

# Visualisation of data

**U4 – Measure**

**E2 – Statistics**

The element ‘Statistics’ reviews the basics of statistics such as mean, deviation and probability. This element reviews a range of graphs that can be used to visualize data as well.

## Graphical analysis

- Graphs visualise the data
- Graphs help to understand the nature of variation
- Graphs help to separate signal from noise

## Pareto chart

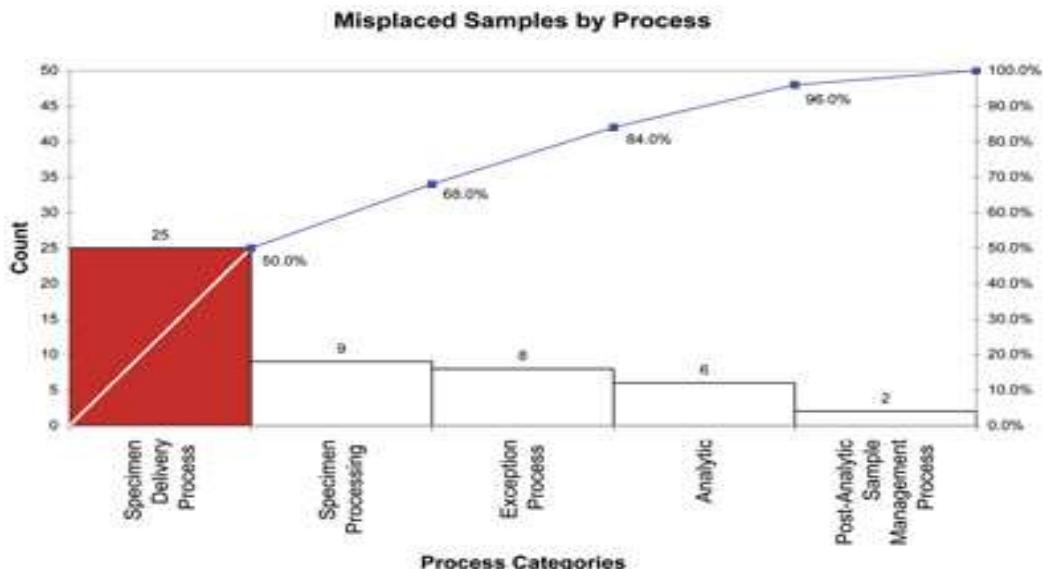
**A Pareto chart is a type of bar chart with:**

- A horizontal axis that represents the relevant categories (usually defects or errors)
- Bars that are ordered from largest to smallest value to identify the “obvious many” and the “vital few”
- A cumulative percentage line that shows the cumulative contribution

**80-20 rule**

- 80% of the problems are caused by 20% of the factors

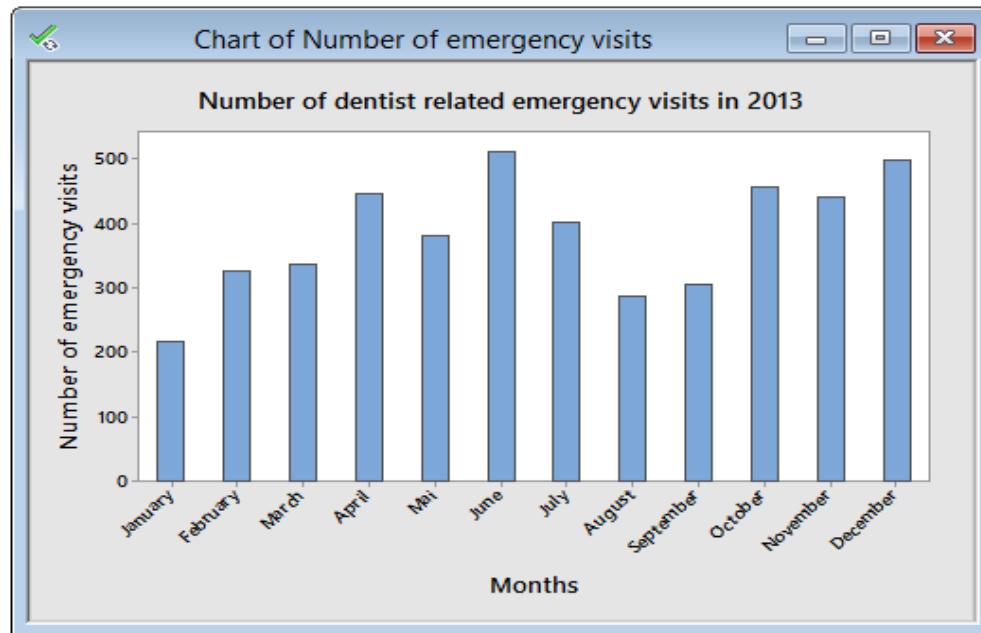
**A Pareto chart can help us to focus!**



## Count results by category - Bar chart

- Use a Bar chart or a Pie chart to graphically compare count results or frequencies for two or more groups

Example: Bar chart of dentist related emergency department visits

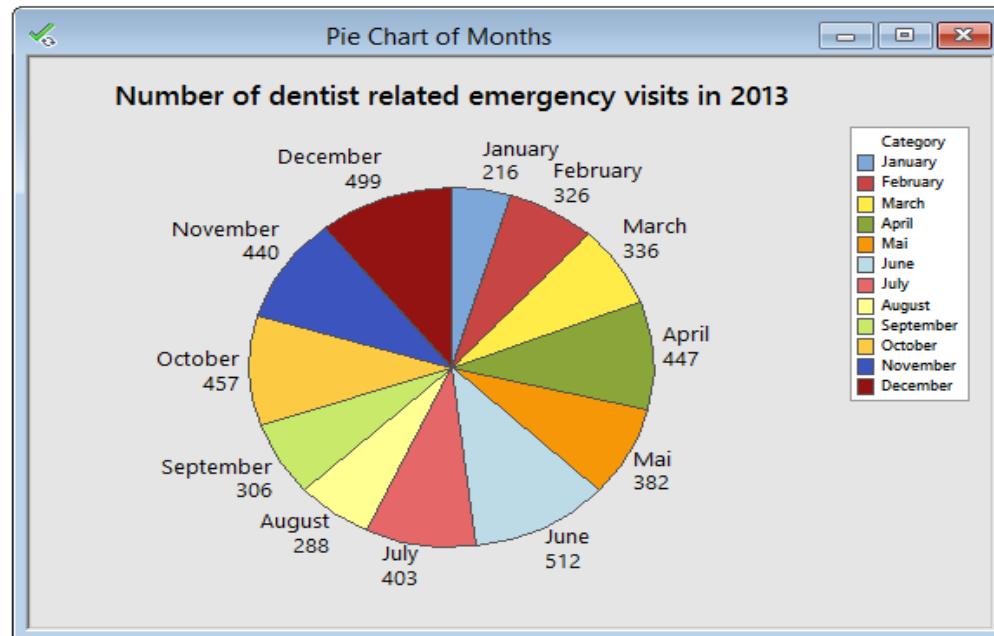


# Visualisation of Data

## Count results by category - Pie chart

- Use a Bar chart or a Pie chart to graphically compare count results or frequencies for two or more groups

Example: Pie chart of dentist related emergency department visits

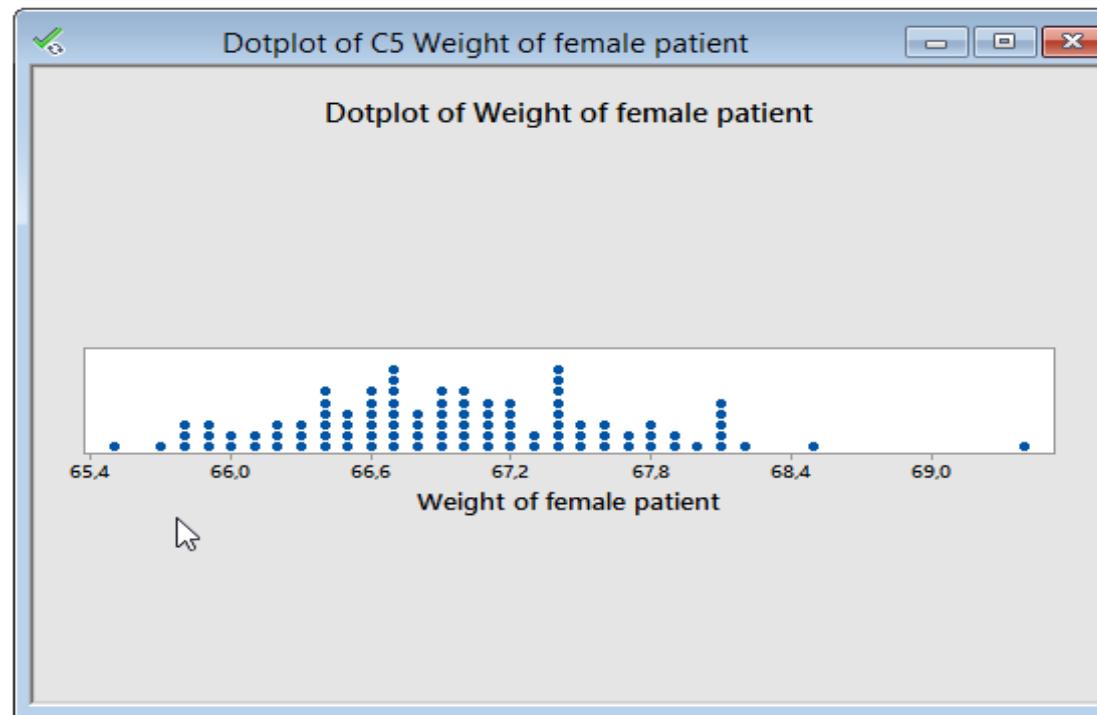


# Visualisation of Data

## Count results by interval - Dot plot

- Visualises the distribution/dispersion of data

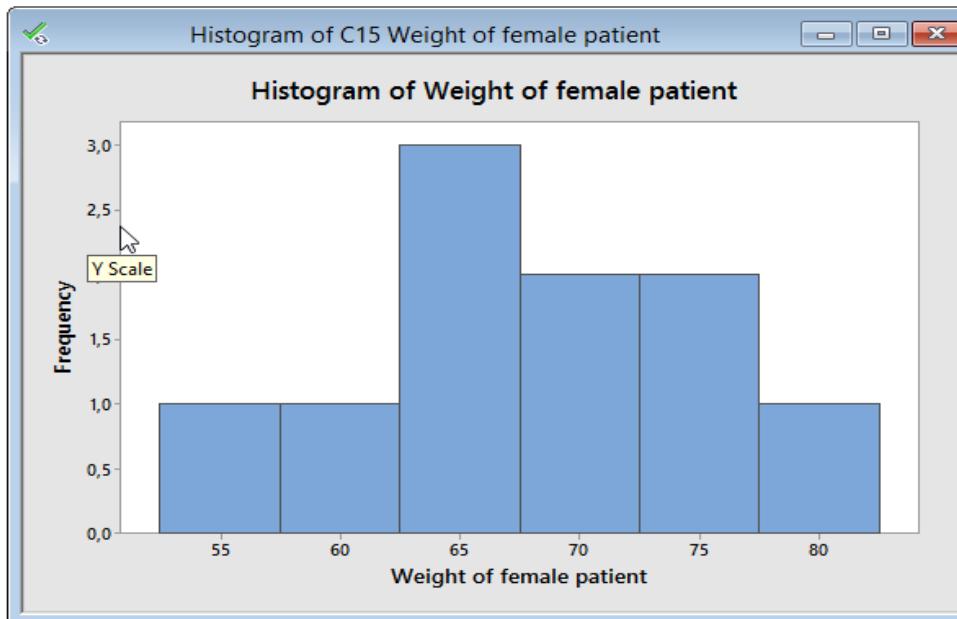
Example: Dotplot of patient Weight



## Count results by interval - Histogram

- Visualises the distribution/dispersion of data
- Frequency: bars indicate the number of observations
- Density: bars indicate the percentage

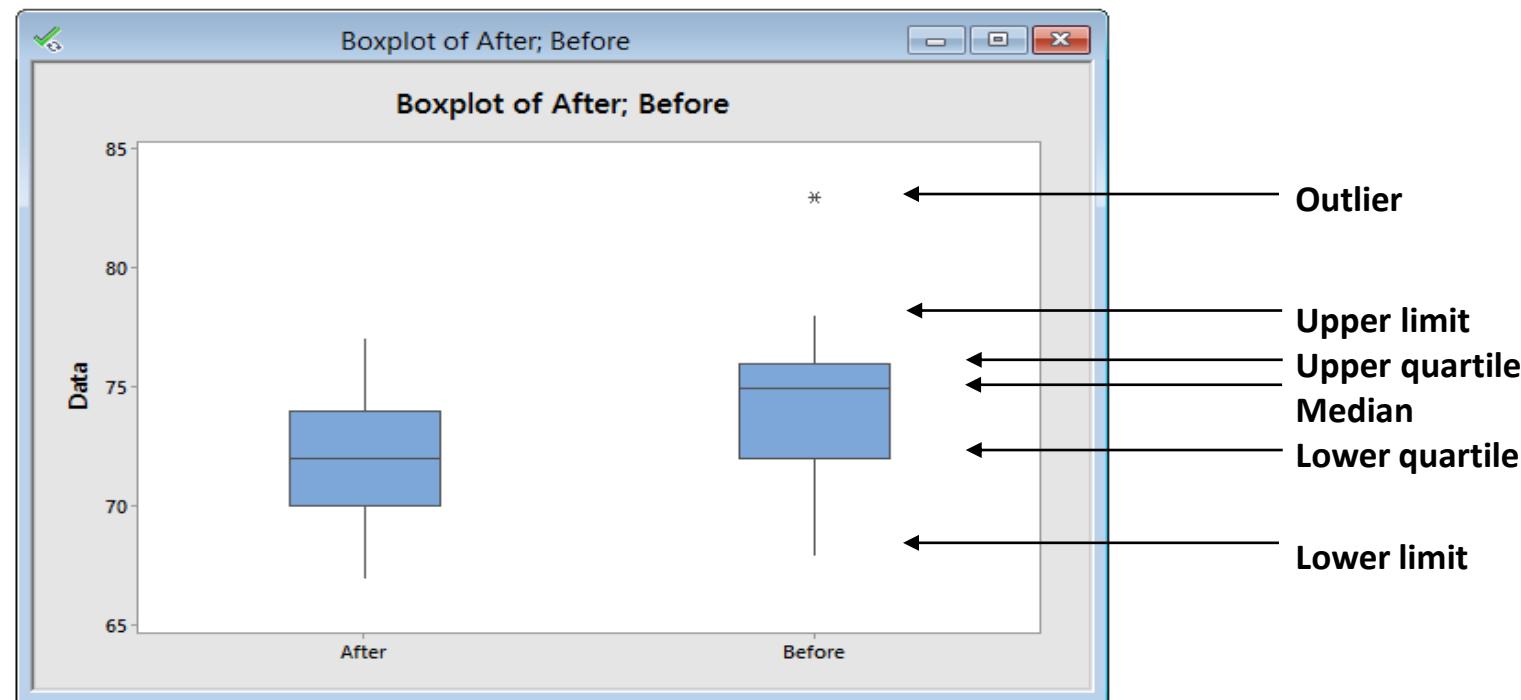
Example: Histogram of female patient weight



# Visualisation of Data

## Box plot

- Use the Box plot (box-and-whisker plots) to visualise and compare data distributions

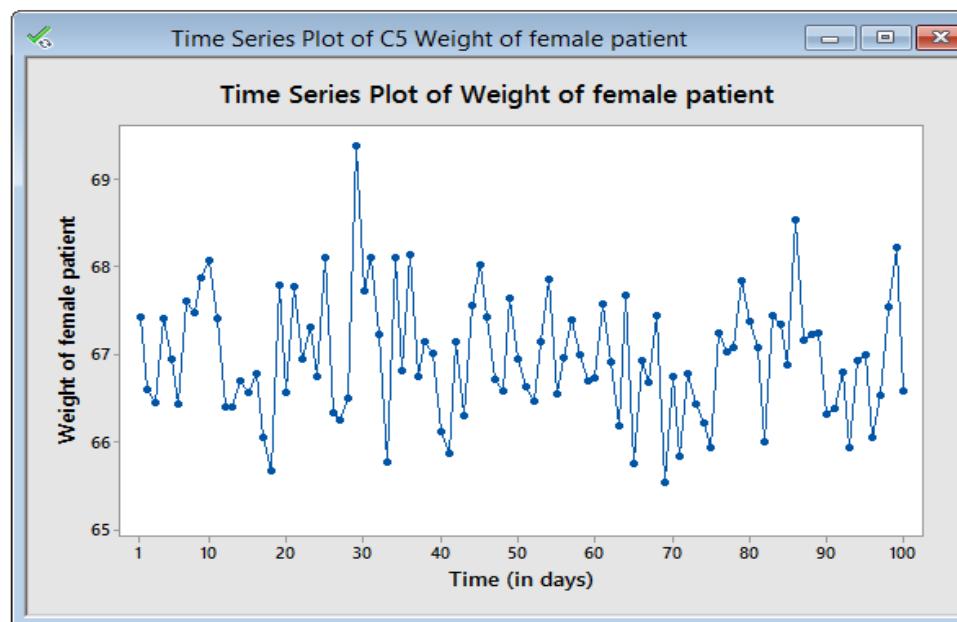


# Visualisation of Data

## Time series plot

- Use the Time series plot to visualise and/ or discover patterns in time
- Usually one of the first graphs made to see if the behaviour is stable

Example: Time series plot of patient body weight

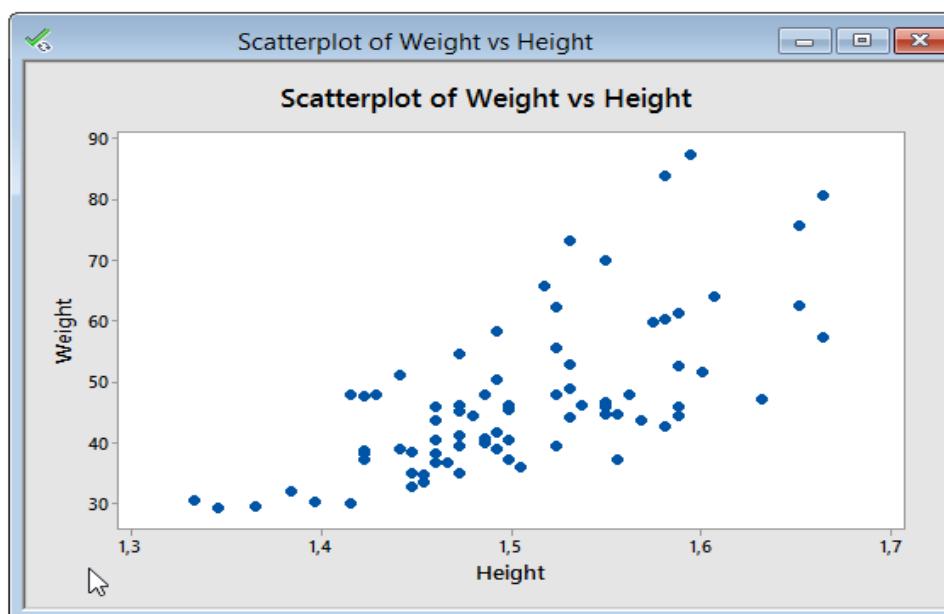


# Visualisation of Data

## Scatter Plot

- Used to examine the relationship between two continuous variables by drawing them on separate axes

Example: Scatter plot height and weight



# Visualisation of Data

## Check sheet

- A simple way to collect and analyse data (how frequently something occurs)
- Indicates where problems occur - location, type, cause, etc.

Sample Number	Soil	Armoured Pit	Bait/Pesticide	Chest Fluid	Lung	Pleural Fluid	Heart Tissue/ Blood	Liver	Stomach Content	Thigh Muscle	Kidney	Aorta Blood	Brain
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## Visual management

- Ideal tool for collaborating, achieving results and preventing problems
- Oversee situation quickly
  - What are the results?
  - What goes well?
  - What goes wrong?
  - What has been done?
  - What needs to be done?
  - Are there delays?



## Visual management is...

- **Making visible (desired and undesired)**
- **Sharing information**
- **For a defined group of people**
- **Reinforcing cooperation**
- **About improvement, not about guilt**
- **Sense of ownership**
- **Clear and standardised working methods**

## Visual management includes

- An organised working environment (5S programs, Labelling, etc.)
- Visualise goals, targets and performance criteria (planning boards)
- Standardised and clear working instructions
- Control work in progress (Kanban)
- Autonomous maintenance
- Failure prevention (Poka Yoke)



# Visual Management

# **Visual management basic principles**

## Providing information

- Which is related to a department
  - Which can be influenced by the department

# **Initiating improvements**

- Visualise goals and performances and discuss them
  - Correct quickly deviations (PDCA)



## Example of organised workplace (5S & labelling)

- Orderliness and cleanliness provides insight and overview



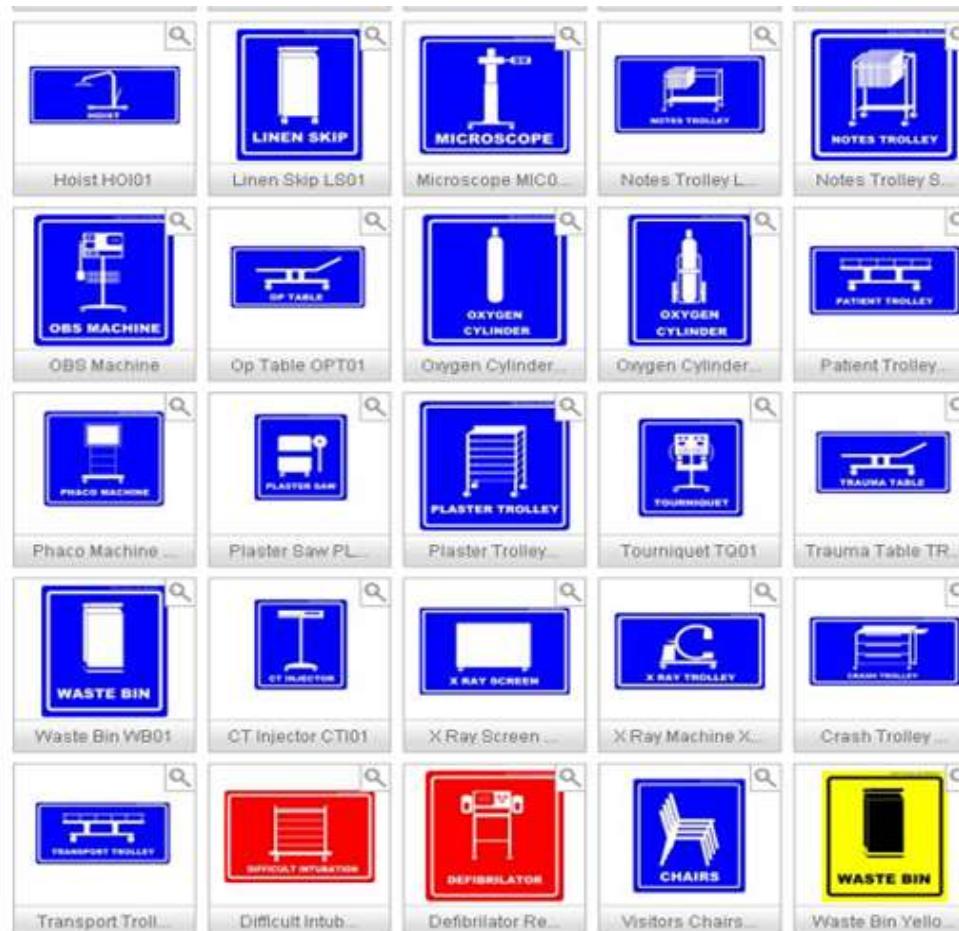
## Examples of organised workplace (5S & labeling)



# Visual Management

## Example of Standardisation

- Standard symbols



# Visual Management

## Example of Employee skill matrix

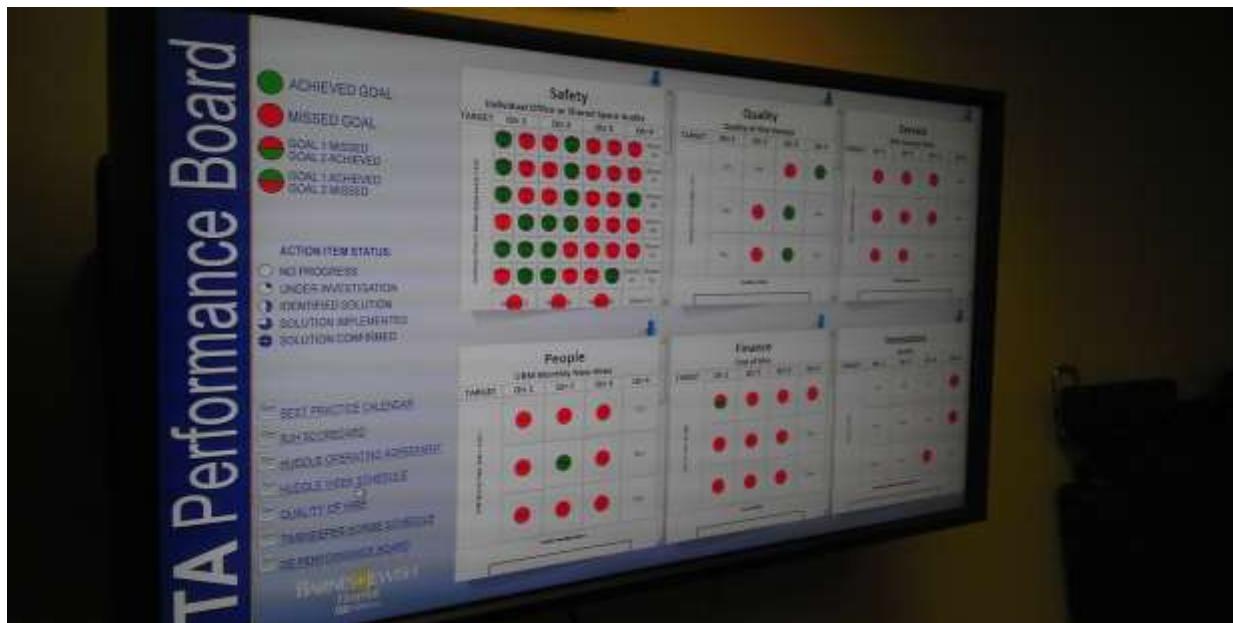
- Trained employees are essential for good quality
- Is sufficient expertise available for a specific process?



	Revision Date: 7/5/2006									
	Symbol	Level								
		Can not perform the task								
		Familiar with elements of the job								
		Can perform with help								
		Can perform solo								
	Accounting									
	Process	Bill Entry	Bill Pay	Invoicing	Receiving Payments	Credit Card Transactions	Reconciliations	Customer Account Entry	Expense Report Review	Expense Report Entry
Name	Marcie									
	Michell									

# Visual Management

## Examples of Visualise performance



## Example of Visualise improvement (PDCA)

- Improvement board



# Visual Management

## Examples of Visual flow

- Every order is linked to a physical card (this is called 'Kanban' or 'Tag')
- Medications in two bin with FIFO (first in first out) organization

