

Performance Management: (1) Problem Solving with Data

Some practical suggestions based
on what has been shown to work



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1. The Need for an Approach that Works

Problems and challenges are common in all types of organisations – private, public or not-for-profit, small or large, in Europe, Asia or elsewhere. However, what is also very common is that data (numbers or data in other forms) is not used to identify what is happening, nor to assist in identifying the solution, or to monitor the impact of the solution. While intuition can be useful in many situations, it needs to be complemented by data. As has been said:

Without data, you're just another person with an opinion!



Furthermore, when data is used, it is often:

- without a clear plan of approach;
- like a deep and confusing forest in which staff and others become lost;
- the wrong data – often just whatever is available;
- data that has no credibility with key people responsible for the process or outcomes; and
- used incorrectly with the wrong performance drivers being identified, and associated with this, the wrong solutions being implemented.

To address these issues and improve performance, it is critical that a well thought through, evidence-based approach is used. Such an approach is described in the following pages. The material is based on both the author's observations and experience over a number of years, in a variety of settings, as well as on some of the literature on this topic.

All, or components of the approach, can be used in a range of circumstances including quality improvement projects, business process reengineering endeavors, and service and program evaluations. Note that this approach does not address broader issues such as having a clear strategy and a measurement system linked in to that strategy, developing a culture of performance measurement and improvement, and so forth. These will be dealt with in other documents in this performance management series that will be progressively made available on this site.

Before looking at an approach to solving problems with data, it could appropriately be asked, *How do I know which problems need my/our time and energy to focus on and solve?* Some comments on this.

- As noted above, it is important to have in place an organisational-wide performance measurement and management system that is connected to your strategy

- Ideally, this should be cascaded out to individual units within the organisation. The most common example of such a system is the Balanced Scorecard.
- When you are consistently not meeting a particular target/s (stretch but achievable) set for a measure/s within this performance management system then this is a 'flag' or a 'sign' that there may be a problem (or as some people prefer to say, a 'challenge') that needs to be addressed.
- Alternatively, performance may have significantly deteriorated for a measure that you always used to meet.
- Working within this type of framework will help ensure you are not wasting energy on non-strategic issues.
- Much caution is needed so that you do not prematurely react to what appears to be a downturn in performance when it is just 'noise' or normal variation. This will be discussed later under control charts (Step 3 – Analysis)

2. Six Steps for Problem-Solving with Data

1. Ask the right **questions**!
2. Collect the relevant data to answer these **questions**
3. Analyse this data to determine the data-based answers to the **questions**
4. Present the data clearly to communicate answers to the **questions**
5. Develop and implement solutions based on answers to the **questions**
6. Using data, monitor and review the implementation of the solutions

This can be represented diagrammatically as shown below in Figure 1.

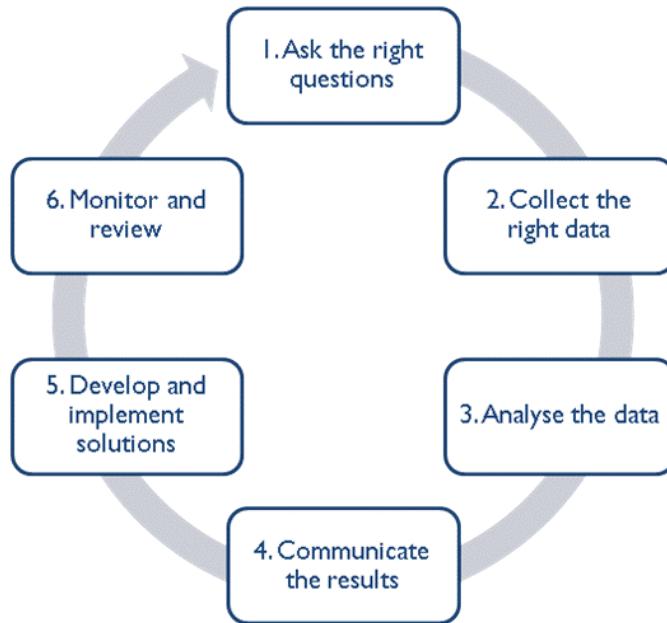


Figure 1 Six-steps for problem solving with data

It can be very helpful to do these steps with a small group of key stakeholders (for example, department head/s, front line staff, staff with expertise in the relevant area, customers) – and don't neglect to communicate with other relevant staff at key times.

While it is difficult to write a document that is suitable for both small and large scale projects and / or organizations, an effort has been made to provide some information that will be of use in a variety of settings and circumstances.

2.1 Step 1: Asking the Right Questions

It is critical to start with appropriate questions, not data availability. Before developing the questions, you may want to explore with your team what's wrong starting with the existing data. Some of the main reasons you may come up with are:

- it means you will be restricting yourself and perhaps missing what are the key issues;
- you will waste time and resources looking at data that may not be relevant to the problem / challenge;
- you will waste time and resources developing and implementing solutions that may prove ineffective; and
- you will lose credibility within and beyond the organisation

If a team approach is used (see above), one really useful way to develop the potential questions to ask is to brainstorm them amongst the group. The brainstorming can be *structured* (each person contributes potential questions/s – these could be on Post-Its and placed on a wall) or *unstructured* (suggested questions are called out by anyone in the group until they are exhausted – these are written up on a board as they are called out).

Some questions that could be asked may spring from the following broad questions:

- What do you think are the key drivers of performance?
- What are the barriers to improvement?
- How does our performance compare with leaders in this area?
- What have we been doing different?
- What changed external factors may be impacting?
- Is this change in performance real, or is it just normal variation?
- Are the measures we are using the most appropriate for what we are seeking to monitor and improve?

One way to get to the heart of a problem: The 5 whys

- Many facilitators in this area have found the use of the '5 Whys' as a very useful tool for getting to the root cause of a problem.
- It involves looking at a particular problem and asking *Why?* Once this has been answered, it is possible to drill down further by asking *Why* did that happen (and so forth). By the fifth *Why* you will be getting beneath the surface to the more specific root cause/s.
- Example: a problem may have arisen with access block (bed blockage) in a hospital emergency department (ED) during the past couple of months.
 - Why did this occur? Because we could not find beds for patients in the ED.
 - Why couldn't you find beds? Because the beds in all the wards were all occupied.
 - Why were they fully occupied? Because we could not discharge the aged care patients we normally would.
 - Why couldn't you discharge the aged care patients? Because the nursing home won't accept them?
 - Why won't they accept them? Because they have a staffing shortage.

Having developed a list of potential questions that could to be asked, the next step is to prioritise them. This may result in not proceeding any further with some of them as it is much better to have a smaller list of critical questions than to spread you and your team too wide.

One useful way to prioritise the questions

1. Gather together a group of relevant people for a 60-90 minute workshop
2. Good to have a mix of people – management, frontline staff, staff from other linked units, perhaps customers (depending on the issue being looked at).
3. Introduce the workshop making sure everyone knows each other and there is clarity about why this project or program is being conducted as well as clarity about the workshop – what is going to happen and the expected outcomes. Sometimes, it may be appropriate to develop some consensus around the rules for the running of the workshop, for example, no one to speak while someone else is talking, everyone's view is respected.
4. Hand out 3 post-it it 'sticky notes' (or sheets of paper) per participant.
5. Get them to individually write (one per note) down what they see as the most important questions that need answering during the analytical phase of the project.
6. Have them stick their notes on a wall or board.
7. Arrange for two people to group the questions into common themes and feedback to the group.
8. Prioritise the questions. This could be done by seeing which questions were the most popular or by allocating points (for example, 1 for most important, 2 for second most important and 3 for third most important, or using adhesive colour dots (3 colours based on priority – stuck next to each question).
9. Check if anyone has any questions about what has happened.
10. Outline next steps and thank people for their involvement.

Based on each prioritised question or set of prioritised questions, develop hypotheses about the issues and what may be contributing to them. That is, some ideas about what you think the answer will be and why.

Developing hypotheses will help you and your team start thinking more analytically about the problem and will help with getting the right data and doing the right analysis. If you used the workshop approach above, then this could be done as part of that workshop – after step 8 or 9.

2.2 Step 2: Collecting the Right Data



Garbage in, garbage out!

How will you get the appropriate data to answer the prioritised questions developed above (2.1) and test your hypotheses?

Before collecting data or requesting data, draft up some dummy tables and/or graphs. This will help you think through what you want so your time and the time of others will not be wasted. These can be drawn free-hand in just a couple of minutes. These dummy tables / graphs can be blank with just the headings or they can roughly show what you expect (hypothesis) will be the answer to your questions from Step 1 above.

There are two important questions to ask at this stage:

1. Does the data already exist?
2. What do we do if it doesn't?

Where data **is available**, it may be helpful to write down in table format:

- the sources of the data;
- an assessment of the reliability of the data;
- format of data;
- dates (from..., to...) of when data available; and
- who will access and analyse the data.

Where data **is not available**, what tools will we use to collect it? Some examples of measurement (quantitative) data collection methods include:

- census (at a point in time or over a short period);
- questionnaire / survey (eg of staff or customers); and
- audit of existing documentation

Some examples of non-measurement (qualitative) data collection methods include:

- questionnaire / survey (eg of staff or customers)*;
- audit of existing documentation*;
- interview;
- focus group;
- process mapping; and
- mystery shopper or customer tag-alongs.

* Depending on how these are constructed, they can have quantitative and / or qualitative elements. Both can be very important and complementary.

Note: there is a lot of readily available information on these and other data collection (and analysis) methods on the internet, for example, at <http://gsociology.icaap.org/methods/>.

If it is going to be a substantive project with quite a lot of data and associated analysis, it can be useful to draw up a table with the prioritized questions down the first column and with other columns showing the collection method (quantitative or qualitative approach) that will be used as well as data availability and so forth.

With this stage, here are some other useful things to keep in mind:

- Data quality. Always check the data quality. If staff, either at the grass roots or management, do not trust the data (for example, its completeness, coding, accuracy or timeliness) then any conclusions drawn from it will probably lack credibility and be ignored. Conversely, depending on what you are looking for, it is unlikely you will have access to data that is perfect. Rather than dismissing all such data, there are times you may have to make a judgment call that the data is sufficient for the purposes it is being used and that the conclusions being drawn from it are thus valid. This needs to be acknowledged and communicated clearly.
- Clean the data. Having gained access to the data, whether existing or new data just collected for this project, it is important to do some checks and clean the data. For example, removing empty fields or cells that are clearly wrong. One easy way to clean data if you do not have access to a statistical program is to use MS Excel and the sort and / or filter options. Pivot tables (see above) can also be very useful to see the magnitude of potential data quality issues.
- If data is not available, then the use of a time-limited census can be very useful. For example, when I was involved in a health management consultancy in Fiji, we found there was very little waiting list or emergency department data upon which to assess access issues. However, it was not too difficult to collect the required data so that the conclusions we drew were evidence-based. For example, with the emergency department, we developed a simple manual system to collect data on every patient over a three-week period. Staff were only too happy to be involved as they knew the information was going to be important for the improvement of patient care. If the numbers are really high, then systems can be developed to randomly sample patients rather than get information on every individual. Too often people see that there is no existing data and then only rely on qualitative data collection approaches rather than also looking at simple approaches to quantitative data collection.

2.3 Step 3: Data Analysis



The best analysis is nearly always the simplest analysis!



The aim of this step is to determine **fact-based** answers to your prioritised questions.

In doing this, it is important to explore the data but not to waste time “data mining”. That is, it is about getting answers to your important questions, not going on a gold hunting expedition.



Some critical lessons in working with data:

“No data have meaning apart from their context”

“Before you can interpret data, you must have a method of analysis”

“The best analysis is the simplest analysis, but you must have the right data”

“While all data contains noise, some data contains signals”

“The purpose of analysis is insight”

(From Wheeler, D (2000) *Understanding variation: The key to managing chaos*. SPC Press)

One possible framework for data analysis is shown below in Figure 2.

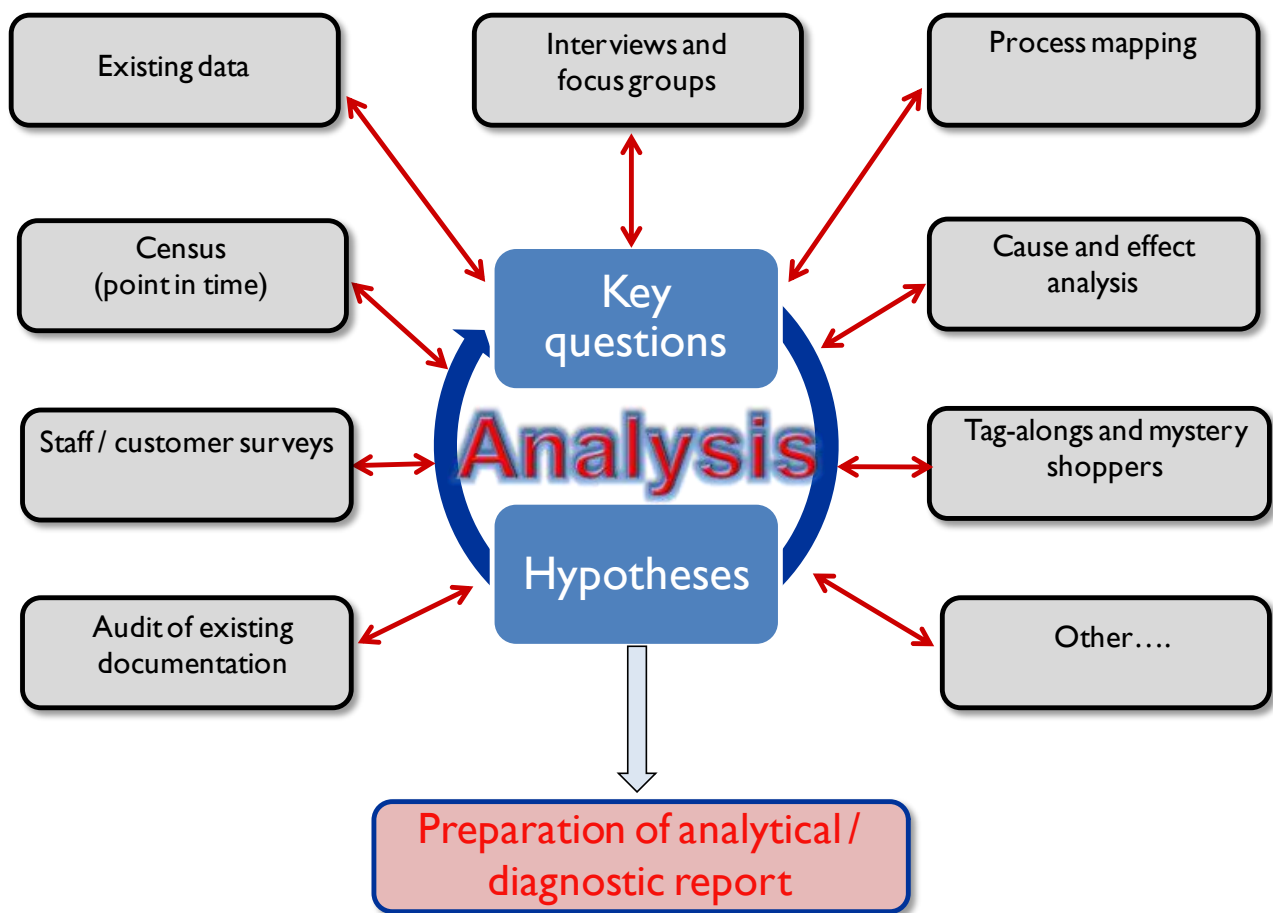


Figure 2 A framework for data analysis

Note that for small projects the analytical / diagnostic report may be just a page or two at most – you don't want to get too bogged down in paper work, but you do need to document your approach and findings so clear to all key stakeholders, both now and in the future.

Some tools that can be used for the analysis of data are summarized below. Examples are given of both quantitative and qualitative approaches and tools.

(i) Descriptive statistics

For most measurement data, simple descriptive or summary statistics are usually adequate.

- Frequencies (numbers, a count of how many), for example, 22 births.
- Percent (proportion) distribution, for example, 50% of patients were 65+ years.
- Mean (average), for example, the average length of stay for 2009 was 4.9 days.
- Median (mid-point) – use when data not normally distributed (ie when skewed), for example, the ages ranged from 0 to 85 with the median age being 35.

- Rates, for example, the rate of lost time injuries was 20 per 1,000,00 man hours.
- Percent change over two points in time, for example, deaths increased by 20% over the past five years.

More advanced analysis of quantitative data

For most people involved in improving organisational performance or evaluating the effectiveness of a service or project, you will only occasionally need to use basic statistical approaches such as a t-test, analysis of variance, chi-square or a Mann-Whitney test etc and it is very unlikely you would need to use more advanced techniques such as logistic regression.

It is not possible here to go into any detail about these approaches for the analysis of quantitative data. If this required, then it is recommended that a course in statistics be undertaken or one-on-one mentoring be sought. Learning is facilitated if you can use actual data that is collected as part of your project work.

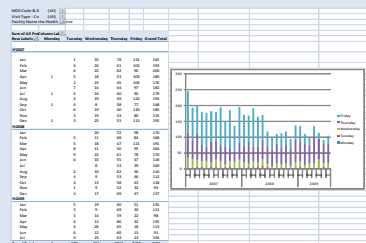
Too often, use is made of readily available statistical software packages without an adequate understanding of what are the most appropriate statistical tests as well as possible limitations in interpretation of their results.

A great tool for exploring and analysing quantitative data:

MS Excel pivot tables!

Pivot tables are a wonderful data manipulation and analytical tool that is available to anyone who has Microsoft Excel.

- You can use them to summarise large amounts of information - tens of thousands of rows and many columns of data depending on which version you have
- Data variables can be rapidly manipulated and displayed in relation to other variables – eg number of visitors by day of week or hour of day or year
- Graphs can be generated from the pivot table and are automatically modified as changes are made to the table
- Data can be analysed with simple formulas
- Once you know the basics they are a simple, flexible way to explore data and get maximum value from it



(ii) *Control charts - an important tool in statistical process control (SPC)*

While every data set contains noise, some data sets may contain signals, for example, that an intervention is having an impact. Therefore, before you can detect a signal within any given data set, you must first filter out the noise (Wheeler, 2000).

Control charts, which are recognised as statistically rigorous, are the best way to analyse time series (trend) data to see if variation in the data is due to noise (common cause variation) or a signal (special cause variation). Some indications of special cause variation on a control chart are:

- A single point falls outside a control limit (three standard deviations)
- Two out of three successive values are on the same side of the centreline and more than two standard deviations from the centreline
- Four out of five successive values are on the same side of the centreline and more than one standard deviation from the centreline
- Eight or more successive values fall on the same side of the centerline
- A trend of six or more values in a row steadily increasing or decreasing

One of the main things with using control charts, is the choice of the correct chart/s for your situation. Most books on statistical process control include simple decision trees for doing this. A modified version is shown below in Figure 3 and then in Figure 4 there is an example of a P-chart and an I-chart.

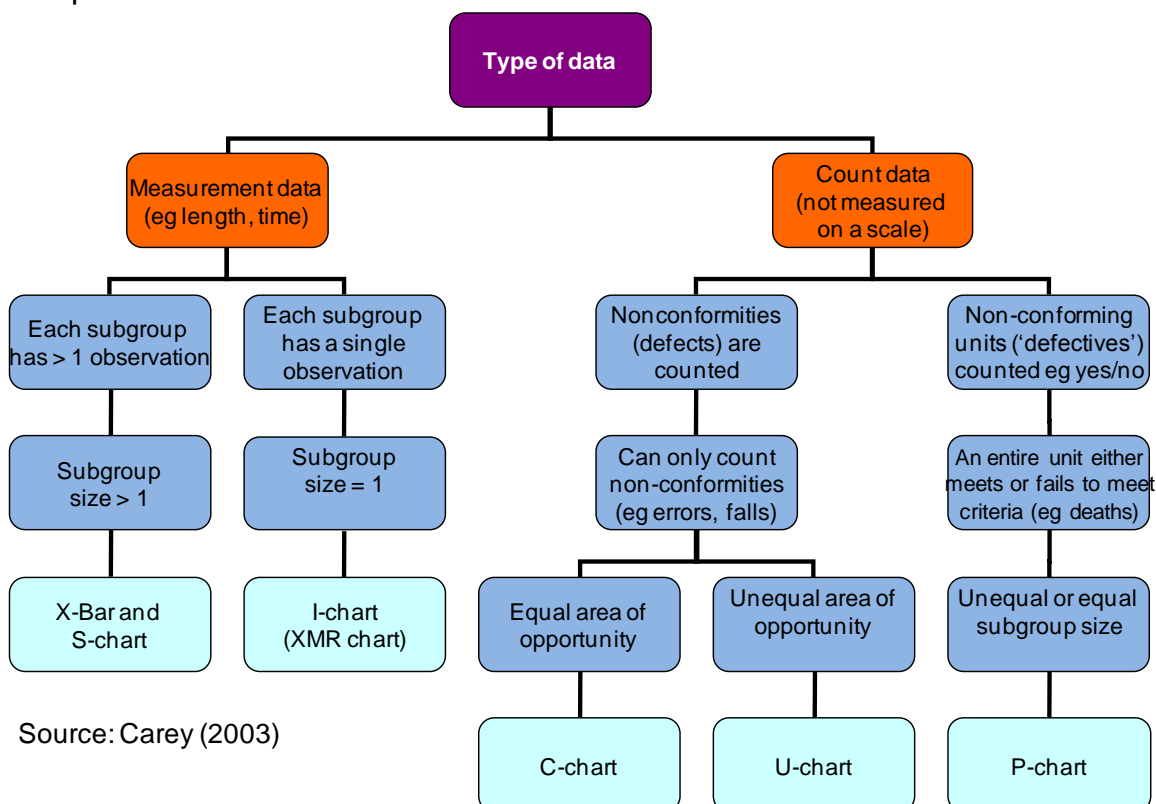
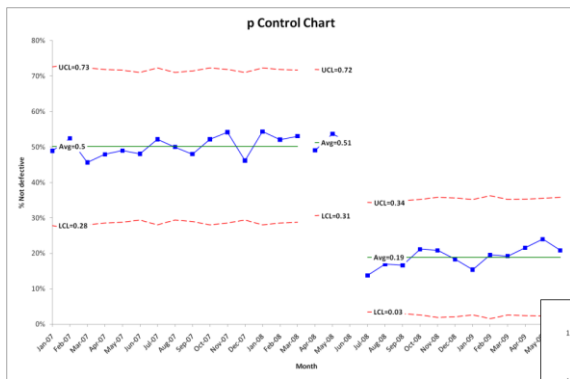


Figure 3 Choosing the appropriate control chart



Software packages

If you do a lot of control charts, it may be worthwhile investing in a software package that can make this process very easy. While there are some free packages on the internet, the author has found that SPC for Excel is one of the best available with excellent integration with MS Excel and loads of features besides control charts - <http://www.spcforexcel.com/spc-for-excel-software>.

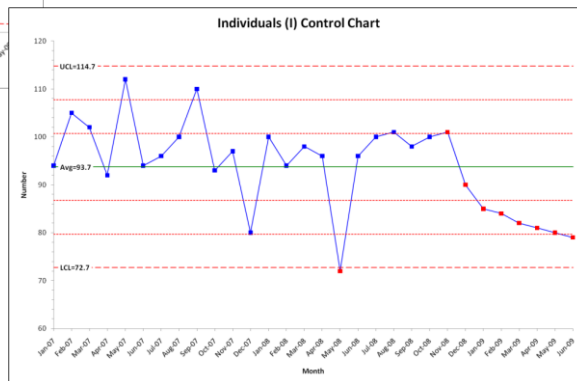
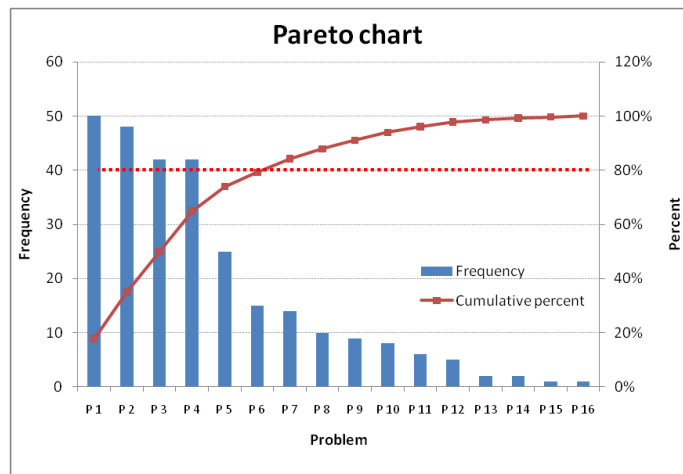


Figure 4 Example of a P- and an I-control chart (note these were drawn using SPC for Excel – see www.spcforexcel.com)

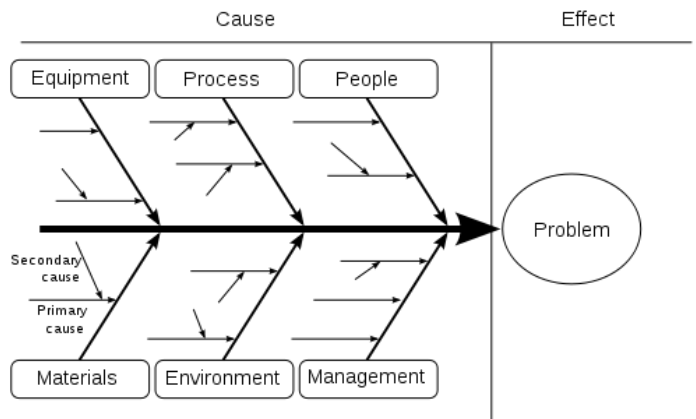
(iii) Pareto chart

This is based on the 'Pareto principle' that 80% of the problems come from 20% of the causes. It is a specialized version of a histogram that ranks the categories in the chart from most frequent to least frequent to assist in highlighting those critical few things to focus on. This can be used for presentation as well as identification of problems and analysis – see also Section 2.4.



(iv) Cause and effect diagram

Also known as the Ishikawa or fish-bone diagram. This helps with understanding a process as well as identifying problem areas and opportunities for improvement

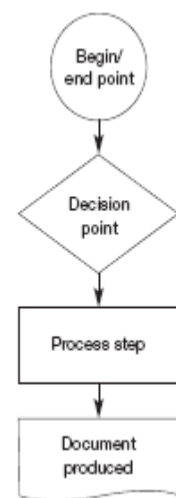


The problem is stated on the right-hand side of the chart and the likely causes are listed around major headings (or 'bones') that are believed to lead to the problem. It can also be used in a similar way for solutions.

(v) Process mapping

Process mapping involves developing a simple visual picture of a process. It is a relatively simple tool that can help you better understand how parts of your organisation work and assist with analysing how it could work better. A search on the internet will bring up lots of resources and guides for process mapping and flow charting. Some points to note are:

- any process can be mapped;
- keep it simple so staff do not become confused and bogged down;
- it may be useful to initially do a high level process map (ie for the broad 'forest' view) and then more detailed ones of critical steps;
- initially, focus on the steps that currently happen, not what should happen;
- use butcher's paper, post-it notes or a whiteboard for developing the map;
- make sure steps are in the right order with arrows showing the direction of flow;
- it is not necessary to use the symbols shown on the right but they can be helpful; and
- analysis the process map in a structured way through asking questions, for example, what, how, when, where and who.



(vi) Affinity diagram

An affinity diagram is a helpful tool that can be used in group or team settings to gather and organise ideas. These may be around identifying issues, root causes of problems, or solutions. It is also an excellent tool that can be used for cause and effect analysis.

- Following an appropriate introduction where you clearly state the problem or issue, ask each participant to write down their ideas (say a maximum of three) clearly in large print on Post-It notes with one idea per note. This should be done in silence.
- Have them place their cards on a suitable surface such as a white board or a wall
- Once everyone has pasted up their notes, arrange for two people to group the notes in columns according to ideas that have a common theme.
- Give a heading to each column that describes the theme for that column

- Check with the participants that everyone feels comfortable with both the groupings and the headings. There may be a need for some participants to clarify what they have written.
- Having reduced the number of ideas to a small number of manageable groups, discuss and prioritise the issues according to their perceived relative importance for what you are trying to achieve.

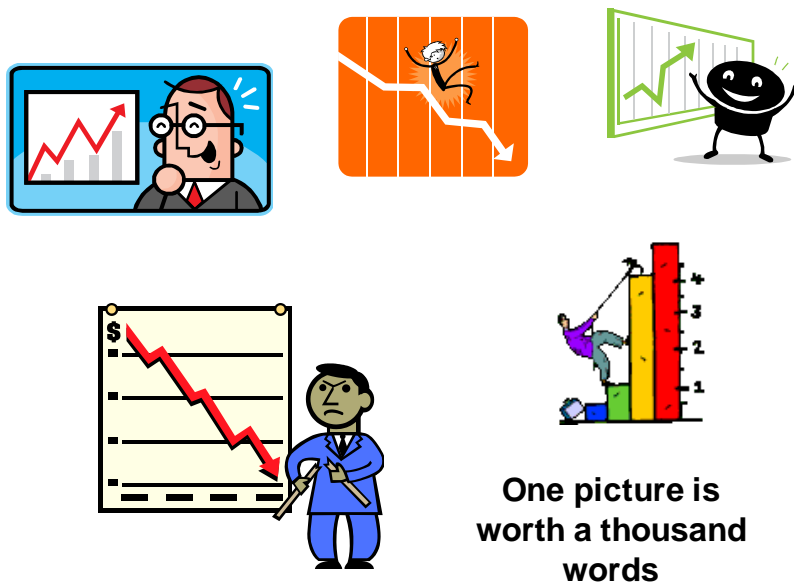
(vii) Thematic analysis

Thematic analysis is used for the analysis of qualitative data, for example, from interviews, focus groups or open-ended survey questions.

- Listen to the tapes (if taped) and / or read notes / documents and jot down possible themes.
- Go over the material again and identify the dominant themes and sub-themes. Focus on the particular words used and do not impose your own thoughts.
- Get an independent assessor to assess the material (or a sample of it if time-limited) for common themes. The facilitator and independent assessor then meet to review common themes. Where there is disagreement the process should be repeated until agreement occurs.
- Group the themes as appropriate. Minor themes can be grouped under 'Other'.
- Identify any direct quotes that help illustrate the themes.

There are of course a number of other tools that can be used for the analysis of quantitative or qualitative data as well as for the identification of root causes of problems. These can be found in any good book on quality improvement.

2.4 Step 4: Communication of the Results: Data Presentation



Some general comments on presenting data in the text, tables or graphs.

- Data can be presented in the text, in a table, or as a graph.
- If presented in the text, then it is recommended no more than three numbers are presented together.
- When whole numbers (integers) are given in text, numbers less than or equal to nine should be written as words, numbers from 10 upwards should be written in digits. When decimal numbers are quoted, the number of significant digits should be consistent with the accuracy justified by the size of the sample and the variability of the numbers in it (The University of Reading Statistical Services Centre 2000).
- If there are less than 20 numbers then it is usually better to use a table than a graph.
- Tables and graphs should be self-explanatory – that is, the reader should be able to understand them without major reference to the text.
- The title should be informative and the rows and columns of tables or axes of graphs should be clearly labeled.
- Remember to keep it simple so the main message is clear and the reader is not distracted by minor information.

Should I use a table or a graph?

Tables: Better for presenting data

Graphs: Better for presenting the message

(i) Tables

Often tables are too crowded, confusing to read and interpret. The following are some hints for designing more effective tables.

- Keep simple and use just the most critical information
- Consider percents where possible
- Round to whole numbers
- Where appropriate, include total numbers (for example, bottom row and right hand column)
- Clearly label rows and columns
- Keep the number of significant digits to a minimum
- Use slightly smaller type than text
- Sort rows with the largest numbers at the top
- Put comparisons of interest in vertically – this is much easier to read and interpret than having them arranged horizontally
- Provide source of data
- Make sure the units of measurement are clearly presented
- Tabular output from a computer program is not normally ready to be cut and pasted into a report. For example, a well-laid-out table need never include vertical lines.

(ii) Graphs

Sometimes just giving statistical data in a table or text can be misleading. A classic example is quoted by Tufte (1983) from Anscombe. In this example, the sample number ($n=11$), the mean of the X's (9.0) and Y's (7.5), the equation of the regression line ($Y=3+0.5X$), the standard error of the slope estimate (0.118), the sum of squares (110.0), and the correlation coefficient (0.82) are the same for each of four different sets of numbers (Anscombe's quartet). Yet when they are graphed, four very different pictures of the data emerge.

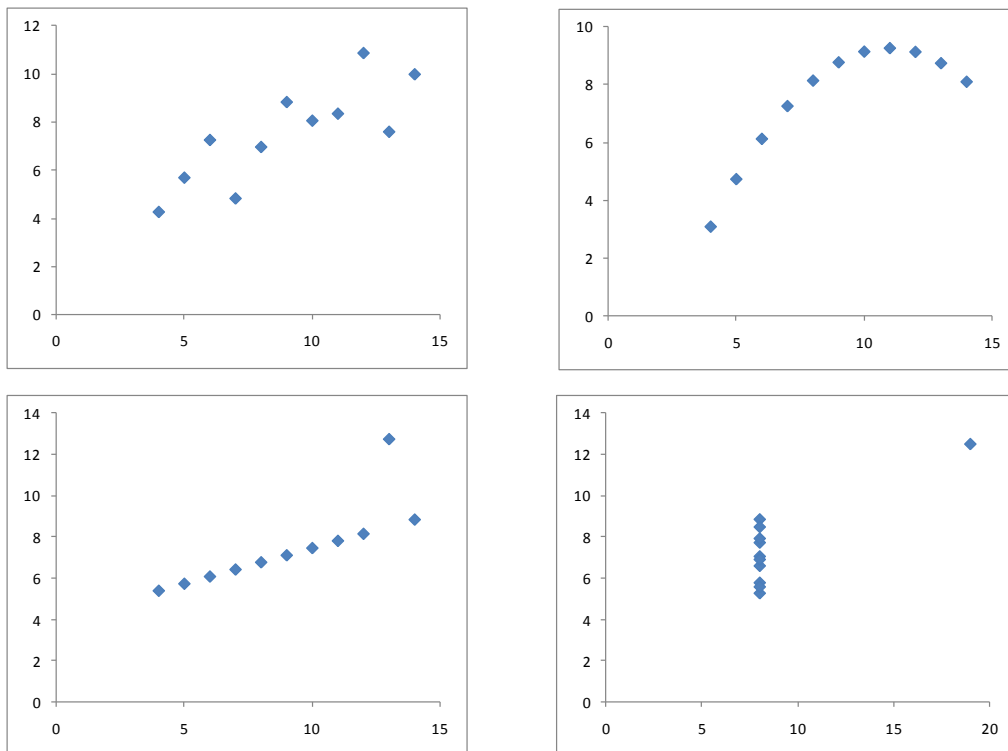


Figure 5 Anscombe's quartet: Each graph is described by exactly the same linear model (from Tufte 1983)

This very clearly illustrates that graphs can tell a story that can be hidden by just presenting statistics or numbers.

Tufte is a leader in the visual display of quantitative data and any of his articles and books on these topics are well worth reading.

Some Principles of Graphical Excellence:

- Well designed presentation of interesting data – a matter of substance, statistics and design
- Complex ideas communicated with clarity, precision and efficiency
- Provides the reader or viewer with the greatest number of ideas in the shortest time with the least ink in the smallest space

(From Tufte 1983, p51)

Far too often, one sees on TV, in newspaper stories, in reports and even published academic papers, graphs that have been poorly constructed and often misleading to the average reader. Sometimes graphs are purposely misleading, other times it is through ignorance or lack of care. Tufte provides six principles for graphical integrity.

1. The representation of numbers, as physically measured on the surface of the graphic itself, should be directly proportional to the numerical quantities represented. He puts forward the concept of the Lie Factor = size of the effect

shown in the graph / size of the effect in the data. Lie factors greater than 1.05 or less than 0.95, he proposes indicate substantial distortion.

2. Clear, detailed and thorough labeling should be used to defeat graphical distortion and ambiguity. Write out explanations of the data on the graph itself. Label important events in the data.
3. Show data variation, not design variation.
4. In time-series displays of money, deflated and standardized units of monetary measurement are nearly always better than nominal units.
5. The number of information-carrying (variable) dimensions depicted should not exceed the number of dimensions in the data.
6. Graphics must not quote data out of context.

(From Tufte 1983, p77)

Over the years, I have seen many errors in the display of graphical data. Some common examples are shown below.

(a) Context too limited for interpretation

This is illustrated by the following graph of triage performance in a hospital emergency department.

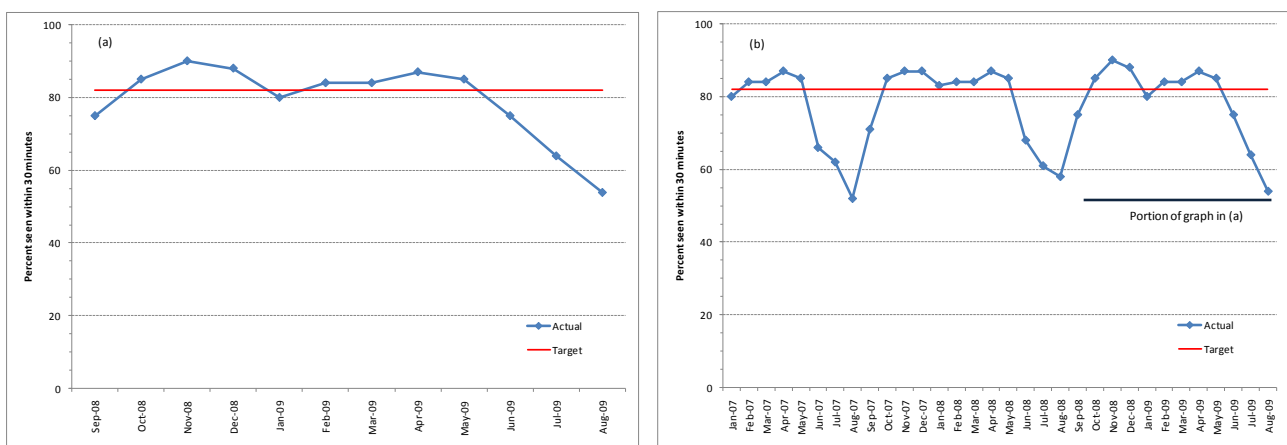


Figure 6 Percent triage 3 patients seen within 30 minutes. (a) September 2008 to August 2009, (b) January 2007 to August 2009

The problem with Figure 6 (a) is that there are only 12 months of data. Many processes, including a number of processes within the health sector for example, are seasonal. The downturn in performance in the last three months is due to an increase in patients presenting to the hospital in the cooler months (southern hemisphere) with respiratory and other seasonally related problems. This can only be clearly seen and correctly interpreted when more than 12 months of data is viewed. Not recognising recurrent patterns, be they seasonal or other, can result in the wrong conclusions being drawn and inappropriate solutions being implemented.

(b) Misleading axis scales

This is a very common error that leads to some people thinking there has been a much greater effect than may be justified from the data. While people who are experienced with statistics will look at the scale soon after looking at the following graphs, most people do not and draw the wrong conclusions.

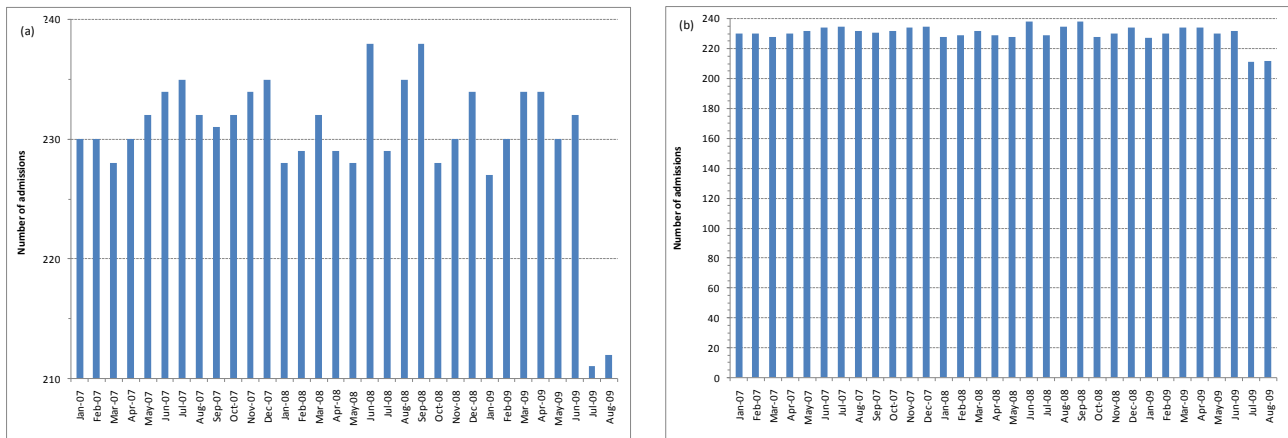


Figure 6 Number of patient admissions. Vertical axis from (a) 210 to 240, and (b) 0 to 240. The same data is used in both graphs

This inappropriate setting of the minimum value of the vertical axis goes against the principle of graphical integrity mentioned above by Tufte. Generally, it is wise to set the minimum value to zero unless there is a sound reason for doing otherwise.

(c) Not understanding variation

With a world-wide increase in performance reporting, an increasing number of managers and their staff are not data literate and hence often jump to conclusions about changes in performance that may just reflect normal or common cause variation in the process/s. This is illustrated by the following figure which, using statistical process control (Figure 7 (b)), shows the apparent decrease in the number of patients in the last three months is not statistical but rather can be attributed to common cause variation or 'noise'. That is, it is not a signal that something has changed to result in fewer patients having surgery.

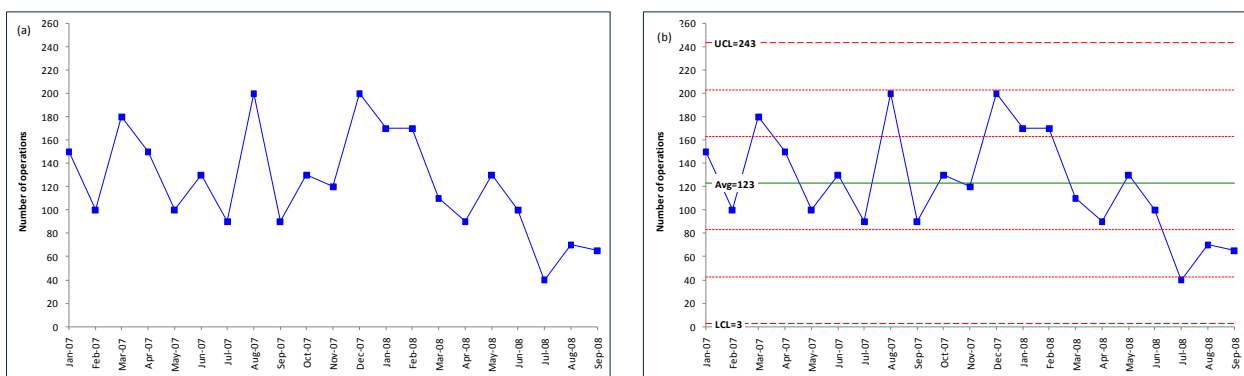


Figure 7 Number of operations. (a) Run chart and (b) I-Control chart using the same data as in (a)

(d) Inappropriate use of computer-generated trend lines

Over the past decade there has been a rapid increase in access to work computers and software programs such as MS Excel. While this has been of enormous benefit and has saved countless man-hours of time doing things manually, it has also resulted in many people inappropriately using these data tools inappropriately. One common error is to add trend lines to graphs in MS Excel that do not warrant such a treatment. Consider the example in the following figure.

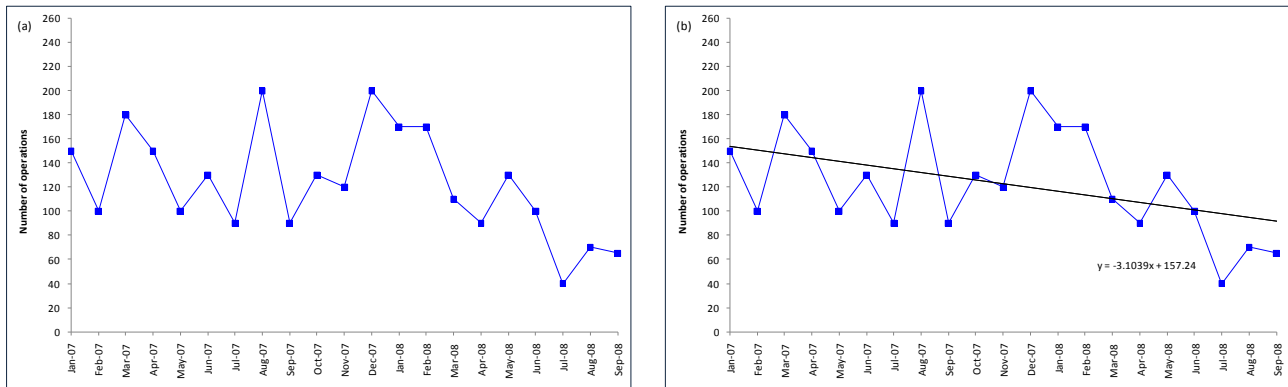
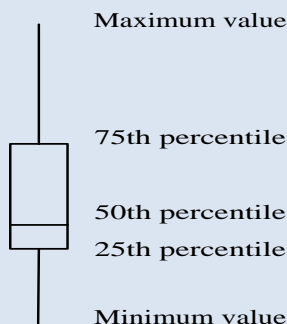


Figure 8 Number of operations. (a) Run chart and (b) Run chart with the addition of a trend line. This uses the same data as Figure 7 above.

While the added 'trendline' would suggest there is a significant decrease (slope of the line is -3.1) in the number of operations with time, this is clearly not the case as shown in Figure 7 (b).

Some further suggestions for developing and presenting good graphics:

1. “*The only worse design than a pie chart is several of them*” (Tuft 2001). Visual recognition research shows that bar charts (or in some situations, a simple table) are much easier for the brain to process than a pie chart (Simkin and Hastie 1987).
2. For bar graphs, placing the bars in order makes it easier for the reader to quickly and correctly see and interpret the results. The exception to this would be some scales (for example ordinal) that need to remain in a set order regardless of the value.
3. Avoid the use of 3-D effects and hatching with graphs. Remember Tuft’s principle –a good graphic *provides the reader or viewer with the greatest number of ideas in the shortest time with the least ink in the smallest space*.
4. Avoid thick lines as they are distracting and confusing
5. A box plot can be a useful way to summarise data and display variation. Values more than 1.5 box lengths away from either end of the box are considered outliers and are represented by individual points.



6. Grid lines on a graph can be very useful but always make sure they are much fainter than other features. This often means not using the default but modifying so narrower and dotted / dashed.
7. Try to keep the number of lines on a line graph to less than five to avoid crowding and confusion

(iii) Use of Case Studies in the Communication of Results

In presenting the results to your audience, whether it be a formal written report or a MS Powerpoint presentation, it is important that the results are presented succinctly, logically and in a format that is attractive and easy to read. One simple, but powerful, way to do this is to include case studies in the presentation. People like to read well presented case studies because they can tell a simple, interesting story. These stories can be a mix of quantitative (for example, a graph or table) and qualitative results (for example, key quotes

from any interviews) and may be set in a bordered box taking a page or less of space. Contrasting case studies can also be interesting and helpful.

2.5 Step 5: Develop and Implement Solutions

This is usually where the greatest challenges arise! It can be fun and stimulating working through the above steps and often not so difficult having key people engaged and active. Developing good solutions can also be stimulating but their implementation is where many teams and organizations fail. It is usually quite hard work and can involve significant changes in workplace practices and culture. These are universally recognized as challenging and many great ideas have failed to be implemented successfully, or to be implemented at all, because of the numerous obstacles to this. But first, let's look at the easier task of developing solutions to address the identified challenges the team or organization are facing.

(i) Develop the appropriate solutions

Having identified the critical questions and gained the best answers and presented these in an attractive way to the appropriate people, you are now in a much better position to develop solutions that will bring about the required changes for improved performance. That is, you will have developed a solid evidence-base for really important decisions that may impact on the organization for a long time.



As a general principle, solutions are often best developed from the grassroots with the support of senior management. A number of techniques mentioned above can also be used for initial generation of solutions, for example, affinity diagramming and brainstorming. Remember that the solutions you need to focus on will be those that have the highest probability of effectively and efficiently addressing the issues raised in earlier steps. These then need to be reviewed and approved by management who have a more global view of the organization as well as the broader risks and resource availability. Of course, there is a much greater likelihood of successful implementation if both grassroots staff and management are involved as suggested here in the design and signoff of solutions.

Prioritization matrix: A tool to assist in decision-making

- This analytical tool can be used to help you decide between a set of options by taking into account a number of relevant factors.
- It can be used not just for looking at solutions but also for issues, problems and their causes.
- When used with a broadly representative group of staff it can help get everyone on board with the final decisions.
- To develop the matrix, put the various possible options (eg proposed solutions) in the rows of the first column and then for the remaining columns, list the relevant factors. Each cell is then scored with a number, and these are totalled for each option. High numbers are used for the most desirable options. For example, in example below, low cost, high likely impact and low implementation risk.

An example is shown below where option 1 is the preferred option having the highest score followed by option 3. If desired, differential weightings can be devised for the columns.

Option	Cost ¹	Likely impact on addressing the issue ²	Risk of implementation failure ³	Total
Option 1	5	4	4	13
Option 2	1	3	3	7
Option 3	2	5	3	10

¹1=very high, 2=high, 3=moderate, 4=low, 5=very low

²1=very low, 2=low, 3=moderate, 4=high, 5=very high

³1=very high, 2=high, 3=moderate, 4=low, 5=very low

Getting an evidence base for your decision-making around solutions

- When developing solutions, it is important to choose ones where there is some evidence base for their likely success.
- Of course, sometimes this evidence base will be totally lacking and you need to proceed with implementing the solutions that the team think will be most likely to effectively achieve the desired outcomes. In this latter situation, it will be critical to evaluate the impact of the solution over time. Actually, we would say evaluation and monitoring is critical in all change programs (see below).
- If you have been **benchmarking** with another similar group, either within or external to your organisation, then this can be a great way to obtain the evidence that something new and different could well work for you. By benchmarking with the best performing teams or organisations and comparing your results and processes, you will soon identify some potential changes that may help you to achieve the improved performance and excellence you are seeking.
- Other ways to find out what may be good solutions with an evidence base is a literature review, networking with colleagues from elsewhere, and participating in conferences.

(ii) Implement the solutions

As mentioned above, this is the hardest part of the process and where the most challenges are encountered. These can be minimized by doing the above steps well including making sure that people do not feel left out of the processes and that there is good communication.

One reason for people's difficulty in implementing successful solutions is because this often involves significant change to existing cultures and work practices and processes. There are numerous articles and books on these topics with space here only to highlight a few important issues and principles.

Some important things for consideration during this stage are summarized below.

(a) Develop an implementation plan

A good implementation plan will minimally include:

- the objectives;
- what is going to be done to achieve these;
- by whom;
- when;
- resource implications; and
- how the implementation will be monitored and evaluated.

Depending on the nature and size of the implementation, it will probably also need to address:

- governance - for example, who will be the project sponsor and the project leader, and what will be their key accountabilities, and to whom will they be responsible;
- risk management including the identification, assessment and treatment of risks;
- a training plan
- a communication plan; and
- an assessment of readiness for change.

A Gantt chart delineating project phases, milestones and timeframes may also be a useful component of the plan and then updated as the solutions are implemented.

The plan can be written up in tabular form or as a normal document. It may range from just a page or two (for example, where there are just some small changes to existing processes and approaches) to a number of pages (for example, as part of a major reform effort across the organisation).

(b) Overseeing the Implementation

The degree of overseeing the implementation of the change program will depend on the size of the program and the difficulty of implementing it. In general, we would recommend there is at least an executive sponsor and a team leader. An executive sponsor is important to ensure that the project does not become bogged down with cumbersome decision-making. It also demonstrates the importance of the program and provides a means for ensuring implementation is dynamically aligned to what the organization is trying to achieve more globally. It would also be worthwhile having a status update as a standing item on the agenda of the Executive (depending on the size and scope of the project) or management meetings until the program is successfully implemented.

Keeping on top of implementation: Outstanding Issues Log

- This is a really useful management tool to record and track issues that may be impacting on solution implementation. You can set it up in the way that most suits your situation but it could be in tabular form with the following headings:
 - Solution
 - Brief description of implementation issue
 - Date issue raised
 - Actions to be taken to resolve
 - Responsible person for action
 - Due date to complete
 - Status
 - Open/Closed
- It is regularly updated by those leading the implementation and then reviewed at the appropriate management meetings where the log could be a standing agenda item.
- If tools such as this are not used, then implementation can drift and perhaps totally stall with everyone's energy and enthusiasm dissipated. Implementation needs to be monitored and any challenges or barriers identified and proactively managed within agreed tight timeframes.

Note that if there are solutions that need to be implemented at multiple sites, then it may be important to pilot the solution in one or two different locations before a broad rollout. This allows fine tuning of the solution and its implementation prior to more extensive rollout. Much care needs to be exercised in a 'blanket' rollout as there may be different local factors that need to be taken into consideration in the rollout process. Local consultation will be important to determine these and also to engage their ownership and involvement.

(c) Change Management

Implementing your solutions and doing things in different ways involves change, no matter how large your solutions may be. Many change efforts fail with some saying that only 30%

are successfully managed (Todnem 2005). While there are many publications on the various theories and practices of change management, there is still debate in the peer-reviewed literature on the factors necessary for successful change management. Despite this, there are a number of elements that are generally seen as important. Based on a comprehensive review of the change management literature by Judith Swan (in McDonald et al 2006, Vol 2, p156), it was noted that the main factors associated with successful change in complex organizations are:

- strategic alignment and vision;
- strong leadership and senior management support;
- the organizational culture supports and encourages change;
- collaboration and participation at the frontline including incentives and benefits;
- communication on a large scale;
- skills in change management;
- knowledge sharing and informal networks;
- resources and planning for implementation; and
- plan for sustainability and spread.

These were also my experience during seven years of involvement in a large change and reform program in the public health sector.

An influential writer on organizational change is John Kotter. Based on a comprehensive review of change in over 100 organizations, Kotter (2007) found that there are eight sequential steps necessary for effective change efforts:

1. Establishing a Sense of Urgency

- Examining market and competitive realities
- Identifying and discussing crises, potential crises, or major opportunities

2. Forming a Powerful Guiding Coalition

- Assembling a group with enough power to lead the change effort
- Encouraging the group to work together as a team

3. Creating a Vision

- Creating a vision to help direct the change effort
- Developing strategies for achieving that vision

4. Communicating the Vision

- Using every vehicle possible to communicate the new vision and strategies
- Teaching new behaviours by the example of the guiding coalition

5. Empowering Others to Act on the Vision

- Getting rid of obstacles to change
- Changing systems or structures that seriously undermine the vision
- Encouraging risk taking and non-traditional ideas, activities, and actions

6. Planning for and Creating Short-Term Wins

- Planning for visible performance improvements
- Creating those improvements
- Recognizing and rewarding employees involved in the improvements

7. Consolidating Improvements and Producing Still More Change

- Using increased credibility to change systems, structures, and policies that don't fit the vision
- Hiring, promoting, and developing employees who can implement the vision
- Reinvigorating the process with new projects, themes, and change agents

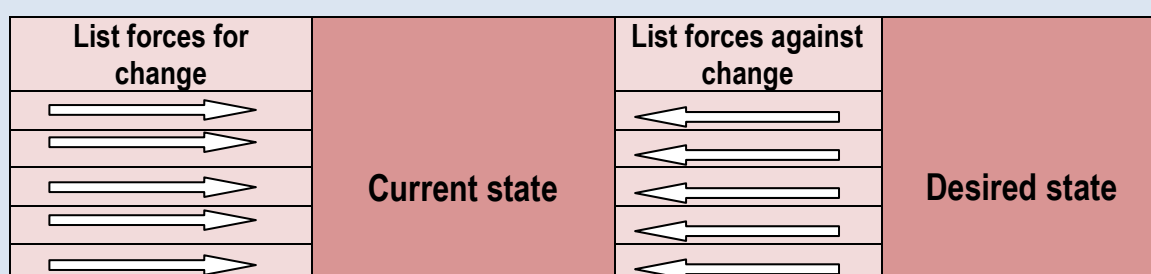
8. Institutionalizing New Approaches

- Articulating the connections between the new behaviours and corporate success
- Developing the means to ensure leadership development and succession

Kotter goes on to say that: *The most general lesson to be learned from the more successful cases is that the change process goes through a series of phases (see above) that, in total, usually require a considerable length of time. Skipping steps creates only the illusion of speed and never produces a satisfying result. A second very general lesson is that critical mistakes in any of the phases can have a devastating impact, slowing momentum and negating hard-won gains. Perhaps because we have relatively little experience in renewing organizations, even very capable people often make at least one big error (Kotter 2007).*

Lewin's Force Field Analysis: A useful exercise to examine the forces for and against change

- Lewin's model of force field analysis has been used successfully to examine the drivers and resistors to change so the change can be managed more proactively.
- The model states that for any change to occur, the driving forces must be greater than the resistant force.
- This can be represented as follows:



- This exercise may be worth undertaking as part of the solution design phase as it may highlight that there is too much resistance to change and the solution may be best dropped.

2.6 Step 6 - Monitoring and Evaluation

Having worked out what may be needed to address some challenges and improve performance, it is really critical that the implementation and impact of the solutions is closely monitored and evaluated. At this stage the solutions are really only hypotheses; that is, until you implement them you cannot be sure that the postulated changes will occur as expected. The solutions may be well implemented but not have the expected effect and/or they may be the right solutions but are poorly implemented. Thus, the need to have in place formal processes that should minimally include choosing the best approach for your situation for monitoring and evaluation, choosing the right measures; setting appropriate targets and the ongoing monitoring of the results. At the end of the project, if it has major implications or significant resources, it may also be worthwhile carrying out a summative evaluation (see below).

(a) Developing an evaluation model

If the project is relatively large, it is important to establish a small group of people to plan and oversee the monitoring and evaluation. It is also important that there is someone on this team with expertise in these areas otherwise a lot of time will be wasted and the wrong conclusions may be drawn. From my experience, people with these types of skills are quite rare in most organizations. If no one is available with these skills then it is probably worthwhile contracting in someone to help guide the process and provide mentoring and capacity building for a person/s within the organization. The best way to learn these types of skills is actually doing it with someone experienced and with mentoring skills. It is also important to target the right person/s within the organization for this capacity building process.

If the project is small and there is already someone with the appropriate skills and experience (for example, a quality manager), then there should be few problems.

There are a number of different models for evaluating programs and new services or models. These can easily be found by searching on the internet or reading one of the many books on the subject (for example, McDavid and Hawthorn 2007). Most evaluation models fit into one of two types, formative and summative.

Two forms of evaluation: Formative and summative

- **Formative** evaluations are focused on how the program can be improved. They are often conducted in the early stages of a project with a view to providing feedback and advice for ongoing improvements to the program.
- **Summative** evaluations deal more with determining whether the program objectives were met and assesses the overall effectiveness of the program.
- By combining both, it will help you know not only how effective the program has been but also, should a program be continued, what needs to be done to further develop and improve it.
- Ideally, evaluation should be built into the program from day one and not an afterthought at the end of the program when it can be much harder to collect the required evaluation data.

One evaluation model that is frequently used is program logic. An example is shown below where it was used in a major evaluation of a very large multi-million dollar healthcare reform program undertaken by Hunter New England Health in NSW, Australia called 'Maggie'. A copy of the Executive Summary is available at: http://www.hnehealth.nsw.gov.au/innovation_and_reform/maggie_program_evaluation_and_response

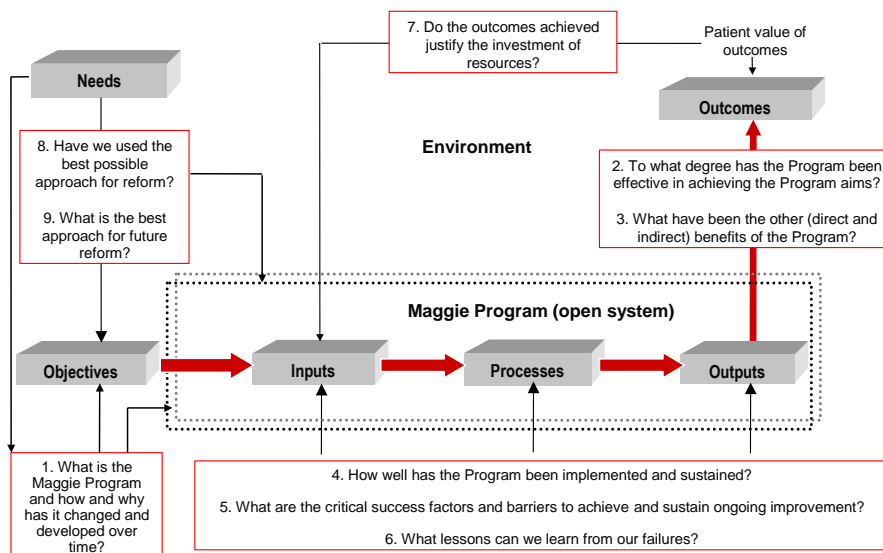


Figure 9 Example of a high-level program logic model: Hunter New England Health Maggie reform evaluation

Most evaluations look at whether the Program objectives were met with a focus on program inputs → processes → outputs → outcomes → impacts. As part of the above evaluation, a more detailed program logic model was developed.

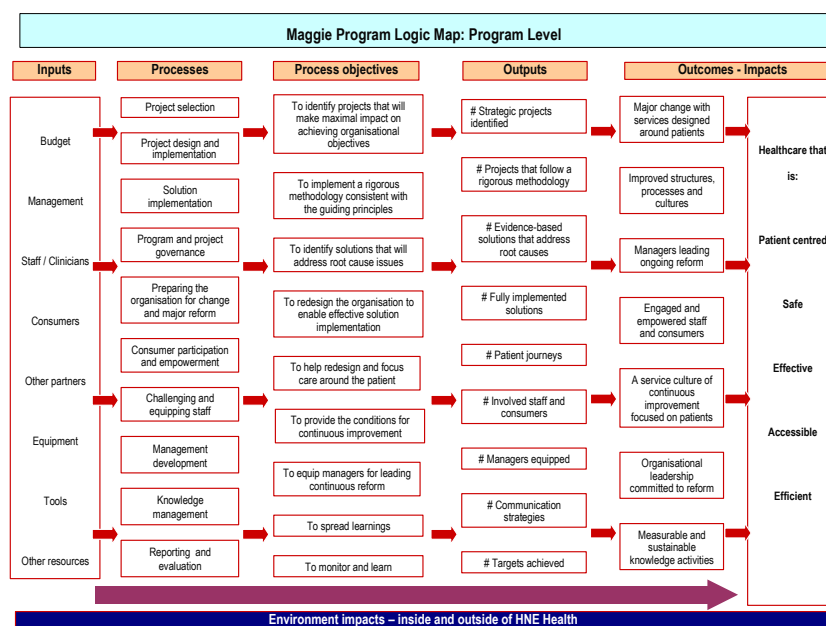


Figure 10 Example of program logic map: Hunter New England Health Maggie reform evaluation

Some websites with more information on evaluation include:

<http://www.socialresearchmethods.net/kb/intreval.htm>

http://managementhelp.org/evaluatn/fnl_eval.htm

<http://gsociology.icaap.org/methods/>

<http://www.evaluation.lars-balzer.name/links/>

<http://www.policy-evaluation.org/>

<http://www.eval.org/resources.asp>

<http://www.cdc.gov/eval/resources.htm>

<http://www.uwex.edu/ces/pdande/evaluation/evallogicmodel.html>

<http://webcache.googleusercontent.com/search?q=cache:sOV4B8uz0QUJ:www.wkkf.org/~media/475A9C21974D416C90877A268DF38A15.ashx+%22W.+K.+Kellogg+Foundation+Logic+Model+Development+Guide%22&cd=1&hl=en&ct=clnk&gl=au>

(b) Choosing measures

Whether it is part of a large scale evaluation or you just want to see if one or two new solutions are having the desired impact on improved performance, it is now well accepted that performance measurement is a vital element. If the right measures are chosen, and accurate and timely data is collected, then this can provide critical evidence that an intervention is or is not working as expected.

Some reasons why performance measurement is important in improving performance

- If you cannot measure it, you do not understand it
- If you cannot understand it, you cannot control it
- If you cannot control it, you cannot improve it
- If you do not measure results, you cannot tell success from failure
- If you cannot see success, you cannot reward it
- If you will not recognise success, you may not be able to sustain it
- If you cannot see success/failure, you cannot learn from it
- If you cannot recognise failure, you will repeat mistakes and keep wasting resources

(From Halachmi (2005))

However, it is important to recognize that just the fact of measuring something will not of itself lead to improved performance. This is pointed out by Spitzer (2007) in an insightful book where he says that one often overlooked factor is the need for a supportive culture where improved performance (including measurement) is valued.

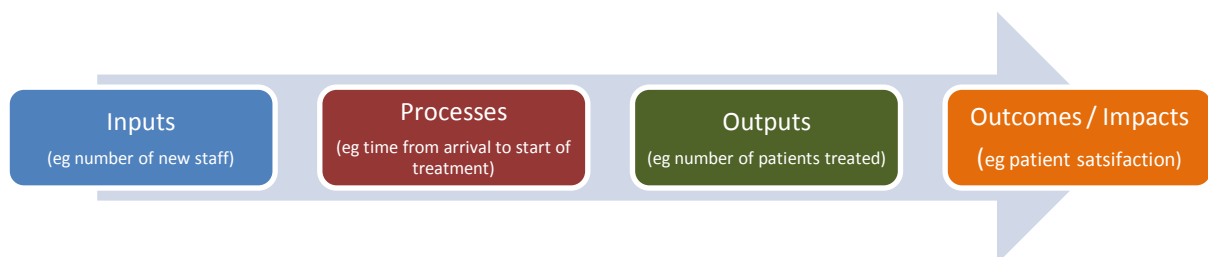
How do you choose the most appropriate performance measures for your situation? Based on their research, (Franco and Bourne, 2003) list a range of critical characteristics of measures. While these largely apply to the development of performance measurement

systems (eg for the whole organization), they can be relevant when looking at measures as part of an improvement project. Some of the main characteristics include:

- *Relevant measures* – relevant to the business and the people being accountable for them
- *Clear and simple measures* – clarity of definition and calculation, unambiguous, and simple to understand
- *Few measures* – as few measures as possible
- *Balanced measures* – between financial and non-financial
- *Precise and accurate measures* – accurate calculations, concise and precise measures to increase credibility

Some people talk about different types of measures, for example, performance indicators, performance measures and key performance indicators. While there may be important distinctions between some of the terms in use, I have found that trying to explain the differences to staff usually results in confusion and is unhelpful. It is better to stick with the one term (I prefer 'performance measure') no matter what the situation. If you want a definition, then performance measures can be defined as tools we use to determine whether we are moving towards the successful implementation of our strategies or solutions and meeting our aims (eg safe patient-centred care).

In choosing measures it is appropriate to consider the various components of the program logic model above:



While performance measures may be chosen for each of these elements, for most projects, it is sufficient to choose measures from just two – processes and outcomes. A mixture of measures from both is usually desirable.

Measures of processes (and inputs) can be seen as indicators of performance drivers and are frequently referred to as 'lead' measures, whereas outcome measures can be viewed as 'lag' measures. Lead measures can be somewhat predictive of what the outcome/s may be and are available earlier in time. If your causation model is correct, then poor results for a lead measure will be indicative of poor outcomes later on, and vice versa.

Note that sometimes the distinction between lead and lag measures may not be as clear as initially thought. For example, staff satisfaction may be an outcome measure resulting from a range of HR solutions including flexible work practices, but it can also be a lead measure, for example, for customer (eg patient) satisfaction.

In order to test whether individual measures are appropriate the following tests can be used (Kennerley and Neely 2003). Failure on any one of these tests would suggest the measure should be modified or not used.

The truth test	- Is the measure definitely measuring what it's meant to measure?
The focus test	- Is the measure only measuring what it's meant to measure?
The consistency test	- Is the measure consistent whenever or whoever measures?
The access test	- Can the data be readily communicated and easily understood?
The clarity test	- Is any ambiguity possible in interpretation of the results?
The so what test	- Can, and will, the data be acted upon?
The timeliness test	- Can the data be analysed soon enough so that action can be taken?
The cost test	- Is it worth the cost of collecting and analysing the data?
The gaming test	- Does the measure encourage any undesirable behaviours?

Alternatively, a common approach in evaluating measures is to make use of the acronym SMART where each of the letters describes key attributes or properties that are needed for a good measure, namely, S = Specific; M = Measurable; A = Achievable (or sometimes Agreed or Appropriate); R = Relevant (or sometimes Realistic); and T = Timely. There is considerable overlap between the two sets of tests or criteria and you cannot go wrong using either.

Setting up a performance measure template

When you have decided on your measures, as part of good project management you may find it really useful to use the following template (or your own modification of it) where important information is recorded for each measure. This will ensure that everyone is clear about the measure and also that you have thought through what is involved in collecting the performance data.

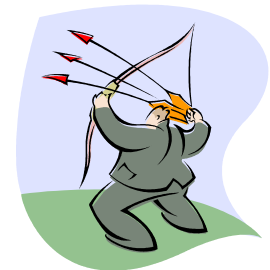
- Name of measure (this should be clear but self explanatory to staff). Do not include the target in the name as this is given separately.
- Purpose of measure
- Formula for the measure eg if a rate clearly setting out the calculation with numerator and denominator
- Type of measure eg process or outcome
- Source of data
- Frequency of measurement
- Data availability (if not available now, when first available)
- Who responsible to collect
- Who is the manager responsible for the performance or action (but not about blame)
- Target (see below)

Towards the end of this process of finalizing the measures it can be really helpful to map the measures to the project goals and solutions. If there are solutions that will not impact on any of the final set of measures than you know that you have a mismatch and there is a need to review both the measures and the solutions.

(c) Setting targets

For each measure there needs to be a performance target. These may be set for one year away, for the end of the project or broken down into stages or a combination. What you decide all depends on your situation and timeframes.

Setting targets is a delicate task and can be seen as both an art (based on good judgment and understanding of the organization and its culture) and a science (based on data and evidence). Targets should define the level of performance that will transform the organization. The challenge for managers is to set the bar high enough to drive an ambitious level of performance without adversely affecting the workforce in terms of morale or behavior.



As with many other steps described in this document, it is best that data is used to guide the decision-making around targets. This is best done by looking at historical data and with your team determining what is an appropriate and achievable stretch target for the future. Of course sometimes historical data is not available and you may need to wait a while until you have some prospective data that you can use. You will also need to consider the likely impact of the solutions as well as organizational culture and resource impacts. External and internal benchmarks can also be useful for target setting. For example, you may want to be the 'best-in-class' performer or in the top 10%. If there is a big gap between your performance and the best-in-class then you may decide that your target is to close the gap by, for example, 25% per annum.

While 'stretch' targets (that is, targets that push/pull the organization to achieve maximal levels of performance, levels of performance that are seen as quite challenging) are needed, be very careful setting targets that will be impossible to achieve. This will just demoralize staff and be totally counter-productive for performance improvement. In regard to this be careful of setting extreme-value targets such as "no one shall wait in a hospital emergency department for more than four hours" because as soon as one patient waits more than four hours the target is not met and staff feel as though they have failed, even though the remaining 999 patients were seen within four hours.

Sometimes you will see reference to setting BHAG (Big Hairy Audacious Goals) targets. This is a reference to stretch targets that will inspire and drive change. It will take people outside their comfort zone and be 'almost impossible to achieve'. The original idea was that BHAGs were long term organizational goals that would change the very nature of the organization.

Of course, while setting a stretch target is good and can be motivating for staff, it does need to be recognized that achieving the stretch target can be very challenging. While some of the information on change management above is relevant here, it is also important that management buy in to the stretch targets and there is strong organizational commitment to achieving them.

(d) Monitoring the results



Just having in place some great solutions and measures to assess their impact will not guarantee that the expected performance will eventuate.

In the busy and hectic world of most organizations, whether they be private, public or not-for-profit, other issues soon crowd in and take up management and staff time. It thus can become a management afterthought – ‘I wonder if those things we implemented last year have made any difference?’ If that is the case then it is almost certainly the

case that the desired performance improvements have not eventuated and things have drifted back to how they were, to the status quo.



There are a number of things you can do to avoid this happening. Here are some:

- Ensure that the results (against target) are a standard agenda item at management team meetings.
- The results can be presented simply with a summary table and trend graphs (for example using statistical process control – see above section on data presentation) with actual and target.
- It is suggested that an Escalation Form be completed for any measure where performance is well short (use an agreed percent or criteria for completion of the escalation form) of the target. The latter would be a briefing for the management team by the person responsible for the measure on such things as the current performance against target, why it is not as expected, what is being done/going to be done to improve performance, where the performance is expected to be in 1-, 3- and 6-months, and what are the ongoing risks. An informed discussion can then be held during the management meeting.
- This is also the appropriate time to talk about how the implementation is going (see above – Overseeing implementation).
- Ensure that everyone is aware of how performance is progressing by communicating the results to all relevant staff every month via your intranet or using staff notice boards. This can be very empowering for staff – knowing that the data is being looked at, particularly by management, and seeing that their hard work is making a difference.
- Acknowledge good performance – a ‘well done’ from management can be very motivating. Share and celebrate good results and the meeting of targets.
- Where appropriate link rewards and incentives to the achievement of targets. This can be more challenging in the public sector.

Of course this is an iterative process and you may well need to return to Step 1 in Figure 1 as you seek to continue to fine tune the solutions and improve performance.

Enjoy the journey!

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