III-3-3-2…PDCA Cycle is golden cycle for KAIZEN

Dr. Walter A. Shewhart and Dr. W. Edward Deming advocated PDCA concept for productivity management, and continuous quality improvement of process and products. PDCA is the "golden cycle for improvement". It is a methodical approach for problem solving and continuous improvement. PDCA wheel should be considered a never-ending cycle for improvement towards an ideal condition.

Plan *is to establish objectives and process or countermeasures with expected outcome based on the past performances or future forecasting of work*
Do is to implement the processes or countermeasures planed.
Check is to measure the effectiveness or achievement of processes or countermeasures planed between the actual results and expected results to ascertain any differences.
Act is to analyze the differences to identify the causes of "Gap", and take necessary action to improve changes
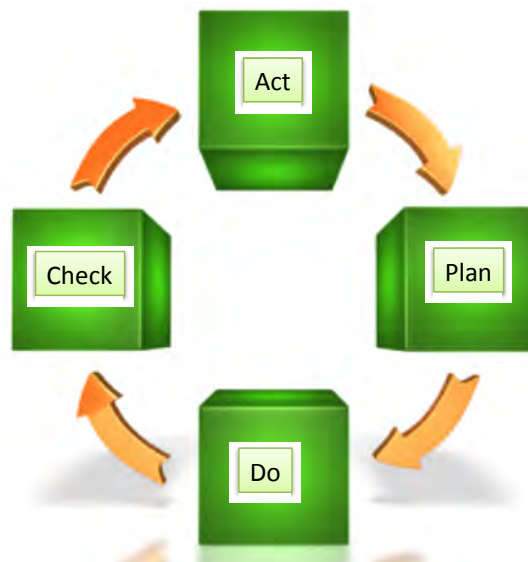

Figure 3-16: PDCA cycle

PDCA cycle is the concept behind the KAIZEN approach.   Look at how PDCA cycle is used in KAIZEN approach.
PDCA is rotated like the way described in the figure 3-16. During the planning, 5W1H need to be clarified against the theme or topic as shown below:
Why are we undertaking the project?
What are we going to do? **What** data is required?
Who is responsible for each task? **Who** should be involved?
Where can we find relevant data and facts?
When must a task be complete? **When** do we need to give feedback?
How must it be accomplished?   **How** do we review?
Then, implement the plan and see the effectiveness and efficiency of those activities that are taken. Then, activities that show good result should be standardize and adopted in routine practice. The activities that do not reduce the problems should be discontinued and it is necessary to plan better activities for improvement of the situation.

This matches exactly with the KAIZEN Process that will be explained in the next section. However, PDCA cycle consists of four steps only and the cycle may be stopped at Act often. Kaizen aims to raise the standard of your workplace, productivity, quality and safety in a continuous upward spiral

through rotating PDCA cycle, reflecting on achievement of KAIZEN and taking action to improve the way for next KAIZEN.

Plan, *preparing how to implement KAIZEN* - Clarify the objectives and decide on the control characteristics (control items) - Set measurable target - Decide on the methods to be used to achieve the target.

Do, *Implementing KAIZEN activities* - Study and train in the method to be used - Utilize the method - Collect the measurable data set up on the plan for decision-making.

Check, *Reviewing the result of KAIZEN activities and achievements* - Check whether the results of implementation has been performed according to the plan or standard - Check whether the various measured values and test results meet the plan or standard - Check whether the results of implementation match the target values.

Act, *taking countermeasures based on the review in "Check"* - If the results of implementation deviate from the plan or standard, take action to correct this - If an abnormal result has been obtained, investigate the reason for it and take action to prevent it recurring - Improve working system and methods. The diagram below explains which KAIZEN process match with PDCA cycle.
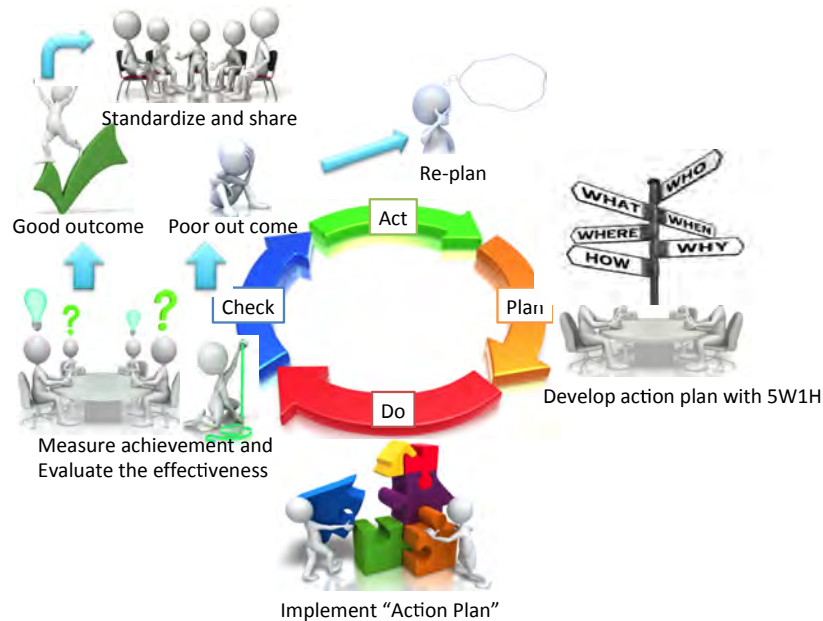

Figure 3-17: How PDCA cycle is rotate in actual setting

It is often misunderstood that KAIZEN is the Japanese name of PDCA cycle.
This must be clarified that PDCA cycle is used, as the backbone of KAIZEN process, and it is not exactly same as original concept of PDCA. It can say that KAIZEN process is the improved concept and practical approach derived from PDCA cycle. Original PDCA cycle is often illustrated as "closed cycle". However, "PDCA" used in KAIZEN is not "closed cycle". It is "open quality spiral". PDCA. Since PDCA cycle consist of four steps only, the cycle maybe stopped at "ACT " often. KAIZEN aims to raise the standard of our workplace, productivity, quality and safety in a continuous upward spiral through rotating PDCA cycle, reflecting on achievement of KAIZEN and taking action to improve the way for next KAIZEN.
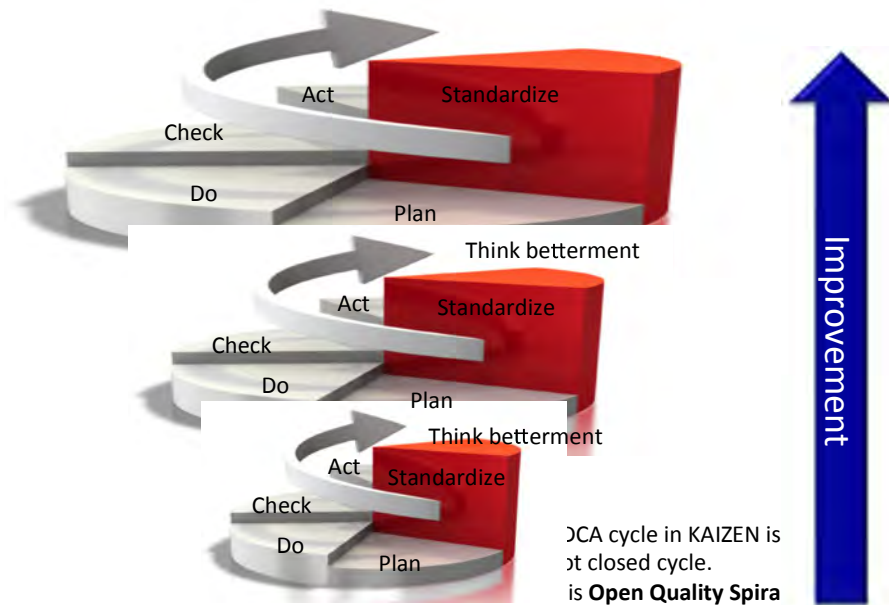
Figure 3-18: "Open Quality Spiral" for CQI

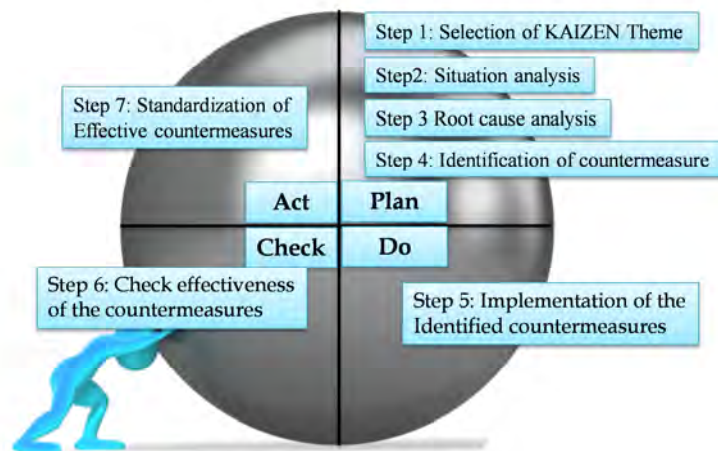Figure 3-19: PDCA Cycle and KAIZEN Process

III-3-3-3…Two level of KAIZEN

There are two level of KAIZEN. One is called "Small KAIZEN", and other one takes a standard "KAIZEN process". "Small KAIZEN" should be the first choice of making things better without any financial input or very little financial input, and quick improvement. On the other hand, "KAIZEN process" takes time and financial input.

Figure 3-20: Two level of KAIZEN

Hearing the word "KAIZEN" makes us to think about "doing something hard". Many people has the images of "KAIZEN" as "changing big", however, "KAIZEN" is not a difficult things. It is to change things little by little or change what you can do in a short period of time with available resources. Then, continue those small changes.

It is better not to think of changing things all at once, but rather to think of changing whatever you can. It means that put feasible "KAIZEN" measure into practice. As it goes, little things make a big difference.
Continuation of small KAIZEN activities will be able to make a big change. However, the people, who are stuck with the idea that KAIZEN is a difficult and hard thing to do, it is difficult to convince them. Therefore, use pictures, numbers and other evidences to explain about KAIZEN.

Here is the good example of small KAIZEN. The picture bellow was taken at one of the base hospital in Sri Lanka.

Figure 3-21: Example of small KAIZEN at base hospital in Sri Lanka

The hospital gardener came up this small "KAIZEN" idea, and the management of hospital adopted it to maximize productivity of the staff and minimize water usage.

The gardener used to pull a long water pipe and took a lot of time for watering plants all over the hospital. However, the gardener came up with an idea to utilize used empty IV drips container and line without needle to drop water to watering the plants. After introducing this KAIZEN idea, workload of the gardener was reduced and possible to do other works, and water usage was reduced. By such a small idea, the hospital accomplished the reduction of workload of staff, costs, and could improve productivity.

As indicated in the Figure 3-21: Example of small KAIZEN at base hospital in Sri Lanka, a clue of KAIZEN is "analyze the way of doing your work". Looking at the current work process, which consumes time and financial resources, low productivity and safety, and makes worker tired, it is necessary to analyze the way of doing your work for improvement.

Quick and easy KAIZEN empowers employees, enriches the work experience and brings out the best in every person. It improves quality, safety; cost structures, delivery, environments, throughput and customer services. In small KAIZEN, there are two type of methods in general; Gemba KAIZEN and KAIZEN suggestions.

III-3-3-4…Gemba KAIZEN: Managers should visit work front-line frequently.

Gemba is a Japanese word meaning "real place" – now adapted in management terminology to mean the "workplace" – or that place, where value is added. In manufacturing, it usually refers to the shop floor. *Gembutsu* the tangible objects found at gemba, such as work pieces, rejects, jigs, tools, and machines

Go to *gemba* is first principle of *gemba kaizen*. This is a reminder that whenever abnormality occurs, or whenever a manager wishes to know the current state of operations, he or she should go to *gemba* right away, since *gemba* is a source of all information

In many service sectors, *gemba* is where the customers come into contact with the services offered. In the hospital sector, for instance, gemba is everywhere: in OPD, ward, dispensary, operating theatre, laboratory etc. In the hotel business, it is in the lobby, the dining room, guest rooms, the reception desk, the check-in counters, and the concierge station.   Most departments in these service companies have internal customers with whom they have inter-departmental activity, which also represents gemba.
To start *kaizen* in *gemba*, *muda* offers a handy checklist and *mura* and *muri* offers a handy reminder for this purpose.

MUDA is a Japanese word meaning "waste" which, when applied to management of the workplace, refers to a wide range of non-value –adding activities. But this word carries a much deeper connotation. Work is a series of processes or steps, starting with raw material and ending in a final product or service. At each process, value is added to each activity, and then sent on to the next process. The resources at each process – people and machines – either do add value or do not add value. *Muda* refers to any activity that does not add value. *Muda* in *gemba* has seven deadly wastes.

Seven deadly wastes
Waste is so often in front of us that we do not always see it

"The greatest waste is the waste we do not see"

Overproduction: Blood draws done early to accommodate lab. Lab investigations not taken to the BHTT and idling in nurse's lockers.

Transportation: Moving patients to tests unnecessarily. Sending two or more ambulances for the same clinic due to lack of planning in the hospital.

Excessive Processing: Asking patient the same information multiple times. Nurses drawing the drug chart, observation charts rather than spending time on patient care.

Waiting: Inpatients waiting in X-Ray rooms, ECG rooms etc for investigations, especially during emergency.

Inventories: Keeping the items, which are unnecessary for the unit, condemning items, and irrelevant items for the unit, and excessive items in a unit.

Movement: Looking for missing charts or equipment, searching an item for more than 30 seconds, unnecessary movements to perform a work.

Defects: medication errors.

MURA (Irregularity)

Whenever a smooth flow of work is interrupted in an operator's work, the flow of parts and machines, or the production schedule, there is *mura* .For example, during an emergency in labour room (Post Partum Haemorrhage), each person from VOG , MOO, Nursing Officers to LR attendant are performing more than their capacity to recover the patient. But the one who goes to blood bank may take her own time to return to LR without any consideration about the emergency. Therefore everybody's work in the labour room must be adjusted to meet the slowest person's work. Looking for such irregularities becomes an easy way to start *gemba kaizen*.

MURI (Strenuous work)

Muri means strenuous condition for worker and machines as well as for the work processes. For instance, if a newly appointed nursing worker is assigned to assist a veteran surgeon without sufficient training, the job will be strenuous for her, and chances are that she will be slower in her work and may make many mistakes, creating muda. To avoid this, the managers should follow LUCK principle i.e. Labour Under Correct Knowledge. Muri can occur when operating a machine. For instance if the trolley is not properly maintained in the hospital, a minor staff may feel difficult to push it when taking a patient. This causes strain on him meaning that abnormality has occurred.

Golden Rules of *Gemba* management

When a problem (abnormality) arises go to gemba first;
Check the *gembutsu* (relevant objects);
Take temporary countermeasures on the spot;
Find the root cause; and
Standardize to prevent recurrence

Ten basic rules for practicing *KAIZEN* in *gemba*

Discard conventional rigid thinking about production / service;
Think *how to do it*, and not why it cannot be done;
Do not make excuses. Start by questioning current practices;
Do not seek perfection. Do it right away even if for only 50% of target;
Correct mistakes at once;
Do not spend money for kaizen;
Wisdom is brought out when faced with hardship;
Ask 'Why?' five times and seek the root cause;
Seek the wisdom of ten people rather the knowledge of one; and
Remember that opportunities for *Kaizen* are infinite.

Figure 3-22: Before and after of 5S

III-3-3-5…KAIZEN Suggestion

To propel PDCA cycle in the hospital, you have to consider how to make a plan for KAIZEN by each WIT. The solution of your consideration is KAIZEN Suggestion. KAIZEN Suggestion is an entry point of KAIZEN and brings valuable opportunities for work unit members' self-development as well as for interactive communication in the workplace. KAIZEN Suggestion makes employees' KAIZEN - consciousness and provides opportunities both to health and non-health staffs to speak out with their managers as well as among themselves.

KAIZEN Suggestion, which is the first process of KAIZEN, encourages staffs to generate a great number of suggestions. Having these opportunities, they work hard and consider how to implements the job, which are suggested and created by them. The top management has to prioritize the submitted KAIZEN suggestions based on the relevance, effectiveness and efficiency, and also gives the recognition to employee's efforts for improvement. An important aspect of KAIZEN Suggestion is that each suggestion, once implemented, has potentials to lead the entire work process to an upgraded standard.

The American-style suggestion system stresses the suggestion's economic benefits and provides economic incentives. However, the Japanese-style KAIZEN Suggestion stresses the morale boosting benefits of positive employee participation.

Figure 3-23: Outcome of KAIZEN

In KAIZEN Suggestion, there are three Stages as followings.

1. Encouragement
In the first stage, top manager and QIT should make every effort to help all staffs, who provided suggestions. No matter how primitive those suggestions are, the top management group has to handle them for the betterment of the work flow, the workplace and visitors' satisfaction. This will help the staff look at the way they are doing their jobs.

2. Education
In the second stage, manager and QIT should stress employee education so that employees can provide better suggestions. In order for the staff to provide better suggestions, they should be equipped with skills to describe the problem objectively and the backgrounds.

3. Efficiency
Only in the third stage, after the staff is both interested and educated, the top management should be concerned with the management improvement through the suggestions.

Example of major subjects for KAIZEN Suggestion as followings,

Improvement in one's own work
Savings in energy, material, and other resources
Improvements in medical equipment and facility
Improvements in medical supply, medicine and other goods
Improvements in work process
Improvements in quality of service packages and / or products
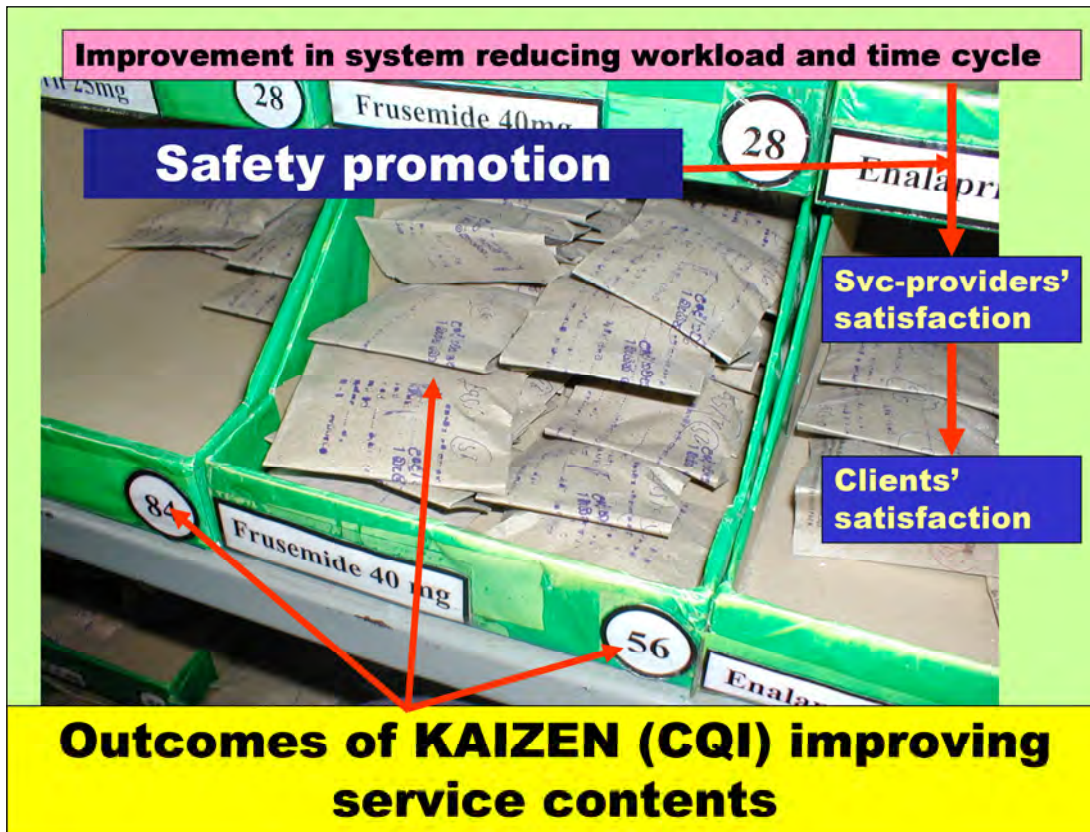Improvement in non-medical customer services and customers relations

Figure 3-24: Outcome of KAIZEN improving service contents

Even small changes, KAIZEN Suggestion activities should be recorded. Very simple format can be used to keep record of KAIZEN Suggestion activities, and the format called – "KAIZEN Memo" as shown below.

Simple record the current situation or problem the section is facing, and add what kind of input and solution applied with picture or drawing. Then, on the other side, record of the benefits and outputs from the KAIZEN Suggestion with pictorial records,

....Unit/Ward/Department **Implemented date : / / Head of WIT:...**	
Before Improvement (KAIZEN)	After improvement (KAIZEN)
1) Problems 2) Kaizen points 3) Input Pictures **after** KAIZEN	1) Benefit/Outputs Pictures **after** KAIZEN

Figure 3-25: Example of KAIZEN Memo format

Surgical ICU **Implemented date : December 2008**	
Before Improvement (KAIZEN)	After improvement (KAIZEN)
1) Problems • Staff, visitors often confused the status of shoe cover • There were inappropriate practice of Infection Prevention and Control **2) Kaizen point** • Establish boxes for shoe cover for "safe/clean" and "dirty" at entrance of ICU **3) Input** Two empty boxes and stationeries	**1) Benefit** • Confusion of shoe cover status is reduced • Infection prevention and control are improved

Figure 3-26: Actual usage of KAIZEN Memo

By continuous practice of small KAIZEN, and solving small problems, bigger problems, which take time, costs, human resource input and other resources, will remain in workplace.

To solve those bigger problems or improve such situation, it is necessary to take some actions that need to learn some skills for using Quality Control (QC) tools and statistical analysis methods.

III-3-3-6…How to implement KAIZEN process (QC Story)?

As mentioned in the above, KAIZEN is the approach of solving problems that exist in workplace. KAIZEN process was established as a sequential process of events based on PDCA (Plan-Do-Check-Action) cycle, so-called "Quality Control (QC) story". QC story is a basic procedure for solving problems scientifically, rationally, efficiently and effectively.

Before try to solve "problem", it is necessary to understand what is "problem"
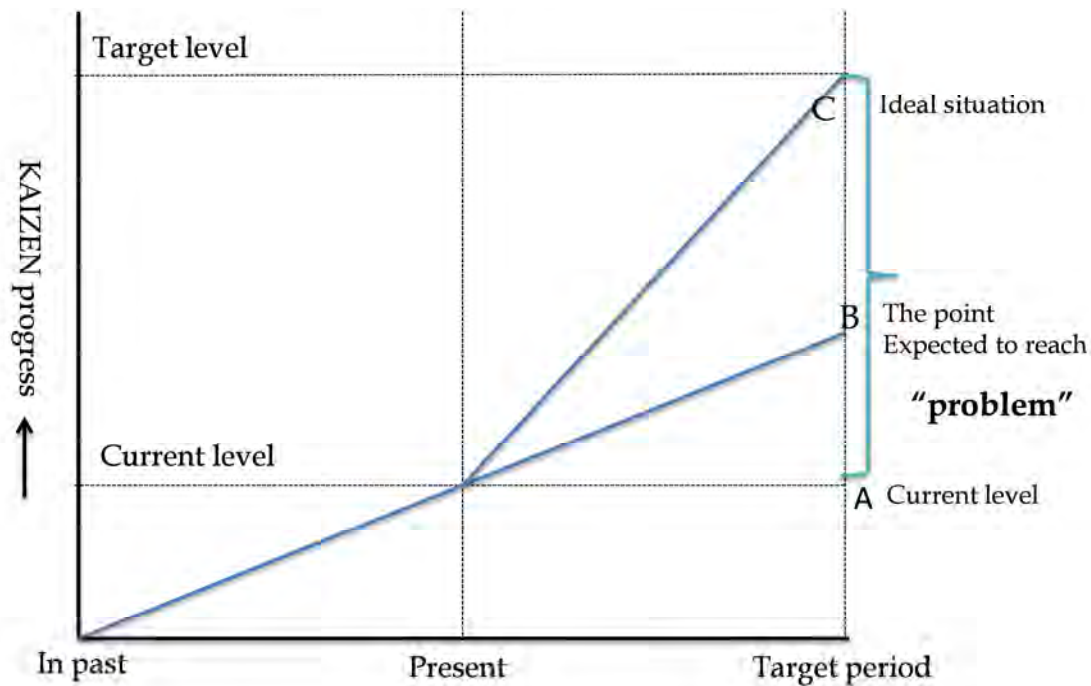"Problem" can be defined as "the gap between ideal situation and current situation".

Figure 3-27: What is "Problem"

Then, it is necessary to take some action for making things better and close to the ideal condition or situation. To do so, it must take some steps to solve "problem" or minimize "gap". Generally, these steps are called "QC story", and it consists of 7 steps. The 7 steps of QC story are like when a mountain climber is climbing High Mountain. You need to make sure the correct route and taking process step by step.

Step 1 is "Selection of KAIZEN theme" - the issue needs to be tackled, and then followed by analysis of the current situation of selected KAIZEN theme together with target setting; that is Step 2. In Step 3, try to find root causes for the issues / problems. In Step 4, think of counter-measures to tackle the issues / problems, and then implement the identified counter measures in Step 5. In Step 6, it is necessary to check the effectiveness of the counter measures. In Step 7, if the countermeasures are effective in reducing the problem or improve the situation, standardize the counter measures for easy implementation by anyone who may face same problem in the future. Even though, a problem is solved, it may have other problems affecting the set theme. Therefore, finally, it is necessary to sort unsolved problems and plan for next KAIZEN activities.
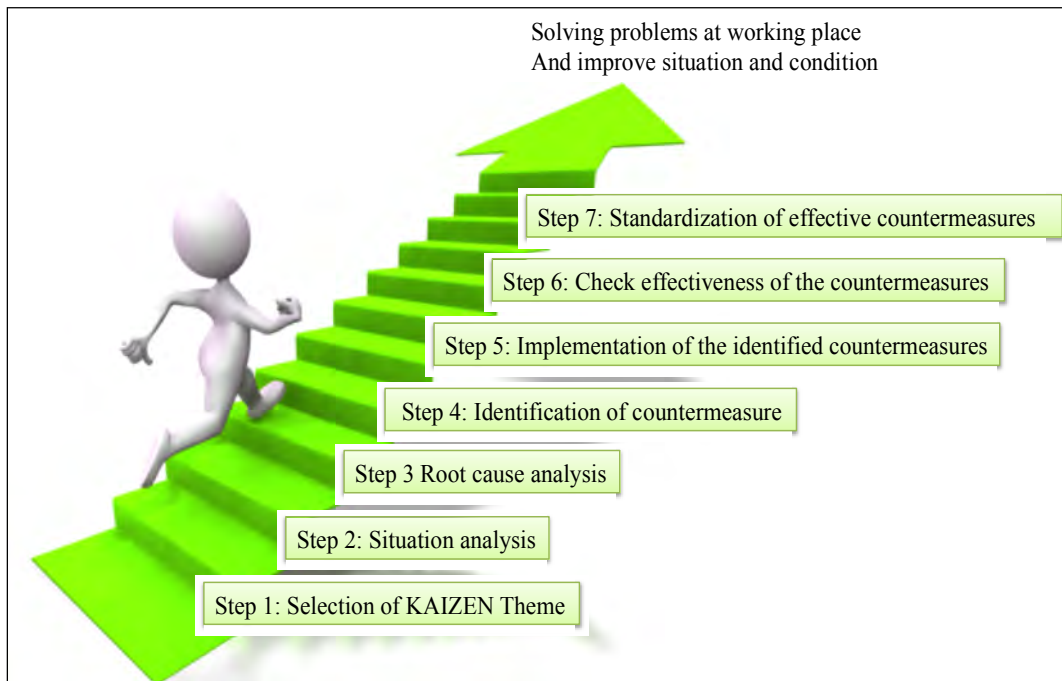
Figure 3-28: KAIZEN Process

Note that the situation created by KAIZEN process may not be the best. If you think that is the end of KAIZEN, things will not improve further. Client's need and expectations changes easily. Therefore, always consider client's needs and expectations, and continue KAIZEN activities.

To complete KAIZEN process for solving problems scientifically, it is necessary to take the 7 steps mentioned in the above. Each step needs to use some tools and information that is collected routinely. The process needs to be understood properly. It is necessary to learn each step more in detail.

"Target of KAIZEN is one's own work, not others". This is the very basic concept of KAIZEN implementation. In a traditional way, suggestion box has been used to identify problems that happening in a hospital, and try to solve the suggested issues. However, those suggestions are made by others and it is difficult to set priority and solutions as most of them are complain and no suggestion for betterment. . Then, it will be left out and no change made. However, KAIZEN is different. Person identify problem must come up with ideas for improvement, and also implement those ideas.

In actual settings in health facility, individual action is not recommended. Therefore, a team should be established with section or unit and practice KAIZEN activities as a team. Usually, the team practicing KAIZEN at section level called Work Improvement Team (WIT) with the member of 5 - 6 staff working in the section.
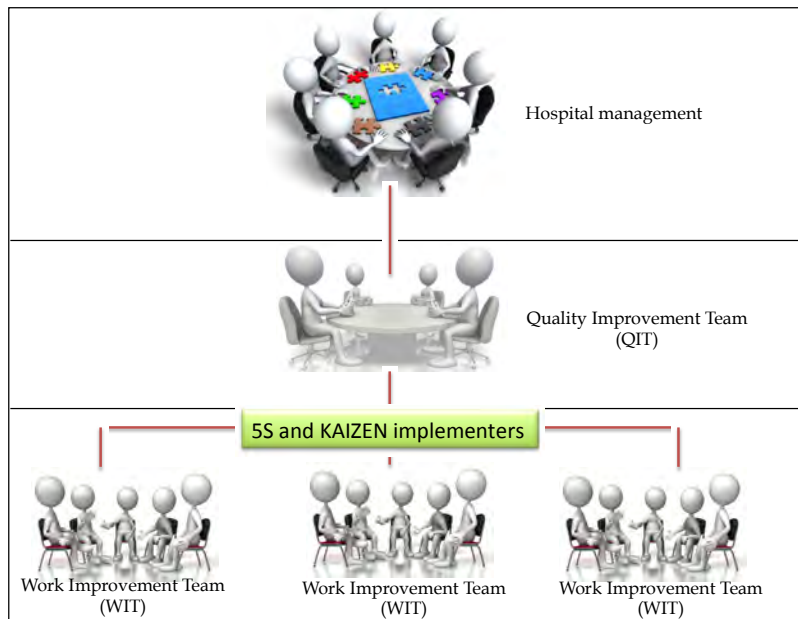
Figure 3-29: QI implementation structure

As mentioned in Figure 3-29: KAIZEN Process, there are seven (7) steps to complete one cycle of KAIZEN process. Detailed explanation of each KAIZEN Process is as follows:

Step1: Selection of KAIZEN theme

The first step of KAIZEN is to select KAIZEN Theme. The step takes participatory process. It starts from discussion on difficulties that staff and clients are facing in their workplace, and then select a KAIZEN theme that can be improved within a given period of time with existing resources.

During the brainstorming meeting, possible KAIZEN themes (It is also called KAIZEN suggestion) will be suggested by staff working at the department, section or unit based on:
Claim from clients/patients
Mistakes often happening
Working process that takes time and are hard to do it
Medicines and equipment that are disturbing the smooth practice of routine work

Several KAIZEN themes might be suggested during the brainstorming meeting. From those suggested KAIZEN themes, it is necessary to evaluate feasibility on each suggested theme. Feasibility of KAIZEN theme can be evaluated based on the following criteria:

Impact: The impact when the problem is solved or reduced will be great.
Urgency: The theme has to be tackled with immediately.
Realization: Is it possible to tackle with existing resources (costs, human resource time, information availability etc.)
Burden to service users: It is of less burden to service users

KAIZEN activity should be carried out accurately and statically. For example, in a ward, giving wrong medicine to patients was occurring frequently. Therefore, when this ward held a meeting for selection of KAIZEN themes, "Giving wrong medicine is reduced" was raised as one of the possible themes. On the other hand, another staff raised a problem of small working space, and others raised many sampling mistake, high wastage volume of medicine and so on. Based on the matrix in the above, highest mark obtained is **"Giving wrong medicine is reduced"** as it will have immediate effects, does not require many resources, and is possible to realize.

Table3-1: Example of Kaizen theme selection matrix

Possible KAIZEN themes	Kaizen theme selection					
	Immediate effects	urgency	Realization	Burden to service users		Target score
Ward space is expanded	◆	×	◆	×		2
Giving wrong medicines to patients is reduced	O	O	O	◆		7
Sampling mistakes of laboratory tests are reduced	◆	◆	O	O		6
Medicine wastage volume is reduced	O	◆	◆	◆		5

O   2 points
◆   1 points
×   0 points

KAIZEN theme should be selected as low resources input and possible to implement and complete all seven steps within short period (approximately in 6 months). All process for selection of KAIZEN themes must be recorded to explain why and how KAIZEN theme was selected.

KAIZEN theme should be described in "ideal situation". In the above example, like in the example given, if many cases of giving wrong medicines is occurring, many people write, *" To reduce prescription of wrong medicines"* in objective way. What should be done will be clear in objective case. However, this is not clear how the situation should be.
"**Giving wrong medicine to patients**" was the problem that they were facing, and ideal situation of this problem is "**Giving wrong medicine is reduced**". The reason why it should be described in "ideal situation" is to clarify what we are aiming for, and make everyone to understand the target situation. Therefore, it is recommended to describe in a perfect tense like *"Giving wrong medicine is reduced"*

Step 2: Situation Analysis of selected theme and target setting

After KAIZEN theme selection, accurate and statistical analysis of current situation needs to be conducted.   Using the example of the above, *"Giving wrong medicine is reduced"*, it is necessary to know what are the contributing factors leading to *"Giving wrong medicine"*.
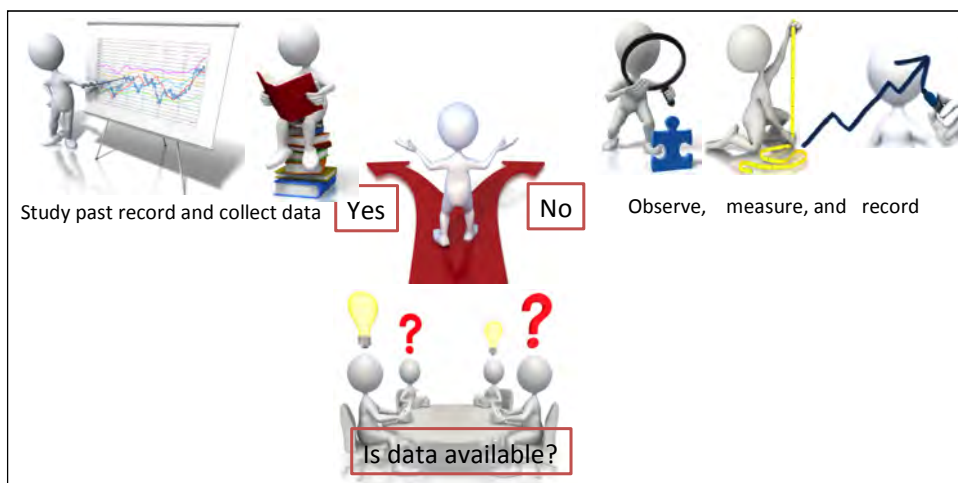

Figure 3-30: Data collection for situation analysis

Collection of right information and data is the key for accurate situation analysis. To do so, it is necessary to check the availability of information and data related with the selected KAIZEN Theme. If the data and information were kept well and available, WIT needs to collect them and study the trend or movement. However, if data and information is not available, it is necessary to identify necessary data and information, and then start collecting them for certain period.

Collected data and information should be analyzed properly. There are some tools that are useful for accurate and statistical situation analysis used in KAIZEN process called **QC tools**. One of the tools is called *"Pareto Chart"*.

In the Step 2, Pareto Chart is useful for prioritization of target(s) for problem solving, when various contribution factors exist. Visualize frequency of incidents that contributing the problem is also helpful for decision making on prioritization of target for problem solving.

Pareto Chart is able to identify "the contributing factors that need to be focused for better improvement". It means, identifying the contributing factors that has high frequency and affecting work process most. To make a Pareto Chart correctly, it is necessary to count frequency of incidents that are causing or contributing the problem (selected as KAIZEN theme) and calculate accumulation ratio of the incidents like in the table below.

Table 3-2: Example of frequency and accumulation table

Incidents related with giving wrong medicines	Frequency	Accumulation (Cumulative Frequency)	Accumulation ratio
Giving wrong Injectable medicines	14	14	14÷31 = 0.45
Giving wrong inhale medicines	11	25	25÷31 = 0.81
Giving wrong oral medicines	3	28	28÷31 = 0.90
Giving wrong volume of Insulin	2	30	30÷31 = 0.97
Apply wrong ointment	1	31	31÷31 = 1.00
Total	31		

Making the above table is the first step to draw Pareto Chart. On the process for making Pareto Chart, place the high frequency one from the left of the graph like below so as to visualize "the problem that needs to be focused on". Set frequency of occurrence on the left vertical axis of the chart and, set cumulative ratio of the total number of occurrences on the right vertical axis of the chart like example shown below.
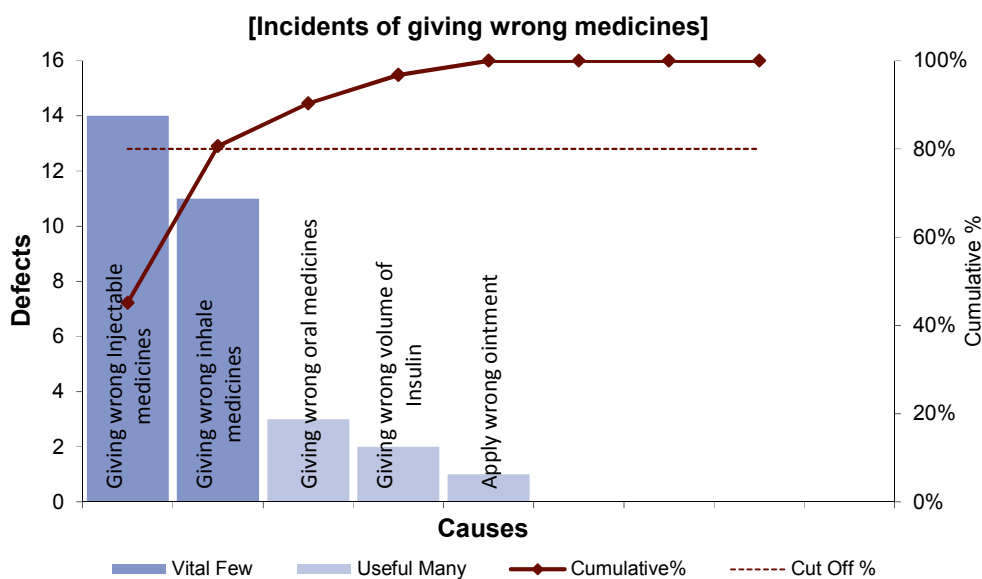

Figure 3-31: Example of Pareto Chart (on incident of giving wrong medicines)

There is free tool for making Pareto Chart available on internet, and it is recommended to use those tools for making you work easier and simpler.[1]

Pareto rule:
In terms of quality improvement, the Pareto chart tells us that a large majority of problems (80%) are produced by a few key causes (20%). This technique helps to identify the top 20% of causes that needs to be addressed to resolve the 80% of the problems
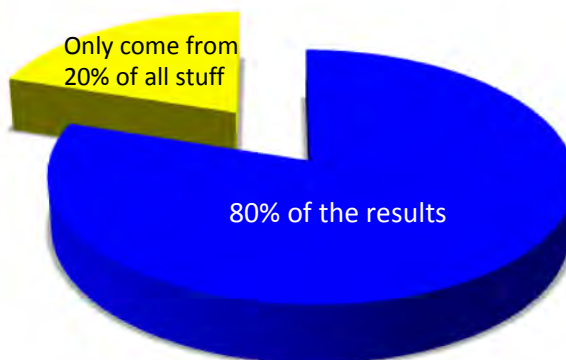

Figure 3-32: Pareto rule (80:20 rule)

In Step 2, the current situation is clarified with numbers, and now, it is easy for us to set "target". "Target" means how much the problem (gap) can be reduced, minimized or improved. Using the example from Step 2, only the "giving wrong injectable medicine" and "giving wrong inhale medicine" are accounted for 80.6% of the problem. Which means if we could reduce or avoid those two major incidents, majority of the problems will be solved or reduced.

Well, how can we set the target? At the first time, probably 30% to 50% of reduction from the current situation is valid. At the same time, it is better to set the time frame for the KAIZEN activity. Use of the Pareto chart by choosing the first or the first and second most frequent causes will make the calculation of the target easy.

Once the top 20% of the causes that are (representing 80% of cases) identified, then tools like the Ishikawa diagram (Fish-bone Analysis) can be used to identify the root causes of the problems. Also the application of the Pareto analysis in risk management allows management to focus on the 20% of the risks that have the most impact on the project

Step 3: Root Cause Analysis

Finding root cause(s) of the problem (KAIZEN theme) and tackle with root causes is very important to solve or reduce the problem. In this process, "Fishbone diagram", one of QC tools, is used to identify root cause(s)
"Fishbone diagram" is useful for sorting various causes, and it is able to clarify a causal-effects relationship under the selected KAIZEN theme.

The first procedure of root cause analysis is to listing "Gassing causes" and then focus on "Possible causes". Finally, identify "Root causes" from the "Possible causes". How to narrow down from "Gassing causes" to "Root causes" is simply ask ad repeat "why-because", minimum of five times.

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[1] Reference: http://www.vertex42.com/ExcelTemplates/pareto-chart.html
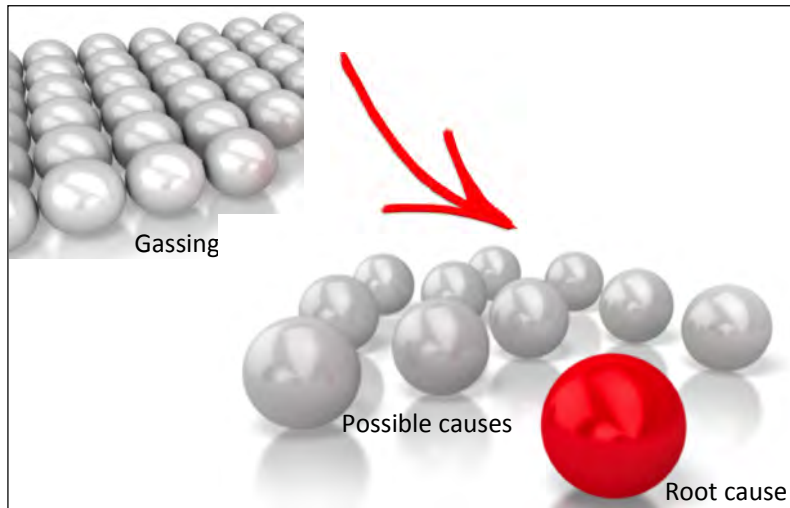
Figure 3-33: Basic concept of root cause analysis

Let's use the example of "giving wrong medicine is reduced". Based on the situation analysis and result of Pareto chart, the main incidents that need to be tackle with are "giving wrong injectable medicine" and "giving wrong inhaling medicine". Therefore, it is necessary to develop two (2) fishbone diagrams for "giving wrong injectable medicine" and "giving wrong inhaling medicine"

Head of "fish" will be the identified **contributing factor**, **not KAIZEN theme** and need to find root causes for one contributing factor and another. Let's pick up "giving wrong injectable medicine" as example. Figure 3-34 is the example of Fishbone analysis to identify root causes of "giving wrong injectable medicine"
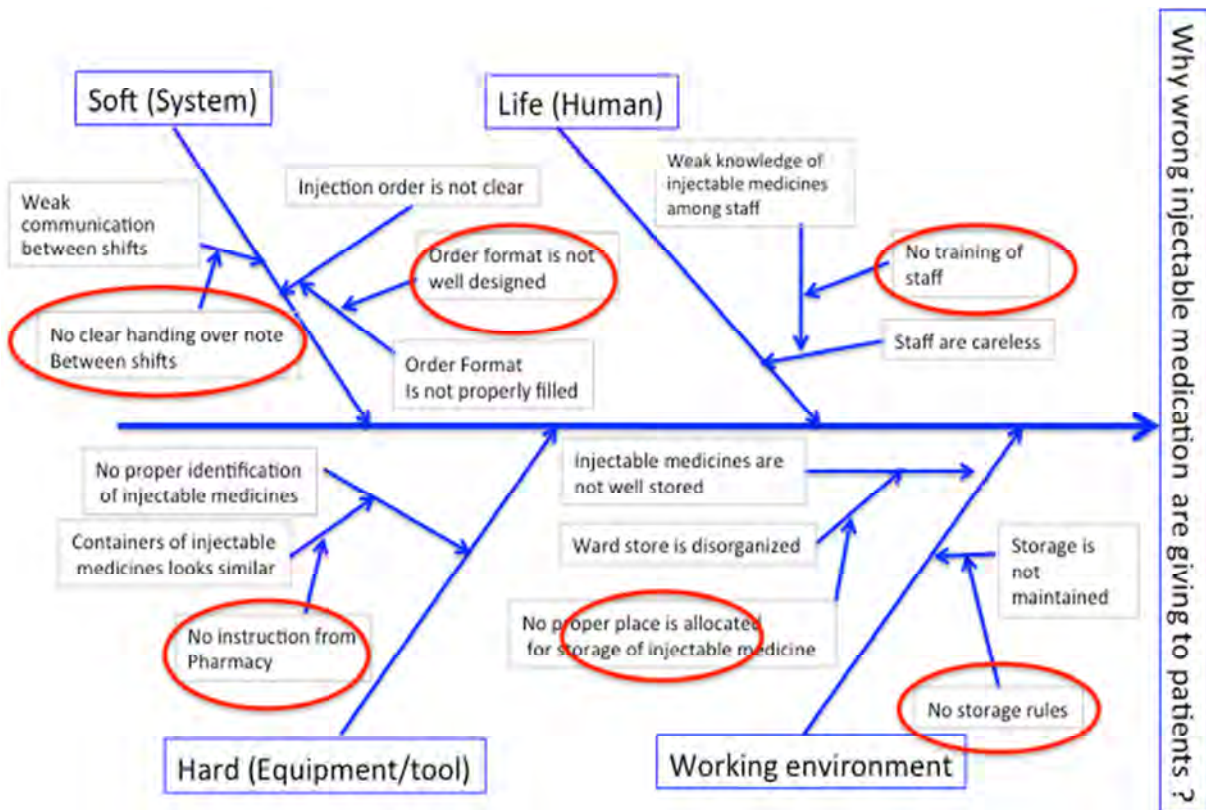
Figure 3-34: Example of fishbone analysis (root cause analysis)

Easy way of making "Fishbone analysis" is to start categorizing causes into 5 groups. Those 5 groups are called "**MSHEL**" as follows; 1) **M**: caused by **M**anagement, 2) **S**: caused by **S**oftware, 3) **H**: caused by **H**ardware, 4) **E**: caused by **E**nvironment, 5) **L**: caused by **L**ife (human). This categorization

will help us to identify causes smoothly.

For finding root causes, ask, **"Why it is happening- because ---" 5 times** for each possible cause and extend branches from each possible cause until it is embodied. Finally, circle the identified root cause in red.

Free tool for making fishbone analysis diagram is available on Internet. Using those tools will make you work easier and simpler.[2]

Step 4: Identify Countermeasures for solving KAIZEN theme

After root causes analysis, next step is to think the ways of eliminate the root causes. Therefore, it is necessary to come-up with countermeasures for eliminating or reducing those root causes. In this process, two QC tools are used to select countermeasures. One is "Tree diagram", which is used to identify possible countermeasures. Other one is "Matrix diagram", which is useful for checking feasibility of those identified countermeasures. Feasibility of identified countermeasures should be evaluated in terms of 1) importance, 2) Urgency, 3) Difficulty, 4) Time consumption, 5) Resource availability.

List the identified "root causes" in Step 3 on the left end. Then, start brainstorm countermeasures with team members. If the countermeasures are identified, connect the line with each "root causes" systematically (1st line countermeasures). Then, brainstorm again to come up with realistic countermeasures and branch them from 1st line countermeasures (2nd line countermeasures). Note that it is not always one countermeasure for one root cause. Therefore, if more counter measures identified for a root cause, branch line and connect like in the diagram xx

After development of the Tree diagram, feasibility of identified countermeasures needs to be looked at with Matrix diagram. As mentioned in the above, the following terms are used to evaluate the feasibility of countermeasures; 1) importance, 2) Urgency, 3) Difficulty, 4) Time consumption, 5) Resource availability.

WIT or KAIZEN team must have agreed set of evaluation scale for feasibility check before making Matrix diagram. Then, evaluate feasibility of each countermeasure through discussion among team members and mark according to the agreed scale like example showing below:

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[2] Reference: http://www.vertex42.com/ExcelTemplates/fishbone-diagram.html

Figure 3-35: Example of Tree diagram and matrix diagram

Root causes	1st line Countermeasures	2nd line Countermeasures	Importance	Urgency	Difficulty	Time consumption	Resource availability	Feasibility
No training on Handling medicine	Conduct training on handling medicine	Develop training materials	3	3	1	1	1	9
		Conduct TOT	3	2	1	2	1	9
No proper place for storage of injectable medicines	Sort and set the store and organize the s	Proper labeling and color cording of injectable on store shelf	3	2	3	2	2	12
No rules for storage of injectable medicines	Develop storage rules for injectable	Develop Monitoring tools for storage	3	2	2	2	1	10
		Develop of storage rules with pharmacists	3	3	2	1	2	11
		Disseminate the storage rules to staff	3	3	1	2	2	11
No instruction from Pharmacy	Provide proper instruction	Develop instruction and check sheet with Pharmacy department	3	3	3	2	2	13
		Disseminate and conduct OJT	3	3	2	2	2	12
No clear handing over note between shift	Develop safe handing over mechanism	Develop check list and handing over note, and communicate between shift well	3	3	3	2	2	13
Order format is not well designed	Develop new order form	Redesign of format with pharmacists and doctors	3	2	2	1	1	9

Cutoff=70% Scale:
3= high priority, easy to do
2=moderate
1= Low priority, not easy

TREE DIAGRAM   MATRIX DIAGRAM

The example showed in the above use the scale from 0 to 3. Each countermeasure is evaluated using the scale. Note that explanation of evaluation scale is very important to reduce confusion in and outside of the team. For instance, "0" has negative meaning and "3" has positive meaning. For example, if a countermeasure got "0" point in "importance", which means that counter measures is "less important". If a countermeasure got 3 points in "Difficulty", it means that counter measures is "not difficult to implement"

The countermeasures that got more than 11 points out of 15 (Cutoff line is the above 70%) are selected as feasible countermeasures.

Step 5: Implementation of identified counter measures

Countermeasures that are evaluated as "feasible", it will be implemented by WIT. Implementation period of "feasible countermeasures" is usually between 2 months to 3 months. If the "feasible countermeasures" take long time to implement and need have lots of preparation, those are not "feasible countermeasures" and stop implement.

Figure 3-36: Time frame of KAIZEN process

To facilitate the implementation of "feasible countermeasures", it is important to develop Implementation plan by WIT. Key for developing effective Implementation plan is to clarify 5W 1H (Why, Where, Who, When, What, How) that make all team members understand the roles and responsibilities of everyone involved in the KAIZEN process, and how to implement.

Why (are taking this action?)
Who (is responsible for?)
When (must be completed? How often?)
Where (it is taking place?)
What (should be done or is output?)
How (to achieve / do it?)

Table 3-3: Example of Implementation Plan

Counter Measures	*WHO*	*WHEN*	*WHERE*	*WHY*	*WHAT*	*HOW*
Develop of storage rules with pharmacists	Ward In-charge and pharmacist	By Dec.01	At the ward	Strengthen stock management of medicines	Storage rules and regulation	Develop
Develop check list and handing over note, and communicate between shift well	Ward In-charge and WIT leader	By Dec.15	At the ward	Reduce miscommunication	Checklist and handing over note	Develop
Develop instruction and check sheet with Pharmacy department	Head of Pharmacy and Ward in-charge	By Nov.10	At the ward	Reduce taking wrong injectable	Medicine handling instructions	Develop

Progress of each countermeasure must be monitored regularly and the result came out from each countermeasure should be shared not only team members but also other workers in the department/section. After development of the implementation plan, it should be displayed on the staff notice board at department/section level. Information sharing is important to remind WIT members to

implement and monitor KAIZEN activities on time and share progress in the department/section.
The following actions need to be taken in Step 5 for verification the effects:
Collect baseline data for each countermeasure
Ex. "Knowledge is improved through training"
Pre-assessment of training need to done and the results must be analyze
Develop Monitoring check sheet based on "action plan" of each countermeasure
Monitor implementation of countermeasures with checklist

Step 6: Check effectiveness of the counter measures

After the implementation of identified countermeasures, effectiveness of the countermeasures must be measured. As used in Step 2, **"Pareto Chart"** is useful for measuring effectiveness of countermeasures and easy to make comparison between before and after KAIZEN activities. Procedures for making **"Pareto Chart"** in Step 6 is exactly same as explained in Step2. However, cumulative table can be combined before and after KAIZEN activities showing like a below.

Table 3-4: Differences between before KAIZEN and after KAIZEN

Mistakes related with sampling	Frequency before KAIZEN	Frequency after KAIZEN	Reduction of frequency	Reduction Rate
Giving wrong Injectable medicines	14	7	7	50%
Giving wrong inhale medicines	11	5	6	55%
Giving wrong oral medicines	3	1	2	66%
Giving wrong volume of Insulin	2	1	1	50%
Apply wrong ointment	1	0	1	100%
Total	31	14	17	Average of 55%

The example used in this Chapter, the target set in the Step 2 was "Frequency is reduced by 50% from the current situation". As stated in the table above, reduction rate is 55%, and achieved the target. It means that the countermeasures implemented were effective. However, it is difficult to say which countermeasures were effective to reduce the frequency of the problem.
Identification of effective countermeasures is very important for standardization of effective counter measures.

The relationship between countermeasures and effectiveness can be defined as listed the table xx below: Use the monitoring results and place the countermeasures according to the situation and condition.

Table 3-5: Countermeasures – effectiveness relationship

		Effectiveness	
		Effective	Not effective
Countermeasures	Implemented	1 It is effective and need to be standardize	2 It is not effective and need to review measures
	Not implemented	3 Need to clarify why it is effective	4 Implement some measures (Do something)

The following actions need to be taken in Step 6 for verification the effects:
Evaluate the implementation status of the countermeasures through the monitoring check sheet
Conducting situation analysis with the same method was used in Step 2 for verification of results and effectiveness of KAIZEN activities
Evaluate the outcome of the countermeasures
Collect data and compare with baseline data

And how "effects" are verified as follows;
Various methods for measuring "effectiveness" of countermeasures
Qualitative and quantitative measures can be applied according to the target/objectives
"Effectiveness" can be categorized into the following categories:
Tangible effects = Expected outcome
Ripple effects = Predicted outcome
Intangible effects = Unexpected outcome
If you observed "Intangible effectiveness" also, it needs to be recorded.

Step 7: Standardization of effective measures
(Sorting of unsolved problems for next KAIZEN Plan)

After identified effective countermeasures in Step 6, it is necessary to consider preventing recurrence and sustainability of the improved situation. Therefore, Standardization of effective methodology is essential.

Actual meaning of "standardization" is not only "standardize method(s)" but also all workers in the department/ section must practice the "standardized" manner.

Why standardization is necessary? It is because;
No "Standardization" means discontinuation of KAIZEN effects = Recurrent of the problems
Stabilize processing time, costs, and workloads
Work or services process that require some level of quality need to be standardized
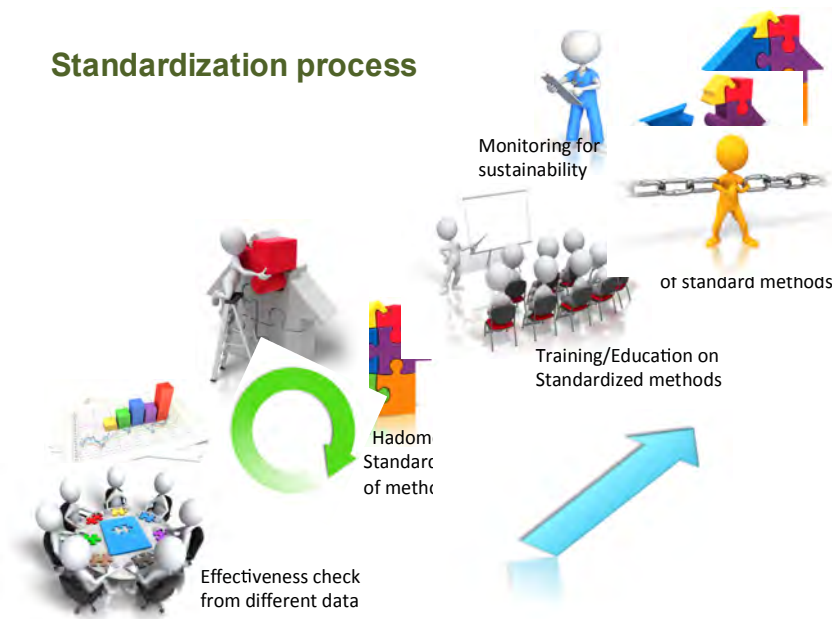Note that discipline is a key for successful "Standardization"

Figure 3-37: Standardization process

Like an implementation plan developed in Step 5, it is necessary to develop Standardization plan in Step 7. It is to clarify standardization procedures with the information of 5W1H (Why, Where, Who, When, What, How). Moreover, it is necessary to develop a checklist to monitor implementation of standardized countermeasures.

There are few tips to make Standardized Procedure Table with 5W1H as follows;
"Countermeasures" that showed effective results of KAIZEN is placed in the "WHY" column
In-charge of the activity is placed in the "WHO" column
Period of implementation is placed in the "WHEN" column
Place that activities take place is placed in the "WHERE" column
Output or tools used for the activity is placed in the "WHAT" column
Methodology to carry out the activities is placed in the "How" column

Format of Standardized Procedure Table with 5W1H is very similar to the action plan developed in Step 5. Therefore, should not confuse and not to mix-up this two. Example of Standardized procedures is shown below:

Table 3-6: Example of Standardized procedures

WHY	*WHO*	*WHEN*	*WHERE*	*WHAT*	*HOW*
For strengthen the management medicine storage	In-charge of stock management	Daily	Ward	Inventory and checklist	Continuously practice
To reduce miscommunication between staff for reduction wrong medication	All staff working at the ward	Before taking over next shift	Ward	Handing over note and checklist	Check the note and checklist before new shift start

Only making a standardized procedure table does not make any sense. All workers in the department or section must practice the listed standardized measures continuously. Therefore, regular monitoring with proper checklist is an important for us to know how the workers are practicing and ensuring the standardized method in sustainable way. Period of monitoring should be agreed within the team, and shared with everyone working in the department or section.

Table 3-7: Example of Checklist for standardized measure

Date	Check by	Standardized measures	Implementation status	
		Management of medicine storage	Sustained Not sustained	Following STD Not following STD
		Reduction of miscommunication between staff for reduction wrong medication	Sustained Not sustained	Following STD Not following STD

It does not matter either small KAIZEN or big KAIZEN. What is the most important thing is to have positive mindset (KAIZEN mind) and think of making things better continuously. Continuous small changes make things better and better, and possible to make big changes one day.

III-3-4…Organizational issues and the resource necessary for the activities

To commence KAIZEN activities, the commitment of top management is important as emphasized at introduction of 5S activities. In critical situation, the most of top managers complains that "It is not my fault" or "I do my best but nobody work enough", and neglects the voice of frontline staffs. The top management, if they wish to be capable managers, shall recognize that "crunch is chance to change", "blaming problems creates nothing". It is also obvious that the workforce serving in the frontline listen to the voice of patients more than the top management. Under these circumstances, KAIZEN activities will improve the situation in hospital, if the top management shall promise the following commitments.

- To describe the clear directions and objectives
- To share the directions and objectives with all staff through continuous communication
- To make decisions based on the evidences
- To select measurable evidence for decisions making
- To measure the evidence by the staff of the workplace
- To trust the staff
- Not to be afraid the change and challenge

Based upon the above, the top management shall keep in mind that KAIZEN (improvement of productivity) will be attained based on employees' satisfaction. If you attained the productivity by the sacrifice of employees' satisfaction, it is NOT KAIZEN (improvement) and it is only TRANSACTION (EXCHANGE) between productivity and employees' satisfaction.

KAIZEN activities will implement by small teams called QC circle or WIT. The team is a small group consisting of first-line employees, who continually control and improve the quality of their network, products and services. These small groups operate autonomously, utilize quality control concepts and techniques and other improvement tools, and promote self- and mutual-development. **Activities of WIT or QC Circle are periodical activities around a half year.** When a QC Circle, once, attained the purpose in the period, new target of KAIZEN would be selected based on the directions and objectives of the organization. KAIZEN will be attained through continuous QC Circle activities.

QC Circle activities are core activities for the improvement of productivity and quality, and also aim to develop members' capabilities, to achieve self-actualization, to make the workplace more pleasant, vital and satisfying, to improve customer satisfaction, and to contribute to society.
Executives and managers ensure that QC Circle activities contribute to improving the health of the enterprise by treating QC Circle activities as an important part of employee development and workplace vitalization, personally practicing company-wide improvement activities such as TQM, and providing guidance and support for total participation while respecting the humanity of all employees.

At the first step, WIT should upgrade into **QC Circle** and a **Quality Improvement Team (QIT)** should be upgraded also. Even though name of WIT is remaining, the function of WIT should upgrade into QC circle. WIT aims to promote 5S activities in several workplaces, to collect the voice of frontline staff, to define the problems, to train the principle of 5S, to monitor 5S progress and so on. The functionally upgraded new QIT or, so-called Quality Secretariat is the command unit of KAIZEN in the hospital and full-time staff shall be assigned. "Quality Secretariat" aims to promote KAIZEN activities in whole hospital, to describe periodical KAIZEN direction and objective, to organize QC circle, to train the member of QC circle, to facilitate QC circle, to train the staff for QC tools, to support QC circle activities, to monitor the progress of each QC circle, to advocate the QC circle activities and to conduct the exhibition of KAIZEN process and outcomes. Capacity of full-time staff of Quality Secretariat is not much enough to promote KAIZEN activities in hospital wide. The leader

of QC circle shall understand the QC process (QC story) well, attach the proper skill of QC tools and adequate capacity as leader, such as guiding, communicating, medicating, fascinating, coaching, facilitating, energizing, and so on.

Japanese industry takes a lot of effort to facilitate the QC circle activities and, as touched upon in previous sections of this book, there is a lot of methodology for QC circle. You can utilize the experience of Japanese industry in your hospital easily.

III-3-5…Valuable Hints for practicing KAIZEN

To implement KAIZEN, there are a lot of good and bad examples at industry in Japan. However, the starting point of KAIZEN shall be considered how to reduce the unnecessary work called "Three Ms" in Japanese; "MURI = **Strenuous work**", "MURA = **Irregularity**", "MUDA =waste" as mentioned before. The followings are the hints for better KAIZEN from the experience in Japan.

Change the Process

-to reduce effort too much
-to avoid taking care too much
-not to check too much
-to implement naturally
-to consider cutting corners with employees' satisfaction, productivity, quality and safety

Plan with Implementation

-to consider feasibility of the plan
-to avoid negative effect by the implementation

In addition to the above, there are many useful phrases describing key to success of KAIZEN. These contain trustworthy ideas for better implementation and outcome of KAIZEN.

-There is no usual work without implementation
-Sharing usual work through standardizing
-Implementation will make work usual

-Challenge from pity success
-The fail is the egg of the further success
-But big fail make you discourage
-The success make you encourage even if it is small

-Looking the Reality
-Continuous measuring will take a time
-Calculation will induce the mistakes
-To consider necessary function to attain the objective as minimum as possible

III-4... TQM

III-4-1…Definitions and the annotations

Total Quality Management (TQM) is a comprehensive and participatory management comprised with several kinds of systematic and scientific approaches, with which "quality of products or services" are specifically emphasized with the purpose to ensure managerial successes also in productivity enhancement, cost control, delivery effectiveness improvement, safety promotion and moral establishment both of personnel and organization. TQM is, at the same time, characterised with the team approach at every work unit or function in the management ladder and with enabled bi-lateral managerial vectors of top-down and bottom-up. In the context of public sector hospital management, TQM is logically explained as a three-step-approach of;

(1)…Work Environment Improvement (WEI) using 5 S Principles
(2)…KAIZEN practice for problem-solving in work processes and service contents at all work front-lines
(3)…TQM for adjusting decision-making in full utilization of reliable evidences provided from KAIZEN processes, which were continuingly carried out by the workforces

In ISO 8402 official documents, definition of TQM is described as follow.

"Management approach of an organization, centered on quality, based on the participation of all its members and aiming at long-term success through customer satisfaction, and benefits to all members of the organization and to society"

When you ask what TQM is, you can find several answers in books and web sites. In business management, TQM is described as the final result of the forth revolution, demonstrated schematically in the following illustration, for enabling quality management.
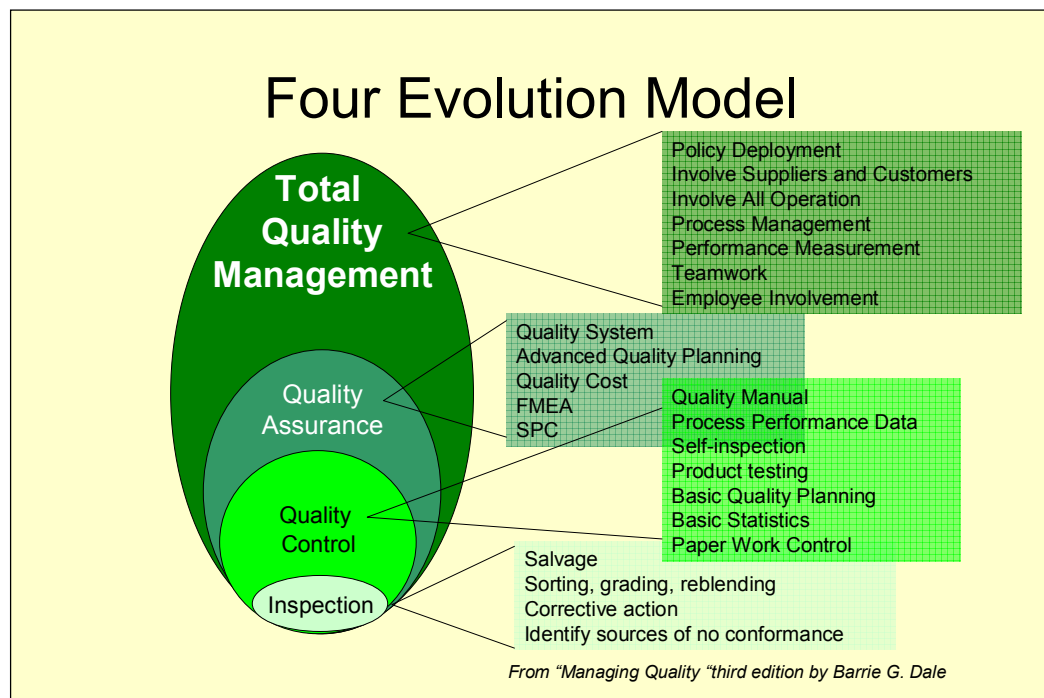

Figure 3-38: TQM (Four Evolution Model)

There are several other important terms related to quality management. Useful definitions are here just cited for the sake of better understanding from ISO 8402.

Inspection
Activity, such as measuring, examining, testing or gauging one or more characteristics of an entity and comparing the results with specified requirements in order to establish whether or not conformity is achieved for each characteristic.

Quality Control
Operational techniques and activities that are used to fulfill requirements for quality

Quality Assurance
All the planned and systematic activities implemented within the quality system and demonstrated as needed to provide adequate confidence that an entry will fulfill requirement for quality.

TQM is given a higher position in categorization of different managerial approaches than the summit of stone building with other modalities as shown in the illustration below. Obviously, 5S is in the bottom layer due to its nature with "Basic Education". "Standardization" is, then, in next layer, since it should be done based on the improved work environment. KAIZEN, equivalent to Continuous Quality Improvement (CQI), is located in the shown position with interlinking to all other modalities in the figure.
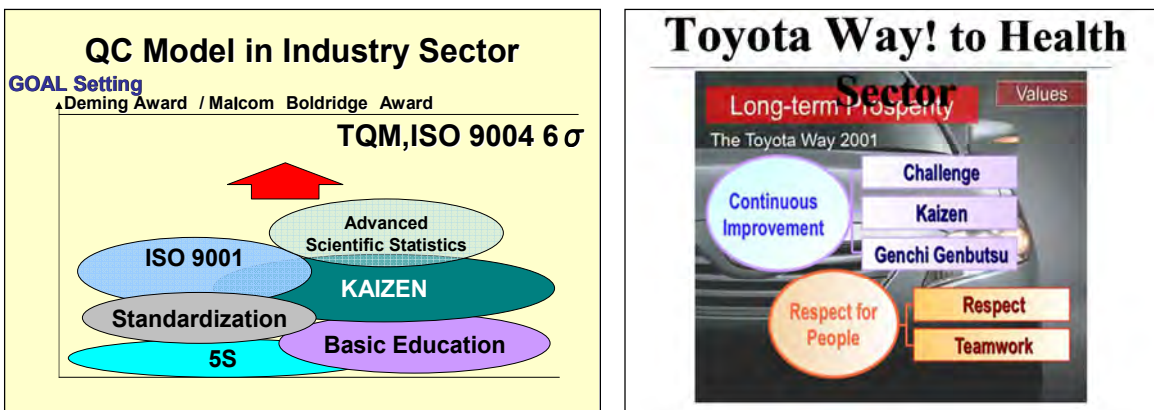

Figure 3-39: "QC Model Industry Sector" and "Toyota way to Health"

TQM implies an organization-wide management of quality. "Management activities" include various dimensions of planning, organizing, directing, control, and assurance. The term "Total" of TQM here represents two crucial dimensions of "Quality". The first dimension is quality issues connecting satisfaction levels of clients. The second one is obviously the direct meaning of quality of products or services. Based on those definitions, any organizations practicing TQM are required to maintain certain standards in all aspects of production processes or processes for creating and delivering services. Wastes and defects are, of course, supposed to be reduced to the possible most minimal level.

In industrial sector, TQM approach is, often discussed, citing various examples from "TOYOTA production system", "Lean methodology", "Six Sigma" or "Theory of constraint". It is possible to summarize that the core concept of TQM is to adjust the entire production system meticulously for preventing over-productions and also preventing shortage of the end-products in the manufacturing process.

In health sector, however, particularly in public sector hospital services, TQM should be understood to

be an approach promoting maximum utilization of limited resources and an approach seeking elimination of non-productive activities. In hospitals, every client or patient wishes to be taken care under smooth implementation of hospital services all the venues from the entrance to the exit.

III-4-2…TQM is macro-level optimization of resource usage and investment

Only after achieving organization-wide work environment improvement and organization-wide continuing implementation of KAIZEN, the top management group is entitled to proclaim that TQM is implemented with evidence-based decision-making for realizing macro-level optimization of resource usage and investment.

Whereas KAIZEN is a mean of optimization in work process and the outcomes at each work front-line in division / department level, TQM is an approach to optimize the entire organization by resource utilization and additional financial inputs. For this purpose, top management group should have sufficient capability to analyze the collected evidences from each work unit. As repeatedly touched upon in previous chapters and paragraphs, WEI and 5S contribute to construct the managerial foundation for implementing KAIZEN by strengthening sensibility and capacity of respective work unit or team during implementation process of 5S activities.
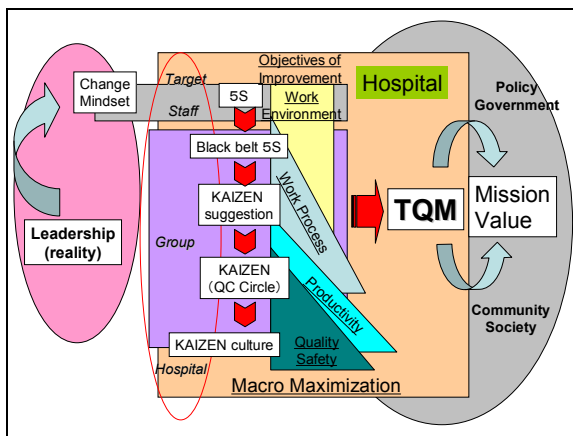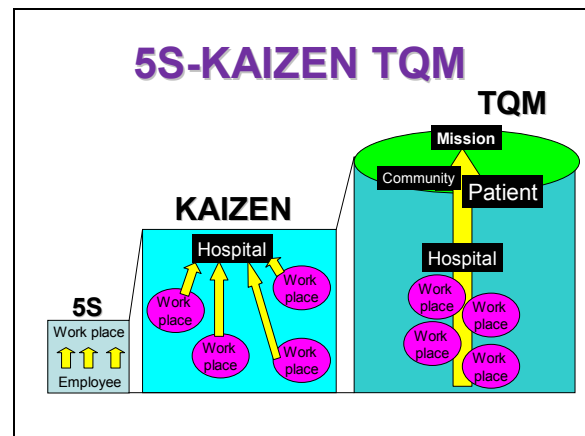

Figure 3-40: TQM

Figure 3-41: Present of the direction of KAIZEN

It is obvious that functional harmonization among different jobs is a precondition of rationalized working condition in hospitals. Well-coordinated handling of diversified jobs in backyard, logistics and the service front-line should be realized, if the hospital wishes to be called as a centre of excellence. Mission, credo and vision of the hospital are well documented and disseminated to all personnel as well as to other stakeholders including the catchments.

Micro-level optimization of the work process and outcomes can be realized within a relatively short period by perfection of KAIZEN activities in one work venue of the hospital. It is, however, not enough to guarantee the macro-level optimization, if the latter work processes are not well adjusted and /or optimized to meet the needs. In the hospital, where TQM is maintained, every pass connecting different jobs are optimized both in efficiency and effectiveness. In addition to that, all job groups are extremely sensitive to safety, timeliness and equity in service delivery.
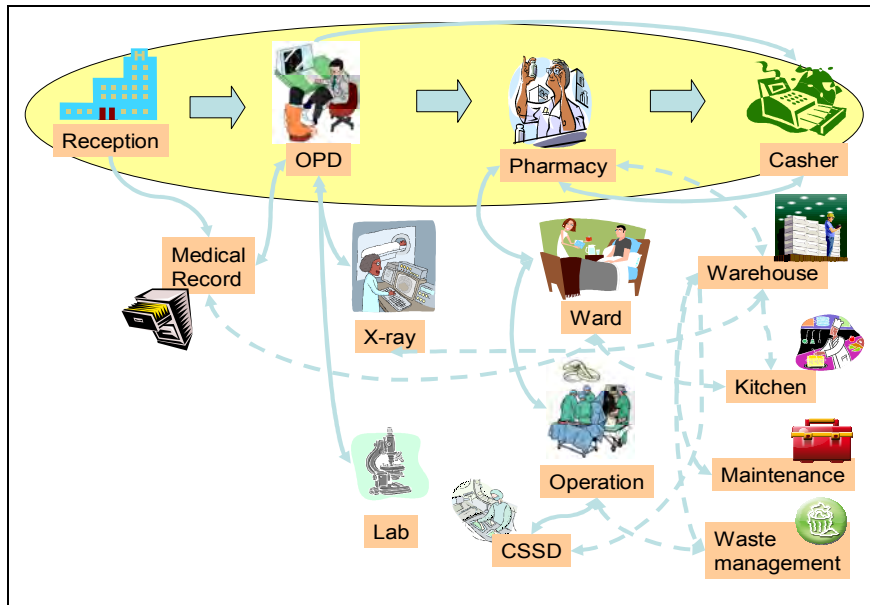
Figure 3-42: Continuous TQM

Majority of the people in developing counties rely on government-run health facilities for receiving curative and rehabilitative health services. Even though the existing chronic resource shortage, the government cannot stop the public sector hospital-based health service. Government, regardless central or local, is obviously responsible to protect people's lives through their public services including health services. There are absolute needs and demand among general public.

Under the above circumstances, quality of services at government-run hospitals becomes controversial. Direct measurement of the quality is not easy, since the issues are complicated involving various stakeholders including care-providers and beneficiaries. It is mandatory to involve the third parties in neutral positions in the measurement and evaluation.
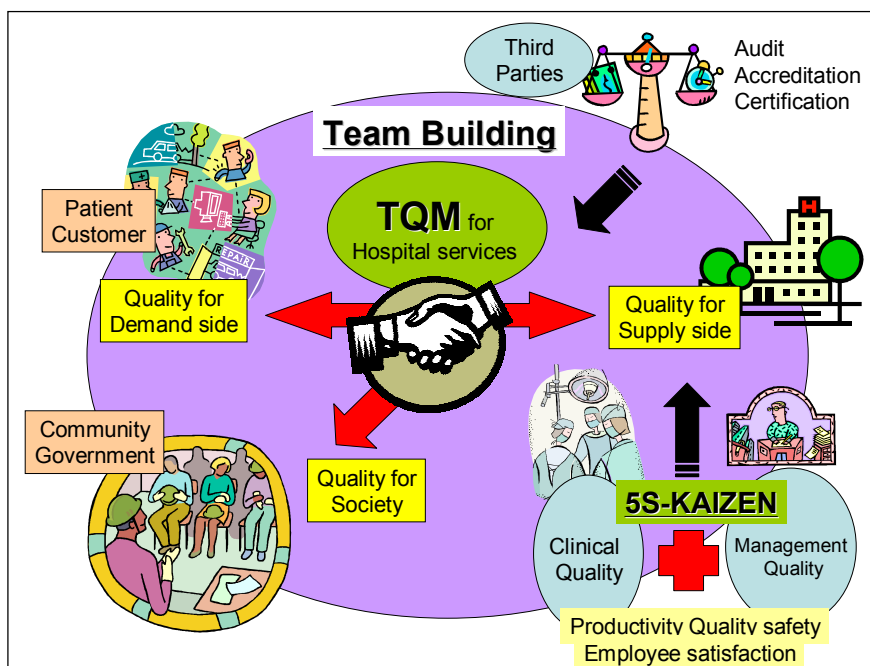

Figure 3-43: Team Building

For realizing macro-level optimization of resource usage and investment, TQM is a sole approach to vitalize the entire management ladder from the top to front-line work unit level. "Team Building" involving all stakeholders, regardless the internal or external customers are essential activities, which should be continuously and repeatedly conducted by the hospital.

III-4-3…Phasing and the steps

The core group including, chief administrator, senior consultants (doctors), matron and senior technologists are regarded as the core management group. Obtaining their collaboration, hospital director, as the top management of the organization, has to take major risk in decision-making. The common TQM process, which is directly connected to his or her decision-making, is the followings. This process is called "Mission Deployment Management".

1…Top management has to identify and formulate the statements of "mission, credo and vision" of the hospital. Logical coherence should be maintained between the above policy statements and the short- and mid- term objectives of the organization.

2…Top management encourages mid-level managers including all department heads to formulate departmental short term objectives maintaining consistency with the policy statements.

3…The departmental objectives set by the mid-level managers have to be approved by the top management and notified to all staff members of each department. Five (5) S and KAIZEN activities have to be accordingly carried out by each department to attain the departmental objective.

4…The mid-level managers, responsible for departmental objectives, maintain periodical monitoring and reporting with reciprocating information with the top management. Top management gives proper instruction or guidance to the mid-level managers upon necessity.

5…Top management analyzes the monitoring results to find out determinant factors of successes and failures.

6…Top management notifies the analysis results to the department to reflect them to the next process of short-term objective setting.
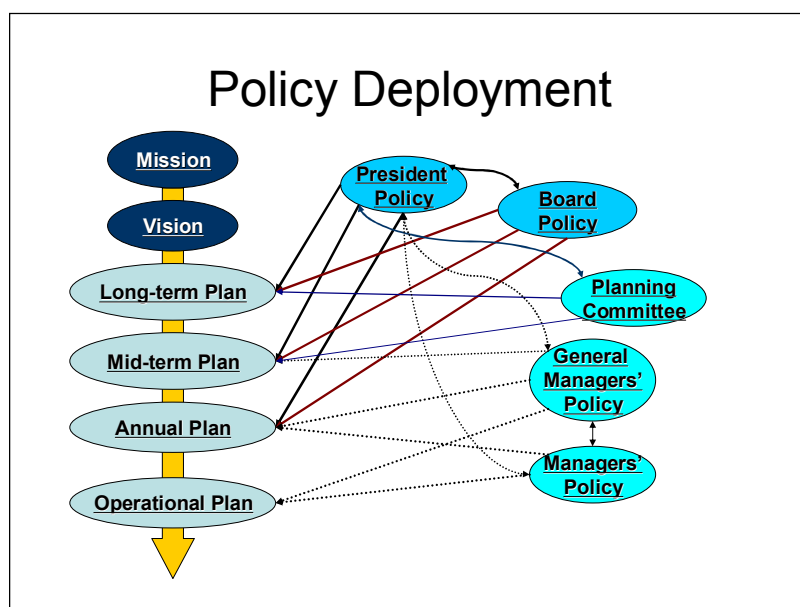

Figure 3-44: Policy Deployment

Continuing education and training is important elements of TQM approach. In business sector in Japan, for instance, different training courses are developed respecting the demand in respective segment of managers. Leadership, team building, communication, planning, monitoring / evaluation and training / coaching methodology are all included in the training schemes.

TQM cannot be applied to hospitals in developing countries as a copy of TQM, which has been functioning in developed world. In the government-run hospitals in the third world, the cultural and economical background, accepting a new managerial approach, is totally different from them of the hospitals, coping up to market economy and universal protection of health insurance system. In addition to that, learning opportunities on TQM in African continent, for instance, are not sufficiency available due to shortage of training institutes and the trainers in societies. Managers and front-line workforce in government-run hospitals is, therefore, unable to develop sufficient capacities to commence bottom-up activities both of 5S and KAIZEN.

Top down initiative is now crucially important to maintain the organization-wide KAIZEN. Standardization of KAIZEN process should be achieved throughout the organization for ensuring reliability of the collected evidences, which have to be taken into consideration in top level managerial decision-making. For this standardization, periodical training for mid-level managers are institutionalized within the organization. Managing managers across the management ladder of the organization is responsibility of the top management.

Directly under top management office of the organization, an office for TQM promotion and its TQM Promotion Team (TPT) can be installed for handling various managerial issues related to TQM. Quality Improvement Team (QIT), which was previously mentioned as a coordinating office of 5S and KAIZEN, should maintain information exchange with TPT.

In every step of TQM, human resource management is a key process, since human hands mainly create the core value of the hospital service. The managerial targets ranges from management of their salaries, positions to capacity, motivation, work-life balance, and their will to work.

In relation to human resource management, award system in 5S-KAIZEN-TQM activities is one of the best systems to encourage enrolled workforces to TQM. Positive competition among work units regardless the categories are promoted with expectation to enhance effectiveness of team work and its outcome. You can establish your own award system in hospital.

The Malcolm Baldrige National Quality Award is a famous award in USA. Also Quality of Health Care Award was, later, established in Japan at 2004. It is recommendable that Ministry of Health in developing countries establishes a suitable award system for quality management of health care. .

III-4-4…Example of TQM process in Castle Street Hospital for Women
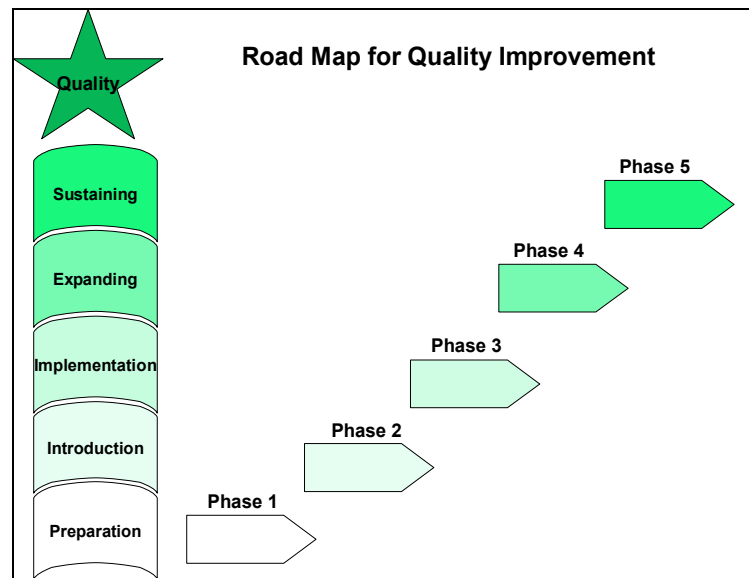

Figure 3-45: Road Map for Quality Improvement

Phase1; Preparation
- Learn about 5S, Kaizen, Productivity and Quality
- Situation Analysis (KAIZEN Diagnosis Team, Photos/ Video)
- Integrate and align 'Quality Goals' into the hospital plan
- Determine how transfer initiative will be integrated with other processes and initiatives already in the organization
- Select resource persons
- Address financial issues
- Identify 10 key areas for improvement

Phase2; Introduction
- Establish infrastructure
  - Quality Management Unit
  - Steering committee
  - Work Improvement Teams
- Develop and begin implementation of the communication plan
  - Internal
  - External
- Establishment of objectives
- Develop KAIZEN Improvement activity programme.
- Training of middle level managers and dissemination of objectives
- Study visits

Phase3; Implementation
- Train staff members and disseminate objectives
- Conduct pilot projects
- Form WITs
- Start with implementing 5S (No cost, Low cost activities)
- Support and monitor projects
- Measure and review programme
- Customer and employee satisfaction surveys

- Review lessons learned
- Make decisions
- Involve consultants

Phase4; Expanding
- Modify original plan based on lessons
- Expand to other units and additional training
- Communicate success of pilot and on-going projects
- Establish and communicate objectives to all staff members
- Measure, review and inspect
- Customer and employee satisfaction surveys and disseminate to middle level managers

Phase5; Sustaining
- Conduct audit and take appropriate actions
- Continue to assess culture and act on gaps
- Customer and employee satisfaction surveys and disseminate to middle level managers
- Stay focus on the customers and bottom line
- Strategic goals for the organization must include measurable, stretch goals related to such areas as customer loyalty, service performance, competitive performance, costs of poor quality, and internal quality culture
- Upper managers must personally review and audit progress towards quality goals
- All employees must be trained to know what is expected of them, know how they are doing with respect to those expectations, and have the skills, tools, and authority to regulate their work to meet expectation
- Training – on the job, competitions (Essay, Posters, Quiz)
- Apply for awards