A PRACTICE BASED HANDBOOK ON
HEALTHCARE
QUALITY
3rd Edition

Prof.H. Seval Akgün, MD, PhD   Prof. A. Al-Assaf, MD, MPH

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BY

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2017

Preface

This handbook is a modest presentation of the concept and the techniques of quality assurance and improvement in healthcare.   At least one model for the effective implementation of Healthcare Quality (HQ) is presented. Several issues are raised in order to adequately prepare for the introduction and sustainability of HQ in any country as well as internationally.   The authors of this handbook are aware of the current challenges facing the healthcare industry and an attempt has also been made in this publication to address some of these challenges and lessons learned from their vast experiences in the healthcare field.

The objective of this publication is to present up to date information on HQ in a practical and concise outlet. Even though it is designed for the physician consumer, any healthcare professional may find the content and information in this publication useful.   Another objective of this publication is that professionals, especially physicians, are able to provide active support to HQ and are able to participate in some of the HQ and performance improvement (PI) activities in their organization. In fact, it is the ambition of the authors that this publication is distributed as widely as possible to healthcare professionals, and is "taught" to those aspiring to become "quality professionals". This handbook has the basic content areas that deal with - what is HQ?, why HQ?, how to organize for and implement HQ?, what will work the most?, how to achieve it? how difficult ? and how long will it take to see results? The answers to these questions will become available for the reader after reading this handbook.

This handbook is divided into two volumes and 12 chapters organized to follow the succession of HQ implemented in healthcare organizations around the world. It is meant to address audiences from different cultural and educational backgrounds with a leaning towards the physician as the primary target.   In Volume One, there are seven chapters.

Chapter One you will find a general overview on HQ concepts, answering the why for improvement, the how to implement it and the supportive mechanisms to sustain it in healthcare organizations. It also contains a few definitions on HQ and what major organizations in the United States refer to quality.

Chapter Two is a list and brief description of the main principles of HQ as addressed by a few of the most notable gurus in the field. The principles of management as reported by Dr. Edward Deming is presented, similarly those of Dr. Joseph Juran and others from Dr. Philip Crosby are presented. Whether it is Deming's 14 Management Principles, the Quality Journey or the Absolutes of Quality, all are presented and briefly discussed in this publication.

Chapter Three describes different systems and alternative methods, which we use while developing quality systems at healthcare settings. It also includes accreditation in general, its components, its activities, the agencies and how to prepare for and achieve it by healthcare organizations.   A listing with description of the major accreditation agencies is provided.

Chapter Four describes the ways and models of staffing and organizing for HQ in a healthcare organization. This chapter also includes a description of the quality professional, their job responsibilities, how quality departments are organized and what documentations are needed to run such a department in a healthcare organization.

In Chapter 5 and 6, Quality improvement methods, performance measurements and methods for improvement are described. Chapter Five presents the most common tools and techniques to collect HQ data, measure performance, display outcomes, monitor performance improvement and the ways of improvement of documentation. Included are several documents and forms that may prove useful to health professionals in measuring and improving performance in their organization. Chapter Six focuses on change management and process improvement methods.

Chapter Seven is one of the most important chapters. It is devoted to Patient Safety. With the international goals for patient safety making headlines and are major requirements for healthcare organization it is no surprise that this topic is on the top of the agenda of providers and regulators alike. This area is receiving considerable attention worldwide and is deservingly so as about 1 in 10 patients experience medical errors on the international scene. Therefore, the extent and what needs to be done about improving patient safety and how to improve patient safety is described in this chapter. This chapter also describes the process of identifying errors, reporting them and how to prevent them. It has several practical tips for healthcare providers and may find the forms attached very useful in their practice.

Chapter Eight is a short synopsis on teams and teambuilding in HQ and how to organize and sustain an effective team effort to improve performance in healthcare organizations.

Chapter Nine is a combination of several topics related to peer review, credentialing and privileging. These topics are somewhat new in healthcare outside the United States, but are making their way into the healthcare systems of the countries in throughout the world. They are very important from the standpoint of accreditation and accountability and their presence in healthcare facilities will increase in the near future.

Chapter Ten is a description of patient rights issues and how to protect them. It includes such topics as informed consent, confidentiality, end of life and privacy issues. It also discusses other ethical issues in patient care and how to protect patients and employees alike from abuse, over and under utilization. Chapter Ten describes

Chapter Eleven is a description of utilization management issues, methodologies that being used in utilization management and some case studies will be of importance to the target audience of this publication.

Chapter 12 outlines the main challenges and lessons learned in implementing, sustaining and institutionalizing healthcare quality in organizations. It also presents a model for system-wide organization, administration and improvement. The handbook

concludes with a comprehensive listing of all of the references used or could be used in healthcare quality for this publication and beyond.

It is the desire and objectives of the authors to make this publication practical and as simple as possible. It is meant to provide the reader a quick reference to the main issues and headings related to healthcare quality and the methods on how to implement it in their organization.   It is our hope that it makes an enjoyable and beneficial publication.

Professor Seval Akgün and Professor A. Al-Assaf

Dedication

It is our honour to dedicate this handbook to all healthcare professionals worldwide genuinely committed to patient care who are constantly seeking way and means to improve their performance and those of their organizations

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CHAPTER SIX
Change Management and Process Improvement Methods

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Change in healthcare organizations could be planned or unplanned for, and could be either in structure, processes, which leads definitely to change in outcomes. Decades ago in farming, heavy machinery reduced the number of hands needed to reap the harvest making it an easier, faster, and more efficient process. The application of new technologies in healthcare changed the way medicine is practiced today. Who would of imagined open heart surgeries would be less in numbers with the introduction of new non-invasive catheterization techniques, or the application of electronic medical records, making it faster and easier for the healthcare provider and caregiver to access his or her patient's records at a click of a button, and tying its implementation to reimbursement in some healthcare systems, pushing for its adaptation and change.

Change today or fade away

In the examples given above, a farmer that did not adapt to the changes in farming, grazing , and hasting would of ran out of business by hiring more workers and by harvesting less. Healthcare organizations and hospitals in the United States that do not implement electronic health records are losing reimbursement from the largest single payer in the nation the Centers of Medicare and Medicaid. Some photography and film developing companies are out of business today with the introduction of digital and instant photography. The message is clear, the whole world is changing, and those who fail to improve, adapt, or change will definitely find themselves as a result out of business, since it is inevitable and also an essential pillar of growth.

Reasons employees and organizations resist change

Insecurity: People derive security from doing the same things the same way, and any changes are considered a threat. Insecurity could be either ***economic***; such as losing the job, thus a reduction in pay, or ***social***; such as being distant from the coworkers that bonds have developed over a previous part of time.

Habitual challenge: A job with time becomes easy to perform as habits and skills develop. Change causes an interruption of that easiness, which causes fear of difficulty learning how to perform on a new job.
Organizational and work group inertia: Organizations promote stability, as they carefully select employees and train them to perform either alone or in groups for certain jobs, which cause forces of resistance to accept change.

Unsuccessful previous change experiences: As it implies "*Once bitten twice shy*" an organization or a person who has failed a previous experience in anything and/or change are reluctant to endure another attempt. (Greenberg & Baron, 2008)

Change Models in Theory

Lewin's Change Model
Kurt Lewin proposed that for change to occur driving forces must be greater than restraining forces and thus the greater the driving forces the faster the change. Motives of change could be frustration and/or dissatisfaction with the status quo, which creates an urge to change.

Lewin summarizes the change process into three stages:

A) *Unfreezing:* The recognition of need to change or a sense of urgency, as the current state is undesirable or dangerous to stay in, such as a financial loss or a threat.

B) *Intervening change*: In this stage a change actually occurs with restructuring and creating a desirable state.

C) *Refreeze:* Refreezing occurs when the new state of changes become habitual as the changes are incorporated as they freeze again and become the new culture or practice. (Levasseur, 2001)
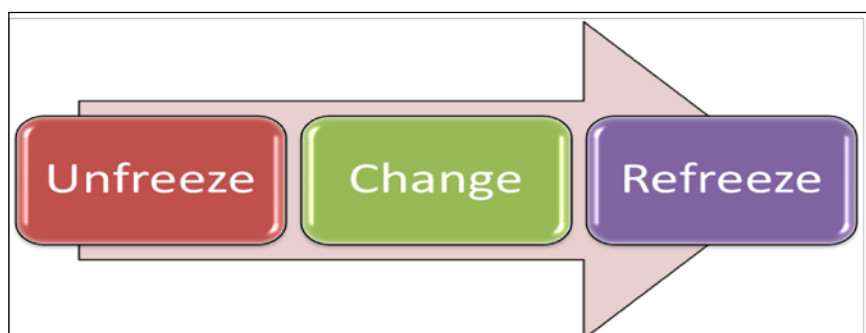
Figure 1: Summary of Lewin's Change Model

1) DeWeaver and Gillespie's Change Model

The Stages of this change model are broken down into 5 stages as described by (DeWeaver & Gillespie, 1997) and are as following:

First Stage- *Awareness*: The individual is aware of a change plan, but does not have an opinion towards it and even is in denial at this stage. This happens when an advertisement of a change is announced to increase awareness in an organization.

Second stage- *Curiosity*: As it implies the individual is concerned and becomes curious by inquiring about the effect of change. The organization is obliged to explain clearly and acknowledge the difficulties change might cause. This stage creates a level of dissatisfaction with the current state to generate interest into the newer state the organization is headed to.

Third stage- *Visualization*: The individual seeks to understand the effect of change on them along with the organization. Organization's leadership trying to change is recommended to give employees the opportunity to try the change before it is put into place.

Fourth stage- *Learning*: The individual takes part in learning how to implement the change and could share any suggestions or ideas to the change. Organizations in this stage are supposedly educating and training staff at this level.

Fifth stage- *Use*: The individual uses the change actively and becomes accustomed to it in their daily work. He or she is able to explain the change to others. Organizations are required to provide technical assistance to make the change move rapidly, efficiently, and effectively.

2) Prochaska's Change Model

James Prochaska's explanation of behavioral change is useful when working with staff members, patients, and/or providers. The model explains the individual preparedness to change his or her behavior rather than changes in organizational processes. Prochaska summarized the change of behavior in six steps as following:

- Precontemplation: The individual has no intention to change practices or behaviors within the next six months
- Contemplation: The individual at this stage has the intention to change practices or behaviors with the next six months.
- Action: The individual has changed the intended behavior for less than six months.
- Maintenance: The individual has changed the behavior for more than six months.

- Termination: The previous behavior will never return as it is terminated and the individual is able to cope without fear to go back. (Prochaska & DiClemente, 2005)
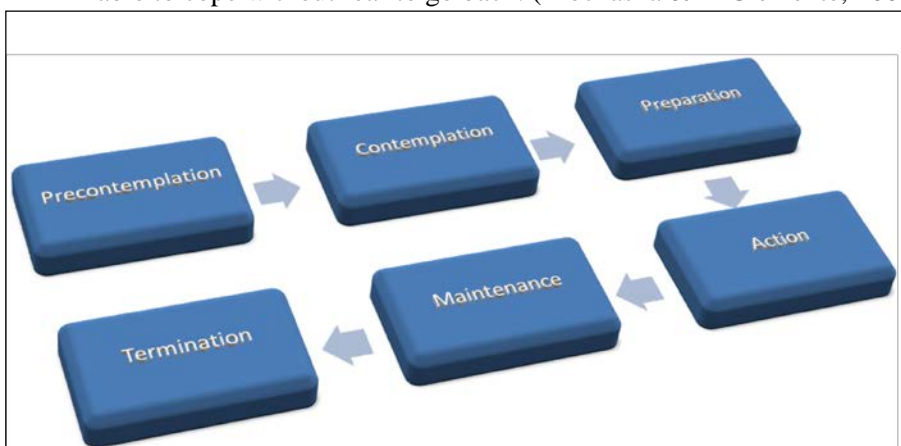
Figure 2: Prochaska's stages in behavioral change

3) Kotter's Change Model

John Kotter suggests and associates emotional feelings and the heart with change. He describes an eight step change model as following:

Step 1: Elevate urgency: The most critical to Kotter is to create a feeling of urgency with evidence that change is required.

Step 2: Guiding team build up: Influential leaders are employed at this stage to promote for change. Picking the proper and committed people is extremely important and vital for the success of the change efforts

Step 3: Get the vision right: A clear vision is always essential. Leadership is responsible for proper direction, which will steer into the new changing direction.

Step 4: Communicate: Once a vision and strategy have been produced, the organization is required to communicate, communicate, communicate! This step must be repeated throughout the change effort and the message must be direct, simple, and concise.

Step 5: Empower action: Barriers and obstacles must be removed along with promoting confidence in change by giving the employees the ability to act.

Step 6: Create short term wins: The creation of short term wins inspires and energizes users of the change.

Step 7: Do not let up: The change process is not over until change is a reality and fully implemented. Leaders are supposed to build on short term wins and keeping the urgency alive.

Step 8: Make change stick: This is the most difficult step as it is the end of the change process as it is tough to sustain and ingrain. (Kotter & Cohen, 2002)

Importance of Process Improvement in Healthcare

With the emerging concerns of the inflation in the healthcare cost, placing the industry under increased scrutiny. The Institute of Medicine's (IOM) report in 1999 titled *To Err is Human*, answered and documented the alarming status of the U.S. Healthcare system by defining some of its shortcomings.

According to the report almost all of medical errors that occur in healthcare organizations today are a result of faulty processes and systems. The blame is not fully placed on the healthcare providers. The variability of processes in healthcare along with a plethora of contributing factors such as provider's educational background and experience along with different case mix and the biology all add to healthcare's complexity. Due to these factors, it is highly vital to embrace process improvement (PI) techniques to define the shortcomings and deficiencies in the system, and work on preventing these errors from happening again.

Most accrediting bodies such as the Joint Commission in the United States (TJC, 2007), and the Joint

Commission International (JCI, 2014), and the Central Board for Accreditation of Healthcare Institutions (CBAHI, 2011) as examples of bodies that require healthcare organizations to show evidence of continuous process improvement projects throughout their departments as a standard of quality and excellence.

In our daily lives, we come across process improvements without training. In example if we dial the wrong phone number using a landline telephone, we concentrate the second time dialing the number slowly and get the correct number by proof dialing, which is a process improvement that leads to better outcomes. We will introduce in detail several process improvement techniques in the following section.

Process Improvement techniques

There are many process improvement techniques and tools used in healthcare to assist an organization to assess for change. It is important to know that "All changes do not necessarily lead to improvement, but all improvement requires change" (IHI, 2014).

İ) Plan-Do-Check-Act (PDCA)
Also known as Plan-Do-Study-Act (PDSA) and Plan-Do-Check-Adjust
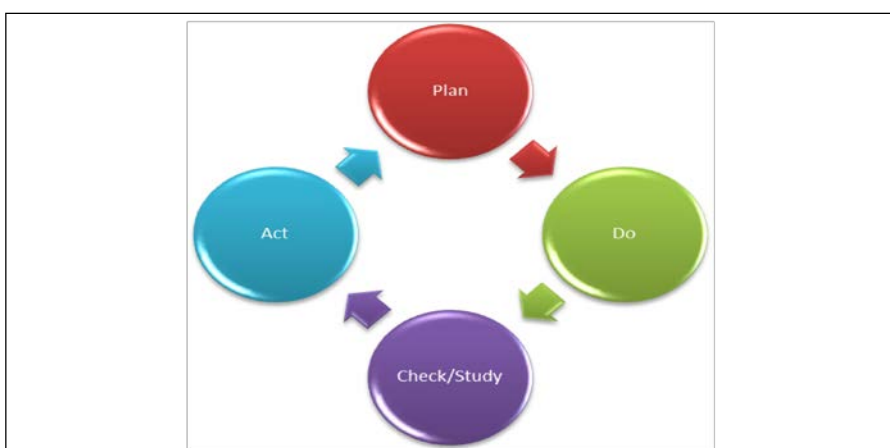
Figure 3: PDCA/PDSA Continuous Process Improvement Cycle

Are both a four step cycle in management for control and continuous improvement of processes and outcomes? This basic concept we practice daily when we plan to wake up at a certain time and do our alarm watches and check if we set the correct time and act to wake up when the alarm rings in the morning. PDCA was the precursor to PDSA as it was introduced by the American engineer/statistician Walter Andrew Shewhart, and is also known to be the Shewhart wheel. This same cycle was amended by W. Edward Deming, also an engineer/statistician as he substituted the "C" to "S" and coined the PDSA cycle or the Deming cycle. The PDCA/PDSA is the most acceptable and widely used technique in healthcare, due to its simplicity and ease of application.

- **P**-*Plan:* The Plan stage of the PDSA or PDCA cycle is important, since any move needs a plan. It sets out the guidelines for the whole process, which includes the outcome expectations along with the objectives and goals.
- **D**-*Do:* Actual implementation of the plan occurs in this stage, such as data collection. Along with collecting the relevant measurement data or metrics.
- **C/S**-*Check / Study:* This stage of the cycle involves studying and checking the results obtained and collected in the "DO" step, hunting for deviations from the expected.
- **A**-*Act:* In this last step of the PDSA/PDCA cycle, it is necessary to define and act upon corrective actions on areas where there are significant differences between actual and planned results. It is important to analyze the results to determine the root causes wherever possible.

Once this has been achieved, it is possible to implement the process improvement changes (Chiarini, 2011).

The PDSA / PDCA cycle is repetitive. So, once it has competed, it is necessary to return to the beginning and see what further improvements could be made.
A simple project example of a PDCA/PDSA cycle in healthcare would be as following:
PLAN: A hospital begins to realize that the length of stay (LOS) at the emergency department is too high, and they plan to perform a PDCA project to find a solution and improve the LOS.
Using some of the quality improvement tools that are outlined in the following chapter, such as visualizing the whole patient experience in a process map, a Root Cause Analysis (RCA). The PI team then pinpoints the cause of the elongated length of stay at the ED, and defines a goal of time reduction and by a certain time, which usually does not exceed three to six months.
DO: In this step of the cycle the PI project team members would meet and brainstorm (Explained in detail in the chapter Quality Improvement tools and Methods). After brainstorming, The PI team would have an action plan for this PI project as they would realize the gap areas and will assign areas of improvement to specific team members.
CHECK/STUDY: The team would check or study the results of waiting times at the baseline and current and compare to identify improvements. Updating the action plan usually happens at this step.
ACT: At this stage if the waiting times are not improving as planned, as there is still room for improvement, and reassessment of the action plan after adjustment. If the goals were achieved then it is time to standardize and act upon the new standardization, in addition to expand this practice to other departments if applicable or appropriate.

II)   FOCUS PDCA

Dr. Paul Batalden formed the Quality Resource Group (QRG) in the 1980's, which is part of the Hospital Corporation of America (HCA). QRG developed this new process improvement model and named it FOCUS-PDCA. The model name is an acronym that describes the basic components of the improvement process. The steps include added to the above mentioned PDCA steps as they precede them:
F- Find a process to improve:
- Define the process
- Identify the customer/s and who will benefit from this improvement

O- Organize an effort to work on improvement:
- Choose people who are involved and experienced in the process to be improved
- A team with an appropriate number of members that represents multi levels of the organization
- A methodology must be developed to document the progress of the project.

C- Clarify current knowledge of the process:
- A revision of the current state of the process
- Outline and analyze the process and compare expected and actual performance

U- Understand process variation and causes of this variation:
- Learn the causes of variation by measuring the process using performance indicators.
- Pick measurable and controllable variables.

S- Select a strategy for continued improvement:
- Identification of the actionable improvement to the process
- Support the proposed action with evidence that is documented

(Batalden, 1992)

The FOCUS steps are followed by the PDCA/PDSA cycle mentioned in the previous section.

III)   Kaizen

Kaizen is the Japanese word for "improvement", where "Kai" means change and "Zen" means good. It is the involvement of everybody in ongoing and continuous improvement, including the CEO, all managers, and workers. The primary goal of a Kaizen is to eliminate waste. Kaizen started in Japanese

factories post world war II, as a process improvement method to restore Japan and its manufacturing. In case of any minor anomalies in the factory all assembly line workers would stop and start a Kaizen immediately to resolve the problem. A kaizen team could be comprised of one member or more, which proves its simplicity as it is not a pre-planned project in most cases. Kaizen could be a preliminary step before a Lean or six sigma project, as the problem need to be solved is identified in this simple step. Kaizen evolved to the Toyota way. (Imai, 1997)

An example of a Kaizen small project in healthcare witnessed, Pediatric patients at a children's clinic would not sit still or began to cry and shout during ultrasound procedures. The excessive recurrence of this specific event caused frustration to both technicians at that pediatric department along with the kids' parents. The head of the department formed a Kaizen and brainstormed for an easy and innovative solution. The team reached consensus to have bubble bottles prepared at all times and blow some bubbles for this group of patients, which is certainly entertaining to everybody including the kids and children.

IV)   Ernst and Young Seven-Step "IMPROVE" Model:

Ernst and Young (EY), is a multinational consulting firm headquartered in London, England. It is considered one of the "Big four" audit groups along with the American giant Deloitte, the British PricewaterhouseCoopers, and the Dutch KPMG.

EY developed the following seven step process improvement model:
I- Identify:
-    The Problem to be addressed is identified and determined in this step.
-    The current performance level is assessed and understood.
M-Measure:
-    The extent and level of the stated problem is measured at this stage.
-    The impact on both external and internal customers is measured using available data.
P-Prioritize:
-    The possible causations are identified and listed
-    The listed causes are prioritized
R- Research:
-    The root cause is analyzed and understood.
-    In depth assessment of the root causes is done at this stage.
V-Validation:
-    Validation of the previous steps are done at this stage
-    An established monitoring system determines the effectiveness of the solutions proposed
E-Execute:
-    Solutions and standards are fully implemented and are of common practice
-    A continuation of the monitoring to assure sustenance and problem resolution
(Schiller, Miller-Kovach, & Miller, 1994).
The EY seven-step IMPROVE model specifically, is not widely used in healthcare, although the concepts are of similar practice.

V)   The "FADE" cycle Model:

The American based healthcare quality consulting firm Organizational Development (ODI) developed a four step process improvement model and named it the "FADE" cycle (Brown, 2008), and is broken down as following:
F- Focus:
▪   A problem is identified, selected, and verified based on primary data. A problem statement is written.
A- Analyze:
▪   The problem is analyzed by data collection and creating a baseline to understand the problem in detail.

D- Develop:
- ▪ A plan for improvement is developed to be implemented with a promising solution/s

E- Execute:
- ▪ The plan at this stage is executed, and the impact is monitored and recorded for proof of sustenance. (Milakovich, 1995)

VI)   The Lean Enterprise model:

Lean thinking coined by James Womack the MIT professor, and also called lean manufacturing or the TOYOTA methodology as it evolved from the automobile manufacturing industry in Japan (Graban, 2011). The Toyota production system's methodology main focus is to remove and eliminate waste. The common measure in lean is the touch time, which is defined as the total time a product or service is spent on by the worker, and thus the focus is emphasized on flow, and the reduction of waste. Lean is a widely accepted methodology nowadays in healthcare, since the application of statistics is lesser than six sigma. Six sigma is a better methodology that deals with widgets and is widely used in the manufacturing arena, however lean simplifies processes and eliminates waste, overcomplicated processes, workarounds, and rework in these processes, leading to the reduction of time in these processes, and thus leading us to a uniform output, reduced inventory, and a lesser variation in the processes performed. Lean is distinct from the remaining process improvement methods in that it emphasizes the investigation of getting things done efficiently along with total redesign rather than change (Womack & Jones, 2010).

Anything in excess of value is considered to be waste. The customer defines what is valued and what is not valued. Waste is any activity that does not add value to the process. The lean enterprise categorizes "Muda", which is waste into the following "TIM-WOOD":

1) **Overproduction**: It is the excessive production for the client, such as delaying patient discharges in hospitals or over producing meals that patients do not eat.
2) **Over processing:** Excessive services for the client, such as ordering too many diagnostic tests that are unnecessary. Or performing a surgical procedure when an alternative non-invasive intervention is applicable.
3) **Unnecessary Motion:** As it implies wasted movement in a working center, such as caregivers walking long distances to get or search for supplies or a medication.
4) **Unnecessary Transport**: It is the unnecessary transportation of materials and patients throughout the healthcare facility, such as patient transportation from a department to another or the transportation of goods such as meals or specimens throughout the healthcare organization.
5) **Excessive Waiting:** Timeliness is very important in healthcare. Long lines to see a caregiver or an examination room is considered to be wasteful.
6) **Defects:** Which are errors mistakes, wrong medication prescriptions.
7) **Inventory inefficiency:** It is the over stocking of unnecessary medications, supplies, or equipment until they expire or become invalid for usage. (Liker, 2003).

VII)   Six sigma (6 σ):
Six sigma is a business strategy and a process improvement methodology used in many services and in manufacturing that was developed by the U.S. phone manufacturer Motorola in 1987 (Snee, 2004). The American giant General Electric (GE), successfully implemented six sigma to reduce errors and to profit significantly (Eckes, 2002). Six sigma's goal and concept is the elimination of defects in processes, services, and eventually products to as minimum as Crosby's "zero defects". The statistical explanation of six sigma is calculated as 3.4 defects or errors in a "six digit" million opportunities (DPMO). A defect is the outcome that does not meet the specification or expectations of the customer. Any of the seven wastes mentioned in the previous section is considered a defect. As mentioned previously, Lean and six sigma are used widely nowadays in healthcare. More than of the titles and abstracts published in quality healthcare improvement literature had both of these terms stated (Walshe, 2009).

To understand the meaning of six sigma, the following table 1 as it shows a decrease in DPMO with an increase in the sigma level.

Table 1: Sigma (σ) value and the DPMO associated with it:

Sigma Level σ	Defects per million (DPMO)
1 σ	700,000
2 σ	308,537
3 σ	66,807
4 σ	6210
5 σ	233
6 σ	3.14

(Brown, 2008).

From the above table it is obvious that healthcare has not even reached a 4 σ level yet, since the healthcare error rate in the U.S. is about 6.2 DPMO, which is approximately 3.8 σ and about 1 σ when it comes to other activities in the healthcare sector. The six sigma methodology is still in its infancy stages when it comes to healthcare. Healthcare providers strive to reach a 5 or 6 σ level such as banking and the aviation industries. Most six sigma practitioners find healthcare and the services industry potential and fertile grounds for improvement. Six sigma methodology works well where there are high production rates of the same parts in areas such as the clinical laboratories, billing, and emergency departments (Trusko, Pexton, Gupta, & Harrington, 2007).

Six sigma project outline:
Six sigma's projects include five steps: define, measure, analyze, improve, and control- known as DMAIC. The DMAIC process is divided into two main themes or parts the first is familiarizing ourselves with the problem and understanding it and consists of the first three steps of the DMAIC process: Define, Measure, Analyze. The second part is the solution of the problem part, which includes the remaining two steps the improve and the control steps. The DMAIC process activities are summarized as following:
Define:
- Defining the problem based on data.
- Mapping of the process.

Measure:
- The development of input, process, and output measures.
- Baseline data is collected.
- Flowchart process in detail to understand the current process

Analyze:
- The analysis of root or potential causes of the defects.
- The confirmation of the causes with supportive data.

Improve:
- The creation of solutions for the root causes.
- The development of plans.
- Piloting the developed plans.
- The actual implementation of the plans.
- The measurement of the results.
- The determination of the unit cost savings.

Control:
- The standardization of the new processes.
- The development of the monitoring systems.
- Sustainment, communicating learned lessons, and recommendation of future improvement plans.

(Shankar, 2009)

Differences and similarities between six sigma and lean methodologies:

Both six sigma and lean management use quality management statistical tools, which are explained in detail in the quality improvement: tools and methods chapter of this textbook.

Six sigma and lean methods have a lot in common, as they use similar statistical tools, but the differences between them could be summarized as following:
- Lean primarily has been thought of as "thinking and or principles", on the contrary six sigma is considered to be a "philosophy or a standard of excellence".
- Lean is a precursor to six sigma, since it provides tools to sustain six sigma much better, whereas six sigma can be achieved without lean, but could build on lean operations.
- Lean is directed by middle management, however six sigma is driven by leadership.
- Lean impacts selected processes for speed and value, but six sigma impacts both products and processes.
- Lean is efficient; on the contrary six sigma is effective.
- Lean reduces wasted activities, and six sigma reduces waste in activities.
  (Trusko, Pexton, Gupta, & Harrington, 2007).

In a nutshell, the implementation of lean would result in your meal arriving at your table faster (efficiently), but six sigma has your meal arrive to your table at a decent time, but warmer (effectively).

Conclusion

Healthcare has been identified by the IOM to be inefficient and ineffective with inflation and an increase in defects and errors that are avoidable. Process improvement is a way to improve the quality of healthcare and to avoid those errors. It does not matter whatever the methodology the leadership of your organization chooses to take, but the only thing that matters is the safety of our internal or external stakeholders; the patients, clients or customers, and providers of healthcare. The element of and for success is the term sustain and cultural gain. The sustenance and cultural development is the role of leadership in healthcare to monitor and share improvement and success stories with the community, which will always benefit mankind.

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