Quality Management

In Healthcare

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Introduction

Do you have a formal quality control program in place?

We all understand how important it is to deliver quality to our customers, and we all have some level of quality control in place. It may consist of a pride of craftsmanship, a pre-shipment checklist, or complaints monitoring of customers. But is it sufficient? Absence of quality usually leads to absence of customers.

The manufacturing industry has been addressing this issue for decades. Many industries identified and follow detailed criteria to ensure quality of their products. Some, such as various ISO9000 standards, have their origins in 1980's. Many manufacturers will not accept a shipment from supplier that is not certified as compliant with an industry standard. Certification of processes has become a requirement for many industries.

Quality is becoming very important in healthcare. Substantial resources dedicated to healthcare and the high cost of mistakes bring the quality into focus. The providers and provider organization are interested in a formal quality program not only to improve quality of care or to improve patient satisfaction, but also as a defense strategy against regulatory and legal threats.

The delivery of health care is becoming more decentralized. Convenient Care Clinics represent a perfect example of that. They operate in multiple locations with only few mid-level medical professional on each location. The operators of such multi-location environment will require a formal quality control programs to ensure consistent care across all locations.

Well designed and consistently implemented quality control program not only improves the organization's products and services but also identifies problem areas that require frequent rework. By adjusting the processes, the clinic operating efficiency improves. Reduction of mistakes may pay for the costs of the program even before we consider other, more severe consequences of mistakes, such as the possibility of defending against a malpractice action.

A great deal of the quality control activities consist of data acquisition, recording of survey results, and analyzing the quality control metrics. Technology can make many of these activities easier to perform or even eliminate completely –when the quality data are recorded automatically. A formal quality control program has to use technology to be practical.

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Background

The need for quality control stems from our inability to be perfect. As expectations increase, so does the need for quality. The industrial revolution with its division of labor and elimination of the time consuming "fitting" process created the need for precision and thus for development of a formalized quality control program. Today, the quality control is fully integrated into manufacturing process.

The requirements of each industry are different. Obviously, we require much less stringent criteria for a broom handle than we do for a helicopter rotor shaft. The quality standards for the latter will be much higher because of what are the consequences of a failure. Sophistication and discipline levels of quality control vary from industry to industry.

Quality in healthcare has evolved in sophistication with our knowledge. The sterility of the operating room became a requirement after Pasteur. Medical protocols exist to promote consistent care based on sound science and proven methodology. Like in manufacturing, the quality control was implemented first in areas with the highest risk – for example in the operating room. Like in manufacturing, we see the requirements for quality expanding into other areas.

Decentralization of the health care delivery created an additional need for consistent quality controls. For example, it is critical that the protocols and operating procedures are consistently used in each clinic. Implementing a formal quality control program is not only good business, but it also decreases risks inherent in the environment.

Collecting quality information makes sense only when it is part of the process improvement program. Process improvement means that the information provided by the quality data is used to improve business. All improvement involves change (even though not all changes result in an improvement), and changes produce distress within the organization.

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Measuring Quality

In order to manage anything, we need to measure it, and in order to measure quality, we must define what it is.

Defining Quality

For practical purposes, quality must be defined in a quantifiable way. It means that we need to be able to assign certain value to quality. For such purpose, definition is simple.

Quality is a degree to which results match expectations.

Important conclusions are:

- Quality must be Quantifiable. It must be described by values that can be analyzed using the standard statistical methods. The values must range from full compliance to no compliance.
- Expectations define Quality. If we cannot define what our expectations are, we cannot define quality. Conversely, once we defined expectations, we defined quality.
- Expectations must be Definite. Quality of expectation definition is critical for validity of the evaluation. Substantial errors may be introduced by ambiguous descriptions. Each grade of quality must have a clear and distinct definition.

Grading Quality

How do we measure quality once the expectations are defined? The answer to this question depends on how we defined expectations. Some expectations have only two grades – passing and failing – and others need more granular grades.

For example: The expectation that "everything is OK" is much harder to measure than "there will be at least 15 sterile syringes available at the beginning of each shift". The measurement of the first example would probably result in binary "yes" or "no". The measurement of the second example could be "always", "sometimes", or "never". Much of the value of quality control plan will depend on how well are the expectations described.

The quality of any requirement must be expressed by a number – quantitatively. Quantitative presentation is important for computation of a quality grade of the whole system and to compute the variances from the norm.

- For requirements that are defined as numeric value, the value of quality is based on difference between actual value and desired value.
- The numeric quality grades should have one value for full compliance and one value for full non-compliance. Using consistent grading scale across systems allows easy aggregation of grades for more complex structures.
- For requirements that are qualitative we need to translate the qualitative information into quantitative information. This is accomplished by assigning several levels – "perfect", "good", "acceptable", "bad", and assigning each a numeric value.

Another important issue is the grade number range – is it going to be 1 through 5, or 1 through 10? The issue is the interval – numeric spread between the failing grade and full compliance. The maximum value matters less than the consistency – for your analysis is important that the maximum grade is same for all metrics. Consistent grading will provide you with capability to consolidate quality rating of several subsystems into a number that describes the whole system. For example, you can say that your average quality grade is 4.75 or 3.90.

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Grading Example

A good example is the grading table of one metric. It shows the differing descriptions as required for grading in three levels of granularity – full, medium, and binary. The metric (compliance with the lab protocols) is a qualitative value. The grading instructions are descriptive.

Highly granular grading of the quality metric. The metric measures the compliance with the lab protocols	Full compliance	Full with minor omissions	Out of compliance, minor, corrected during survey	Out of compliance, promised to comply within 10 days	Out of compliance, close facility until corrected an inspected
Medium granularity for the same metrics	Full compliance		Out of compliance, will be corrected before next survey		Out of compliance, close facility until corrected an inspected
Binary evaluation – either in compliance or not in compliance	Full compliance				Out of compliance, close facility until corrected an inspected
Valuation	**4**	**3**	**2**	**1**	**0**

The table shows a sample coding of a metric using grading of varying granularity. The operator needs to decide which level fits best. Note that some grades may be enforced by the regulations – for example: the lab cannot operate without certification – the only possible values are full or no compliance.

Another example is the grading table of a quantifiable metric. It shows the differing descriptions as required for grading in three levels of granularity – full, medium, and binary. The metric (number of syringes) is a quantitative value. The grading instructions are descriptive.

Highly granular grading of the quality metric. The metric measures the compliance with the "at least 12 syringes are available"	Full compliance: 12 or more found	Full with minor omissions: 10-11 found	Out of compliance, minor, 9-10 found	Out of compliance, 6 - 9	Out of compliance, less than 6 found
Medium granularity for the same metrics	Full compliance: 12 or more found		Out of compliance, minor, 9-10		Out of compliance
Binary evaluation – either in compliance or not in compliance	Full compliance				Out of compliance,
Valuation	**4**	**3**	**2**	**1**	**0**

The purpose of grading is to create quantifiers (values of grades) that can be used in statistical evaluation of whole operation. For example, if the evaluation of a clinic involves a survey of 100 metrics using the scale from 0 (failing) to 4 (compliant), and the average is 4.0, then either the clinic is perfect or there are severe problems with the quality control evaluation.

The management should use the grading approach judiciously. By making the grading to coarse (binary yes – no) may create misleading picture. Grading that is too fine can suffer from ambiguity.

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Quality Metrics

As covered in the earlier section, the definition of expectations is the starting point of building a quality control plan. The expectations are specific to the operation. The expectations for a restaurant differ from expectation for a morgue. The purpose of this section is to define the metrics that are specific to your operation.

A metric is a standard of measurement - the quality metric is a standard of quality measurement.

A complete collection of quality metrics represents the quality attributes of any item or process. Such complete collection is also called Quality Metrics of the system.

Development of quality metrics is a prerequisite to having a quality control program. Making the list may appear simple, but to build a list that is comprehensive and distinct is not easy. The comprehensive list includes all metrics needed in the process. The distinct metrics do not have overlapping meanings. These considerations require a disciplined and structured approach.

Developing the list of metrics is an iterative process. Metrics identified in the initial stage will no doubt require adjustment next time around. The best approach is to get the initial plan in place and then plan for periodic reviews. Remember, looking for a perfect solution as a starting point will destroy the whole project. This work must start now and anticipate changes in the future.

The best way is to start with questions:

- Does your business have products or services? List their names.
- Can you identify processes and tasks for each? List their names for each product.
- Can you define expectations for each task? List their names for each task.
- Can you grade the level of meeting those expectations? If so, grade them, if not, redefine them.

Six-Sigma methodology offers a number of techniques to use the knowledge that is available within your organization or outside. One is a brainstorming session, where the questions above (or similar) are asked and the answers catalogued. The goal of these sessions is to arrive at a consistent and shared definition of our expectations.

The structure of the quality metrics should be hierarchical and organized in a manner that is useful in quality management and that is clear about why they need to be measured.

Products and Services are typically well known and defined in any business. Marketing, order processing, billing, and a number of other processes must recognize products and services. The quality control design must be product or service centered, because the ultimate goal of quality control is meeting of the customer expectations. The product or service should be the first level of grouping.

Manufacturing of a product and delivery of a service is a process. The process has a starting point, consists of one or more tasks, and has a defined ending. Product processing may start with receiving an order and end with the installation at the customer site. Service process may start with receiving an order and end with the customer signoff. Typical process consists of common and specific tasks. List of tasks is the next level in metric hierarchy.

Each task has content. Content includes raw materials, supplies, fees, and labor. For example, receiving an order may require that certain items are completed, all approvals in place, and production scheduled. As you divide the process into tasks, it becomes easier to define the individual expectations for each task.

The definition of each metric must include grading instructions. Grades range from simple passing and failing grades to a more granular grading method. For example: If the task is either compliant or not, you will have only passing or failing grade. If the task has "partial compliance", then you can define several grades in between. Values of "5" for full compliance and "1" for failing to comply usually provide sufficient granularity.

Metrics cannot be defined without a full understanding of how the business works and without the ability to describe them in a structured way. A certain level of revision, rework, and rewriting is inevitable on a path to excellence.

Metrics Impact

The impact of a metric is another important attribute. All metrics are not created equal – they differ in their impact on operation or safety.

The impact of a metric is the consequence of certain expectation not being met.

Metrics have varying impacts. Definition of metric impact, sometimes called 'weight' must include classifications.

See the formula for computation of the impact for a given metric. Remember that the importance of not meeting any given metric is based on its weight. It is quite intuitive that one occurrence of endangering a patient's life is more important than a thousand occurrences of a clerical mistake.

$I = S * O$

Where:

I = Impact of a metric

S = Safety rating of the operation (impact on safety)

O = Operational rating of the operation (impact on operation)

There are many ways to define the impact of a metric – weight, criticality, priority, etc. Conceptually, each failure will have an impact –metrics that do not have an impact make no sense. Such impact may be either operational or safety or a combination of the two.

The operational impact describes the impact of failure on the operation. For example: computer failure will cause the record keeping to be delayed. The safety impact describes the impact of failure on the safety of the involved. For example: failure to identify patient's allergy to certain drugs may affect safety of the patient. In our culture, the latter has higher weight than the former.

Proper coding of the metrics impact helps in the identification of the most important quality problems. Focusing on the most important items first is usually the best strategy.

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Measurement Concepts

Measurement of a metric is process of comparing the desired with the actual and then assigning a grade. Establishing an objective method of measurement is essential part of the quality control.

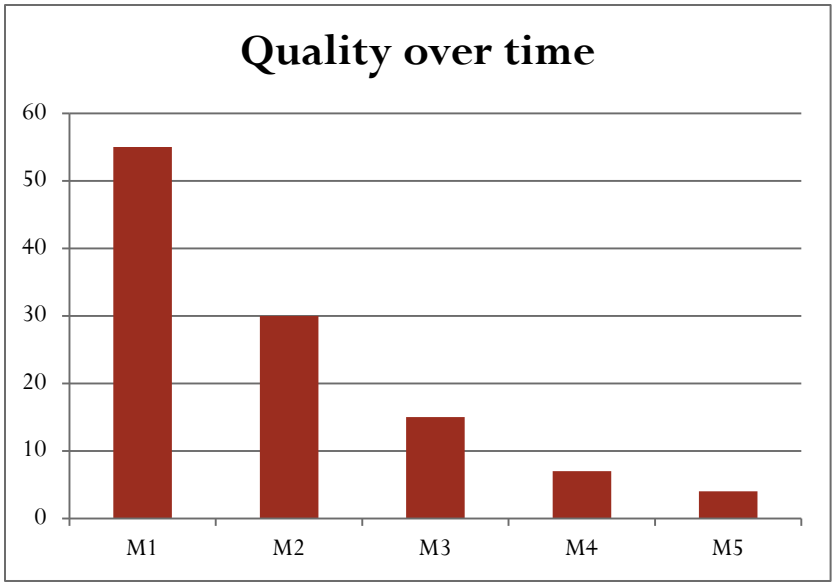
Quality grades are typically numbers in a range – 1 through 5, 1 through 10, and similar. While the choice is arbitrary, using more grade levels leads to more risk of ambiguity. It may be difficult to distinguish between grade 7 and grade 8, and it may be almost impossible to ensure that different surveyors arrive at the same value for the same situation. Practical range should not be over 5 levels – and not all metrics have to use all grades.

Quality metrics may be quantitative or qualitative. The former are described in a number and the latter are described qualitatively. For example: Quantitative expectation of weight is 100oz. We can numerically compare it to the actual weight. Qualitative expectation is appearance. We can qualitatively describe as "healthy", "tired", or "moribund". Both can be translated into a grading scale – the quantitative metrics by describing the ranges of variances (0-10 is grade A, 10-20 is grade B, etc.), the qualitative by selecting the most appropriate grade from the grade scale ("healthy" is 5, "tired" is 3, and "moribund" is 1).

The goal of a measurement process is to produce realistic picture of operation. The precision (or quality) of quality control will depend how consistently your quality program is implemented.

Quality over Time

The time element is an important consideration in analyzing quality. A trend of any given metric will have a large impact on corrective action. If the trend is an increasing frequency of a problem, fast action may be required to correct it. If the trend is a decreasing frequency of a problem, then doing nothing may be the best course of action.



The picture above shows the frequency of defects on a clinic over series of measurements (M1, M2 … represent the periodic surveys). A number of theories exist about the behavior of a defect frequency over time (bathtub curve and other constructs).The decreasing frequencies, as depicted above, are typical for new installation. The frequency of failures is highest early and then decreases to a stabilized state (sometimes referred to as "infant mortality" curve).

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Quality Management

Definition of the business metrics is the first step in managing quality. This section focuses on the next step: design of quality control programs and their implementation. Quality management includes the design of quality programs, scheduling, and gathering the information – surveying.

Quality Program

Quality control data needs to be gathered on a periodic basis because quality levels change over time. It is typical that the quality is highest around the survey times and then decreases with time. Periodic inspections tend to keep the quality levels stable.

The period of the data entry varies depending on the type of metrics. A good rule is: the more volatility – the shorter the period. Faster changing metrics need to be measured more frequently. Regulations may specify frequency of some metrics – for example the number of hours in training needs to be verified at the annual basis. Management may establish the measurement frequencies based on the knowledge of operation.

Quality program defines what metrics will be measured when. The checklists and timeline define the specifics of a quality program.

- **Checklist** is the collection of metrics that needs to be surveyed at the same time. The design of checklists starts with desired frequency of measurement for each metric – the metrics of the same frequency should be measured together. If different surveyors are needed (due to varying qualification requirements), the checklists should be constructed so that one surveyor can perform all measurements of the checklist.
- **Timeline** defines the sequence of points in time – dates that will be used to schedule the quality data gathering activities. The time line can be built for next year or more, and it identifies the schedule.

Quality program sample shows the scheduling of several checklists.

TimeLine	JUL	AUG	SEP	OCT	NOV	DEC	JAN
Monthly Checklist	X	X	X	X	X	X	X
Quarterly Checklist			X			X	
Annual Checklist						X	

The table shows three checklists, one per row, and several months, one per column. The "X" indicates that the corresponding checklist of the row is performed in the month of the column. Note that in some months, as in December, several checklists can be performed at the same time.

Individual checklists need to be designed so that one surveyor can complete the checklist. For example: If a metric requires special qualification, then only surveyors with that qualification can be assigned to the survey.

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Planning

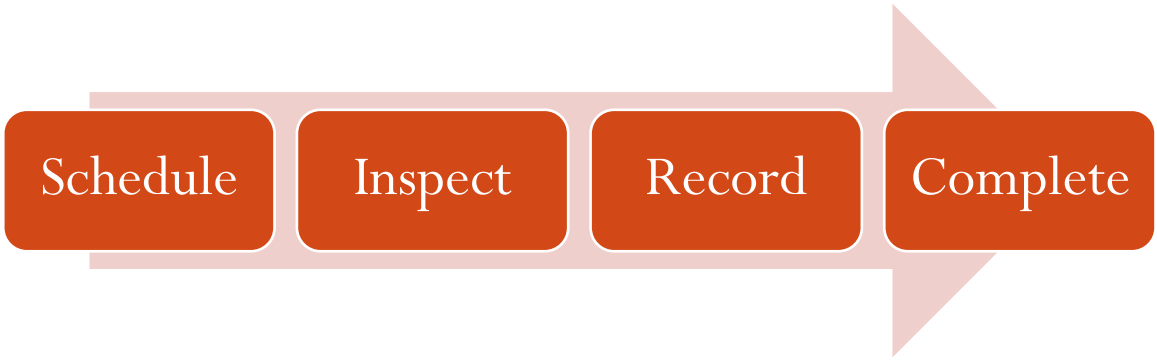
Quality control programs define a timeline of activities. Planning consists of creating surveys for specific locations and assigning them to surveyors. It associates several important components:

- **Survey** is an instance of checklist that is scheduled for a specific date and location. For example, if a certain checklist needs to be completed on a monthly basis, there will be 12 surveys of a given checklist scheduled for one year.
- **Location** is the place of measurement. Multiple surveys – one for each location – may be generated from one checklist. Location geographical distribution must be considered in scheduling surveys to account for the requisite travel.
- **Surveyor** is the person who performs the checklist measurements and posts them to the surveys. Computerized quality control can have ability to record the quality data automatically.

Planning for a large number of clinics and a large staff of surveyors may be complicated. It requires organizing the process by groups of locations, balancing the load on individual surveyors, and close monitoring of the quality program compliance.

Surveys

Survey is a checklist scheduled for a specific time, associated with a location. The surveys are scheduled in accordance with the parameters of a quality plan. Survey is an order to perform a checklist at a location.



Processing of a survey consists of the steps depicted above.

- Schedule the survey and surveyor
- Inspect the location using the survey's checklist
- Grade and record the grades
- Complete the survey

The inspection description is in the checklist and each individual metrics. The surveyor must ensure that the grading is performed consistently. For example: For a particular metrics we evaluate the number of sterile syringes on hand. The requirement is to have at least 12. The grading of the metrics indicates that from 9 – 11 syringes the grade is 3 (good), and less than 9 represents 5 (failure). The surveyor finds 10 syringes – the rating is 3 (good).

The transition between the recording and completion of the survey should include a control point. The control point may be a supervisor approval or simple verification that all items were inspected. The recordings from the survey are the quality control history. The history must be correct and represent fully auditable record.

Quality of the Metrics

The purpose of quality control is to decrease the number and size of discrepancies between a full compliance of a metric and a reality. It is important to realize that the measurement methods may be a source of discrepancies - the quality control methodology must be verified. Measuring instruments must be calibrated and grading systems must be tested.

There are two important items affecting the quality of the measuring methodology:

- **Consistency** describes the variance of survey results over several surveyors. Measurements are consistent when all surveyors reach same conclusions after surveying an identical location at a particular time. When the real condition does not change, the quality evaluation should not change either.
- **Repeatability** describes quality of surveyed items by same surveyor at two different times. The survey is repeatable when for static underlying environment the evaluation does not change.

Lack of consistency may indicate unclear definition of expectations or insufficient training of the surveyors. It is very important that the coding be tested for consistency early in the process and the results to be used to improve the metric definitions.

Lack of repeatability may indicate that the surveyors do not apply the criteria in same way over time. This also points to lack of clarity in definition of the metrics. More likely, it may be due to insufficient training or insufficient quality of surveyor's work.

Testing of the measurement quality should be scheduled periodically to ensure consistent quality over time.

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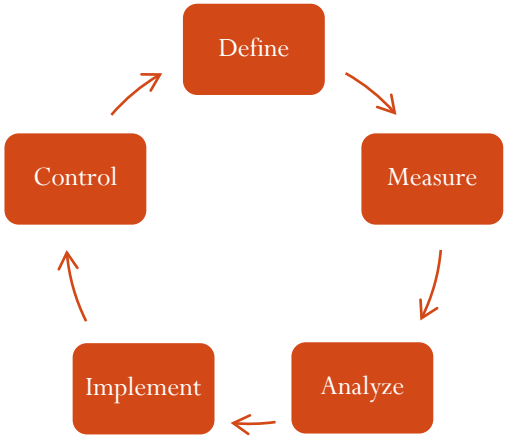
Process Improvement and Analysis

An effective quality control program does not exist in a vacuum. It must be an integrated part of the overall strategy to improve processes. The value of the quality control is only in its use for the improvement of the operation. In order to achieve those results, you need to implement process improvement strategy, analyze the quality information, and decide on what action to implement. Finally, you need to use the quality analysis to evaluate the results.

Process Improvement Strategy

The process outlined in the picture below is quite intuitive – define what you want, find out whether you are getting it, find what you can do about it, and then validate if it worked. The outline of the picture is the simple form. In real world the expectations change adding more variations.



The chart above shows the standard Six Sigma concept of DMAIC (Define, Measure, Analyze, Implement, and Control). The process is intuitive because it follows common sense. However, following common sense is not always the easiest strategy. So far, we discussed only the first two sections – defining and performing QC. Now we need to find how to use the information to improve our business process.

- **Define Expectations**: The expectations need to be specific.
- **Perform QC**: Collect the quality data.
- **Analyze QC Data**: Study data and develop meaningful information from it.
- **Identify Causes**: Identify and validate causes.
- **Implement Changes**: Implement changes to the process.

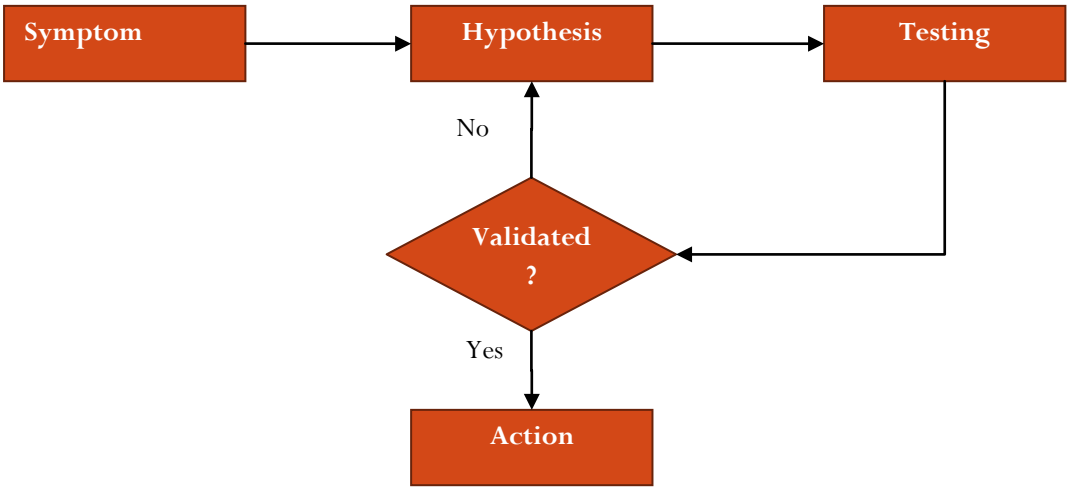
Obviously, the implementation of improvements is an iterative process. The analysis of the QC data is an integral part of this process – it is used to identify causes and to validate them. Only an operator with access to a fact based analytical tool can prioritize metrics and establish which one is the most critical.

Finding the Cause

Quality control surveys results help identify what are the most important defects. Analytical techniques are described in more detail later in this document. This section explains the methodology used to determine the cause of the problem.

- First, a problem must be identified. For example: There are too many problems with the quality of EMR (Electronic Medical Record). Such a statement identifies a symptom. In order to determine its cause, we must establish one or more hypotheses.
- Second, we need to determine which hypothesis is the valid one. This process is called: testing the hypothesis. There are number of methods described in the analysis section of this document.
- Third, we need to decide what action to take to correct the problem.

The process is depicted below.



Again, the process of determining cause may be iterative – we may have several hypotheses and we may even find that it is hard to decide which one is valid. As stated above, the thorough knowledge of the process is prerequisite for finding the valid causes and actions.

- **Symptom** represents a problem. For example: there are many coding problems.
- **Hypothesis** represents an educated guess about what is causing the symptom. For example: we assume that the problems of coding (identifying correct CPT codes) are caused by insufficient training.
- **Testing** validates the hypotheses. For example: Can we validate that the practitioners with more experience will have lower incidence of incorrect coding?
- **Validation** decides which hypothesis is correct. For example: we determine that there is negative correlation between time in service and number of coding problems (negative correlation means that the higher is the time in service the lower is the incidence of the coding problems).
- **Validated** hypothesis must be analyzed to determine the best course of action.
- **Action** is the change to the process that is intended to eliminate symptom.

Not all symptoms require extensive analysis. The majority of symptoms are simple to correct – the key is in finding the problem (symptom). Some symptoms may have several hypotheses that appear equally valid – in such case the operator must make the final choice.

Developing a Hypothesis

The best approach to developing a hypothesis is the observation of reality as presented by objective measurements. The data are observed in several dimensions:

- **What** is the failing metric with most impact?
- **Where** did the failing metric occur most – what location?
- **When** did the discrepancy occur and what is its trend?
- **Who** was responsible for the discrepancy?

The hypothesis creation requires knowledge of the process and its quality history. It is practical to prepare several hypotheses and then choose the one that is most probable. Well organized metrics are the key to high quality hypotheses.

Testing a Hypothesis

Testing of a hypothesis typically focuses on general applicability. If the hypothesis is generally applicable, then it should be generally valid, and therefore action design generally applied. If the hypothesis is applicable only specifically, then the action must be focuses on the specifics.

For example: The symptom is: Problems in coding. The Hypothesis is: The cause is training. The test is: Are the Symptoms correlated with training? If so, hypothesis was validated, if not, hypothesis was not validated.

The testing methods vary depending on quality of information available and its statistical behavior. Visual or tabular review of the discrepancy distributions is usually sufficient to resolve the more obvious validation issues. More sophisticated analysis is in order to resolve more obscure situations.

Action Design

Action should be always based on a validated hypothesis. Once is the hypothesis about a cause identified, the management is must choose the best course of action. Choosing the appropriate action is the proper role of a manager equipped with full understanding of the process. The quality data may be used to help resolve issues by presenting the actual instances of problems. For example: showing the instances of invalid coding as examples of what not to do.

Do not hesitate to do the obvious – not all problems warrant equally detailed analysis. At the same time, always test even the obvious approach – sometimes the obvious solution leads to a not so obvious consequence.

Determination of the proper course of action where the resolution is not obvious requires more discipline. The final choice of the proper action in unclear situation will require management decision.

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Analyzing Quality Data

Analysis transforms data into useful information. The result of data gathering is a database of defects (discrepancies), each identified with specific location, person, and time of survey (acquisition). Individual defects are grouped under metric type, and multiple metric types relate to metric category. Each discrepancy can have a different operational risks and safety risks (weight). This database is the source of information for the quality control analysis.

The goal of an analytical process is to develop a valid hypothesis about the cause of problems or to validate previously established hypotheses. The details of the approach as defined below follow the principles outlined in the Six Sigma methodology.

Analytical Process

The analysis is based on a history of defects by metric, location, practitioner, and other criteria. The analytical process focuses on following:

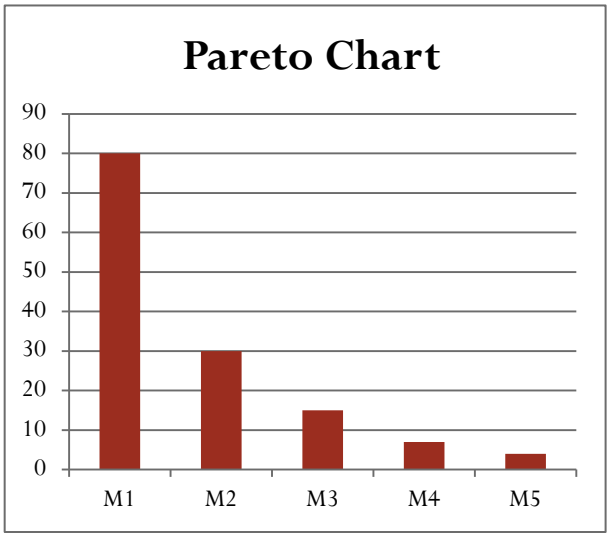
- **Metric** is the definition of individual measurable expectations.
- **Location** is the location where the measurement is taken.
- **Practitioner** is the person responsible for some metrics.
- **Time** of the measurement is used to compute trends.

The quality control information sorted by the dimension can be used to determine the most significant problem. The important analytical tool is a chart using Pareto principle.

Pareto principle (or 80 – 20 rule) is a well accepted rule that few causes can produce many effects. Specifically, several metrics will account for majority of defects.

The Pareto chart shows the frequency of several types of defect (C1, C2, etc.) ordered from the most frequent to least frequent. The basis for the analysis is the assumption that small group of discrepancy types represent the majority of problems in the system.

The utilization of the Pareto charts allows quick visual focus on the type of problem that causes the most trouble – making the quality improvement more efficient. Not all situations will exhibit Pareto chart behavior but the Pareto presentation is the most useful for determining the most important cause.



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Analytical Presentation

The ability to present data in a meaningful manner is essential. As the saying "picture is worth a thousand words" indicates, trends, shapes, and other aspects of graphic presentations are better understood than tabular data. Quality data typically consist of number of occurrences by category - histogram format is usually the best one.

Why Histograms

The collection of defects is a sampling taken over a specific period of time using certain parameters. The histogram shows the number of occurrences by various types. To see whether the Pareto principle applies, the categories are best displayed from left to right with the most frequent category on the left. The only exception is when the category is a time of measurement – such histograms show the trend by time.

Histogram Shapes

Much can be inferred from the shape of the Pareto histogram. The steeper the curve is the more meaningful is the metric in the leftmost position. Excessively steep curves may indicate that the most frequent category is too broad or that we have problems in one area only. Conversely, the flat curve (number of incidents are evenly spread) indicates either incorrectly defined categories (defect types not sufficiently distinct) or that the frequencies are in reality evenly distributed.

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Example Analysis

To illustrate the analytical process, let's assume that we are reviewing only the metrics in the medical category. The table shows the list of metrics:

EMR	EMR entry quality.
PRTS	Protocol observance.
DIAG	Diagnosis quality
CODE	Coding quality.
MEDS	Medication prescribing quality
CMPL	Regulatory compliance

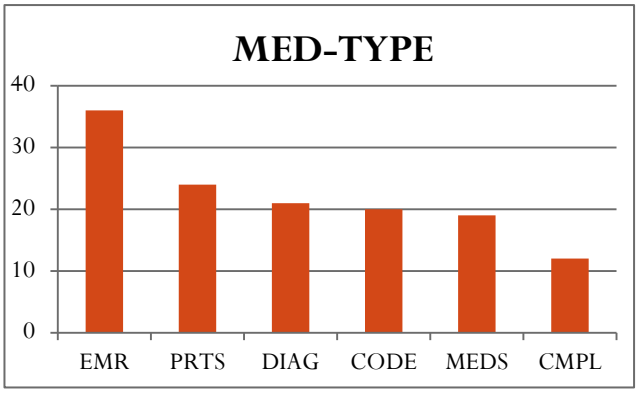
The metrics were observed over several measurements, multiple locations and with multiple practitioners. Each location has been surveyed over several periods. This covers the **what**, **where**, **who**, and **when** for each metric.

In the sample below, all data are shown in the histogram format showing highest frequency on the left. The steeper is the slope of the curve the more significant is the left-most element.

Medical Category by Type

The first step of the QC analysis needs to start with analysis of defects within category. The most important and useful start is with the medical category. You want to know which defect types within that category are most frequent.

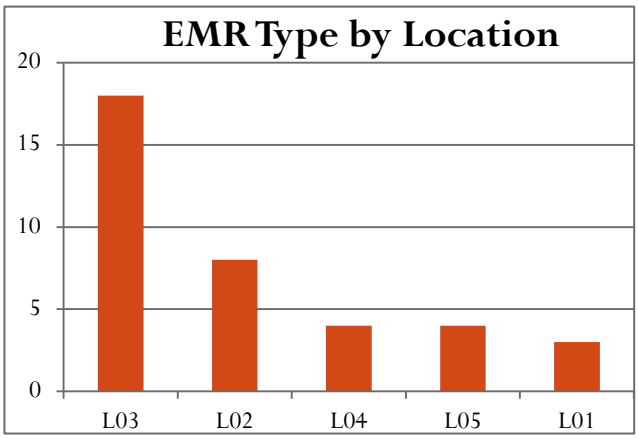
The table shows the total counts of individual metrics over all locations of the **MED** category. This shows majority of the problems is occurring in the defect type of EMR. Since the EMR is the most important category, we will pursue it in our next analysis.



Category by Location

The highest frequency is found in the location **L03**.

Let's investigate the **L03** location further to determine why.

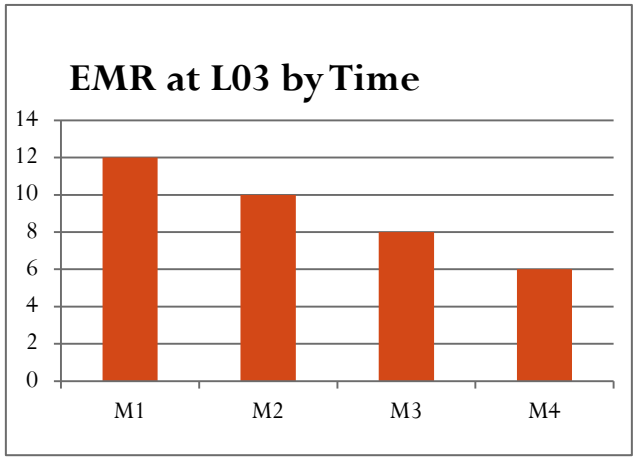


PRAGMATE

Type at Location by Time

The table shows the frequency of the specific discrepancy at a specific location over time.

The trend is apparent – the **EMR** defects are improving over time.

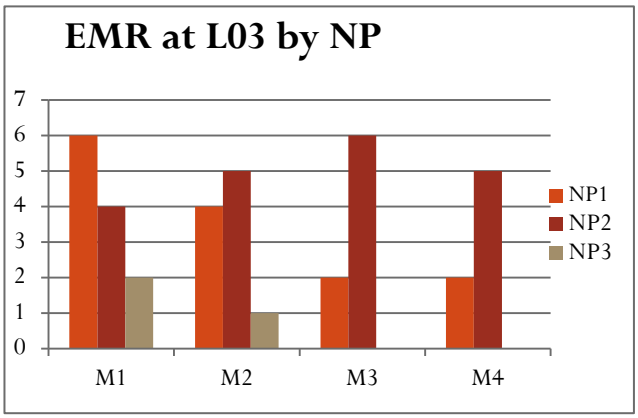


Defect by NP

The table shows the discrepancy frequency by NP over time. The chart includes frequencies for each NP by the measurement time to provide easier comparison.

Several conclusions can be drawn from the chart:

- **NP1** started with many problems and improved significantly over time. The trend is improving.
- **NP2** does have high incidence of this type and there is no significant trend – correction is needed.
- **NP3** has very short learning curve and is apparently having least problems with this type of defect.



Conclusion

The simple analysis of the defect frequencies can point out problems in operation. The clear cause of problems appears to be the specific **NP**. Additional training is probably the best course of action.

PRAGMATE

Summary

Quality management in healthcare is an important issue.

Formal quality programs are common in manufacturing. Early manufacturing was done by craftsmen who did the majority of work and who were able to maintain high level of quality because they had control over the whole process, and because they had direct feedback from their customers. Evolution of manufacturing created a need for more division of labor, specialization, and fragmentation of the manufacturing process. That, in turn, led to a need for quality control.

The art of medicine has been undergoing similar evolution. A Norman Rockwellian family doctor who delivered babies and took care of whole family life has been transformed into a complicated system of specialties. The scope of the primary care practice has diminished substantially with the Convenient Care Clinics being only the latest entrant to the long list of specialized services.

Like manufacturing, healthcare's division of labor into specialties created a need for quality and coordination. The quality ensures that services are delivered consistently. The coordination ensures that the medical information is properly disseminated among the various specialties.

Implementing a quality control plan is a necessity, especially for the Convenient Care Clinics and their distributed business model. The quality control plan must be integrated into other business processes and the commitment must have support of the whole organization.

Using technology is a logical choice. It not only increases efficiency of the quality control process, but it also provides the management with the requisite analytical tools.

A complete quality control system includes following components:

- Requirement definitions organized in a well defined structure. The database includes the requisite metrics of the business processes.
- Planning, scheduling, and data acquisition facilities provide a full support for the quality data acquisition according to the schedule.
- Analytical facilities allow inquiry into the quality control database. The results are presented in a manner that supports forming and testing of the hypotheses, and it can be used to validate corrective actions.
- Full audit capability capable of documenting the quality control plan compliance.
- It must provide all authenticated participants with full access to authorized information.

Quality control is an integral part of the process improvement strategy. Its ability to show the effect of individual management input on the outcomes makes it an invaluable management tool. The primary benefits of quality control are:

- Better patient care is the primary goal of any healthcare provider organization.
- Better operation increases efficiency and the profits.
- Better compliance with regulatory and legal requirements.

Using specialized software for managing of the quality control is the only logical approach.

For more details visit www.pragmate.com

or contact Mark Kajdos at mailto:mkajdos@pragmate.com?subject=Inquiry re Quality Management.