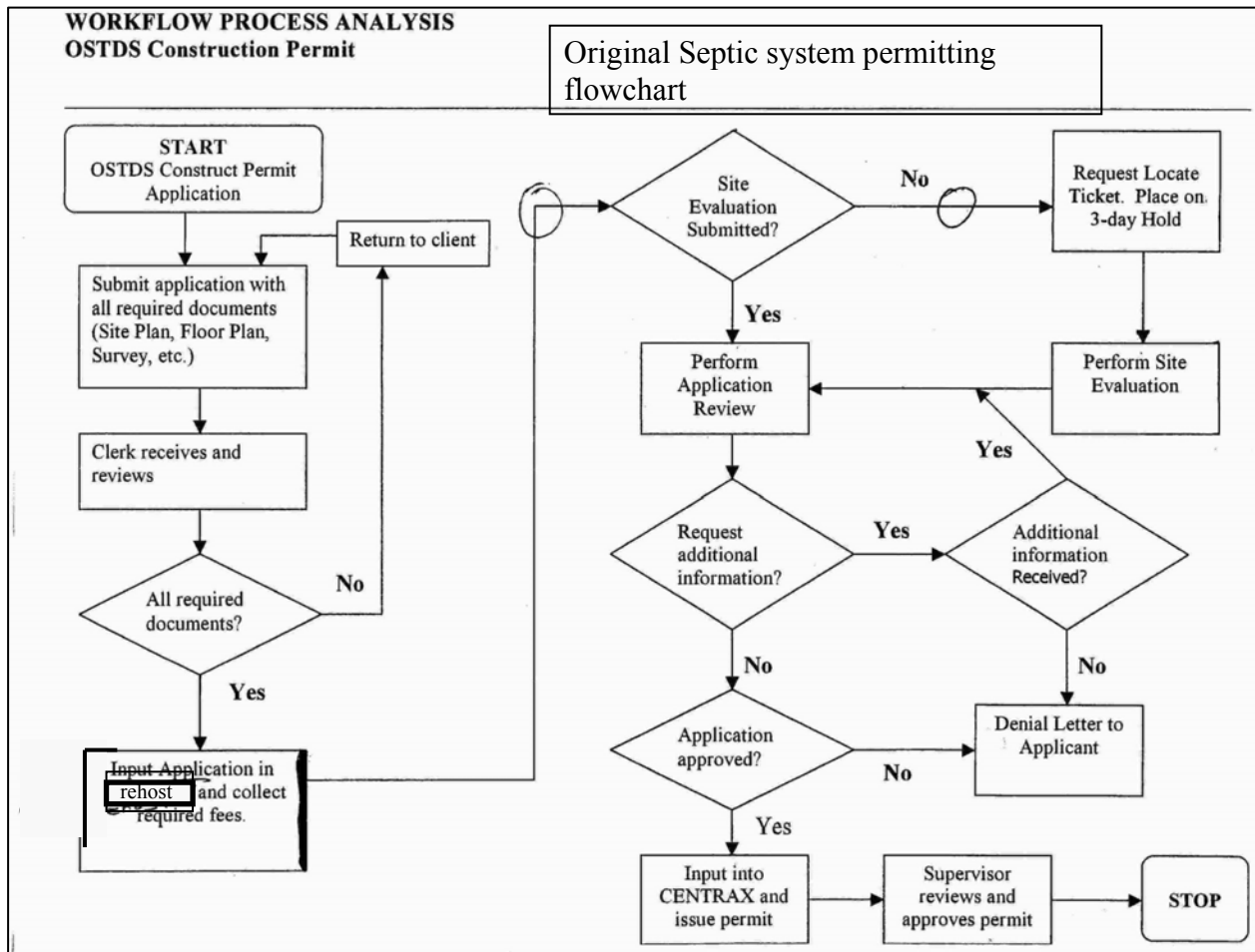
Figure 4.12: As-Is Flowchart of Environmental Services Department Septic System Permitting

42

Understand the System to Manage Performance

Understanding individual processes is critical for measuring and maintaining organizational performance. Improving processes individually, however, without assessing the interconnected impact of change to related processes is a recipe for inefficiency. The tools introduced in this chapter provide the reader with the ability to envision the interrelated nature of the department as a system of processes to meet the strategic goals of the organization. Change management and the ramifications of performance management on the overall operation of the health department are covered in subsequent chapters. Once the overall expectations of system performance are understood, additional tools are available to define the cause of disruptions and analyze the best alternatives for reducing or eliminating waste and defects. Change and improvement are successful when accomplished at the level of daily work management. These accomplishments are integrated into the overall activities of the organization. Performance management techniques capture the results of these improvements at the middle and senior management levels.

The concept of Modular *kaizen* is dependent upon accurate measures to move effectively through the planned steps of an improvement project. Organizing tasks within a Modular *kaizen* project includes a possibility that one task may be performed and the next task left to wait until the improvement team comes together again much later to pick up the problem-solving and decision-making. Having a well-defined, organized matrix of requirements provides a solid foundation for resuming effective operations after a planned hiatus.

Modular *kaizen* suggests the development of a Tri-Metric Matrix to support performance management for most processes. The Tri-Metric Matrix helps guide the decision maker to measure the important aspects of a process's capacity, process capability, and outcomes. Because of the interrelated nature of processes within a total system, the overall capacity, capability, and outcome of one process is usually dependent upon interaction with other processes. Chapter 7 describes the Tri-Metric Matrix and how it supports the overall performance of the organization using the Modular *kaizen* approach.

Chapter 5: Focus on the Disruption – Develop the Response Team

Introduction

The main enemy of efficient operations is disruption. Anything that hinders the smooth and efficient flow of interactions between organizational processes required to reach the goal must be identified and removed. Chapter 1, The Value of Performance Management, introduces the importance of tying improvement efforts to the key performance indicators of the organization. Chapter 4, System View of the Process, explores the intricate balance of minimizing disruption among cross-functional processes and the broader challenge of efficiency across suppliers, organizations, and customers.

Disruption Identification
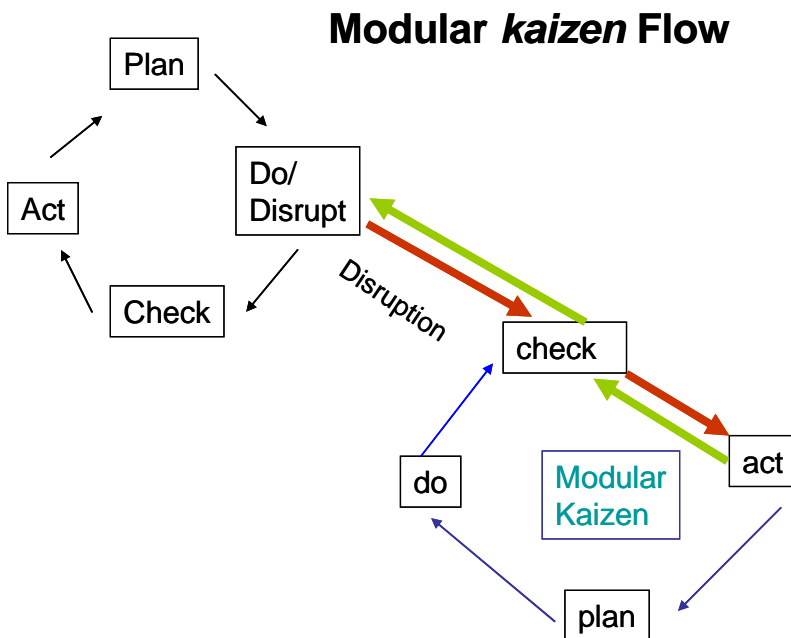
Figure 5.1: Using the "Check:" phase to Identify Disruption

The iterative check and act cycle described in previous chapters is the basic building block for minimizing disruption. The Plan-Do-Check-Act (PDCA) cycle shown in Figure 5.1 is constantly comparing what is actually happening in a process to what is supposed to happen. Figure 5.2 illustrates a simple gap analysis model where a sensor is applied to a defined process (1). The sensor (2), either technical or human, compares the measured process performance against an expected goal (3). Depending on the comparison of actual performance to the goal, an actuator is employed. If the comparison is equal to actual or within specified performance limits, the actuator (4) may simply document that performance is within expected variation and return to normal processing (5). If the

comparison shows actual performance beyond normal variation, the actuator performs additional measures to ascertain whether the process is capable of meeting expected outcomes through improvement or redesign, if necessary.

Figure 5.1 makes allowances for the three different actuator responses, based upon the severity of the disruption. The check phase in the routine PDCA cycle monitors key performance indicators for sustainability of normal operations. When either technical equipment or front-line personnel observe a disruption that is beyond normal process variation, the Modular *kaizen* flow enters the Check–Act–Plan–Do (CAPD) Modular *kaizen* response cycle.

The **Check** phase in the CAPD Modular *kaizen* cycle gathers additional data to assess the severity of the disruption identified by the **Do** phase in the routine PDCA cycle. If the disruption can be resolved with minimal improvement to the process or related resources, the **Act** phase is employed to return the process to normal operation. The green and red arrows in Figure 5.1 show entry into the CAPD cycle from the routine PDCA cycle, entry into the **Act** phase to resolve the minimal disruption, and return to the PDCA cycle of normal operations.

If the **Check** phase in the CAPD Modular *kaizen* response cycle indicates that the disruption is severe enough to require significant improvement or redesign of the process, the whole CAPD cycle will be activated. The response team will analyze the data from the **Check** phase, use the **Act** phase to identify alternative solutions to the disruption, move to the **Plan** phase to design the specific improvement or total redesign, then pilot the solution during the **Do** phase of the CAPD cycle. If the pilot solution resolves the root cause of the disruption, the operation returns to the PDCA cycle to formalize the changes and update documentation for sustainability. If the solution does not meet long-term requirements, the response team remains in the CAPD Modular *kaizen* cycle for continued measurements and improvement efforts.

Prioritize Disruptions Based Upon Areas of Concern

Modular *kaizen* uses the key performance indicators (KPIs) established during strategic planning to prioritize work on minimizing disruption. KPIs are established as the basis for performance management across the total set of processes which comprise the organization. Performance management tracks KPIs on a consistent basis as the target for identifying disruptions. Modular *kaizen* analyzes the disruption during the **Check** phase as Areas of Concern for further data gathering and response team action.

Figure 5.2 illustrates the sequence of activities to establish measures and indicators at the daily work management level. As indicated in Chapter 1, The Value of Performance Management, the head of an organization and functional directors set organization-level

Modular *kaizen*: Dealing with Disruptions   Chapter 5

goals and objectives, based upon the Voice of the Customer.[1] A working draft of the strategic plan, including high-level objectives and outcomes, cascades down through the organization to be assessed by those who will perform the daily work to accomplish the tasks.

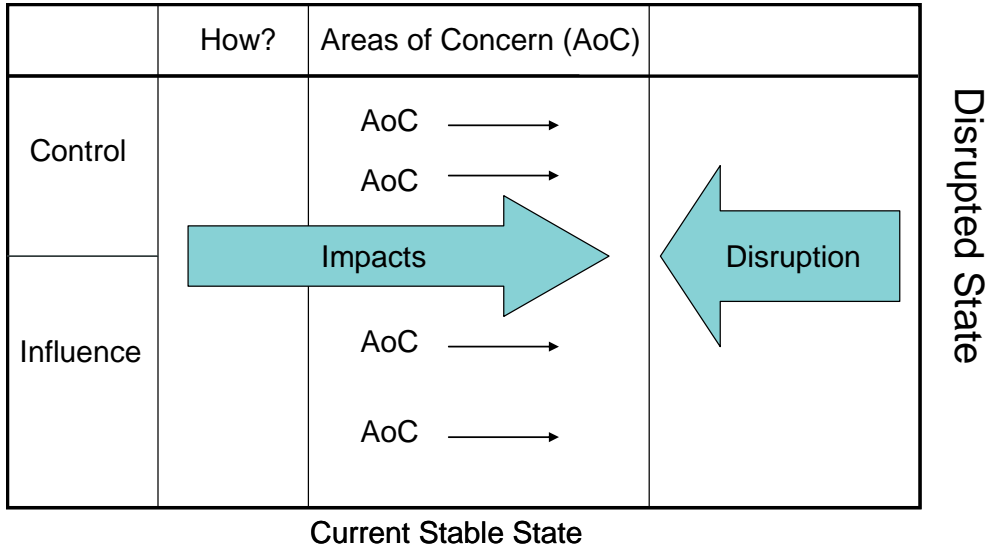## Alignment "Vertically" Within the Organization
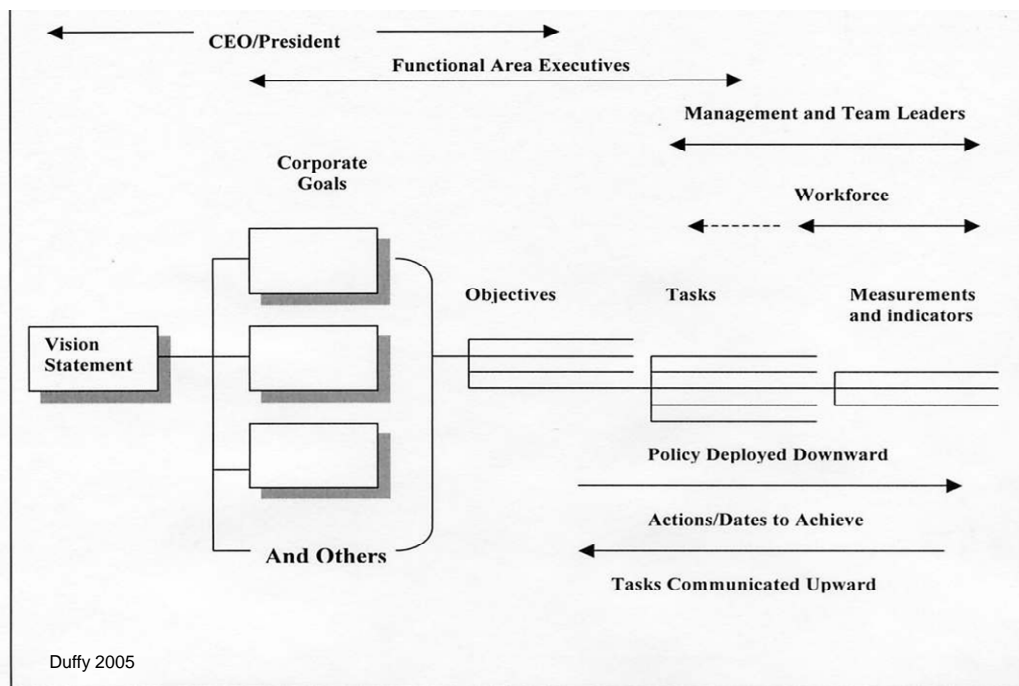
Figure 5.2: Align core processes vertically within the organization

As shown in Figure 5.2, policy is deployed to the workforce, while actions, dates, and tasks to meet goals and objectives are returned upwards for validation and integration into a final strategic plan. Measures and indicators can only be efficiently created once tasks are identified. High-level outcome indicators and generic performance expectations are set for all objectives in the early stages of strategic planning. Once the policies, goals, and objectives cascade downward into the organization, management, team leaders, and workforce verify capability of operations level processes to meet the high-level indicators

Once an Area of Concern (AoC) is identified by the response team, a Disruption and Impact Matrix is used to clarify the details of the situation. Figure 5.3 shows a Disruption and Impact Matrix with a number of AoCs listed in table format. The matrix is developed

---

[1] Voice of the Customer (VOC) is a result of an organization's efforts to understand customers' needs and expectations and to provide products and services that truly meet such needs and expectations.

along a force field analysis[2] concept which seeks to minimize the disruption by strengthening the ability of the AoCs to meet customer requirements or performance management objectives. The end goal of the Disruption and Impact Matrix is to guide the response team to return the disrupted state to the current, desired state of the process.

	How?	Areas of Concern (AoC)		
Control		AoC ⟶ AoC ⟶		
	Impacts ⟹		⟸ Disruption	
Influence		AoC ⟶ AoC ⟶		

Current Stable State

(Right side label: Disrupted State)

Figure 5.3: Disruption and Impact Matrix

An additional aspect of the Disruption and Impact Matrix is the left column - Control and Influence. This column prompts the response team to ascertain whether they are in control of the AoC and its resolution or whether they can only influence the resolution of the disrupted state. Different behaviors are required when attempting to influence the outcome of others' actions, rather than being in control of the resources and decisions. Figure 5.4 is a representation of a Circle of Influence.

Concern
Influence
Control
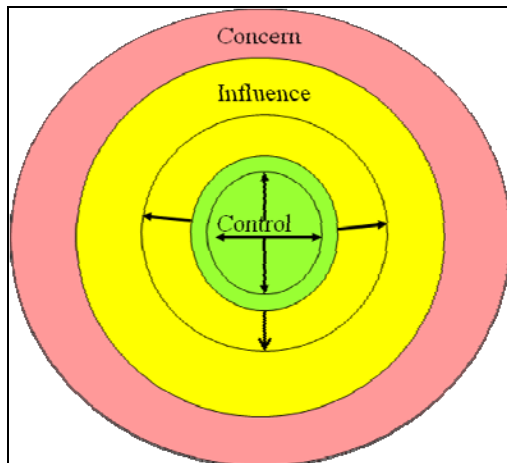
Figure 5.4: Circle of Influence

---

[2] For more information on Force Field Analysis, refer to Bialek R, Duffy G, and Moran J, *The Public Health Quality Improvement Handbook*. Milwaukee, WI: Quality Press; 2009.

The authors have found a useful approach for involving others in the resolution of process disruptions from Dr. Stephen R. Covey.[3] The most effective area in which to act is that in which we have the strongest control. As seen in Figure 5.5, the area of control is in the center of the Circle of Influence. Process owners and those who control the resources that support public health programs have the best opportunity to assess and anticipate areas of disruption to those programs. They call the shots; they own the environment.

The next most effective area in which to manage disruption is where strong partnerships with customers, community, corporate sponsors, and related agencies exist. This area is one in which some level of influence over the use of resources and the eventual outcomes of the programs of involvement are evident. A group may not own the resources, but it can use its relationship with others to guide the positive outcomes of activities and decision-making.

The outer loop of concern is the highest level of risk for both positive and negative consequences of decisions or actions. Areas where a person is interested in the outcomes but has little or no ability to guide and influence the actions of others require a complex set of relationships. Response teams are often on the edges of the activity and outcomes for programs such as this. It is important not to commit scarce resources, personnel, or reputation on the outcomes of programs where potential exists but influence or control over what happens is not available.

The control and influence column in Figure 5.3 leads the response team to the initial consideration of how to address the AoC to impact the disruption most efficiently. The "How" column in Figure 5.4 can only be addressed once the team understands how much control they have over the resources required to affect changes to the disrupted process. Chapter 6, Modular Flow/Rapid Cycle, will introduce additional tools to drill down into the details of the disruption to gather specific data and implement effective and efficient resolutions based upon the performance management requirements of the organization.

Choose a Team that Tolerates Conflict

The response team chartered to address the disruption and return the impacted process to standard operation will need a strong set of skills and behaviors which include conflict management. Conflict is a recognized stage in the team development process. Scholtes, Joiner, and Streibel describe the four phases of team development (forming, storming, norming, and performing) in *The Team Handbook*.[4] Since conflict will happen during most disruption response activities, it might as well be beneficial.

---

[3] Covey S. *The 7 Habits of Highly Effective People*. New York: Simon & Schuster; 1990.

[4] Joiner B, Scholtes P, Streibel,B. *The Team Handbook*, 2nd ed. Madison, WI: Oriel Incorporated; 2000.

49

Conflict between or among team members can occur at any of the stages but is more likely to surface during the *Forming* and *Storming* stages. Conflict is common and useful. It is a sign of change and movement. Conflict is neither good nor bad. The effort should not be to eliminate conflict but to refocus it as a productive rather than destructive force. Conflict can be a vital, energizing force at work in any team. When conflict occurs within or among teams, it should not be ignored. Addressing the conflict, using it to find the friction that change has created within the team, and using problem-solving techniques to resolve and improve the situation generate more positive outcomes.

When addressing a disruption in core business processes, it is common to experience conflict among interested parties. The response team can use this conflict to initiate positive change in resolving the disruption. Tools such as Force Field Analysis, and Force & Effect + ca[5], and effective facilitation techniques, are useful in drawing conflict into the open for direct communication among the conflicted stakeholders. The goal is to use the issues in conflict to select the most efficient resolution that is consistent with organizational or customer requirements.

Leaders, with guidance from a facilitator if needed, can help to transform a conflict into a problem-solving event by:

- Welcoming differences among teams, team members, and stakeholders

- Listening attentively with understanding rather than judgment

- Helping to clarify common goals among the conflicting parties

- Acknowledging and accepting the feelings of the individuals involved

- Offering support to the parties in resolving the differences

- Reinforcing the value of each of the parties to the organization as a whole

- Creating appropriate means for communication between those involved in the conflict

No matter what form teams take, common characteristics of all successful teams exist. The organization must focus on integrating these characteristics into daily work management **BEFORE** implementing the team concept. Much is written about these components of effective team building; this chapter covers the basics.

John Zenger[6] includes the following as some crucial characteristics for members when first initiating a team environment:

- Common goals;

- Leadership;

---

[5] The Force & Effect + ca tool is described in Chapter 6, Modular Flow/Rapid Cycle.
[6] Zenger, et al, *Leading Teams, Mastering the New Role*. San Jose, CA: Zenger-Miller, Inc; 1994.

- Involvement;

- Self-esteem;

- Open communication;

- Power to make decisions;

- Planning;

- Trust;

- Respect for others; and

- Conflict resolution.

These characteristics are major contributors to high employee morale. They also positively influence customer satisfaction, whether internal or external. The same skills that leaders are required to use work well at all levels of the organization. Figure 5.5 summarizes many of the characteristics and elements of dynamic and successful teams.
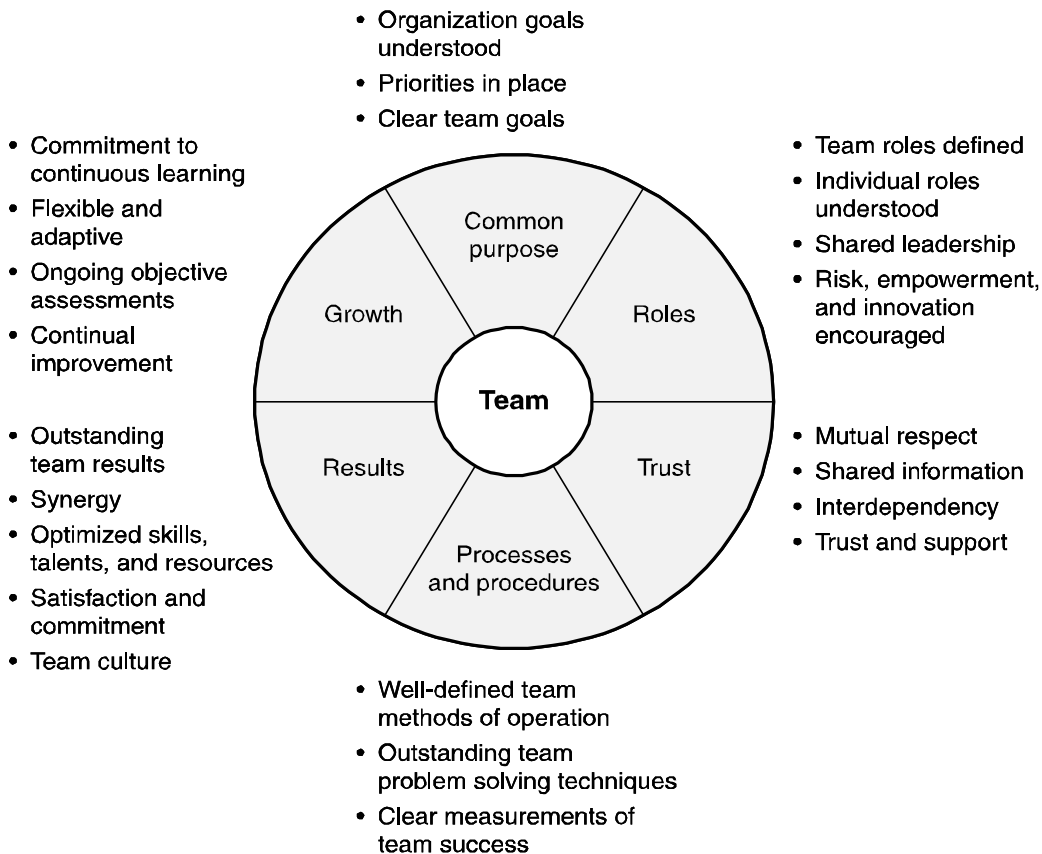

Figure 5.5: Characteristics of an Effective Team[7]

---

[7] Beecroft GD, Duffy G, Moran J. *The Executive Guide to Improvement and Change*. Milwaukee, WI: Quality Press; 2002.

Application of Disruption and Impact Matrix

The quality improvement (QI) team for a local health department was called upon to address a severe disruption in the immunization department. Records in the immunization database were incorrect or missing, causing insufficient vaccine re-stocking, lost funds recovery, and incorrect patient records. Figure 5.7 is the Disruption and Impact Matrix, reflecting the response team's first assessment of the Areas of Concern for improvement or redesign. The disrupted state is identified on the right side of the form as "Records incomplete or missing. Vaccines unaccounted for." The current stable state was entered at the bottom of the form as "All immunization records correctly updated by End of Day. All vaccines accounted for and expiration dates controlled."

The team observed the clinic immunization process and discovered that the nursing staff was not updating the customer record at the end of each immunization event. Some nurses had not been trained on the immunization data collection application so were either guessing what fields to fill in or asking another nurse to perform the update for them. The backlog of updates often rolled into the next day, when memories were less accurate, thereby further corrupting the information.
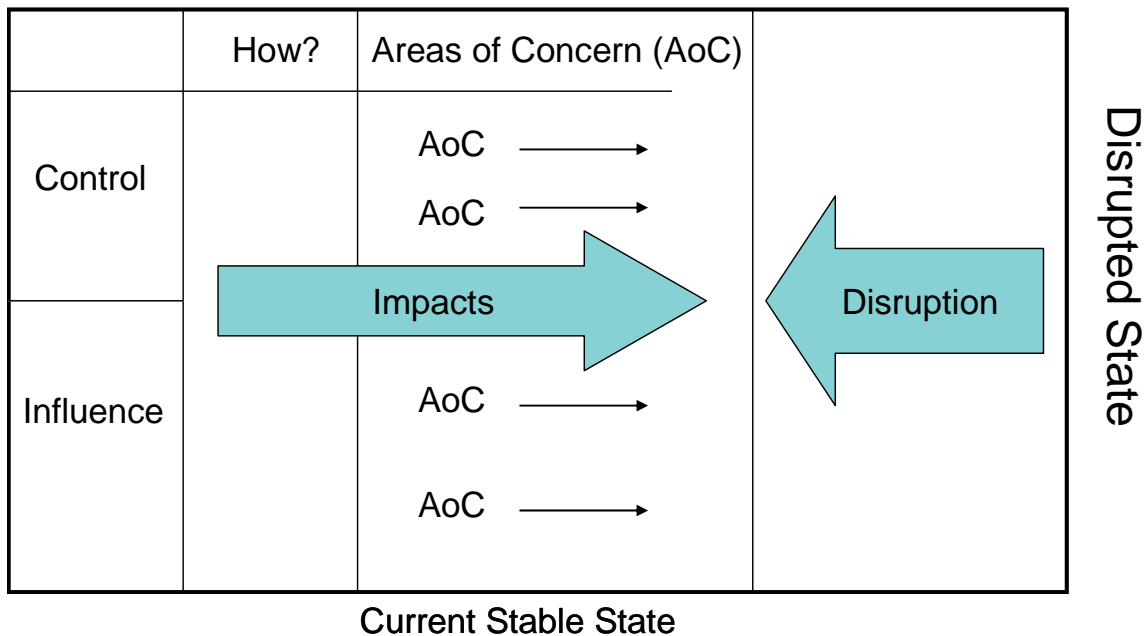
Figure 5.6: Disruption and Impact Matrix for Immunization Response Team

The team agreed that the local health department staff controlled when the record was updated and what data was entered into the collection screen. The top two Areas of Concern in Figure 5.6 are in the "Control" area of the form. The team also realized that the shipment of replacement vaccine was not under health department control but could be heavily influenced by having correct inventory information in the database from which the supplier drew restocking counts. Likewise, funding came from outside the department

and was also based upon the quantity of vaccine used and the population served. Supply and Funding Areas of Concern were placed in the "Influence" area of the form.

The response team used the visual representation provided by the Disruption and Impact Matrix to brainstorm efficient solutions to the process disruptions. Their goal was to strengthen the impact of the Areas of Concern - Accurate, Timely, Supply, and Funding - in order to minimize or eliminate the disruption. The team came to consensus on "How" each impact would be addressed and added this information to the form. The "How" at this point was a high-level suggestion requiring implementation planning. This scenario will be continued in Chapter 6, Modular Flow/Rapid Cycle, with further drill down into disruption resolution.

Modular *kaizen*: Dealing with Disruptions

Chapter 6: Modular Flow for Rapid Cycle Improvement

Modular *kaizen* is a structured plan for scheduling improvement tasks, including the availability of information and resources in units which can be performed within the time limits of a busy and interruption-filled work environment. This planning involves employees in a well-defined context of tasks and deliverables closely aligned to the highest priorities of the department. Modular *kaizen* takes advantage of the lean concept of Rapid Cycle Plan-Do-Check-Act (PDCA) to plan and implement improvements quickly and effectively, using the resources available in the time allowed.

Although Modular *kaizen* is also effective with more complex improvement models such as Define-Measure-Analyze-Improve-Control (DMAIC) or Design for Six Sigma (DFSS), this text focuses on the entry level model of PDCA. Later publications will associate the Modular *kaizen* approach to more complex improvement models.

While it is tempting to think that a single improvement approach will work well for an entire organization, the workplace is rarely so tidy. In reality, the unit of improvement activity should be matched to the response team members' specific jobs and roles—or at least distinct categories of jobs and roles. To resolve a disruption in an individual department or function, it is not enough to launch a set of organization-wide initiatives or to count on a piece of application software. Instead, leaders of busy health workers must understand the specific task needs of their personnel and tailor improvement activities to these requirements.

Few organizations have thought systematically about where additional structured improvement planning could enhance efficiency. A good starting point is to identify the working characteristics of response team members and understand the range of tasks that they perform. The unit of analysis should be a particular job, not the organization as a whole. This practice is important in Modular *kaizen* because different professionals and staff within the same organization often have very different knowledge and information requirements. Furthermore, information is more readily structured for some jobs than for others, and some workers might resist planned improvement activities more than others. Change management techniques to assist in matching approaches to working styles are addressed in a later chapter.

Too often we encounter teams or organizations that launch an improvement effort but take three months to do what could be accomplished in three days or three hours. They waste too much time and energy by not solving the problem quickly. These teams fail to hold the gains or move on to the next organizational challenge. Consequences of improperly planning an improvement initiative or not engaging in Rapid Cycle PDCA is that team members lose interest, become bored with a long process, do not gain experience and knowledge in applying QI, and do not see the impact of their efforts for a long time.

So what is Rapid Cycle PDCA? The word "Rapid" means completed or occurring in a brief period of time and characterized by speed. "Cycle" means an interval during which a recurring sequence of events occurs.[1] Therefore Rapid Cycle PDCA, as shown in Figure 6.1, is applying the recurring sequence of PDCA in a brief period of time to solve a problem or issue facing a team or organization that will achieve breakthrough or continuous improvement results quickly.[2]

PDCA should be repeatedly implemented in spirals of increasing knowledge of the system that converge on the ultimate goal, each cycle closer than the previous.
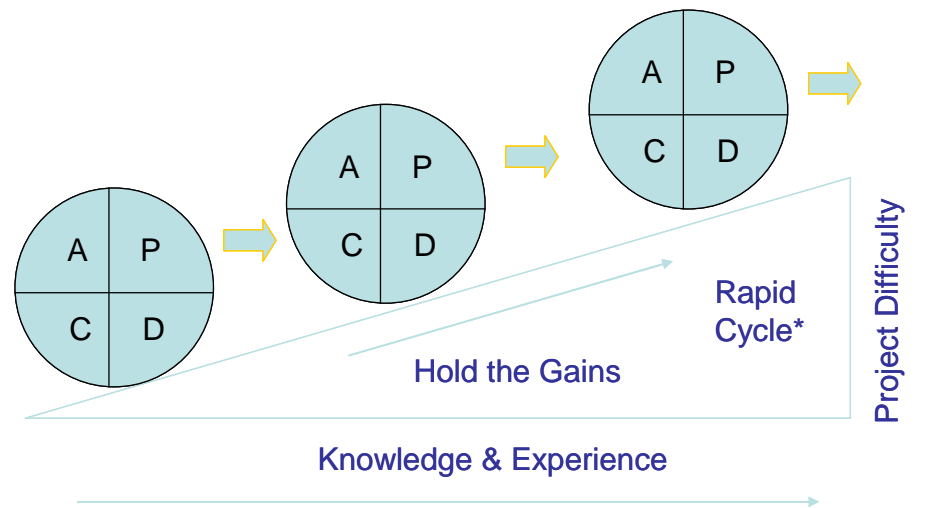
Figure 6.1: Rapid Cycle PDCA as a sequence of increasingly difficult improvement acts

Modular *kaizen* uses the concept of Rapid Cycle PDCA to plan improvements in task level activities that can be performed quickly. These focused tasks are interspersed with daily work normally performed by response team members. Daily work management is explained in Chapter 10.

Figure 6.2 shows the Rapid Cycle Process Model which defines the steps to ensure a successful rapid cycle application of PDCA.

---

[1] The Trustees of Princeton University. Wordnet: A lexical database for English. www.wordnet.princeton.edu. Published 2011. Accessed February 14, 2011.
[2] Duffy G, Moran J, Riley, W. Rapid Cycle PDCA. *Quality Texas Foundation Update*. August, 2009.
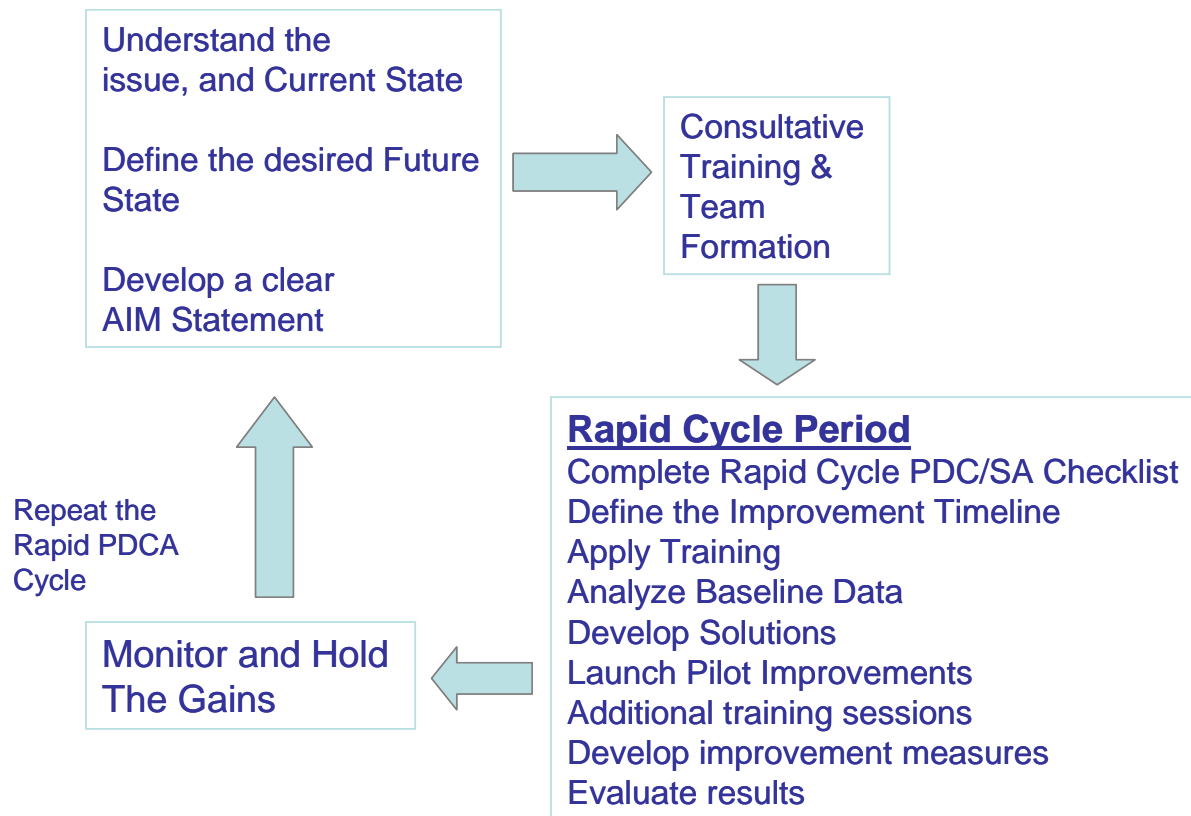
Figure 6.2: Rapid Cycle PDCA/PDSA Process Model[3]

The Rapid Cycle Process is defined as follows:

- **R**ealization of a problem to correct. Management is committed to making the change.
- **A**ct to start a resolution or change to the problem by utilizing the QI tools and techniques.
- **P**lan for success by developing a clear AIM statement.
- **I**nvolve key constituents in the PDCA process.
- **D**evelop the change team and establish the rapid cycle timeline.

- **C**onsultative training interventions as required by the team occur.
- anal**Y**ze baseline data and understand the current state and scope of the problem.
- **C**onstruct solutions to get to the desired future state.
- **L**aunch pilot improvement solutions to determine if the desired change can be achieved.
- **E**valuate results achieved from pilot improvement, make any necessary adjustments, and launch it throughout the organization.

---

[3] Duffy G, Moran J, Riley, W. Rapid Cycle PDCA. *Quality Texas Foundation Update*. August, 2009.

The utilization of a Rapid Cycle PDCA process helps organizations realize a quick return on their investment in QI. Some of the benefits of instituting Rapid Cycle PDCA are:

- Short cycles of change to accelerate quality improvement (QI) in the organization;
- Hold the gains as a platform for the next level of project improvement;
- Development of a broad base of QI knowledge and experience in the organization that will help in the establishment of an organization-wide culture of quality and excellence;
- Solutions to many organizational problems that will promote needed organizational change and improvement; and
- Provision of an iterative opportunity for team members to reinforce their QI knowledge quickly in the next project.

A *Pre-Planning Check Sheet* has been developed to help in using Rapid Cycle PDCA[4] (see Appendix C). The Check Sheet contains questions that guide the response team when starting a Rapid Cycle or Modular *kaizen* QI project. This checklist addresses the Rapid Cycle pre-planning to ensure a successful improvement project. The Check Sheet provides columns to indicate what has been completed (√) and what needs to be done (TBD) along with the expected completion date.

Example of Modular *kaizen* flow of tools and techniques

The Modular *kaizen* approach to rapid cycle improvement is structured to fit within the existing time and resource requirements of the response team, resolving the disruption. The rest of this chapter illustrates the flow of planning and design of a Modular *kaizen* event related to the major power outage scenario introduced in Chapter 3. A number of the elements of the House of Modular *kaizen* are employed to identify the disruption, focus on high priority Areas of Concern, map a process to respond to the disruption in the short term, and implement a full PDCA cycle to resolve the disruptive issues through strategic process improvement and redesign.

Not all elements of the House of Modular *kaizen* found in Chapter 2 (Figure 2.2) are required for each disruptive occurrence. The elements illustrated in the Major Urban Hospital Power Outage example are:

#4: Disruption Identification	#12 Quality at Source
#6: Force and Effect + ca	#13 Process Control
#7: Tri-metric Matrix	#14 Fast Transition
#8: Teams	#17 Daily Work Management
#9: Project Management	

---

[4] Some Rapid Cycle explanations refer to the Plan-Do-Study-Act (PDSA) cycle rather than PDCA. Dr. Deming used the PDSA term in later years to reduce the tension sometimes generated by using the word "check." The "check" term is used with Modular *kaizen* to refer to continuous monitoring and measuring in support of organizational performance management.

58

The continuous monitoring of operational performance is the entry point for <u>disruption identification</u>. Frequently, standard measures of key department objectives will provide data indicating that something is hindering the smooth flow of a critical process. These subtle indicators are often missed in a highly interruption-filled organization because people are focused on immediate tasks. A combination of<u> project management,</u> <u>tri-metric matrix</u> (Chapter 7), and <u>daily work management </u>(Chapter 10) provides the opportunity for team leaders, senior management, or front-line staff to compare actual process performance against the documented standards of performance.

Figure 6.3 is the completed Association of Disruption to Area of Concern (ADAoC) Form for the power outage scenario. The form provides a checklist of major causes of disruption within organizations. Other sources of disruption can be added to the form to personalize the instrument. In this scenario, the disruption was quite apparent as soon as it happened. No power in a busy, urban hospital is a catastrophe with multiple associated disruptions.

The four major disruptions identified for the power outage were:

- Balancing work priorities
- Competing assignments
- Environmental conditions
- Unavailability of equipment, tools, or documentation

Senior management rallied immediately, as seen in the scenario introduced in Chapter 3, by calling a situation meeting at 6:30 AM to check the current status of hospital operations and patient schedules. <u>Teams</u> were assigned to check the status of patients, surgery schedules, power generators, room temperatures, rehabilitation center appointments, and other Areas of Concern stemming from the total loss of power within the facility. Figure 6.4 is a Disruption and Impact Matrix listing the major Areas of Concern (AoC) facing senior hospital leadership. The AoCs are categorized as those within the control of the hospital or only able to be influenced by senior leadership. The "How" to address the area depended on the level of control the hospital had on the AoC. For example, rescheduling elective surgery was completely within the control of operating room administration. Without power in the facility, lowering the temperature on a hot July day needed assistance from outside the hospital and could only be influenced by senior leadership.

Association of Disruption to Area of Concern: Long-Term Power Outage in Large, Urban Hospital

√	Potential Cause of Disruption	How the Disruption Impacts Specific Daily Work Management
√	*Balancing Work Priorities* – fluctuating work demands that create an unstable work schedule observed to interfere with performance based upon key performance indicators	The immediate need to anticipate and prepare for a potentially long power outage in the hospital destabilized existing morning rounds, scheduled surgeries, and other daily management activities. Although the high-priority requirement to prepare for the power outage was critical, a need to maintain a minimum service level for some patients and transfer others who could not be accommodated in-house was unavoidable.
	Implementation failure– failing to translate a customer requirement into concrete action within the performance parameters	
√	*Competing Assignments* – interference from other tasks that are customarily performed parallel to this process	Facilities, security, maintenance, nursing, physicians and administrative staff were required to perform normal daily management activities while taking on additional tasks associated with the unexpected power outage.
√	*Environmental Conditions* – physical factors within the process environment that do or are anticipated to impact performance and/or process outcomes	The anticipated heat in the hospital during the July power outage created a potentially life-threatening environment for patients with respiratory conditions. Lack of power negated use of surgical rooms. Medical and culinary processes were disrupted. Other environmental and sanitary conditions impacted many normal processes.
√	*Unavailability of Equipment, Tools or Documentation* – constraints that impact the smooth execution of tasks to meet performance indicators and process outcomes	Inadequate backup generators, fans, cooling equipment, medical equipment and other tools created a challenge for support personnel. Response teams were called upon to devise innovative plans for assessing the short and long-term needs of patients, out-patients and those scheduled for elective surgery during the power outage period.

	Evidence–Based Research on Real-Time Application - Missing best practice information on successful application of knowledge and tools for implementation of performance management	
	Cause & Effect Contingencies – alternative approaches not identified in advance for minor process adjustments, either through improvement or redesign	
	Organizational Cracks – work delays; bottlenecks, missing/wrong materials; poor downstream or cross-functional communication; or other similar barriers affecting process performance	
	Unclear Policies – unclear or non–existent policies conflict with process performance; also where policy directly contradicts a work direction or intuitive action	
	Politics – politically expedient actions cause conflict with efficient performance to meet customer requirements	
	Power & Accountability – relationship and power issues with functional leadership or stakeholders that adversely affects process performance. Issues with team member accountability	
	Unclear or Conflicting Regulations –standards or regulations create conflict for correct and consistent compliance during process performance	
	Work Culture, Norms, and Values – organizational culture interferes with the efficient performance of process tasks or negatively impacts process outcomes	

Figure 6.3: Association of Disruption to Areas of Concern Form

61

	How?	Areas of Concern	Disruption
Control	Surgery scheduled / 50% of needed capacity / Use data to drive performance	Patients → / Generators → / Audit →	← No Power in Hospital
Influence	Increasing in hospital / Response to situation / Make a bad situation worse	Temperature → / Utility Co. → / Media →	

**Figure 6.4: Disruption and Impact Matrix – power outage scenarios**

Figure 6.5 illustrates a Modular *kaizen* tool designed to engage those whose work is disrupted in the resolution. Most high-performing professionals are self-organizing, meaning that they expect to drive their work processes, not be driven by them. This characteristic of self-organization is frequently observed in health departments.

Effective self-organization is supported by two critical elements: a clear sense of identity and freedom. In organizations, if people are free to make their own decisions, guided by a clear organizational identity for them to reference, the whole system develops greater coherence and strength. The organization is less controlling but more orderly. Self-organizing systems teach an important lesson about how change happens in living systems. When the system is far from equilibrium (e.g. in disruption), singular or small influences can have enormous impact. It is not the law of large numbers or critical mass that creates change but the presence of a small disturbance that gets into the system and is then amplified through communication networks.[5]

Modular *kaizen* uses the inherent self-organizing tendency for knowledge workers to re-balance disruption within their operating system. Small disruptions use the "check/act" iterative process described in Chapter 3 to adjust processes continuously as evolutionary changes occur. Evolutionary changes are generally supportive of the current goals and strategies of the organization. In these situations, the traditional strategic planning process can be used as a reference from which to analyze relevant data and to plan for improvement of existing processes, products, or services.

---

[5] Wheatley M. *Leadership and the New Science: Discovering Order in a Chaotic World*, 2nd ed. San Francisco: Berrett – Koehler Publishers; 1999.

Force & Effect + ca Chart
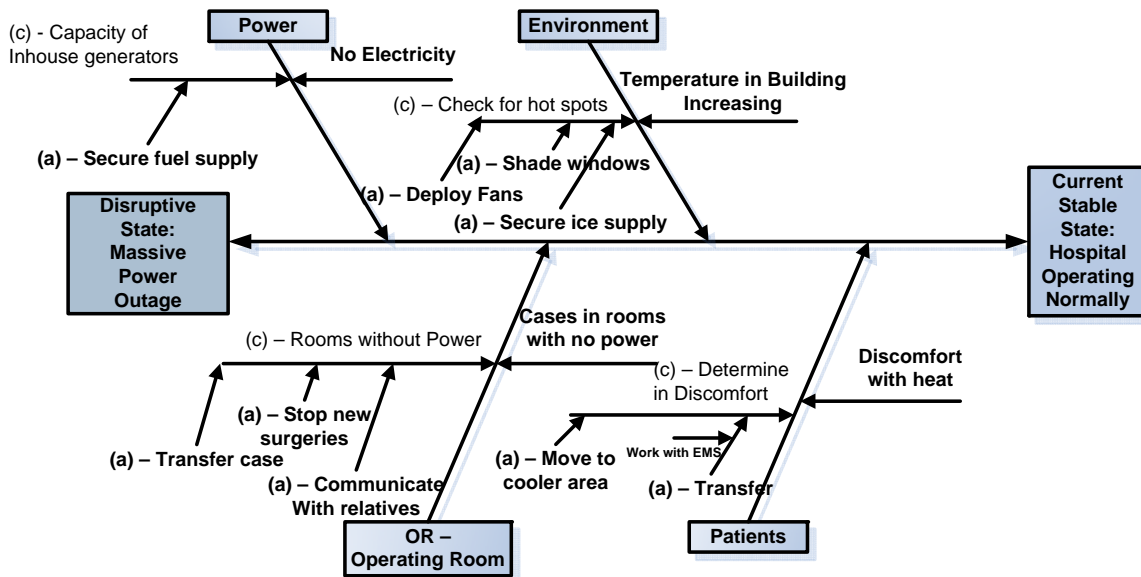
Figure 6.5: Force & Effect + ca Chart – power outage scenario

Contrasting with evolutionary change is revolutionary change. When the disruption diverges radically from existing assumptions, more deliberation is required for resolution. The revolutionary model requires the design of options for resolution which may not be compatible with the traditional strategic direction of the organization. Barriers to change are generally higher when change takes the organization and its workforce away from their current comfort zone. The goal for revolutionary change is to identify alternative solutions having either the most positive or least negative impact to the long-term success of the organization.[6]

One of the most successful techniques for helping people accept change is to involve them in the change. Figure 6.5 illustrates a Force & Effect + (c)(a) Chart developed by key leaders from each of the major hospital functional units. Leaders from facilities, engineering, nursing, case management, and the executive offices came together after the 6:30 AM meeting to anticipate the areas of greatest impact to normal operations. Providing a vehicle for the participants to express their concerns verbally reduced tensions and focused attention on finding solutions, not complaining about barriers. The actions identified during the development of the Force & Effect + (c)(a) form became a task list of small "act" steps.

Once the response team defined the scope of the power outage and major impacts to patients, staff, and other stakeholders, the next step was to generate a high-level picture

---

[6] Beecroft D. Duffy G. and Moran J. *The Executive Guide to Improvement and Change.* Milwaukee, WI: Quality Press; 2002.

of the response process. Figure 6.6 illustrates the SIPOC + CM created that clarified the boundaries of the process. The SIPOC + CM form is the first step in process control. The form guides discovery concerning suppliers, inputs, general process steps, outputs and customers of the process. In addition, the form provides an opportunity to identify major constraints to be addressed, as well as identification of realistic measures to ensure that results are achieved.

Once the leadership and selected specialists within the hospital and community had made a complete "check" of the current situation, response teams were employed to perform small "act" functions to adjust normal operations to accommodate the power outage. Because of the initial project management and process control steps taken by leadership immediately upon disruption identification, the "act" steps were understood well enough to be performed succinctly in parallel with monitoring patients and performing required normal tasks.
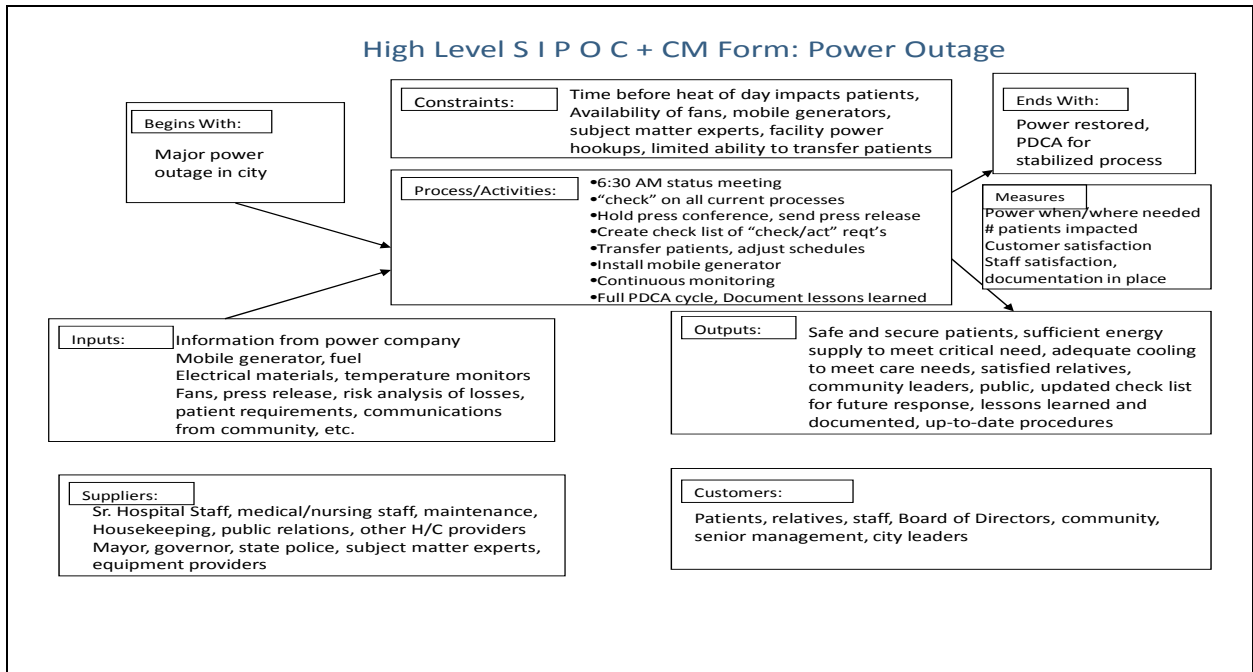
Figure 6.6: SIPOC + CM defining the scope and high-level process for power outage

The key to fast transition of tasks is clear direction and understanding of the end result. The small "act" steps performed by nursing, engineering, maintenance, and the executive office were consistent with standard procedures within the hospital. The timing was critical, as was the requirement to transfer some patients to other locations and reschedule elective procedures until power was restored. Each of these tasks had been defined and rehearsed previous to this unexpected outage. The hospital leadership employed "quality at the source" by having all critical procedures defined, validated, and practiced before they were needed in an emergency situation.

An example of the Operating Room response team plan is shown in Figure 6.7. The operating room administrative staff did a "check" step to ascertain which rooms were functional using direct power generators and scheduled any critical surgeries into those rooms. An outcome of this "check" step was the realization that not enough local generators were available to meet the needs of critical hospital functions. As described in the scenario in Chapter 3, the response team alerted senior leadership, who arranged for the mayor to secure an additional mobile generator from outside the city.
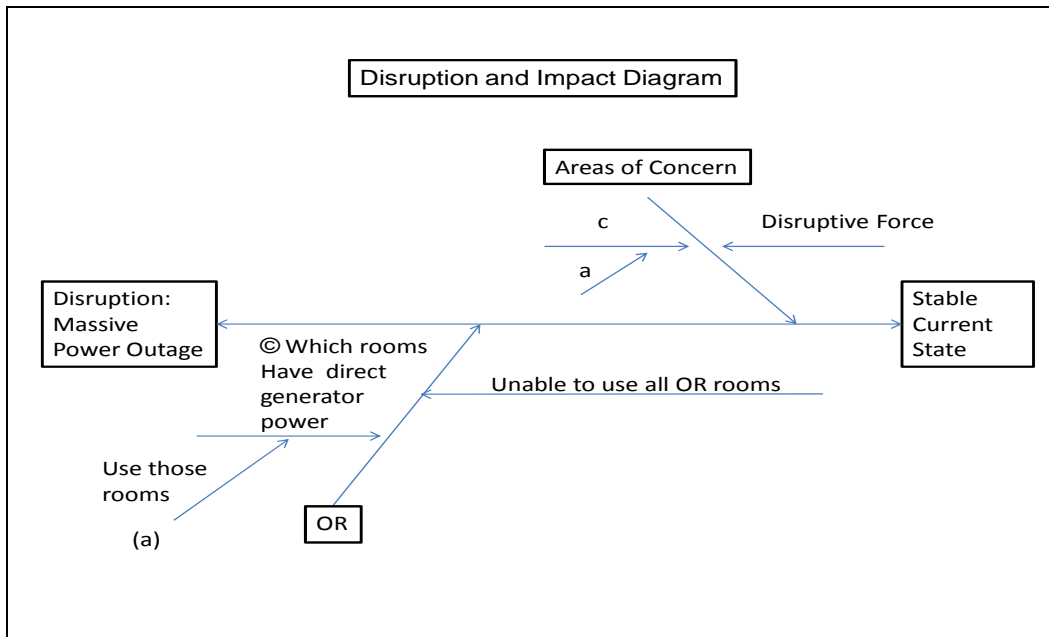
Figure 6.7: Disruption and Impact Diagram for operating room response

The continued hourly senior leadership status updates provided additional small "act" tasks that were integrated into the regular routines of the nursing, engineering, housekeeping, facilities, and administrative staff. Figure 6.8 is a portion of the Disruption form completed as a detailed outcome of the Force & Effect + ca chart shown in Figure 6.5. Once the high priority "act" requirements were identified by senior leadership, functional response teams were empowered to analyze the specific requirements and perform the small "act" steps to anticipate installation of the mobile generator sent from the northern part of the state. Other response teams established a facilities temperature monitoring schedule as part of the normal daily work management activities on the hospital floors.

The Modular *kaizen* Disruption form is a modification of a standard risk management form used in lean enterprise applications. This form is simplified to exclude the weighted priority calculations of the more traditional Failure Mode and Effects worksheet. The priority for action has already been established by senior leadership during the "check" step previous to response team engagement.

					Modular kaizen Disruption Form **High Priority Barriers to Address**				

Process or Activity Name:	Hospital Power Outage					Prepared by: Quality VP			
Responsible:	President of Hospital					Date (Orig) _7/8/2001_____ (Rev) 7/ 13/2001			

Process or Activity Step	What is the Disruption?	Impact of Disruption	Priority	Potential Causes	How is the Disruption Managed Now? CHECK	Actions Recommended ACT	Performance Measures PLAN	Owner	Actions Taken DO
What is the process step/ activity under investigation?	In what way is the activity impacted?	What is the impact on the outcome (Customer Requirements) or internal requirements?	How severe is the impact?	What causes the activity to go wrong?	What are the existing controls and procedures that prevent either the cause or disruption?	What are the actions for reducing the occurrence of the cause or minimizing the disruption?	What controls or measures will effectively prevent this disruption from recurring?	Who is responsible for the recommended action?	What are the completed actions taken to eliminate the disruption?
Electrical power for the hospital	No external electtricity available for 3 days	No fuel for emergency generators	High	Emergency need for large increase in fuel for power generators	Long standing contract with distributor	Secure reliable fuel supply Test escalation procedures	adequate reserves at distributor, logistics to delivery fuel, local storage capacity for cyclical requirement	Facilities Director	Service level agreement with fuel distributor, escalation procedure for emergencies, alert process with power company
Environmental control	heat rising in facility	Some patients heat intolerant, medications, equipment need cool environment	High	Loss of power to cooling systems	Montiroing of tempertures in facility and equipment	Inventory of fans, alternate power source, transfer critical patients	Checklist for patient requirements, adequate inventory, alternate power plan	Director of Nursing, Chief Engineer, CFO	Check for hot spots, shade windows, secure ice supply, deploy fans, transfer patients
Operating Room	Rooms without power	Cases in rooms with no power	High	Loss of external power, lack of adequate alternate power	Stop new surgeries, transfer cases, communicate with relatives	Reschedule elective surgeries, transfer critical patients, move to OR with alternate power	100% critical surgery coverage, accurae assessment of triage	OR admiistration Director	Reschedule surgeries, transfer patients, close all but Ors with alternate power source
Patient monitoring	Discomfort with heat	Heat intolerance by some patients	High	Medical condition, age, personal decision	Fans, ice packs, transfer	Hourly temperature monitoring, "check" on all patients during rounding, escalation where appropriate	Temperature, transfer list, patient satisfaction	Director of Nursing	Contact EMS to transfer patients, Contact other institutions, reschedule elective surgeries, move to cooler area, continued monitoring

Figure 6.8: Modular *kaizen* Disruption Form – Prioritizing barriers addressed

The Modular *kaizen* Disruption form indicates activity related to a full Check-Act-Plan-Do response cycle, including how the disruption is managed currently, actions recommended to resolve the disruption permanently, performance measures to sustain future outcomes, and actions taken in the short term.

The Modular *kaizen* Disruption form is the basic working document from which response teams derive the requirements for action. The information gathered on the Disruption form is used by the response team to generate small "act" steps that integrate efficiently with the normally scheduled activities of the department. The intent of Modular *kaizen* is to deconstruct a disruption to the extent that the cause is resolved by adjusting what is already being done in the workplace. Where the impacted process needs more than adjustment of normal operations, a work-around is identified for the short term, while redesign efforts by subject matter experts are initiated.

The hospital leadership team successfully managed a major power outage in their facility through fast assessment, engagement of the workforce, and effective communication with outside resource partners. Although the short-term response was effective in reducing temperature in the hospital and providing power to critical functions, a long-term process needed to be established to error-proof the situation moving forward.

Figure 6.9 is the process map created once the power outage response was complete. Once the pressure was off the organization, the response teams performed a full PDCA cycle to create an efficient, stable process for handling major power outages. The process map is the beginning of a series of detailed flowcharts for individual departments and is

part of the process control element of Modular *kaizen*. Detailed flowcharts were the basis of formal work instructions for electrical, facilities, maintenance, housekeeping, medical/nursing, public relations and executive action. These flowcharts are not included in this scenario. The detailed flowcharts are subject to frequent modification as daily work management requirements are updated. Including one snapshot in time within a long-term document is not appropriate.
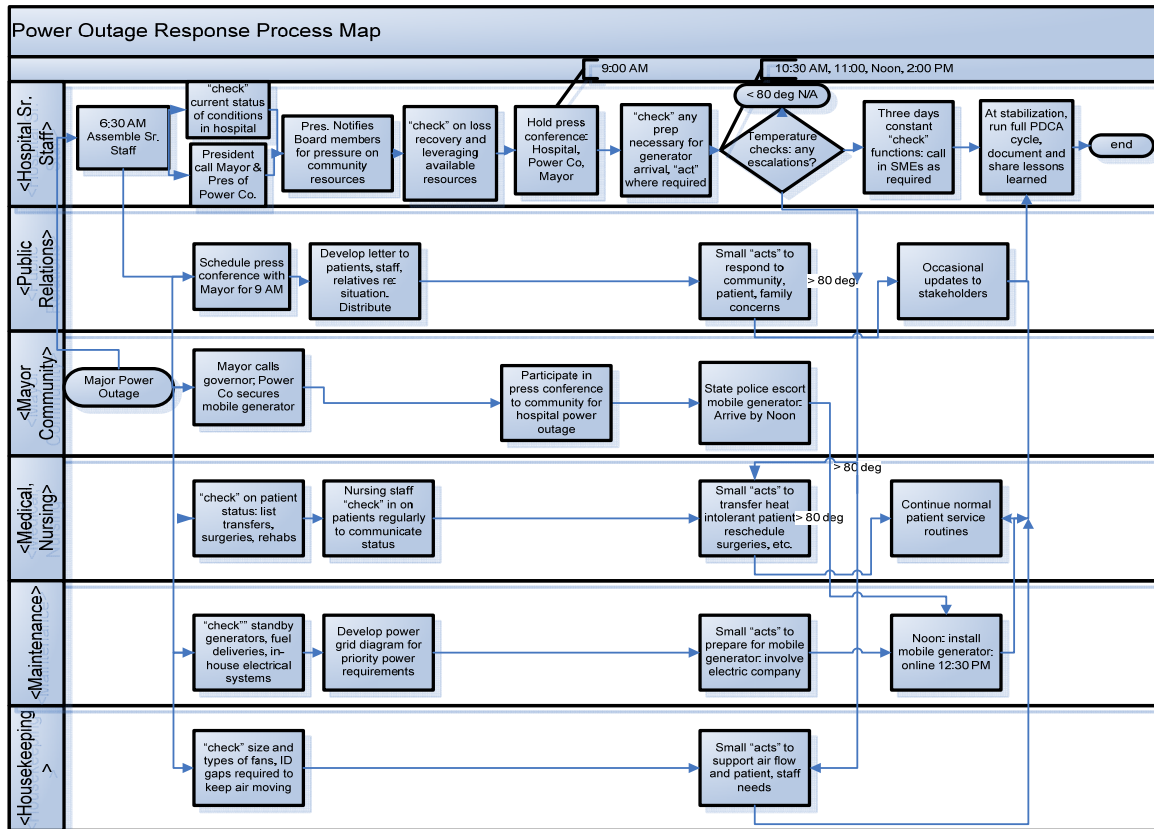
Figure 6.9: Power Outage Response Process Map

One final yet critical document for standardization of performance management is the Tri-metric matrix. This document ties the high priority actions to resolve a major power outage with the ongoing performance management system of the organization. This form analyzes the AoCs from the Disruption and Impact form illustrated in Figure 6.4. The information included in the Tri-metric matrix is part of process control for long-term sustainability of the improved set of processes for responding to a major power outage.

The Modular *kaizen* approach minimized the disruption to normal hospital operations during a major power outage. The interaction of "check" and "act" steps based upon data rather than emotion and the empowerment of the impacted workforce created an efficient, effective response team effort. The short-term response that was successful although less efficient than a carefully pre-planned process was sufficient to meet the needs of patients, staff, and community. The follow-on design of additional Modular *kaizen* steps provided

a smooth flow of process redesign while subject matter experts engaged in their regular responsibilities. Chapter 10, Daily Work Management, provides additional guidance on integrating improvement activities into regularly assigned work schedules.

Tri-Metric Matrix: Power Outage

Tri-Metric	Indicator	Definition	Baseline	Improvement Target
1. Capacity: electrical	# Amperage/ Volts	Amount of power available to service equipment needs	Standard required electrical output of hospital requirement at full patient load	Supplemental capacity available through hospital connections to alternate power sources
2. Capacity: patient care	•% Coverage •Cycle time to meet requirements	All patient needs adequately covered, rescheduled, or transferred to alternate care provider	Standard, documented hospital performance management service levels	Checklist in place and rehearsed for anticipated disruptions to normal service delivery environment
3. Process: Temperature	•Degrees Fahrenheit	Comfortable summer temperature of 75 degrees in patient areas	Normal summer temperature on patient floors is on the average 75 degrees	Control any raise in temperature above 75 degrees on patient floors through alternative cooling means
4. Outcome: Satisfaction	% "top box" patient % "top box" staff	Percent of patient and staff satisfaction rated as "very satisfied"	Compared to national hospital survey data of patient, staff ratings	Attain greater than 80% responses above 75th percentile ranking of national survey data
5. Outcome: Service level	% critical patient care completed to requirements	Amount of critical and non-elective patient care delivered on time and within standards	Using industry accepted, documented medical and audit requirements	Increase ability to provide non-critical care at defined service level

Figure 6.10: Tri-metric matrix: power outage scenario

Chapter 7: Tri-Metric Matrix

Albert Einstein understood the difficulty of measurement when he said "Not everything that can be counted counts and not everything that counts can be counted."[1]

Organizations spend a lot of time and money trying to obtain timely and relevant information about their customers, markets, processes, employees, finances, and product and service outcomes. They build elaborate dashboards and form committees to track hundreds of measures and then wonder why they do not have any useful information upon which to base important decisions. It is essential to have a process to convert data to information and then to knowledge. Dr. Edwards Deming stated "Lack of knowledge . . . that is the problem."[2] Decision makers take data, apply statistical processes to it, display it graphically, and convert it to knowledge to make decisions.

Organizations attempt to capture all relevant information on a situation of interest to them; they think that information is knowledge. They indiscriminately go about amassing information and measurements to "find out all there is to know." This action wastes time, effort, and money. When they eventually have all relevant information available, they find that it is useless because it is not centered on a specific need. This gathering of all of the information impedes planning and problem-solving by burying an organization in an avalanche of irrelevant, unmanageable details. It leads to "analysis-paralysis."

Furthermore, the information and measurements produce a sense of satisfaction about the current situation. Just because all information is available, oftentimes people think that a situation can be controlled. A former boss of one of the authors stated the foolishness of this indiscriminate amassing of information many years ago when collecting data about a process. He stated "We need to know what we are going to do with the data before we actually collect it." Unfortunately, his wisdom often goes unheeded.

The Limited Information Collection Principle of Breakthrough Thinking should be applied in all instances when data gathering is necessary. The Limited Information Collection Principle is based on the premise that a problem cannot be solved by throwing data at it. The Limited Information Collection Principle is the opposite of the indiscriminate amassing of information and measurements to "find out all there is to know." Finding it all out wastes time, effort, and money. It impedes planning and problem-solving by burying the problem in an avalanche of irrelevant, unmanageable details which usually lead to analysis paralysis.

---

[1] BrainyQuote.com. Definition of Counted. http://www.brainyquote.com/words/co/counted148801.html. Accessed October 19, 2010.
[2] BrainyQuote.com. Talk: W. Edwards Deming. http://en.wikiquote.org/wiki/Talk:W._Edwards_Deming, Accessed October 19, 2010. See Appendix A for an Introduction to the work of Dr. W. Edwards Deming.

Continually asking "what purpose could this information serve" before starting to collect any data[3] and then gathering useful and relevant data according to the unique aspect of the situation is essential**.**

Measurement is a key ingredient of any improvement program. To make lasting improvements, everyone in an organization needs to understand how to measure and monitor processes and be able to use that data and information to prioritize where improvements need to be made. Improvement consumes scarce organizational resources and should be focused at the most important and strategic needs of the organization. Measurement helps to shift attention to areas of important needs.

The concept of Modular *kaizen* is dependent upon accurate measures to move effectively through the planned steps of an improvement project. Organizing tasks within a Modular *kaizen* project includes a possibility that one task may be performed and the next task left to wait until the improvement team comes together again much later to pick up the problem-solving and decision-making. Having a well-defined, organized matrix of requirements provides a solid foundation for resuming effective operations after a planned hiatus.

A Tri-Metric Matrix can be developed for most processes. The Tri-Metric Matrix helps to guide the decision maker to measure the important aspects of a process's capacity, capability, and outcomes. When developing measures for a Tri-Metric Matrix, the following questions need to be asked for each measure that is proposed:

- What is the measure measuring?
- What is the baseline for this measure?
- If no baseline exists, can one be obtained or developed?
- Will this measure help to understand how the process is functioning?
- Is the measure directly linked to the current strategy?
- Will this measure positively impact the process under study?
- Will the measure positively impact the customers if it is improved?
- Will employees have personal incentives to improve this measure?
- Are improvements in the measure likely to result in better service?
- Are the resources available for improving this measure?

---

[3]Hoffherr G, Moran J, and Nadler G. *Breakthrough Thinking in Total Quality Management.* Englewood Cliffs, NJ: PTR Prentice Hall; 1994.

When developing Tri-Metric Measures for a process, the goal is to determine what measures should be the Key Process Indicators (KPI). The following areas are some guidelines for potential major KPIs.

- *Effectiveness*—Does the process output conform to stated requirements? Goal: Doing the right things.

- *Efficiency*—Does the process produce the required output at minimum resource cost? Goal: Doing the right things well.

- *Quality*—Does the output meet customer requirements and expectations?

- *Timeliness*—Does the process produce its output correctly and on time?

- *Productivity*—How well does the process use its inputs to produce its output? Goal: Establish the ratio of the amount of output per unit of input.

- *Output* —How much does the process produce in a given time period?

Depending on the process in place, the KPI may be a combination of the above. It is desirable to have proactive measures that show what is happening now in the process rather than reactive measures that show what has happened. Whatever measures are decided upon should give a clear indication of how the process is operating and should indicate when action must be taken. This process is also displayed in Chapter 12 – Daily Work Management.

Tri-Metric	Indicator	Definition	Baseline	Improvement Target
1. Capacity				
2. Process				
3. Outcome				

Table 7.1: The Tri-Metric Matrix

Table 7.1 shows the basic elements of the Tri-Metric Matrix. Three Tri-Metrics that every improvement project needs to focus on are:

1. **Capacity measures** of the process under study. The capacity of a process is defined as an output measure which is a measure of activity. Sometimes this is referred to as the maximum output rate measured in terms of some type of units provided per period of time. For example, ten customers can be processed per hour in a clinic, 100 calls per hour can be processed in a call center, eight surgeries per hour can be moved through an operating room (OR), or 200 boxes of tissues can be made every ten minutes. Once the maximum output rate of a process is known, then the capacity utilization or the percentage of the maximum output that is currently being utilized can be understood. Knowing that the OR has a 75% utilization rate for the past three weeks can become useful information.

71

Sometimes it is useful to understand activity measures which describe the level of resources committed to a process. Just knowing these three measures does little to help us understand how the process is satisfying our customers. Process and output measures help us understand the capability of the process to meet customer needs. Table 7.2 shows some typical capacity measures.

Tri-Metric	Indicator	Definition	Baseline	Improvement Target
1. Capacity	Output Rate	Units/time	400/hour	450/hour
	Capacity Utilization	% of maximum output utilized	75%	85%
	Resources Committed	FTE, space, equipment, etc.	40 FTE 900 square feet	30 FTE 800 square feet
2. Process				
3. Outcome				

Table 7.2: Sample Tri-Metric Matrix

2. **Process measures** are descriptors of how the process is performing in its current state. It is very important to understand how the current state is operating and define the baseline before attempting any type of improvement activities. It is important not to change a process before understanding where it is centered or the amount of variation that is present. The most common measures of a process are the mean and the standard deviation. Once those measures have been calculated, conducting a capability study which measures the number of standard deviations between the process mean and the nearest specification limit in sigma units can occur. In general, as a process's standard deviation rises, or the mean of the process moves away from the center of the tolerance:

   - fewer standard deviations will fit between the mean and the nearest specification limit

   - an increased likelihood of items outside specification will occur

The two indices used in defining process capability are:

   - Cp - Measures the variation - how well the data fits within the upper and lower specification limits (USL, LSL) - width of the process distribution relative to a set of limits

   - Cpk - Measures the central tendency – it is an index which measures how close a process is running to its specification limits and how centered the data is between the specification limits.

72

The larger the index, the less likely it is that any item will be outside the specifications. Table 7.3 shows some typical process measures.

Tri-Metric	Indicator	Definition	Baseline	Improvement Target
1. Capacity	Output Rate	Units/time	400/hour	450/hour
	Capacity Utilization	% of maximum output utilized	75%	85%
	Resources Committed	FTE*, space, equipment, etc.	40 FTE 900 square feet	30 FTE 800 square feet
2. Process	Mean	Mathematical average of a set of numbers.		
	Standard Deviation	Measurement of variability or the square root of the variance		
	Cp	How well the data fits within the spec limits (USL, LSL)		
	Cpk	How centered the data is between the spec limits		
3. Outcome				

*FTE = Full-Time Equivalent Headcount

Table 7.3: Sample Tri-Metric Process Measures

In the service industries, healthcare, and public health, many processes do not have defined specifications. For processes without defined specifications, it is important to develop limits with the customers of the process variation that they will *tolerate*. The authors propose developing an Upper Toleration Limit (UTL) and Lower Toleration Limit (LTL) to allow use of either Run Charts or Control Charts. The questions to ask a customer might be "How long are you willing to wait for the doctor, for a flu shot, to get service in a WIC clinic, or to get a meal at a fast food restaurant?"

Since many customers understand that waits are inevitable, it is important to compile an average from many customers on what would be the UTL on wait time. Everyone would like zero wait time, but realistically people will accept a minimal wait. Defining that minimal acceptable wait as the LTL is important.

73

As an example, our customers of the XYZ process have been surveyed, and they indicated the following for wait time to get services: UTL = 15 minutes and LTL = 5 minutes.

A process capability study of this process shows its center and its variability. It is possible to see if the process is capable of meeting customer wait time levels. If it is not, improvements can be made to center the process so that it meets customer needs. This approach could also be applied to cycle time and Process Efficiency Percentages.

3. **Outcome measures** are measures of the result of a process output. An outcome measure is used to measure the success of a process. For most processes, an AIM statement is developed to focus what the process is supposed to accomplish and by when. Examples of outcome measures are:

- Achieving a Press Ganey score for patient satisfaction of 99%

- Reducing hemoglobin A1c (HbA1c) to less than 7 for patients with diabetes

- Healthcare acquired adverse event - < three surgical site infections

- 300 accident-free days

- 98% TB completion of therapy

- 97% Medicaid billing success rates

- 100% HIV regimen compliance

- < 5% Tobacco use by middle and high school students

- < 8 minutes clinic waiting time

Table 7.4 shows some typical outcome measures. Measurement is the key to having processes that successfully deliver customer satisfaction. Measurement needs to build outward from capacity to process to outcomes. These three measures must be aligned and monitored on a regular basis to ensure that processes are running at maximum efficiency.

Measuring capacity, process, and outcomes gives three critical perspectives to the overall performance of a process. Capacity dictates whether resources to meet current demand of the product or service are available. Process allows the monitoring of the continuing effectiveness of activities performed to create an acceptable product or service. Outcome gauges the satisfaction of the end user with the product or service once it is delivered or experienced.

The Tri-Metric Matrix is a tool which guides an improvement team through the steps of identifying capacity requirements, process expectations, and outcomes for a product or service. The value of this tool is more than a checklist for filling in customer or process requirements. This tool prompts the improvement team to interact with customers,

74

suppliers, subject matter experts, and each other to understand enough about the overall process to control it effectively.

Tri-Metric	Indicator	Definition	Baseline	Improvement Target
1. Capacity	Output Rate	Units/time	400/hour	450/hour
	Capacity Utilization	% of maximum output utilized	75%	85%
	Resources Committed	FTE, space, equipment, etc.	40 FTE 900 square feet	30 FTE 800 square feet
2. Process	Mean	Mathematical average of a set of numbers.	$\mu = 10$ minutes	$\mu = 8$ minutes
	Standard Deviation	Measurement of variability or the square root of the variance	$\sigma = 2$ minutes	$\sigma = 1.5$ minutes
	Cp	How well the data fits within the spec limits (USL, LSL)	Cp = 2.0	Cp = 1.6
	Cpk	How centered the data is between the spec limits	Cpk = 1.5	Cpk = 1.0
3. Outcome	Customer Satisfaction	% satisfied customer	98% score	99% score
	Accident-free days	# accident-free days	300 days	350 days
	TB completion of therapy	Patients completing therapy successfully	75%	95%

Table 7.4: Example Tri-Metric Matrix Outcome Measures

## Chapter 8: Standardizing and Controlling the New System

Once an improvement team has designed, piloted, and installed a new system, the process must be stabilized. Process stability exists when the new process is in statistical control and produces predictable results based upon customer expectations. Previous chapters discuss the concept of process capability. It is assumed that when a new system is designed and installed it is capable of producing the results desired by the patient, the public health organization's customer. Process stability should be determined during pilot testing before final implementation is complete.

The goal of standardizing and controlling a system is to achieve operational excellence. Operational excellence for an organization means that it has its business processes not only standardized but also optimized to realize the organization's strategic objectives as quickly and efficiently as possible. Quality improvement (QI) tools support both standardization and optimization. During initial design and testing of a new or improved process, tools provide structure through which to analyze pilot process flow and outputs. Since changes tend to destabilize processes, some tools are designed to gather data created by the new testing environment. Once the improved or redesigned process is stabilized, other tools are available to monitor ongoing process performance to sustain the desired level of performance.

An organization needs to standardize processes to achieve operational excellence and embed them across the entire organization. Best practices and higher performance must be replicated in every operational unit. Optimizing at the unit level risks sub-optimization at the system level. The PDCA cycle referred to in previous chapters has a counterpart called the SDCA cycle – Standardize, Do, Check, and Act. Once the right change has been designed, piloted, and approved through the PDCA cycle, the SDCA cycle keeps the new process in control. First, one would implement the Standardize process, "Do" it according to the setup designed, "Check" it through measurement to ensure that it is performing correctly, and then "Act" if a variance needs correction. One returns to the PDCA cycle if a major development occurs in customer demand, technology change, a legislative mandate, a political impetus, or other external influence that disrupts the process. These external influences generally require a significant analysis of current operations with the possibility of process improvement or redesign. The integrated PDCA/SDCA cycle is shown in Figure 8.1.

When standardizing a process, its stability and capability must be understood. "While there is no direct relationship between process stability and process capability, there is an important connection: Process capability assessment should only be performed after first demonstrating process stability. If a process is unstable, we cannot predict its capability. Any estimate of process capability we make depends entirely on where the process happens to be when we collect the data. Suppose the process average is shifting about over time. An estimate of the process capability is only reflective of where the process is

at that point in time, not where it may go next."[1] All processes exhibit variation. Service transactions and those processes influenced by the behavior of human beings rather than machines tend to show more variation when statistically in control. Machines are designed to repeat specific actions on a consistent basis. Human beings bring self-awareness to the process, adding a significant factor of choice and interpretation to the situation.
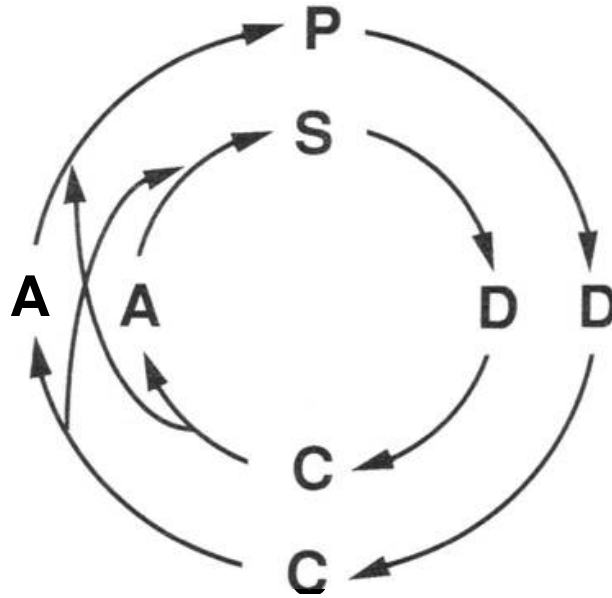
Figure 8.1: The PDCA/SPCA cycle

Variations are differences, usually minor, from the designed and expected outputs of a process. Some variation is found in all processes. The key to controlling processes is to control variation as much as possible.

All variation has some cause. Knowing the causes of variation is important in order to determine the actions that must be taken to reduce the variation. It is most important to distinguish between *special cause* variation and *common cause* variation.

Special cause variation results from unexpected or unusual occurrences that are not inherent in the process. As an example:

> *A new clinic nurse is on her way to work in the morning when her car engine stalls because of a fuel-line leak.*

---

[1] Wachs S. What is the relationship between process stability and process capability? http://www.winspc.com/datanet-quality-systems/support--resources/what-is-the-relationship-between-process-stability-and-process-capability.html, Accessed November 11, 2010.

78

This occurrence was not inherent in the normal work commute process. Special causes of variation account for approximately 15 percent of the observed variation in processes. They are usually very easy to detect and correct. While usually easy to detect and correct, it is important to have processes in place so that special cause variations are actually detected. These special causes are sometimes called assignable causes because the variation that results can be investigated and assigned to a particular source.

Common cause variation results from how the process is designed to operate and is a natural part of the process. As an example:

> *A new clinic nurse starts her morning commute on time, follows her normal route, and arrives at the health department nine minutes later than usual but within the overall time allowance of her schedule. She experienced a slowdown due to the timing of traffic lights.*

Common causes of variation account for approximately 85 percent of the observed variation in processes. When the process is in control, as it was in the above example, taking action may not be necessary. Making minor adjustments to a process because of perceived common cause variation is called *tampering*. Tampering can drive a process into further variation due to unnecessary changes made to a stable process due to a perceived special cause that is actually a common cause. While common causes account for 85 percent of the observed variation, "Fixing" pieces of the process can be time-consuming and miss larger aspects of the process that may warrant adjustment.

Process owners should recognize that the special cause variations in quality within production or service processes can usually be detected and removed by the individuals who are operating the process. Common cause variations usually require management intervention and action to change some inherent feature of the process. This is sometimes called the "85/15 rule," recognizing that management is responsible for providing the necessary inputs to address and correct the majority of variation problems or *common causes*.[2] Tools such as Check Sheets and Run Charts are useful in a wide range of situations, including when a process under study is not yet stabilized. Other tools, such as Control Charts, Paynter Charts, and error-proofing depend upon the process being stabilized or in control before the data are reliable enough for decision making. Using tools built for stable processes on out-of-control data is a recipe for failure.

Once a stable and capable process is installed, it must be monitored to ensure that the process remains stable and capable. This chapter introduces the use of five QI tools for process control. An excellent reference for information on the use of statistics in QI and process control is *Quality Control* by Dale Besterfield.[3]

---

[2] Bauer JE, Duffy G, Westcott RT. *The Quality Improvement Handbook*, 2nd ed. Milwaukee, WI: Quality Press; 2006.
[3] Besterfield, DH. *Quality Control*, 8th ed. Englewood Cliffs, NJ: Prentice Hall; 2009.

Graphical charts are useful to monitor a process for any variation in performance. Visual display of process data allows analysis for patterns not easily seen in numeric tables or spreadsheets. The benefit of monitoring process performance data is to detect indicators of change so that they can be acted upon and to communicate in a concise and visual manner how a process is performing during a specific time period.

It is best to use the simplest graphical method to monitor a process. The method used will be determined by the availability of data and the degree to which the process needs to be controlled. All of these monitoring methods provide a dynamic visual view of process performance. Numeric tables of data or comparison of summary measures do not offer the same graphical impact as visual representations. The following five are a few of the most common methods used either alone or in combination.

A **checklist** is a predetermined list of items, actions, or questions that are checked off as they are considered or completed. This type of Check Sheet is a generic tool.
The checklist is best used when a process or procedure with many steps must be performed repeatedly or when a process is done infrequently and might be forgotten. The checklist is an effective tool at the beginning of a new activity or when a process with multiple steps or lots of detail has been improved or redesigned. Providing a step-by-step sequence of activities or identification of items to be accounted for hastens the stabilization of a new process. When creating a checklist for steps of a process, it is important to prepare a flowchart first to determine the steps and their sequence. Prepared checklists are widely available. Checklists that will guide the work of a response team can be found in books about teams or in final reports of health department QI projects.[4] Figure 8.2 is an example of a checklist used by Duval County Immunization Clinics in Jacksonville, Florida.

Closely related to a checklist is a Check Sheet. A Check Sheet is a form used to record the frequency of specific events during a data collection period. A Check Sheet is a simple form used to collect data in an organized manner and to convert it into readily useful information. The most straightforward way to use a Check Sheet is to make a list of items expected to appear in a process and mark a check beside each item when it does appear. This type of data collection can be used for almost anything from checking off the occurrence of particular types of defects or the counting of expected items (e.g., the number of times the telephone rings before being answered).

Various innovations in Check Sheets are possible. Using a map of the community supported by the health department could be the Check Sheet. The idea in this Check Sheet is for the user simply to mark on the map the location of each septic system inspection that is made. The map becomes a very effective graphical presentation of where new or repaired septic systems are. Another name for this type of Check Sheet is a "measles chart."
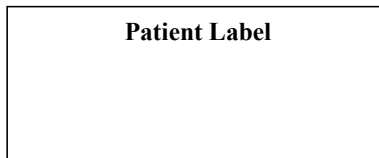
---

[4] Tague NR. *The Quality Toolbox*, 2nd Ed. Milwaukee, WI: Quality Press; 2004.

Immunization Checklist for the Clinics

√	**Front Desk**
	➢ Register patient in HMS ➢ Cross Check for duplicate patients
	➢ Access FL Shots for Patient Information "Search FL Shots"
	➢ Ask for address, phone number, and email address (change information if necessary)
	➢ Import updates to HMS
	➢ Make sure you have selected the proper Current Immunization Provider (CIP) status is correct in FL Shots
	➢ Print Immunization History from FL Shots attach to Superbill/Chart along with Insurance verification
	Staff Signature
√	**RN/LPN/MA/HST**
	➢ Greet patient
	➢ Assess for needed vaccines
	➢ Explain vaccines to be given today
	➢ Give VIS to patient/parent
	➢ Ask for any questions
	➢ Give Injections
	➢ Explain after care instructions, invite questions
	➢ Document immunization in Florida Shots
	➢ Give patient an updated record of shots w/new due date
	➢ Tell patient when to return for next vaccinations
	➢ Document in medical records
	Staff Signature
√	**Billing Clerk**
	➢ Process Superbill
	➢ Process any collections
	➢ Ask did you get your updated record of shots?
	➢ Release Client
	Staff Signature

Patient Label

For more information, email Steve_Spitzfaden@doh.state.fl.us

Figure 8.2: Immunization Checklist for Duval County Health Department Clinics[5]

---

[5] Duval County Health Department, Jacksonville, Florida. 2011.

A Check Sheet may be used to:

- Collect data with minimal effort;

- Convert raw data into useful information; and

- Translate opinions of what is happening into what is actually happening.

The basic steps involved in creating a Check Sheet are:

1. Clarify the measurement objectives. Ask questions such as:
   - "What is the problem?"
   - "Why should data be collected?"
   - "Who will use the information being collected?"
   - "Who will collect the data?"

2. Create a form for collecting data. Determine the specific things that will be measured and write this down the left side of the Check Sheet. Determine the time or place being measured and write this across the top of the columns.

3. Label the measure for which data will be collected.

4. Collect the data by recording each occurrence directly on the Check Sheet as it happens.

5. Tally the data by totaling the number of occurrences for each category being measured.

6. The data from the Check Sheet can be summarized in a number of ways, such as with a Pareto chart or histogram. Another analysis approach for data from the Check Sheet is through the run and Paynter Chart described below.[6]

Figure 8.3 is an example of a Check Sheet.

Run Charts are charts showing how a process performs over time. It is a simple line graph that depicts a running record of process behavior over time. The running record is a chronological plotting of the data points that show the sequence in which process events occurred. These data points can represent measurements, counts, or percentages of process output. This chronological plotting enables the visualization of how the process is performing and whether it is stable. The run chart helps pinpoint indicators of special causes of variation. Figure 8.4 shows a typical run chart with a median line displayed that divides the data into two equal halves. The median is the middle value in the data we have collected to plot the run chart**.**

---

[6] Bauer JE, Duffy G, Westcott RT. *The Quality Improvement Handbook*, 2nd ed. Milwaukee, WI: Quality Press; 2006.

Type of Defect	April 23	April 24	April 25	April 26	April 27	Total Defects
Illegible Address	IIIII IIIII IIIII IIIII I	IIIII II	IIIII IIIII IIIII III	IIIII IIIII IIII	IIIII IIIII I	71
Wrong State	IIIII I	II	IIII	IIIII	IIIII	22
Wrong Zip Code	IIIII IIIII IIIII IIIII	IIIII	IIIII IIIII III	IIIII IIIII II	IIIII IIIII	59
Bad Office Symbol	III	IIIII	I	III	IIII	16
Total Defects	50	19	36	34	29	168

Figure 8.3: Check Sheet tallying number of misplaced letters by reason

A plot of data over time will reveal information about a process under study. Some data patterns such as the following may be observed from a Run Chart:

- Trends
- Mixtures
- Outliers
- Cycles
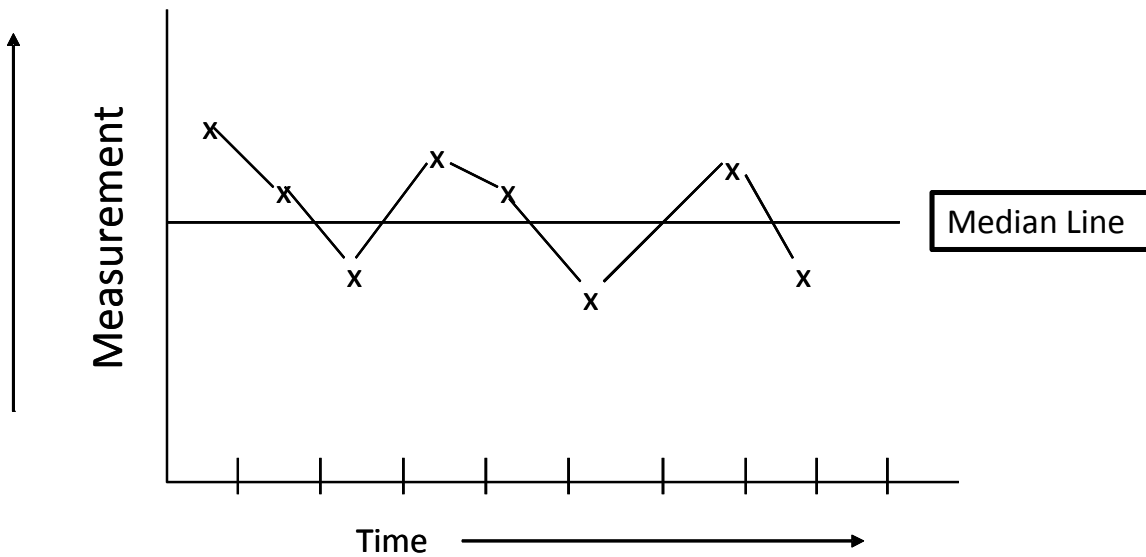- Instability
- Sudden Shifts

Figure 8.4: Run Chart showing measurements over time

83

These data patterns are some of the more common ones observed on Run Charts and are by no means all of the patterns that could be observed. When viewing and interpreting a Run Chart, variation will be observed in action since all processes have variation. Observing any trends, runs, or cycles that indicate the presence of special causes and indicating that a special cause could be present in addition to the Theory of Runs help us analyze the nature of the variation.[7] One example of the Theory of Runs is a sequence of seven or more data points steadily increasing or decreasing with no change in direction.

When analyzing a Run Chart, it is essential to blend knowledge of the process with the data displayed to see if a conflict exists between the outcome expected and actual performance of the process. Investigate any conflict or disruption. A listing of conflicts between expectation and reality or observable disruptions can lead to improvement opportunities. Focus on and understand any unusual patterns, shifts, cycles, or bunching of data points and verify if they are real. It is important to verify if the pattern is real since it may be a signal of a special cause that needs further investigation. Before time and resources are expended on improving a special cause signal, it must be verified. The absence of signals of special causes does not necessarily mean that a process is stable. Quality specialists suggest that a minimum of 100 observations without an out-of-control signal are required before a process can be labeled as in statistical control.

The **Paynter Chart**[8] was developed by Marvin Paynter, a quality engineer at Ford Motor Company, when he wanted to show a number of issues from different sources of inputs on a one- page tool as a summary for management. His idea was to pull together the Run Chart and Pareto data[9] into a single chart. The Paynter Chart can show emerging and declining problems, the timeframe for any corrective action and its effects, and whether or not the corrective action provided acceptable results.

The Paynter Chart is a graphic tool that displays the history of a problem or opportunity over time. It can be used to monitor and track several different areas of an opportunity or occurrence of failure and highlight or show the impact of any changes or corrective actions over an extended period of time. Ideally, and to get a view of the history of a problem, the chart should show the prior few months, six if possible, and at least three to six months into the future. This visual of the timeframe for action and responses is more complete and informative.

---

[7] Evans JR, Lindsay WM. *The Management and Control of Quality*, 6th ed. Mason, OH: Thompson/Southwestern; 2005.
[8] Munro R. Paynter Chart. *American Statistical Association Detroit Chapter Newsletter*. August, 1995.
[9] A Pareto Chart is used to focus efforts on the problems that offer the greatest potential for improvement by showing their relative frequency or size in a descending bar graph.

The information on the Paynter Chart is developed from the Pareto analysis, the bar chart, the Run Chart and a table record/tally chart of measurements or events tracked over time. It demonstrates the following functions:

- Identifies new and reducing problems;
- Shows the effects over time of any changes made;
- Can correlate actions taken to any changes in results, acceptable or unacceptable; and

- Validates effect of changes over time.

While the Run Chart shows a plot of measurement over time as single data points, each of those data points can have a number of items rolled up into it. The Paynter Chart allows us to click on a data point and see what is composing it as shown in Figure 8.5. The bold boxed summary point is composed of data from T, X, Y, and Z which are displayed in the Pareto Chart. From the Pareto Chart we can determine the percent of contribution of each of the subdata to the total.

The Paynter Chart should be constructed as the data tally sheet is created for the Run Chart since this practice will simplify the calculations later. This combination of Run and Pareto Charts provides a comprehensive visual for presenting a process's performance.
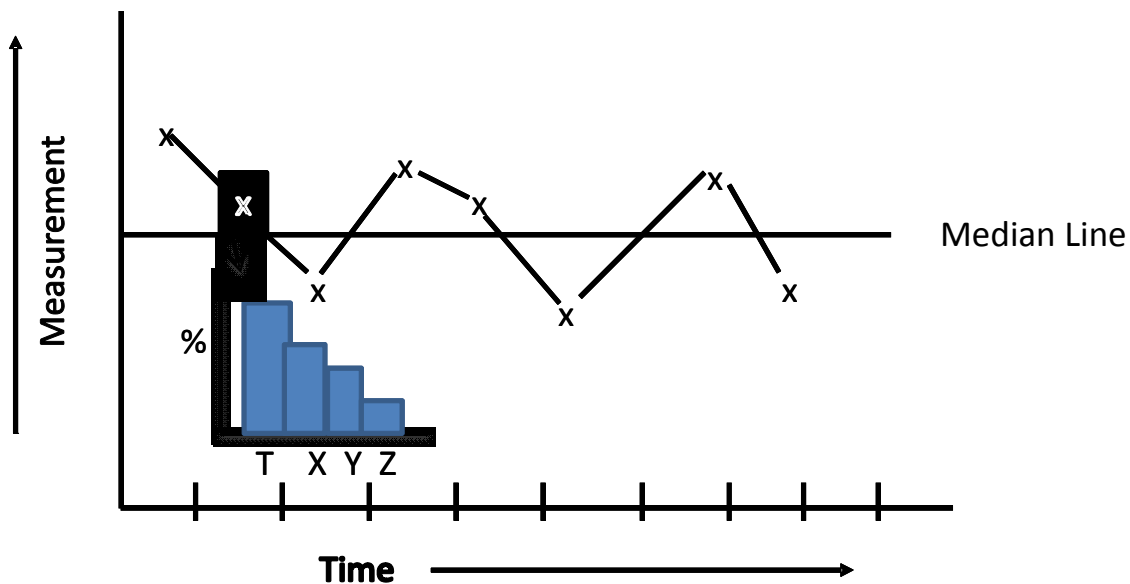

Figure 8.5: Paynter Chart combining Run Chart and Pareto Chart

Control Chart - While every process displays variation, some processes display controlled variation that is natural to the process (common causes of variation). Other processes display uncontrolled variation that is not present in normal operation of a stable process (special causes of variation).

The Control Chart is similar to a Run Chart since it is a graph used to study how a process changes over time. Like a Run Chart, data are plotted in time order. The difference between the Run Chart and the Control Chart is that the Control Chart always has a central line for the Average of the data plotted and not the Median of the data that a Run Chart calculates. The Control Chart is more complicated than a Run Chart since it has calculated upper and lower control limits. These control limits are determined from historical data. By comparing current data to these lines, conclusions can be drawn about whether the process variation is in control or is out of control, affected by special causes of variation. If the process is in control, reliable predictions about its output can be made.

Figure 8.6 shows a typical Control Chart with the average (mean) and control limits displayed. Some Control Charts show warning lines to alert when the process is approaching an out-of-control value. The warning line is shown in Figure 8.6. A Range Chart is frequently calculated with a Control Chart to reflect the span between the highest and lowest values of the data averaged to plot the individual points on the Control Chart.[10]

UCL: Upper Control Limit

LCL: Lower Control Limit
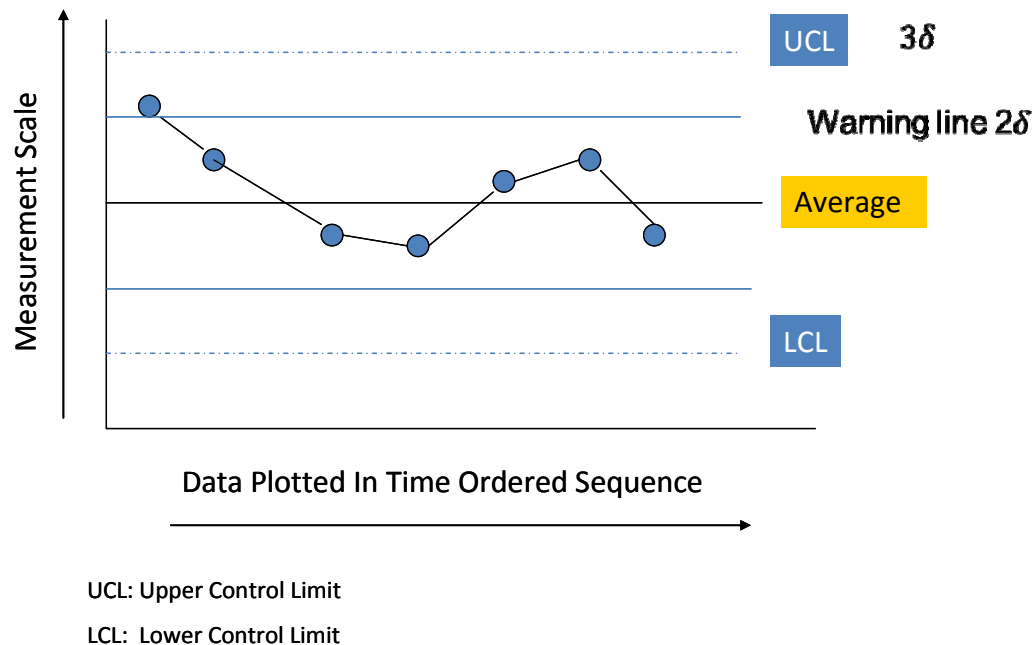
Figure 8.6: Control Chart showing averages of sample data plotted in time-ordered sequence

---

[10] A detailed explanation of statistical control is beyond the scope of this text. The reader is referred to a standard statistics text.

86

Rules for detecting "out-of-control" or non-random conditions were first postulated by Walter A. Shewhart in the 1920's and became known as the Western Electric Rules.[11] Lloyd S. Nelson developed the Nelson Rules[12] to help guide the interpretation of Control Charts which were similar to the Western Electric rules. A general summary of the Out-of-Control Rules is shown in Table 8.1.

Measurement Scale

Any Point Above The UCL

UCL

2 – 3 Points in this area or above

4 – 5 points in this area or above

8 points in a row in this area or above

Average

8 points in a row in this area or below

4 – 5 points in this area or below

2 – 3 Points in this area or below

LCL

Any Point below the LCL

Data Plotted In Time Ordered Sequence

UCL: Upper Control Limit
LCL: Lower Control Limit
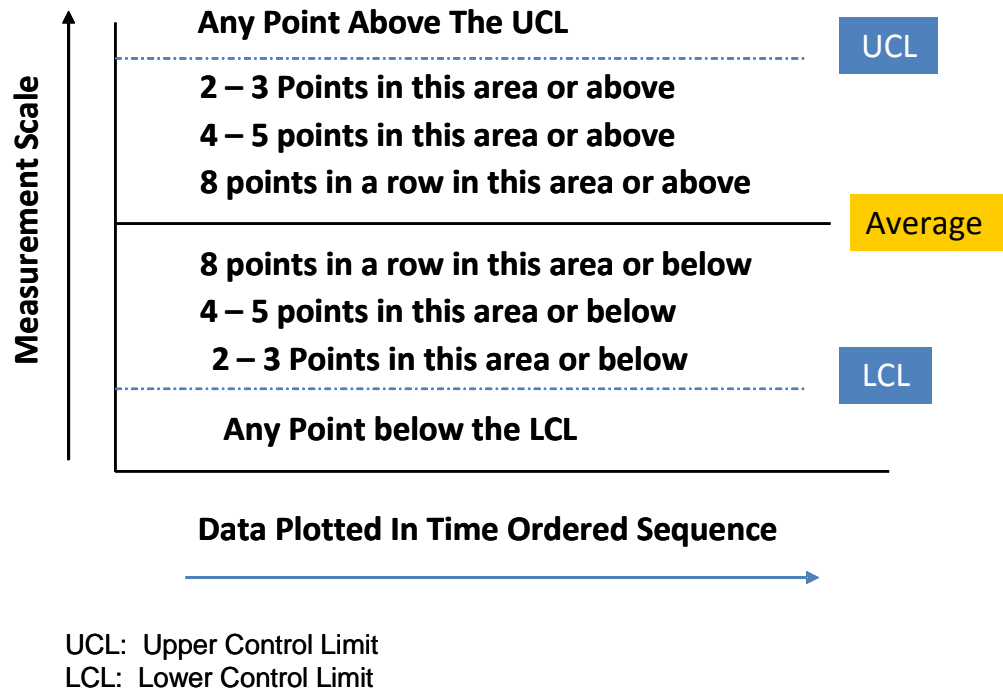
Figure 8.7: General rules for out-of-control process conditions within Control Charts

Many types of Control Charts for variable data, attribute data, and special circumstances exist. *Quality Control* by Dale H. Besterfield is an excellent resource for entry-level QI team understanding of basic statistics, run, and Control Charts.[13]

Control Charts are used to:
- control ongoing processes by finding and correcting problems as they occur;
- predict the expected range of outcomes from a process;
- determine whether a process is stable and in statistical control;
- analyze patterns of process variation from special causes or common causes; and
- determine if a QI project should aim to prevent specific problems or to make fundamental changes to the process.

---

[11] The Western Electric Rules were codified by a specially appointed committee of the manufacturing division of the Western Electric Company and appeared in the first edition of its *Statistical Quality Control Handbook* in 1956.
[12] Nelson LS. Technical Aids. *Journal of Quality Technology*. 1984; 16(4): 238-239.
[13] Besterfield, DH. *Quality Control*, 8th ed. Englewood Cliffs, NJ:Prentice Hall; 2009.

When analyzing a Control Chart, as suggested for the Run Chart, blending knowledge of the process with the data displayed to see if conflict between the outcome expected and actual performance of the process is evident is a solid start. Next, it is important to investigate any conflict or disruption. Creating a listing of conflicts between expectation and reality or observable disruptions can lead to improvement opportunities. Focusing on and understanding any unusual patterns, shifts, cycles, or bunching of data points and verifying if they are real are crucial next steps. It is important to verify if the pattern is real since it may be a signal of a special cause that needs further investigation. Before time and resources are expended on improving a special cause signal, it must be verified.

Is the Control Chart you are using healthy?

Does it include relevant information to help gain insight about your process?

Control Charts are valuable tools to help a response team implement fundamental process changes to improve patient care. Before the team can effectively utilize the information from the chart, they must first be confident that the chart being reviewed is healthy. Just as a physician would not perform elective surgery on a patient with an infection, the team should not analyze a process improvement chart without first considering seven key attributes.

Software is an invaluable tool for creating Control Charts; however, great diversity among software programs exists. When choosing Control Charting software, using these seven traits as a guide will be effective:

1. Lloyd Nelson limits for computing Control Charts

2. Clear, extensive, and accurate titles

3. Underlying data visible on the chart

4. Control limits reflect process change

5. Out-of-control conditions clearly identified

6. Assignable causes shown but not used in overall calculations

7. Annotations used to increase understanding

Error Proofing - focuses on two aspects of process activity: (1) prediction, or recognizing that a defect is about to occur and providing a warning, and (2) detection, or recognizing that a defect has occurred and stopping the process. Human beings tend to make mistakes inadvertently. Typical mistakes in daily work or when providing service to customers are omitted process, processing errors, setup errors, missing information, wrong information or adjustment errors.

Such errors can arise from the following factors:

- Forgetfulness due to lack of concentration
- Misunderstanding because of the lack of familiarity with a process or procedure
- Poor identification associated with lack of proper attention
- Lack of experience
- Absentmindedness
- Delays in judgment when a process is automated
- Equipment malfunctions[14]

Other terms for error proofing are "mistake proofing" and "Poka-Yoke," a Japanese term coined in the early 1960's by Shigeo Shingo, a twentieth century Japanese industrial engineer who distinguished himself as one of the world's leading experts in manufacturing practices.[15]

Blaming the worker not only discourages them and lowers morale but also does not solve the problem. Many applications of error-proofing are deceptively simple yet creative. Usually, they are inexpensive to implement. The checklist in Figure 8.2 from Duval County, Florida is an example of error-proofing. The Check Sheet provides a sequential guide to all of the steps required during a customer engagement in the Immunization Clinic. By following the Check Sheet and marking off each step as completed, the clinic professional is alerted by the next unchecked item that it is the next step to be performed. At the end of the clinic visit, the same Check Sheet can be used to audit daily volume within the clinic and completion of all required steps in each process supported by such Check Sheets.

Modular *kaizen* uses the concepts of control and standardization to identify Areas of Concern and disruption. Performance management, based upon the department's strategic plan, sets the foundation for critical measures that reflect required organization and community outcomes. Using standards set for the health department during its regular planning cycle ensures that comparison of activities performed to required outcomes closely matches the department's mission and objectives. The more aligned response teams are to priority outcomes of the health department, the more efficient they will be in choosing process improvement projects. The benefit of keeping the "check" and "act" process directly related to priority activities is that the tasks performed blend easily with the daily work of the response team members. Fast transition is an element of the House of Modular *kaizen*. Response teams are able to transition quickly from normal work tasks to improvement tasks because the skills and information required for improvement are closely related to what they are doing in their normal work assignments.

---

[14] Evans JR and Lindsay WM. *The Management and Control of Quality*, 6th ed. Mason, OH: Thompson/Southwestern; 2005.
[15] Wikimedia Foundation, Incorporated. Wikipedia: The Free Encyclopedia. http://en.wikipedia.org/wiki/Shigeo_Shingo. Updated February 27, 2011. Accessed February 27, 2011.

Modular *kaizen*: Dealing with Disruptions

Chapter 9: Change Management

If you want to make enemies, try to change something.
Woodrow Wilson

Organizations wanting to adopt the Modular *kaizen* approach need to have a culture that can support and produce quick and rapid change; they must be ready to embrace constant change and continuous improvement towards a defined standard of excellence that is continually rising. This chapter gives leaders a road map to position their organizations for ongoing and rapid change.

A common question asked by leaders and employees in various organizations is "Why do we need to change our organizations on a regular basis? We like the place the way it is! Why keep changing all of the time?" The answer is simply that the old ways of accomplishing an organization's purpose are not effective and efficient and do not work any longer in the current environment. In today's rapidly changing organizational and business environment, most organizations and their leadership realize this problem too late.

Change is critical to the survival and sustainability of public health organizations. Unfortunately all organizations have "antibodies" that resist change and challenges to their legacy. These antibodies drive out new ideas and people that are considered either odd or at odds with the organization's current existence. These antibodies want to maintain the status quo at all costs.
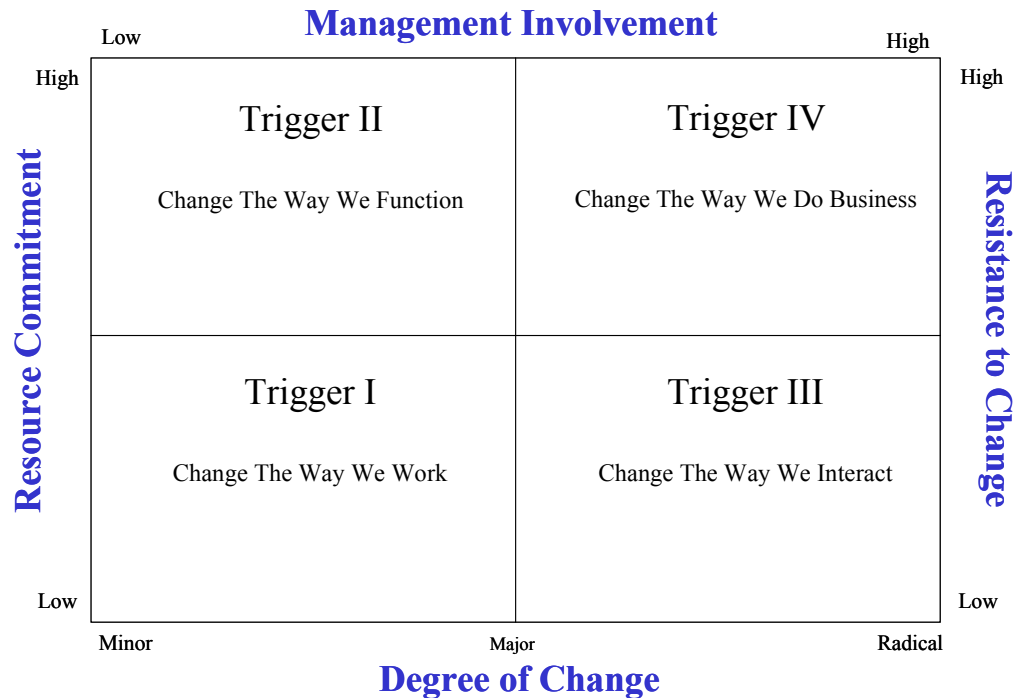
Most organizations do not change in response to seeing what is on the horizon and wanting to prepare to meet the new challenges. Organizations change because they are forced into it kicking and screaming by the aggressiveness of their competitors, political or fiscal changes, or by their customers. Few organizations change because they have visionary leadership that is able to foresee a shifting and sliding marketplace and position their organization for the next market momentum move. These leaders understand the Triggers of Change and the Four Variables of Successful Change.[1] Leaders want to know what and how much to change and when. The Triggers of Change and the Four Variables of Successful Change at different levels of intensity are shown in Figure 9.1. The intensity levels require varying levels of effort and investment of scarce resources. When making an investment in change, one needs to be cautious and try to minimize the risk of failure. The best change is one that minimizes the intensity of the Four Variables of Successful Change, thus reducing the stress and strain on the organization undergoing change. For instance, it is preferable for change to occur without maximizing

---

[1] Parts of this chapter are based on a previous work: Mead J, Moran J. TECHNOSPEED Change. *The TQM Magazine*. 2001; 13 (4): 224-231.

management involvement, resistance, degree of change, and resources. This approach optimizes the possibility of successful change.

The Four Variables of Successful Change

Management Involvement

	Low	High
High		High

Trigger II	Trigger IV
Change The Way We Function	Change The Way We Do Business

Trigger I	Trigger III
Change The Way We Work	Change The Way We Interact

Resource Commitment (vertical, left axis: High to Low)

Resistance to Change (vertical, right axis: High to Low)

Minor	Major	Radical

Degree of Change

**Figure 9.1: The Four Variables of Successful Change**

Change has always been ubiquitous. In the past, the luxury of changing at a leisurely and more controlled pace was possible. What would once have been a long process of changing a culture now has to be a shortened process; the organization might disappear if it takes too long to change. Today the rule is "Change Quickly, Change Often, or Cease to Exist." The organizational culture must be able to support constant change.

Why have past change efforts not been successful?

In the past, the "Water and Wait" philosophy of change was common. The training and consulting companies would dictate that the "process" was important; given enough time, it would deliver the desired results. Organizations quickly lost patience with "Water and Wait" change methodologies. Not many organizations reaped the benefit of "Water and Wait." It used to be that people had to be sold on change. In today's fast-paced world, the options are either change or be passed by. Change is a core competency for even the most basic of jobs. Organizations often need to be prescriptive when change needs to occur as to how soon it will be implemented and accomplished. This prescriptive approach helps employees understand the importance of change to the organization and for the benefit of its customers.

92

Simply training people on how to change will not achieve the desired results because the whole organization never reaches a point where everyone is trained at the same level and at the same time. Oftentimes, it is not affordable to stop work and train everyone. Some organizations adopt the imbedded Change Agent approach where selected individuals are trained in the philosophy of change and then dropped into the organization to make miracles happen. These embedded Change Agents soon find that without all of the Core Ingredients as shown in Figure 9.2—power, authority, interpersonal skills, and commitment—they become quickly frustrated. When someone who has no authority or power is invited in to help an organization, it is important that someone from within that organization becomes the imbedded change agent who can further the assistance; instead, the person in the organization often watches the usual pattern develop of a cluster of trainings, assessments, and change targets set to be implemented. Then the reality sets in that the organization being assisted has other priorities not related to the change envisioned; meetings get canceled, follow-on trainings get postponed, change targets slip, and the imbedded change agent gets frustrated and ultimately gets blamed for the failure. Simply stated, in the absence of leadership and organization-wide commitment to change, a Change Agent's success will be limited.

Core Ingredients and Dimensions of Change
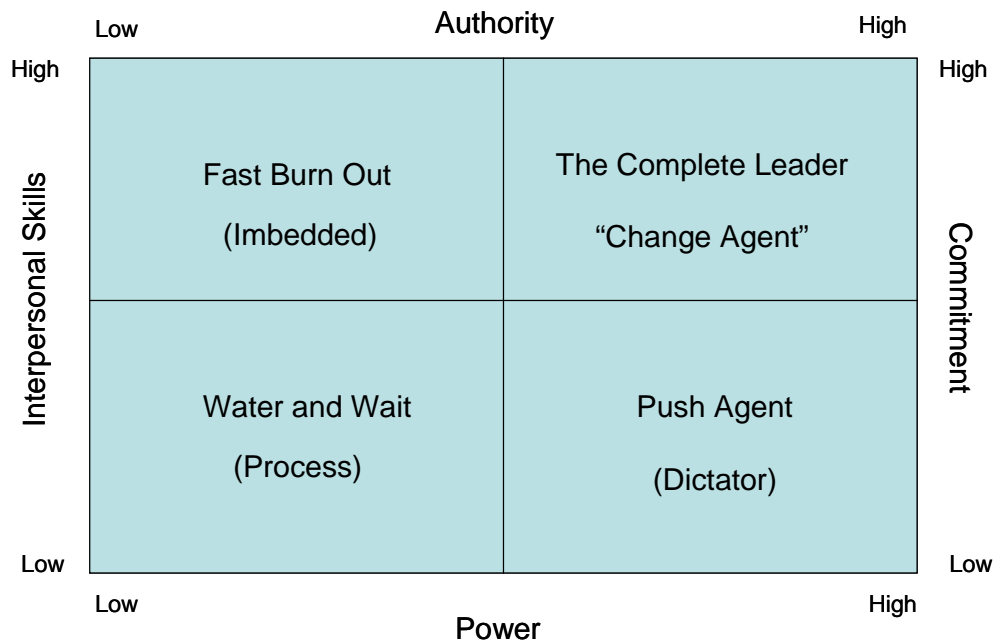
Figure 9.2: Core Ingredients and Dimensions of Change

Real Change Agents have all four Core Ingredients of Change at the highest level, and they lead change by example in their areas of responsibility. If leaders lack interpersonal skills and commitment, they become push agents; since they have been told to lead the

93

change because of their position, they typically do not believe in it. Push agents achieve some limited degree of success initially, but then those employees whom they lead soon stop listening and acting since they see that leadership is not really committed or engaged.

Once a true organizational change effort gets started, an effective way to train all of the people on how to change is on-the-job training. Teaching and showing them how to change by doing a little change all of the time is most beneficial. Individuals become great Change Agents when they are actually practicing changing on a regular and consistent basis. Change has to be led; it cannot be delegated.

How does an organization approach constant change?

Successful organizations approach change by constantly reinventing themselves, thinking ahead, and making minor changes so that they are always positioned for the next wave of change in the marketplace. This way employees view change not as a strange phenomenon to resist but as one to embrace and not fear. It is important not to make everyone an agent of change within the organization. Simply developing Change Agents skilled only in the philosophy of change wastes resources since they usually have never actually implemented change but have only talked about it in the abstract. Putting employees through two to three days of mock exercises of change working on hypothetical issues also is likely to have little, if any, lasting impact. In both cases, no link to reality is evident; nothing beats doing it for real. Saving "Water and Wait" training and consulting dollars and investing them in the first three Triggers of Change will help to lower the resistance to the fourth Trigger of Change—"The way we do business." This approach has a higher potential return on investment.

What behaviors can leaders use to support change on an individual level?

At the end of each week, the leadership and employees of an organization should be asking themselves "How have we changed this week? How must we change next week?"

Leaders can encourage potential change innovators to emerge and the early adopters of change to continue by nurturing, facilitating, and protecting creative and worthwhile change ideas in addition to appropriate responses to change. Leaders can provide this support by standing behind the creative employee's ideas, finding resources within the organization to put their subordinates' new ideas into action, and publicly recognizing individuals who exhibit the organization's preferred response-to-change behaviors. When leaders fail to support and find resources for new ways of doing business, these ideas and adaptive behaviors can wither and die before their potential benefits are ever considered and before others can observe and emulate the early or successful adopters of new changes. Without visible leadership support, any change program will be viewed as just another top management fad to be waited out until it disappears.

When must a consistent and sustainable change effort be initiated?

Does an organization wait for disaster or have foresight? The Four Triggers of Change shown in Figure 9.1 are arranged in four quadrants, bound by the Four Variables of Successful Change at different levels of intensity. The Four Variables of Successful Change—Management Involvement, Degree of Change, Resource Commitment, and Resistance to Change—are elements that need to be thought through in advance of starting any change effort, defining how much can realistically be accomplished and in what timeframe.

The fourth Trigger of Change, "Change the Way We Do Business," is a total transformational cultural change and the most difficult to accomplish in a short timeframe. Often when a more intensive Trigger of Change occurs, organizations shoot themselves in the foot. When an organization undertakes radical and quick change, it is usually as a knee-jerk reaction to being caught flat-footed in a changing marketplace or surprised by a competitor that is fierce and flexible. Massive upheaval usually results. The resistance to the change internally is high and sometimes rebellious. Management must heavily involve itself in making the change and patching up the mistakes caused by engaging in this massive change, possibly defending itself against charges of incompetence. The philosophy that is espoused is to link the organization quickly to a new vision and possibly a new business model that may or may not be well-devised. Thus the possibility of successful execution of a Total Transformational Cultural Change is small, and very few organizations do this well.

The fourth Trigger of Change is the only level where all Four Variables of Successful Change must be at their maximum level of intensity. Running four activities at their maximum level and expecting them to mesh and turn out the desired result typically is more wishful thinking than reality. At least one or two of them will have a misstep and throw the rest out of synchronization. When this happens, the desired goal is not capable of being reached, much less effort or loss recouped.

Organizations have better success with change if they use the other three Triggers of Change since the Four Variables of Successful Change are at different levels of intensity; some are low, and some need to be high. The odds of success are higher when only one or two variables that need to be maintained at high intensity levels are in place.

The first type of change, or first Trigger of Change, may result from a desire within the organization to seek small and continuous improvements. These changes typically are more gradual and less overarching. All Four Variables of Successful Change function at their lowest levels of intensity. When this occurs, each part of the organization is making gradual and continuous improvement in the way that it works and is a great way to train individuals in how to change. This on-the-job employee basic-level change training works.

The second Trigger of Change may result from a desire within the organization for structural change that will affect the organization's functions. This type of change has Resistance to Change at its highest level of intensity and Management Involvement at a low level of intensity. This change can be accomplished quickly since it usually is a reorganization that can be isolated to specific departments and business units. Usually the resistance is confined to a specific area in the organization and can be controlled and monitored. The Resistance to Change may be isolated to a few individuals that can be coached or consulted into joining the effort. This type of change happens whenever certain functions are no longer needed, the organization needs to be flattened, a key manager or employee leaves, a business unit is sold, or a product or service line is discontinued. Such change is healthy for an organization in the long run since it repositions the organization to focus its employees and resources on new tasks or new businesses for the future.

The third Trigger of Change may result when a need and desire for change in the way people interact within the organization is evident. This type of organizational behavior change has the Degree of Change and Management Development at their highest levels of intensity. This type of change involves having a very clear philosophy statement of why it is necessary to change the way employees interact and support each other in the organization. This new philosophy of change could be a new mission, vision, values, or goals for the organization. The degree of change is high since people will be required to act and behave in entirely different ways in order to meet the new goals in the organization.

If organizations are constantly working on the First Trigger of Change and are occasionally making Trigger Two and Three Changes, they will, in effect, accomplish a Level Four Change in an organized manner over time while reducing the stress on the organization that a complete level four radical transformational change entails.

How are organizations and their employees best engaged in supporting a successful change effort?

Once a Trigger of Change is embraced, it is important to engage everyone fully in the change effort. Figure 9.3, the "Change Commitment Spectrum," shows steps that the organization and the individual can take; these steps increase the likelihood of a successful change effort.

When a change effort begins, both the organization and individual employees struggle with the Translation Spectrum shown in Figure 9.3. The Translation Spectrum introduces stress and anxiety into an organization. This stress and anxiety result from an organization not completely defining what it is trying to achieve with its change effort. If the concept of "what change will accomplish" is not clear and compelling, then the individuals in the organization cannot envision what the end state will be and how they fit into that picture. When individuals cannot picture a future reality that clearly includes them in the "Big Picture," they begin to feel stressed and anxious. Successful change

96

results when an organization helps its employees move seamlessly through the Translation Spectrum. Concept to reality is easier when the end state is clearly defined rather than one that each individual interprets differently.

Change Commitment Spectrum

	Organization	Individual	
High Organization Low Individual	Step 1. CATALYST • Cause • Why	Step 3. CAPACITY • Experience • Assessment/Needs	**High Concept Low Reality**
	Step 2. RESULT • Output • Expectation	Step 4. SKILL • Capability • Development/Training	
High Individual High Organization			**High Reality Low Concept**

(Left axis: Commitment To Change — Right axis: Translation Spectrum)
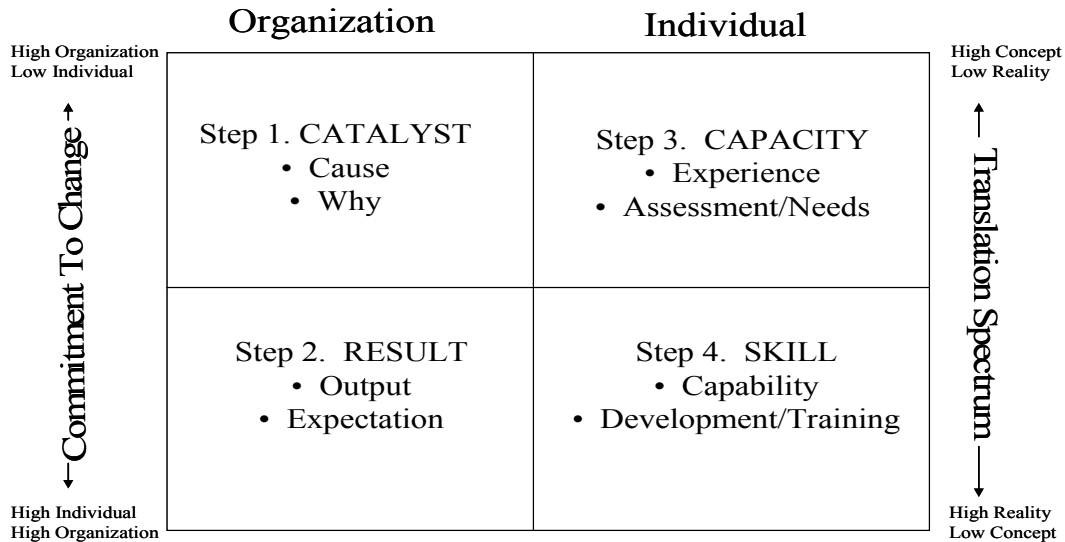
Figure 9.3: Change Commitment Spectrum

What strategies decrease stress, anxiety, and tension in individual employees? Four primary questions need to be answered to an individual's satisfaction before they can even attempt to "give it their all" when faced with change. The individual can answer the first two questions; the organization and its leadership answer the last two questions.

1. Do I have the capacity (experience) to change?
2. Do I have the capability (skills) to change?
3. What is the change that is wanted?
4. What is the expectation of results to be achieved?

All four questions need to be addressed to all parties' satisfaction to ensure that they wholeheartedly move with the change. If any one of the answers is perceived as unclear or threatening according to the individual, then the person will be less likely to move with the change and more likely to hesitate, work at partial speed or energy, sabotage the change, or simply not participate in the change. The likelihood of successful change decreases quickly when the individual perceives more than one answer to these questions as threatening, unclear, or negative.

Organizational imperatives explain the "what" and the "why" of change to an employee. While organizations are improving their ability and consistency in addressing these issues, the individual imperatives that speak to "how" the change will occur are often

assumed or overlooked. One only need look to Maslow's Hierarchy of Needs[2] to understand that the individual's perceptions are the root of greater anxiety and stress and are the more common and frequent reasons why change efforts are not successful in organizations.

Consequently, when addressing the capacity for change, it is essential to look to past individual and organizational experiences. How much change have they experienced? What types of changes have occurred? How have individuals and groups reacted? As a first step towards a proactive stance, management needs to determine how small changes can be built into the daily, weekly, and quarterly regimen of individuals and workgroups (e.g., national workgroups, teams, etc.). In many cases, these changes are occurring now, but the capability to handle them rapidly with an economy of energy while productively requiring that a singular focus be put on what is happening, how people are reacting, and what the expectations are for output is crucial.

How do you really accelerate change?

Individual behavior provides us with four signposts for rapid and successful change.

> *Signpost 1:* Usually, a catalytic event provides the energy or impetus to change. Without the pain or anticipated pain of a catalyst, the necessary commitment energy often is not present to drive through the discomfort of change.

> *Signpost 2*: Next, the individual forms an image of a better; future state as an antidote, or alternative, to the flawed status quo condition. Again, without the promise of substantial improvement, the initial energy required for successful change does not exist.

These first two signposts are fairly conceptual in nature. They set the stage for the next two signposts by building the urgency, energy, and commitment needed to take personal action and commit individual resources. Successful framing within these first two signposts is not a guarantee that change will be implemented or successful, but the absence of one or both is a strong predictor of failure or flawed change.

> *Signpost 3:* Capacity consists of the individual taking stock of his/her own current knowledge and resources and performing a gap analysis between present capacity and the ideal future state. Also, it is important to decide what information, skill, or ability is needed to determine a new course of action and ensure that it will be successful. The individual compares the present state to the ideal future state and determines what is needed to bridge the gap.

---

[2] Maslow A., Lowery R. (Ed.). *Toward a psychology of being* (3rd ed.). New York: Wiley & Sons; 1998.

Signpost 4: Finally, the individual fills the gaps between the status quo and the future ideal state with skill development, knowledge, practice, training, and application. These actions facilitate the move from flawed status quo to the future ideal state as the new reality.

The latter two signposts are concrete, action-oriented, and increasingly labor-intensive. The chance for failure, errors, mishaps, recriminations, second-guessing and other various forms of personal pain and discomfort all exist here with higher possibility and probability. Consequently, an individual requires the most support with these steps.

The interrelationship of the Four Triggers of Change, Variables of Successful Change, and the Change Commitment Spectrum are shown in Figure 9.4. In each quadrant of Figure 9.4, the Four Steps of Change Commitment Spectrum is a subset of each of the Triggers of Change.

The first two steps of the Change Commitment Spectrum frame the change imperative by answering the questions "why change" and "towards what result." These answers are primarily the responsibility of the organization to set forth in a clear and compelling manner so that the individuals making the changes have the necessary energy and commitment to move forward with their work. The organization then needs to facilitate the availability of resources and reward the individuals for engaging in the subsequent two steps, "assessing needs" based on gap analysis of current capacity and future state, then "building capability" to meet that capacity through skill development.

The Four Variables of Successful Change
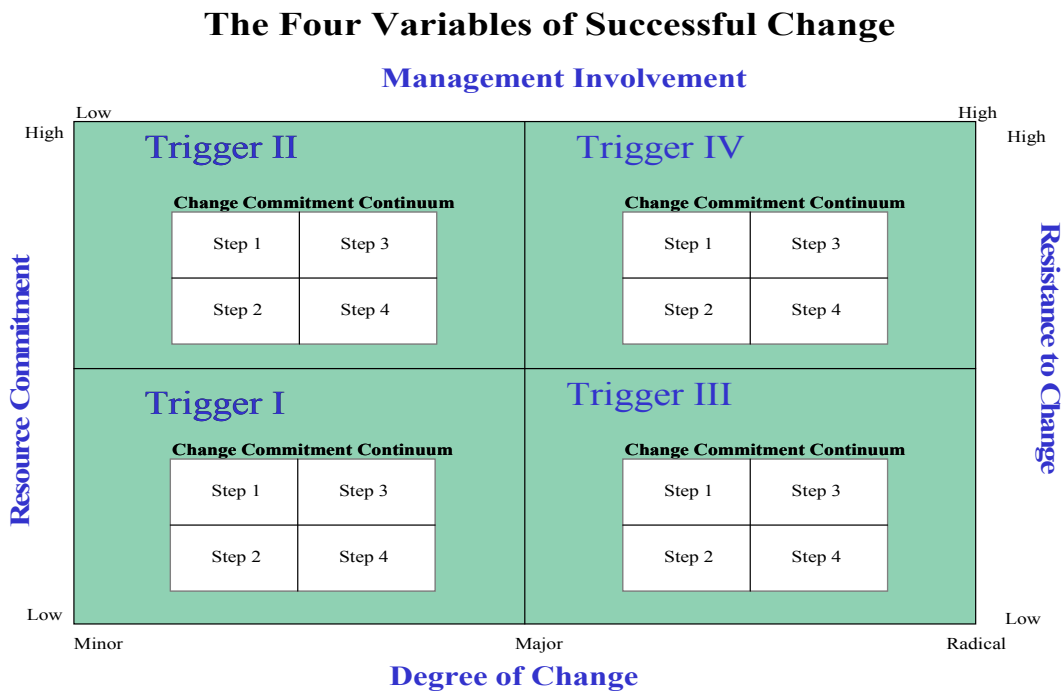
Figure 9.4: The Four Variables of Successful Change

99

Summary

Organizations must approach change by constantly reinventing themselves, continually making many minor changes so that they are always positioned for the next wave of change in the environment (e.g., fiscal, political, community health status). This way, their workforce views change not as strange phenomena to resist but as a concept to embrace. Change becomes routine if it is always happening. It is normal to change if one is always doing it. Organizations must constantly ask themselves:

- What needs to change in order for the organization to be a fierce and flexible force in the marketplace?
- How has the organization changed this week?
- How must the organization change next week?

Organizations have to build a workforce that is willing to take risks and try new ways. It is a never-ending cycle of change, change, and more change in the flexible organization.

The word Kaizen comes from the Japanese words "kai," meaning change, and "zen," meaning good. Organizations that want to embrace Modular *kaizen* must be ready to embrace constant change and continuous improvement towards a defined standard of excellence that is always increasing.

Chapter 10: Daily Work Management: Using Quality Improvement Skills in Daily Work[1]

"If you add a little to a little and do this often enough, soon it will become great."
Hesiod, 8th century BC Greek Poet

The quotation above is the essence of quality improvement (QI) in daily work—many small, continuous improvements add up over time. QI in daily work is called "daily work management" (DWM) because it uses the tools and techniques of QI to make daily work better, more internally and externally customer-focused, and more manageable. By making daily work more manageable, it helps to reduce stress. DWM is the continuous improvement of the day-to-day work that is performed. Organizations must train their workforces at all levels in the tools and techniques of QI to institute organization-wide DWM. DWM can also be related to Standardized work from the House of Modular *kaizen*; Standardized work is consistent performance of a task without waste according to prescribed methods, focused on human ergonomic movement.

The following steps facilitate application of QI skills to daily work to make improvements that simplify tasks, focus more attention on the customer, and deliver a more consistent product or service.

1. **How is time spent?** Using a Check Sheet, it is useful to review a calendar for a couple of months to determine in what categories time is spent. Most people find meetings and e-mails are the major categories, especially at supervisory and managerial levels. This attribution is fine for a first pass, but to use QI in daily work, it is important to be more specific. What types of meetings are attended, how are they related to the job, how much time do they take, are they regular or random meetings? Answers to these questions help to determine what work is completed on a daily basis. It is a good idea to continue to monitor where time is spent in order to capture any changes that take place.

    Some QI tools[2] that can help to determine where time is spent are**:**
    - Check or tally sheets;
    - Concentration diagrams (pictorial Check Sheets);
    - Activity/Time-logs;
    - Sampling—pick days to analyze through a random number generator; and
    - Pie or Pareto charts to display the data.

---

[1] Parts of this chapter are based on: Duffy G, Moran J, Pierson E. Using QI Skills in Daily Work. *The Quality Management Forum*. Winter 2011; 36(4): 6-10.
[2] Bialek R, Duffy G, Moran J. *The Public Health Quality Improvement Handbook*. Milwaukee, WI: *ASQ Quality Press*, 2009.

2. **What are key processes?** Dr. W. Edwards Deming said, "If you can't describe what you do as a process, you don't know what you're doing."[3] Once where time is spent is identified, it will point to the critical processes performed on a regular basis. The next step is to describe these critical processes with between five and ten high-level process flow steps.[4] These flow process diagrams of critical processes describe the daily work completed on a regular basis.
.

A QI tool to help develop a flow process diagram is a SIPOC+CM Form.[5] This form indicates who suppliers are, where the inputs are generated, the key elements of the process, where output goes, who the customers of the process are, any constraints on the process, and what measures are used to indicate how the process is performing. Another QI tool that can be used is the Flow Chart Summary Matrix[6] which helps document resources that a process consumes in generating its output.

3. **Are customers' needs and wants identified?** For each key process identified and mapped, the customers' needs and wants must be described for that process. The first pass will be the process owners' understanding of what they think the customers' needs are. Once this understanding is documented, it should be validated with the customer for alignment. If the alignment is not confirmed by the customer, the needs should be corrected and any modifications analyzed to see if the process can deliver the updated requirements.

Once agreement is reached with customers on needs and wants, the same process should be performed with suppliers to make sure that they understand needs and wants, as well.

Some tools of Quality Function Deployment[7] can be used to help with the analysis of customer wants and needs:
- Process steps impact Customer Needs Matrix
- Kano model
- Understanding/interpreting the Voice of the Customer Table
- Internal/external Customer Needs Matrix

4. **Is each step controlled and owned in the processes defined?** A key part of daily QI is that clearly defined process owners understand which parts of the process they control. Process ownership is important because it establishes the

---

[3] ThinkExist. www.thinkexist.com, Accessed February 19, 2011.
[4] Collett C, DeMott J, Moran J. *Introduction to critical processes*. A GOAL/QPC Application Report No. 92-01A; 1992.
[5] Bialek R, Duffy G, Moran J. *The Public Health Quality Improvement Handbook*. Milwaukee, WI: *ASQ Quality Press*; 2009.
[6] Duffy G, Moran J. Flow Chart Summary Matrix.
http://www.phf.org/resourcestools/Pages/Flow_Chart_Summary_Matrix.aspx, Accessed January 31, 2011.
[7] Duffy G, Moran J, Riley W. *Quality Function Deployment and Lean Six Sigma Applications in Public Health*. Milwaukee, WI: ASQ Quality Press; 2010.

roles and responsibilities for the process and allows those people doing the work to make improvements. The Control and Influence Matrix[8] is a QI tool used to check each process step to determine who has control over it and if others need to be involved in order to make changes.

5. **Are measures for the process established?** Once the process is defined, it is important to understand how it is performing. Verifying whether the process is stable, repeatable, and in control is crucial. Measurement helps to understand how well the processes are being implemented, goals are being met, customers are satisfied, and processes are in control. It is important to determine what measures should be developed as Key Process Indicators (KPI). The following areas are some major KPIs:
   - *Effectiveness*—Does the process output conform to stated requirements? Goal: Doing the right things.
   - *Efficiency*—Does the process produce the required output at minimum resource cost? Goal: Doing the right things well.
   - *Quality*—Does the output meet customer requirements and expectations?
   - *Timeliness*—Does the process produce its output correctly and on time?
   - *Productivity*—How well does the process use its inputs to produce its output? Goal: Establish the ratio of the amount of output per unit of input.
   - *Output*—How much does the process produce in a given time period?

   Depending on the process, the KPI chosen may be a combination of the above or others. It is desirable to have proactive measures that show what is happening now in the process rather than reactive measures that show what has happened. Whatever measures are chosen should give a clear indication of how the process is operating and when action must be taken.

6. **Can the process be monitored and controlled on a daily basis?** Once the process can be measured, it needs to be monitored and controlled daily. Monitoring and controlling are important activities because these indicate when the process is out of control and corrective action needs to be taken. Monitoring, control, and reacting to important processes will be necessary to maintain performance levels and hold the gains obtained from improvement activities.

   Some QI tools useful for monitoring and control are:
   - Pareto charts
   - Histograms
   - Scatter diagrams
   - Run charts
   - Control charts
   - Stem and leaf plots

---

[8] Bialek R, Duffy G, Moran J. *The Public Health Quality Improvement Handbook*. Milwaukee, WI: *ASQ Quality Press*; 2009.

7. **Can processes be improved**? Improvement of daily work is the cornerstone of a quality system. Monitoring and control activities point out where the problem areas are. Using the Plan-Do-Check-Act (PDCA) cycle helps to analyze and develop solutions to identified problems. The following QI tools can help prioritize, analyze, and develop solutions to problems:
   - Problem selection grid
   - Cause and effect diagrams
   - Solution and effect diagrams
   - Stop-Start-Continue matrix
   - Impact action plots

8. Repeating steps 1–7 on a regular basis checks the process's performance and uncovers additional improvement opportunities.

Daily Work Management Case Study[9]

Sally the epidemiologist often feels as though her day is not her own; rarely can she get ahead on her workload. She is responsible for investigating disease outbreaks, surveillance, planning, and preparedness activities, writing reports, responding to community requests for data as well as various other tasks. No matter how many To–Do lists she makes, something always comes up that distracts her from her original priorities. She would like to manage her daily work better, and she remembers that a colleague mentioned something about some helpful QI tools that could be applied to her daily work.

Sally first wants to identify what she does on a typical day and how much time it actually takes. Her favorite method is to use a random number generator to select one day every week to analyze. This week Monday was selected, and Sally spent ten minutes filling out an activity log (Table 10.1). To fill out the Daily Management activity log, she spent some time reviewing her email to see what she had accomplished on Monday. She went back through her appointment calendar and e-mails for ten previous Mondays and found that the majority of her time was spent on communicable disease investigations.

Sally decided to analyze the communicable disease investigations since they took up the bulk of her time on most days. Her analysis pointed to these investigations as one of the critical processes she performs on a regular basis. She thought if she mapped out the process she used to complete an investigation, it might help her figure out where all of her time is spent. So she found a template for a SIPOC+CM form and filled it out. See Figure 10.1 for Sally's SIPOC+CM example.
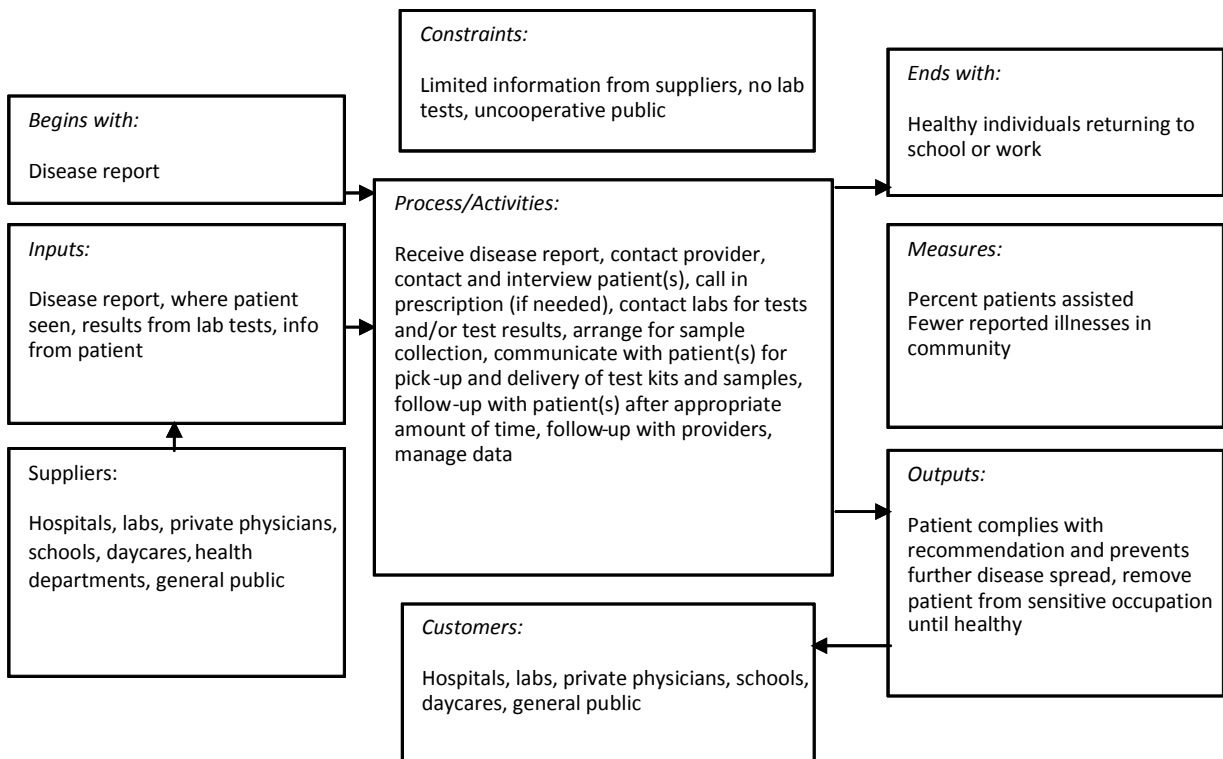

Activity	Category	Amount of time spent (minutes)
Pertussis, Salmonella	Communicable disease investigations	50
Norovirus	Food borne disease investigation	10
Grant updates	Planning and preparedness	25
Communicable disease reporting system updates	Monthly meeting	5
Phone calls and emails from hospitals	Surveillance	10

Table 10.1: Daily Management Activity Log

Begins with:

Disease report

Inputs:

Disease report, where patient seen, results from lab tests, info from patient

Suppliers:

Hospitals, labs, private physicians, schools, daycares, health departments, general public

Constraints:

Limited information from suppliers, no lab tests, uncooperative public

Process/Activities:

Receive disease report, contact provider, contact and interview patient(s), call in prescription (if needed), contact labs for tests and/or test results, arrange for sample collection, communicate with patient(s) for pick-up and delivery of test kits and samples, follow-up with patient(s) after appropriate amount of time, follow-up with providers, manage data

Customers:

Hospitals, labs, private physicians, schools, daycares, general public

Ends with:

Healthy individuals returning to school or work

Measures:

Percent patients assisted
Fewer reported illnesses in community

Outputs:

Patient complies with recommendation and prevents further disease spread, remove patient from sensitive occupation until healthy

Figure 10.1: Communicable Disease Investigation SIPOC+CM

Once Sally understood one of her critical processes, she decided to investigate the customer needs and wants of this process. To do this, she made a list of potential customer desires and used a Customer Needs Matrix as shown in Table 10.2. She listed potential customers and their needs as she understood them. Then she rated the perceived level of their satisfaction on a scale of 1 to 5 with 1 being low and 5 being satisfied. She plans to use the last column after she contacts key customers to verify their needs and current level of satisfaction.

Customer	Needs	Satisfaction	Checked
Patients	Education, Prevention, Prescriptions	3	
Providers	Guidance	3	

Table 10.2: Customer Needs Matrix

As Sally reviewed the process flow and other aspects of the process, she realized that she did not actually have control over all of the pieces of her daily work. Without control, the daily work had the tendency to manage her. The idea of Daily Management is that Sally was the driver of the activities, not the other way around. In the packet of information that her colleague had forwarded to her, Sally found a Control and Influence Matrix (Table 10.3). She sensed that by evaluating her level of control, she might refine the process more effectively and manage her time in more appropriate ways.

|	*Control*	*No control*
Knowledge	**Data management** [Do it]	**Prescribing medication** [Influence]
No knowledge	**Receive disease reports from providers** [Get help]	**Patients don't return phone calls** [Stay away]

Table 10.3: Control and Influence Matrix

What she found was that she really had control only over data management. She had some influence when she contacted the provider and the patient or the lab and limited or no control over whether individuals returned her calls or picked up kits for testing.

Having control over a process is not the only information Sally needs to manage a process; she needs to know a few more specifics. For instance, she needs to review the "how" of the process; measuring indicators of the process can help to ensure that she is getting the results that she wants.

Of several key process indicators, Sally chose to assess the timeliness and quality of her Daily Management tasks, particularly as they relate to managing the data. In this instance, that would mean she would need to review and/or input data into the disease reporting system within a short timeframe. Sally decided to monitor the amount of time that had elapsed between notification of a disease and the first phone call to the patient. She also wanted to add a question about satisfaction to the end of each patient phone call. Based on her reviews with key customers, she determined that a goal of 30 minutes would be appropriate for the review of data and a phone call to the patient.

Sally decided to set up a Run Chart to track performance against a goal appropriate for reviewing and/or inputting data into the disease reporting system. She set up a tracking log to record each time she reviewed or entered data into the disease reporting system and the amount of time that elapsed between notification and action. The Run Chart for the last 20 entries is shown in Figure 10.2. These measurements are the first that Sally took; she made a run chart that gave her a total picture of the outcome of her new Daily Management activities. She needed to get an initial understanding of her performance on a real-time basis to see if she was close to the targets that she had set for herself. The Run Chart showed that of the last 20 entries, the median amount of time that had elapsed between notification of a disease and the first phone call to the patient was more than her personal target of 30 minutes. A simple look at the Run Chart indicates that Sally has more work to do in managing this part of her daily work. At this point she does not know whether the 30 minute target is too optimistic or whether other improvements can be made to the routine that she has for receiving the notification and making first contact with the patient.

Monitoring a run chart is an important activity since it indicates when the process is trending upward or downward or when the average shifts. Sally's use of simple QI tools has clearly indicated that she is not there yet.
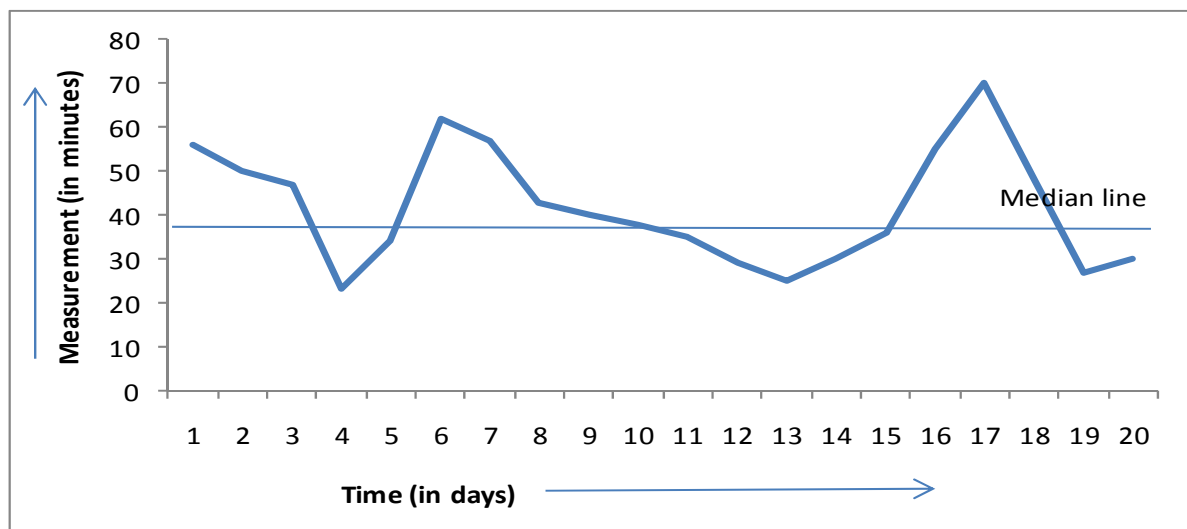
Figure 10.2: Run Chart

When reviewing the Run Chart, Sally realized that some inconsistencies were evident in the amount of time it takes to complete the first steps of the investigation—receiving the data, reviewing it, entering it into the data management system, and calling the patient. As Sally had realized earlier, she had control over the data management piece, so she decided that it was the reviewing and inputting into the system that needed improvement. Sally put together a simple Cause-and-Effect Diagram to investigate further, which is shown in Figure 10.3.

Completing the Fishbone Diagram helped Sally clarify some of the issues that could be directly addressed in the investigation process. She was able to select one of the categories identified and make changes accordingly. Sally also continued to monitor the timing and efficiency of processes so that she could systematically review the data and continue her improvement activities.
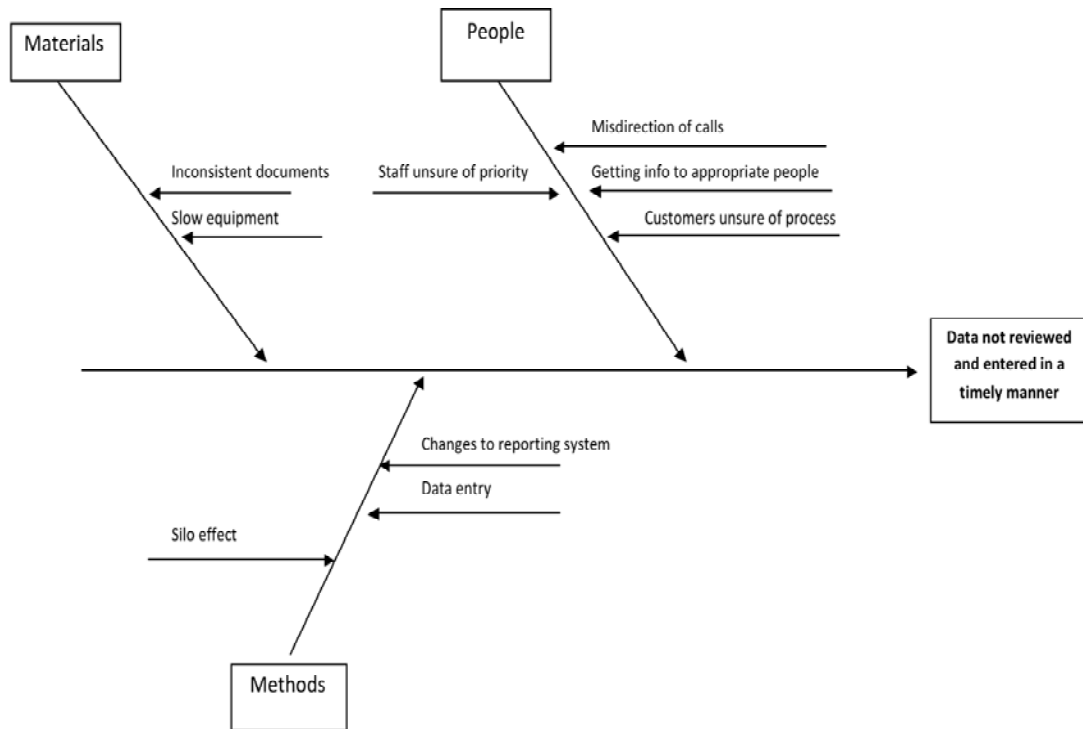
Figure 10.3: Fishbone Diagram (cause and effect)

Conclusion

Henry Ford is quoted as saying, "Quality means doing it right when no one is looking." Daily Work Management (DWM), when done well, is practiced day in and day out at all levels of the organization. DWM may not be apparent except for some up-to-date measurement charts on a wall or some employees meeting to solve a common problem using QI tools. It may show up as employees making a presentation using QI tools and techniques or a conference room containing a Fishbone Diagram on a flip chart from a previous meeting.

Some signs to notice which indicate that daily management is not yet a reality in an organization are:[10]

- The quality of a process's output is different from shift-to-shift, location-to-location, person-to-person. This inconsistency relates to a lack of standardized methods, poor training, or a lack of accurate metrics.

- The same problems continually recur after continually being fixed.

- Work processes were never planned out and instead evolved over time by different people doing the job.

- Different areas doing the same work have different forms, collect different data, and use different technology systems.

- Interacting processes have different goals and objectives. A smooth hand-off does not occur, and items are often lost or delayed.

- A constant crisis mode of operation is in place.

- Employees are blamed for problems that occur.

- Customers complain about a lack of service or long waits.

- Poor documentation of changes made to the process occurs. Often changes are not

- communicated clearly to those involved.

- When veteran employees take a vacation or leave, problems arise because no one else knows how tasks are normally accomplished. They were never documented.

For Daily Work Management to be effective, everyone must understand how a process works, how the process interacts with other processes in the organization, and how it contributes to the strategic direction of the organization. Everyone must feel ownership of the process and its output. Measurement must be a way of life. Measurement is a vehicle for improvement, not punishment. Everyone must have a customer/supplier orientation in which wants and needs are communicated and understood. Equally important is that an evolving culture in which the status quo is constantly being challenged exists. Sally began her journey using some very basic tools of quality to help organize her daily management tasks that allow her to measure real-time performance against her own personal targets. Individual performance tracking does not have to be complex. daily management is a personal target and a personal success story. The more that individuals use the skills and tools learned as team members in daily activities, the sooner a culture of QI will be experienced throughout the entire organization.

---

[10] The ROI Alliance, LLC. www.roi-ally.com. Updated 2010. Accessed February 19, 2011.

Appendix A: Dr. W. Edwards Deming

W. Edwards Deming is referred to by many quality professionals as the primary quality "guru" of the 20th century. Although this reference is arguable, the authors refer to Dr. Deming as a way to orient the reader to the early designers of the current quality movement.

William Edwards Deming was born on October 14, 1900 in Sioux City, Iowa. His family moved to several other locations before settling in Powell, Wyoming. Dr. Deming attended the University of Wyoming, earning a bachelor's degree in engineering in 1921. He went on to receive a master's degree in mathematics and physics from the University of Colorado in 1925. He earned a doctorate in physics from Yale University in 1928. During the summers of 1925 and 1926, he worked for the Western Electric Company Hawthorne Plant in Chicago. It was at Hawthorne that he met Walter A. Shewhart and became interested in Shewhart's work to standardize the production of telephone equipment. After receiving his PhD, Deming went to work for the United States government, applying Shewhart's concepts to his work at the National Bureau of the Census. Transforming routine clerical operations into statistical process control in preparation for the 1940 population census led to six-fold productivity improvements in some processes. As a result, Deming started to run statistical courses to explain his and Shewart's methods to engineers and designers in the United States and Canada.

In 1938, Deming published *Statistical Adjustment of Data* and taught courses in the use of his statistical methods. The beneficial effects of Deming's programs such as reductions in scrap and rework were seen during World War II. However, use of his techniques was generally abandoned after the war as the emphasis turned more to producing quantities of consumer goods to alleviate the shortages experienced during wartime.

After the war Deming was invited to Japan as an adviser to the Japanese census. He became involved with the Union of Japanese Scientists and Engineers (JUSE) after its formation in 1946. JUSE invited him to lecture to the Japanese on statistical methods. In the early 1950's, he lectured to engineers and senior managers, including in his lectures principles now regarded as part of modern quality principles. In 1956, Deming was awarded the Shewhart medal by the American Society for Quality. Four years later, Deming's teachings were widely known in Japan, and the Emperor of Japan awarded him the Second Order of the Sacred Treasure.

In the late 1970's, Deming started to work with major American organizations. However, his work was still relatively unknown in the United States until June 1980 when NBC aired a documentary called "If Japan Can, Why Can't We?" Following this exposure, he became well- known and highly regarded in the quality community.

Deming's teachings reflected his statistical background by encouraging managers to focus on variability and understand the difference between special causes and common

causes. However, his writings, teachings, and work also extended beyond statistical methods; he encouraged organizations to adopt a systematic approach to problem solving, which later became known as the Deming cycle or PDCA (Plan, Do, Check, Act). He also pushed senior managers to become actively involved in their companies' quality improvement programs. Work completed by Deming and his followers in the United States and elsewhere has attempted to make major changes in the style of Western management. Deming constantly improved and refined his ideas and is considered by many to be the father of the modern quality revolution.

Dr. Deming taught that management should have a full understanding of his philosophies in order to achieve sustainable progress in an organization. In his landmark 1986 book *Out of the Crisis*, Dr. Deming delineated the revolutionary management philosophy for establishing quality, productivity, and competitive position. In the book he discusses management's failures in future planning, mainly in the prediction of problems. These shortcomings create a waste of resources which in turn increase costs and ultimately impact the prices to customers. When customers do not accept paying for such waste, they go elsewhere, resulting in loss of market for the supplier.

In the introduction to *Out of the Crisis,* Dr. Deming talks about the need for an entirely new structure from the foundation upward to achieve the needed transformation and replace the typical American reconstruction or revision approach. Dr. Deming suggests the new structure in his renowned "14 Points of Management." The 14 points include creating a constant purpose for the organization, eliminating reliance on inspection, constant improvement in systems, increased training, and instituting leadership.

In *Out of the Crisis* Dr. Deming also discusses his seven "Deadly Diseases" that include a lack of constancy of purpose, focus on short-term profits, management that is too mobile, and excessive medical and legal costs. In 1987, the year after publication of *Out of the Crisis*, Dr. Deming was awarded the National Medal of Technology in America.

In his final book, *The New Economics for Industry, Government, Education*, Dr. Deming outlined his System of Profound Knowledge. This knowledge is needed for transformation from the present style of management to one of optimization. Deming's system of profound knowledge includes management's need to understand systems, knowledge of statistical theory and variation, planning based on past experience, and understanding of psychology.

Dr. Deming died in 1993 at the age of 93.

Appendix B: Additional References

Books:

Beecroft G, Duffy G, Moran J. *The Executive Guide to Improvement and Change*. Milwaukee, WI: American Society for Quality (ASQ) Quality Press, 2003.

Bialek R, Duffy G, Moran J. *The Public Health Quality Improvement Handbook*. Milwaukee, WI: ASQ Quality Press; 2009.

Duffy G, Moran J. *Applications and Tools for Creating and Sustaining Healthy Teams*. Published on www.phf.org. March 2011.

Duffy G, Moran J, Riley W. *Quality Function Deployment and Lean Six Sigma: Applications in Public Health*. Milwaukee, WI: ASQ Quality Press; 2010.

Duffy G, Moran J. *Executive Focus: Focusing your Life and Career*. Milwaukee, WI*:* ASQ Quality Press; 2008.

Articles:

Armbruster S, Kane T, Moran J. Developing a Health Department Quality Improvement Plan. PHF Website. December 2010.
http://www.phf.org/resourcestools/Documents/Developing_a_Quality_Improvement_Plan.pdf

Beaty S, Moran J. Mid-State Health Center Quality Improvement Case Study. *New England Rural Health Roundtable Newsletter*. September 2010.
http://www.phf.org/resourcestools/Pages/The_Mid_State_Health_Center_Quality_Improvement_Case_Study.aspx

Beitsch L, Duffy G, Moran J. Ready, AIM, Problem Solve. *Quality Texas Foundation Update*. October 2009.
http://www.phf.org/resourcestools/Pages/Ready_AIM_Problem_Solve.aspx

Bialek R, Duffy G, Moran J. SIPOC + CM Diagram. *Healthcare Update: Quality Tools and Applications.* American Society for Quality, January 13, 2009.
http://www.asq.org/healthcare-use/why-quality/sipoc.html

Bialek R, Duffy G, Moran J. On-the-Job Tool: Spaghetti Diagram**.** *ASQ Weekly***.** October 13, 2010.

Bialek R, Duffy G, Moran J. Spaghetti Diagram. *Healthcare Update: Quality Tools and Applications*. March 9, 2010.
http://asq.org/learn-about-quality/process-analysis-tools/overview/spaghetti-diagram.html

113

Duffy G, Henry B, Moran, J, Parsons H, Riley W. Realizing Transformational Change through Quality Improvement in Public Health. *Journal of Public Health Management and Practice*. 2010: 16:(1): 72-78.

Duffy G, McCoy K, Moran J, Riley W. The Continuum of Quality Improvement in Public Health. *The Quality Management Forum*. 2010:35:(4).

Duffy G, Moran J. A Complete Quality System Requires A Complete Leader. *Quality Texas Foundation Update*. December 2010.
http://www.texas-quality.org/SiteImages/125/Newsletter/December%20Newsletter%202010.pdf.

Duffy G, Moran J. Flow Chart Summary Matrix. PHF E-News. March 2, 2010.
http://www.phf.org/resourcestools/Pages/Flow_Chart_Summary_Matrix.aspx

Duffy G, Moran J. Force and Effect Chart Guides Teams through Addressing Barriers. *Six Sigma IQ*. August 2010.
http://www.processexcellencenetwork.com/methodologies-statistical-analysis-and-tools/articles/force-and-effect-chart-guides-team-through-address/

Duffy G, Moran J. Modified Approach: Modular *kaizen*. *Six Sigma Forum Magazine*. 2010: 9:(4).

Duffy G, Moran J. Starting and Sustaining a Complete Quality System. *Quality Texas Foundation Update*. August 2010.
http://www.phf.org/resourcestools/Pages/Starting_and_Sustaining_a_Complete_Quality_System.aspx

Duffy G, Moran J. Team Chartering. *Quality Texas Foundation Update*. April 2010.
http://www.texas-quality.org/SiteImages/125/Newsletter/April%202010%20Newsletter.pdf

Duffy G, Moran J, Riley W. Rapid Cycle PDCA. *Quality Texas Foundation Update*. August 2009.
http://www.phf.org/resourcestools/Documents/2009.8_Article_Quality_Texas_Foundation_Newsletter_Rapid%20Cycle%20PDCA.pdf

Duffy G, Moran J, Riley W. TAPP into the PDCA Cycle to Make Improvements in Public Health. *Quality Texas Foundation Update*. June 2009.
http://www.texas-quality.org/SiteImages/125/Newsletter/June%202009%20%20Newsletter.pdf

Duffy G, Moran J, Riley W. TAPP into the PDCA Cycle to Make Improvements in Public Health. *ASQ Healthcare Update Newsletter*. May 2009.
http://www.phf.org/resourcestools/Documents/TAPP_into_the_PDCA_Cycle.pdf

Gorenflo G, Moran J. The ABC's of PDCA. PHF Website. April 2010.
http://www.phf.org/resourcestools/Pages/The_ABCs_of_PDCA.aspx

Katkowsky S, Kent L, Divine S, Hunter J, Bialek R, Beitsch L, Moran J. Using QI Tools
to Make a Difference in H1N1 Flu Immunization Clinics: A Local Health Department's
Experience. *Pandemic Flu Week in Review*. January 8, 2010.
http://healthyamericans.org/assets/files/NKYClinicFINAL.pdf

Moran J. Top "10" Problems Encountered by Quality Improvement Teams. PHF Pulse
Blog. 2010.
http://www.phf.org/phfpulse/Pages/Top_Problems_Encountered_By_QI_Teams.aspx

Appendix C: Templates and Examples

Many of the figures and tables that appear in this book can be adapted for use in new settings and circumstances. With that in mind, this Appendix provides templates and examples using these tools.

Rapid Cycle PDCA/PDSA *Pre-Planning Check Sheet*[1]
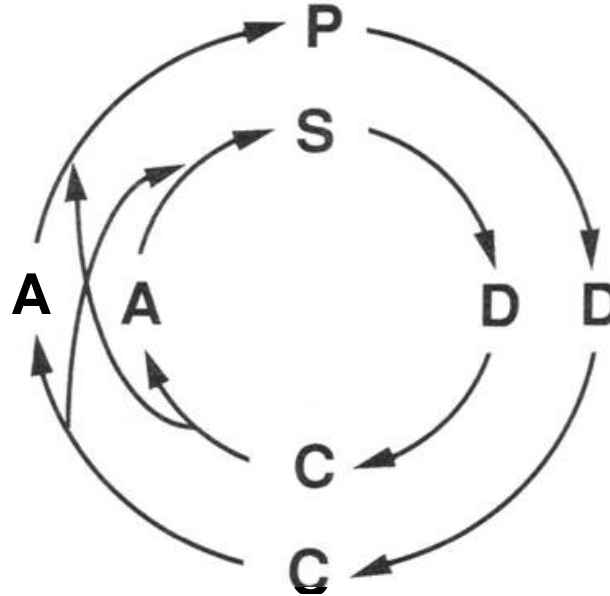
The following are questions that should help guide you when starting a Quality Improvement Project using Rapid Cycle PDCA/PDSA. This checklist helps guide you through the Rapid Cycle planning that needs to take place to ensure a successful improvement project.

The check sheet is constructed to indicate what has been completed (√) and what needs to be done (TBD and Date) and the expected completion date.

Step	Rapid Cycle Questions	TBD/Date	✓
PLAN	What is the focus/AIM of this improvement project?		
	What are the improvement goals?		
	Who is impacted?		
	What is impacted?		
	When is it impacted?		
	Where is it impacted?		
	Why is it impacted?		
	How is it impacted?		
	Who is the customer?		
	Who is the supplier?		
	What are the constraints?		
	What is the rapid cycle time line?		
	Who should be on the improvement team?		

---

[1] ©2009 G. Duffy, J. Moran, and W. Riley

Step	Rapid Cycle Questions	TBD/ Date	✓
	✓ Who are the right people? ✓ What training does the improvement team require? ✓ Who will deliver the required training? ✓ When will the required training be delivered		
	What do we predict will happen?		
	Measurement(s) defined /developed to show current performance and track future improvements?		
	Action plans developed to detail what will be done by who and when?		
	Communication plan developed to inform needed parties of potential changes, timing, and status?		
	What additional information will we need to take action?		
	Other **Plan** questions unique to your improvement project?		
DO	Improvement plan developed?		
	When will the improvement plan be implemented?		
	When will the pilot test be carried out?		
	What did we observe from the pilot test?		
	Did we get sponsors approval and their support if implementing means going outside our personal area of responsibility?		
	Did we document the implemented changes so the process can be duplicated and standardized?		
Check/ Study	Did the pilot test results agree with the predictions that we made earlier?		
	✓ If not, why?		
	What new knowledge was gained through this cycle?		
	How will we use this new knowledge to make additional improvements?		
	Are we continually checking the results as the process is initiated and after it is in place to determine if the changes are meeting requirements?		
	Did we determine if the measurements used to determine success is adequate?		
	Did we remember to automate data gathering if at all possible?		
ACT	Did we go back to **'Plan'** if the process still is not meeting requirements investigate additional process improvement opportunities?		
	Did we make minor adjustments and document them?		
	Did we standardize the change and initiate the SDCA Cycle initiated?		
	If the process changes are meeting requirements have we set up a way to continue to monitor after we standardize them?		

Add other questions that are applicable to your particular improvement project.

Disruption and Impact Diagram
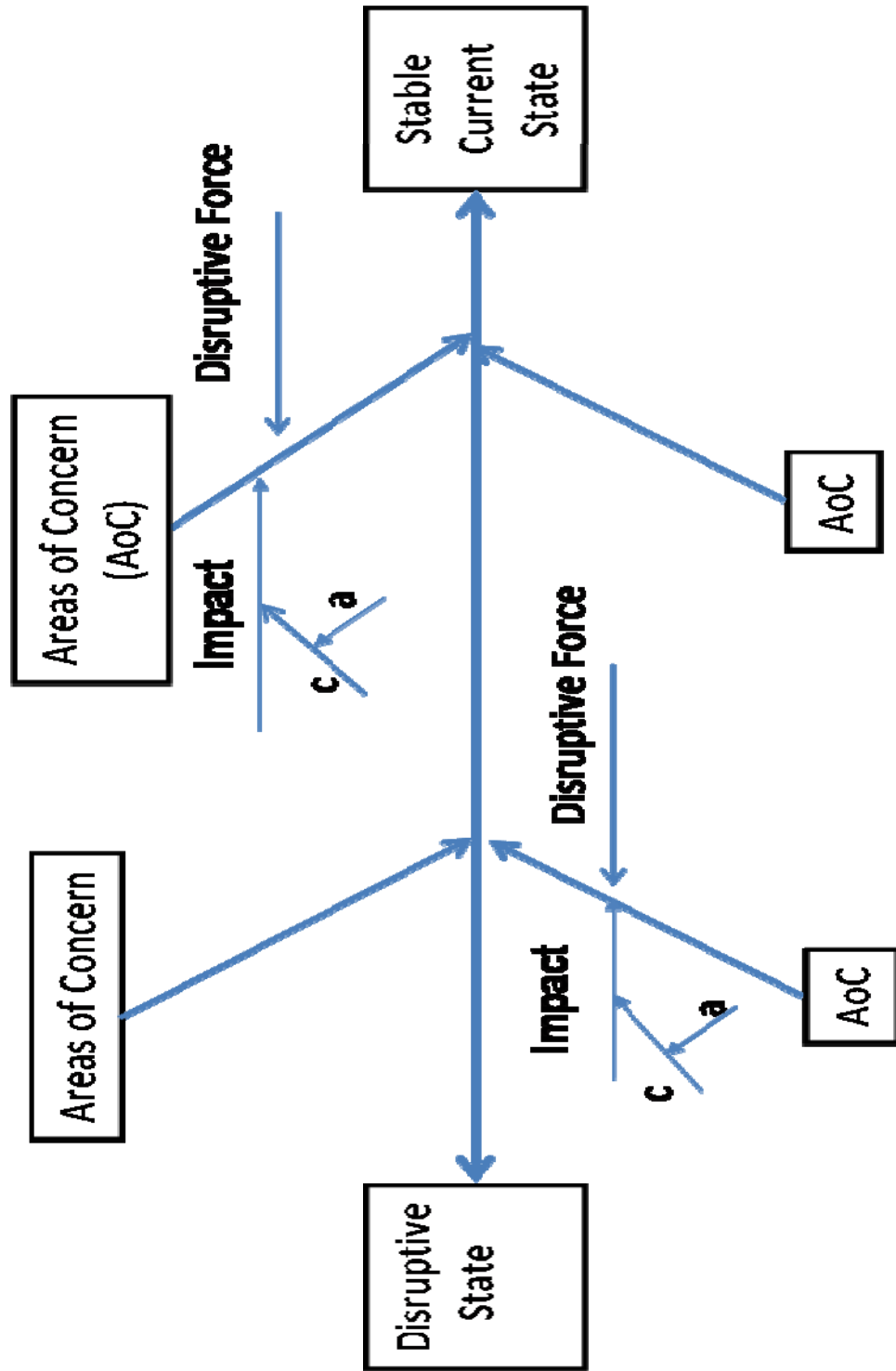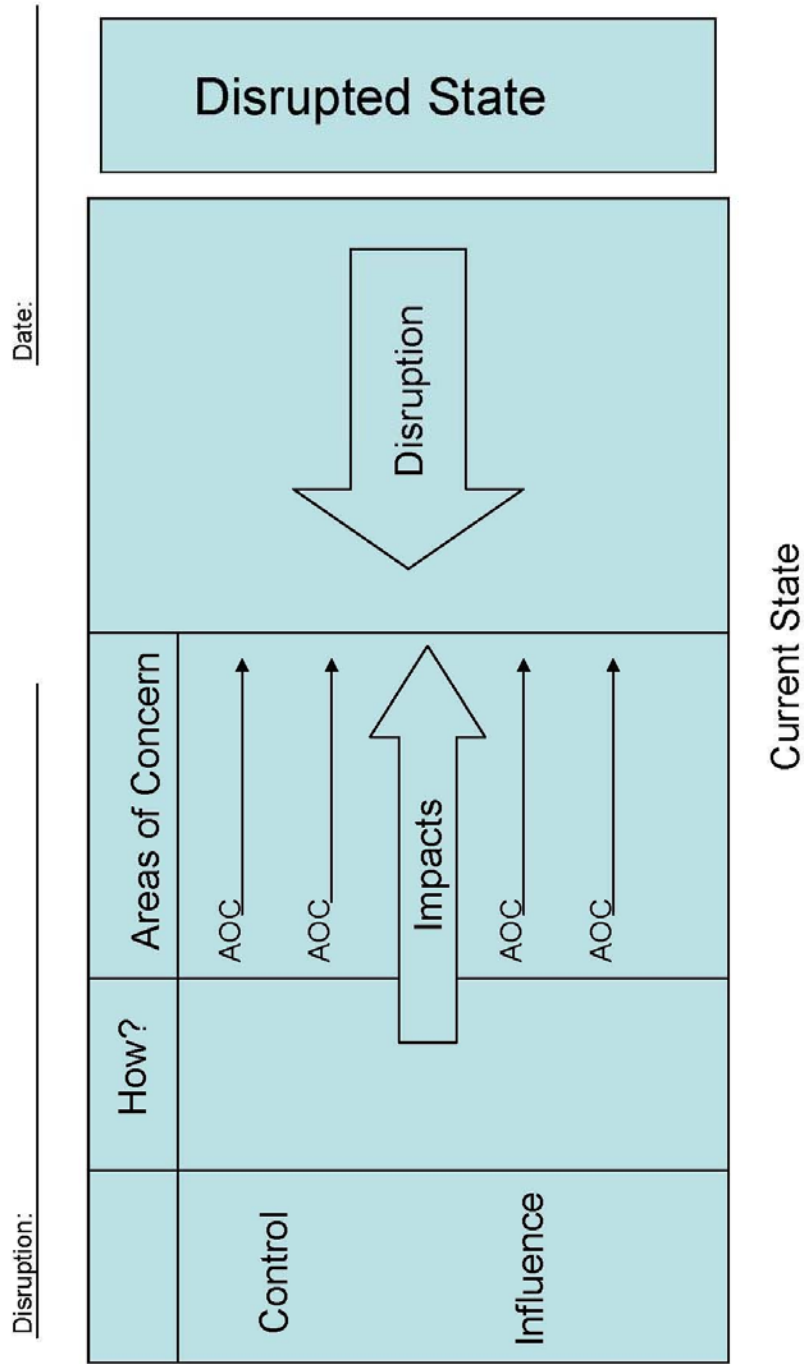
Modular *kaizen*: Dealing with Disruptions   Appendix C

Disruption and Impact Matrix

Disruption:

Date:

Disrupted State

Disruption

Areas of Concern

How?

AOC

AOC

Impacts

AOC

AOC

Control

Influence

Current State

Modular *kaizen* Disruption Form
High Priority Barriers to Address

Process or Activity Name

Responsible:

Prepared by:

Date (Orig) _____ (Rev.) _____

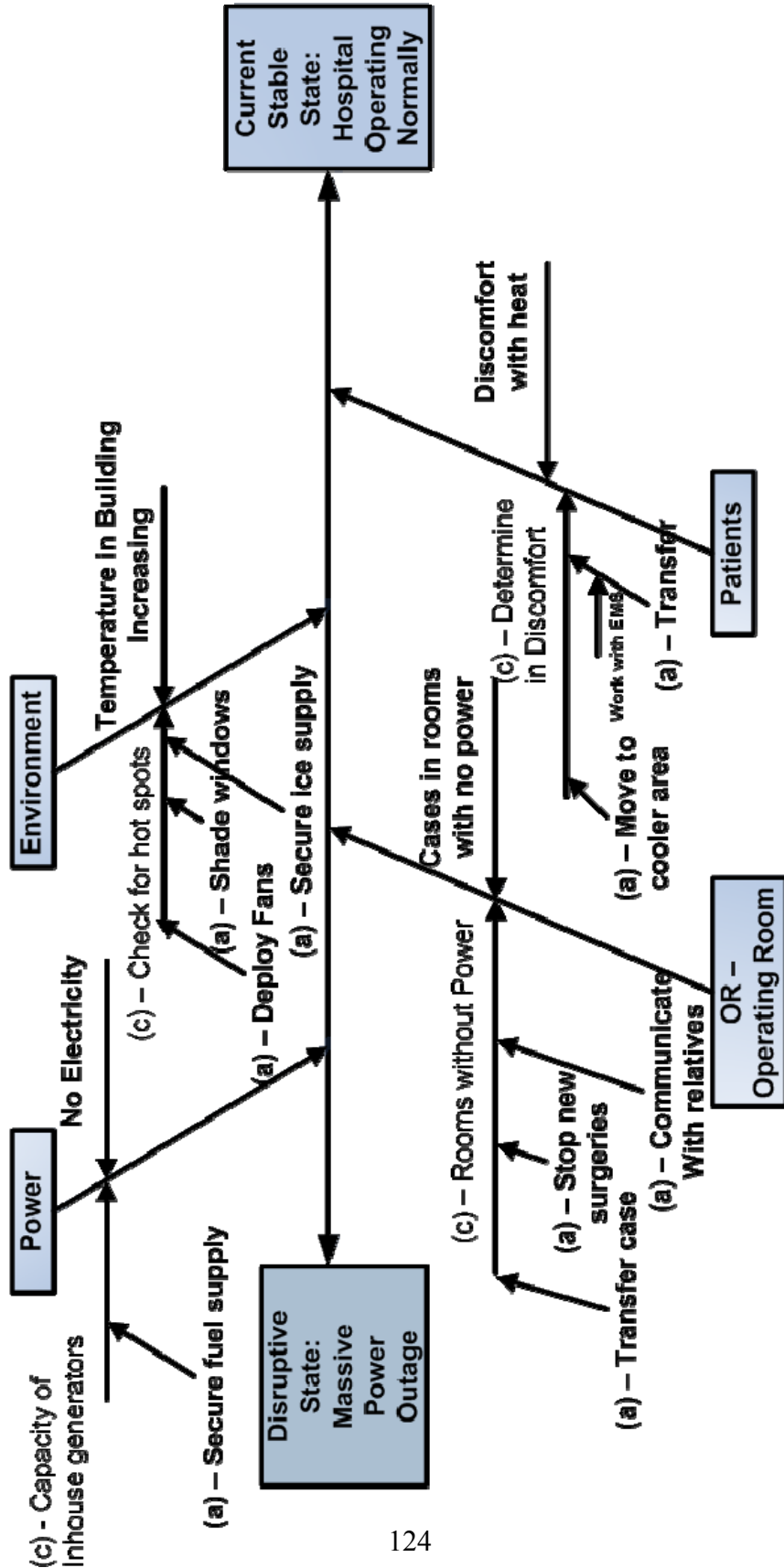| Process or Activity Step | What is the Disruption? | Impact of Disruption | Priority | Potential Causes | How is the Disruption Managed Now? CHECK | Actions Recommended ACT | Performance Measures PLAN | Owner | Actions Taken DO |
|---|---|---|---|---|---|---|---|---|
| What is the process step/ activity under investigation? | In what way is the activity impacted? | What is the impact on the outcome (Customer Requirements) or internal requirements? | How severe is the impact? | What causes the activity to go wrong? | What are the existing controls and procedures that prevent either the cause or disruption? | What are the actions for reducing the occurrence of the cause or minimizing the disruption? | What controls or measures will effectively prevent this disruption from recurring? | Who is responsible for the recommended action? | What are the completed actions taken to eliminate the disruption? |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

122

Worksheet: Associating Disruption to Area of Concern

Disruption: _____   Date: _____

√	Potential Cause of Disruption	How the Disruption Impacts Specific Daily Work Management
	Balancing Work Priorities – fluctuating work demands that create an unstable work schedule observed to interfere with performance based upon key performance indicators	
	Implementation failure – failing to translate a customer requirement into concrete action within the performance parameters of the process	
	Competing Assignments – interference from other tasks that are customarily performed parallel to this process	
	Environmental Conditions – physical factors within the process environment that do or are anticipated to impact performance and/or process outcomes	
	Unavailability of Equipment, Tools, or Documentation – constraints that impact the smooth execution of tasks to meet performance indicators and process outcomes	
	Evidence–Based Research on Real-Time Application - Missing best practice information on successful application of knowledge and tools for implementation or performance management	
	Cause & Effect Contingencies – alternative approaches not identified in advance for minor process adjustments, either through improvement or redesign	
	Organizational Cracks – work delays; bottlenecks, missing/wrong materials; poor downstream or cross-functional communication; or other similar barriers affecting process performance	
	Unclear Policies – unclear or non–existent policies conflict with process performance or policy directly contradicts a work direction or intuitive action	
	Politics – politically expedient actions cause conflict with efficient performance to meet customer requirements	
	Power & Accountability – relationship and power issues with functional leadership or stakeholders that adversely affect process performance. Issues with team member accountability	
	Unclear or Conflicting Regulations –standards or regulations create conflict for correct and consistent compliance during process performance	
	Work Culture, Norms and Values – organizational culture interferes with the efficient performance of process tasks or negatively impacts process outcomes	
Summary of impacts to Areas of Concern		

123

Force & Effect + ca Chart

Power

No Electricity

(c) - Capacity of inhouse generators

(a) – Secure fuel supply

Environment

Temperature In Building Increasing

(c) – Check for hot spots

(a) – Shade windows

(a) – Deploy Fans

(a) – Secure ice supply

Disruptive State: Massive Power Outage

Current Stable State: Hospital Operating Normally

Cases in rooms with no power

(c) – Rooms without Power

(a) – Stop new surgeries

(a) – Transfer case

(a) – Communicate With relatives

OR – Operating Room

(c) – Determine in Discomfort

(a) – Move to cooler area

Work with EMS

(a) – Transfer

Patients

Discomfort with heat

Modular *kaizen*

2 Value Stream Mapping

1 Change Management

15 Pull technology
16 Modular flow
17 Daily management
12 Quality at source
13 Process control
14 Fast transition
9 Project Management
10 Kaizen Blitz
11 Error Proofing
6 Force & Effect + ca
7 Tri-metric matrix
8 Teams
3 5S system
4 Disruption Identification
5 8 Wastes

125

PDCA: Use of the Modular *kaizen* basic tools

Plan
2: Value stream mapping
4: Disruption identification
7: Tri-metric dashboard
13: Process control

Do
10: Kaizen blitz
11: Error proofing
12: Quality at source
14: Fast transition
16: Modular flow

Structure
1: Change management
8: Teams
9: Project management
17: Daily work management

Act
7: Tri-metric dashboard
13: Process control

Check
3: 5S
5: 8-Wastes
6: Force & Effect + ca
7: Tri-metric dashboard
13: Process control

Plan | Do

Act | Check

126

Rapid Cycle Process

	Time Available	
	Low	**High**
High (Team Maturity)	Blitz Kaizen	Rapid Cycle Project
Low (Team Maturity)	Stay Away	Training Project
	High (Project Complexity)	**Low** (Project Complexity)

Importance to Organization

127

S I P O C + C M Form

Constraints:

Process/Activities:

Begins With:

Ends With:

Measures:

Outputs:

Customers:

Inputs:

Suppliers:

RESPONSE TEAM CHARTER

2. Team Name:	3. Version:	4. Subject:

5. Problem / Opportunity Statement:	

6. Team Sponsor:	7. Team Leader:

8. Team Members:	Area of Expertise:
1.	
2.	
3.	
4.	
5.	

9. Process Improvement aim (Mission):

10. Scope (Boundaries):

11. Customers (primary and other):	Customer Needs Addressed:

12. Objectives:
- ✓
- ✓
- ✓

13. Success Metrics (Measures):	

14. Considerations (Assumptions / Constraints / Obstacles / Risks):
.

15. Available Resources:	16. Additional Resources Required:

17. Key Milestones:	Date:

129

18. Communication Plan (Who, How, and When):	
19. Key Stakeholders:	**Area of Concern (as it relates to the Charter):**

Tri-Metric Matrix

Process: _____

Date: _____

Tri-Metric	Indicator	Definition	Baseline	Improvement Target
1. Capacity				
2. Process				
3. Outcome				

132

Appendix D: Modular *kaizen* Author Biographies

Ron Bialek, MPP, CQIA is President and CEO of the Public Health Foundation (PHF). Under his leadership over the past 14 years, PHF has focused its efforts on developing and implementing innovative strategies for improving performance of public health agencies and systems. Initiatives include developing performance management and quality improvement tools and training for public health professionals; developing the consensus set of Core Competencies for Public Health Professionals through the Council on Linkages Between Academia and Public Health Practice; creating the Nation's most comprehensive public health learning management system – TRAIN – linking together 23 states, the U.S. Medical Reserve Corps, and the Centers for Disease Control and Prevention's Division of Global Migration and Quarantine; and developing consumer-oriented county health profiles – the Community Health Status Indicators initiative – for all counties in the U.S. Mr. Bialek recently served as one of the editors for the new *Public Health Quality Improvement Handbook.*

Grace L. Duffy, MBA, CMQ/OE, CQA, CQIA, CLSSMBB provides services in organizational and process improvement, leadership, quality, customer service, and teamwork by designing and implementing effective systems for business and management success. Her clients include: the Library of Congress; the Charleston, South Carolina Veterans Administration Medical Center; the Food and Drug Administration Center for Food Safety and Nutrition; Florida Department of Children and Families; and the U.S. Department of Energy Strategic Petroleum Reserve. During her 20 years with IBM, Ms. Duffy held positions in technical design, services, management and process improvement. She helped design and deliver IBM's Executive Quality training in the late 1980s. Ms. Duffy worked with Trident Technical College in Charleston, South Carolina for ten years as department head for Business, curriculum owner and instructor for Trident's Quality and Corporate management programs, and as a Dean for management and performance consulting to private industry. Ms. Duffy holds a Masters in Business Administration from Georgia State University and a Bachelor's in Archaeology and Anthropology from Brigham Young University. Ms. Duffy is an ASQ Certified Manager of Quality-Organizational Excellence, Certified Quality Improvement Associate, Certified Quality Auditor, Certified Lean Six Sigma Master Black Belt, and Manager of Process Improvement. She is a Senior Research Fellow with Purdue University and a Lean Six Sigma mentor to the University of Central Florida Graduate Engineering programs. In addition, she is a co-author of *The Public Health Quality Improvement Handbook*, *The Executive Guide to Improvement and Change*, and *Executive Focus: Your Life and Career*.

John (Jack) W. Moran, PhD, MBA, CQM, CMC, CQIA is a Senior Quality Advisor with the Public Health Foundation (PHF). He brings to PHF over 30 years of quality improvement expertise in developing quality improvement tools and training programs, implementing and evaluating quality improvement programs, and writing articles and books on quality improvement methods, including *The Public Health Quality*

133

Improvement Handbook and *Executive Focus: Focusing Your Life and Career*. In his role with PHF, he provides consultation, training, and technical assistance to the public health field and has conducted several visits to local and state health departments including Minnesota, New Hampshire, New Jersey, Oklahoma, and Pennsylvania. Dr. Moran is a retired Senior Vice-President of Information Systems, Administrative and Diagnostic Services at New England Baptist Hospital. He has also served as Chief Operating Officer of Changing Healthcare, Incorporated, specializing in management consulting and educational support to healthcare organizations. For 21 years, Dr. Moran was employed at Polaroid Corporation where he worked in various senior management roles in manufacturing, engineering, and quality. His last position was as the Director of Worldwide Quality and Systems. For 20 years, Dr. Moran was an Adjunct Professor in the School of Engineering at the University of Massachusetts at Lowell. Dr. Moran has been active in the American Society of Quality (ASQ) as a Fellow of the Society and as past Exam Chair of the Certified Quality Manager's Exam. Dr. Moran is an ASQ Certified Quality Manager (CQM) and a Certified Management Consultant (CMC) by the Institute of Management Consultants. Dr. Moran is a member of the Malcolm Baldrige Board of Examiners. He holds a BS, MBA, MS, and PhD in education from Walden University.

Index

A
Accelerate change, 98
Accountable Government Initiative, 2
Association of Disruption to Area of Concern Form, 59-61, 123

B
Big "Q," 32, 33

C
Capacity measures, 71
Change agent dimensions, 93
Change commitment spectrum, 96-97
Change management, 13, 15, 17, 43, 55, 91-100
Characteristics of an effective team, 51
Check/act repeating improvement cycle, 28
Check sheet, 58, 79-80
Checklist, 81
Circle of influence, 48
Common cause variation, 78-79
Control and influence matrix, 103, 106
Control chart, 73, 79, 85-88, 103
Customer needs and wants, 105

D
Daily work management, v, 21, 43, 46, 50, 58, 101, 108
Disruption and Impact Diagram, 65, 120
Disruption and Impact Matrix, 34, 35, 47, 48, 52, 59-62
Disruption Form, 65-66, 122
Disruption identification, 18, 45, 58, 64
Dr. W. Edwards Deming, iii, 103, 111

E
Eight (or 8) lean wastes, iv, 19-20
Effective team building, 50
Error proofing, 19, 80

F
Fast transition, 21, 58, 64, 89
Fishbone diagram, 108
Five S (or 5S), 16, 17-18

Flow chart, 39-41, 102
Force & Effect + c a Chart, 19, 50, 63, 65, 124

G
Gap analysis, 45, 98-99

H
House of lean, 15
House of modular *kaizen*, iii, 8, 13-15, 17, 21, 58, 89, 101, 125

I
Immunization checklist, 81

K
Kaizen, 24, 100
Kaizen Blitz, v, 19, 24, 25, 37
Key performance indicators, 1, 7, 10, 45-46, 60
Key process indicators, 71, 103, 106
Key processes, 102

L
Lean process, 36
Lean wastes, iv, 26
Limited information collection principle, iv, 26, 69
Little "q," 32-33

M
Mistake proofing, 89
Modular *kaizen* definition, 23
Modular *kaizen* example, 27
Modular *kaizen* flow, v, 26, 46, 58

O
Outcome measure, 74-75
Out-of-control rules, 86

P
Paynter Chart, 84-85
PDCA or PDSA cycle, iii, iv, vi, 14, 21, 27, 29, 45-46, 55-58, 66, 77-78, 104, 112
Performance management components, 6-8
Performance management framework, 10
Performance management measures, 3

Poka-Yoke (or Poka-Yoka), 89
Process control, 16, 19, 21, 58, 64, 67, 79, 111
Process map, 3, 15, 17, 33, 39-42, 66-67
Process measure, 72-73, 103
Project management, 19, 58-59, 64
Pull technology (Kanban), 17, 21

Q
Quality at source, 16, 19, 58

R
Rapid Cycle PDCA, 55-58, 118
Response process map, 67
Run charts, 73, 79, 82, 84, 88, 103, 107

S
Shigeo Shingo, 89
SIPOC+CM, 37-39, 64, 102, 104-105, 128
Signposts, 98
Special cause variation, 78-79, 82
System view, 31

T
Team Charter, 129
Teams, iv, 16, 19, 45-53, 59
Trigger of change, 94-96
Tri-metric matrix, 67-72, 74-75, 131
Turning Point Model, 3-8

V
Value (stream) map, 4, 5, 14-17, 39, 41
Variation, 45-46, 72-73, 78-79, 82, 84-87