

Preparing Effective Tables and Illustrations

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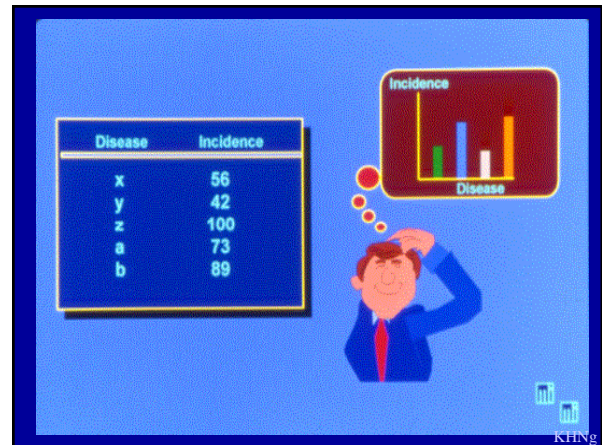
In most scientific research we **collect data, analyze** and **interpret** these data in order to **present them effectively.**

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Tables and graphs are means of presenting data in an organized way.

In fact, the results of many experiments can be presented either as tables or as graphs.

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How do we decide when to use tables or graphs?

If the data show pronounced trends, making an interesting picture, revealing relations between variables in data, use a graph.

If the number just sit there, with no exciting trend in evidence, a table should be satisfactory.

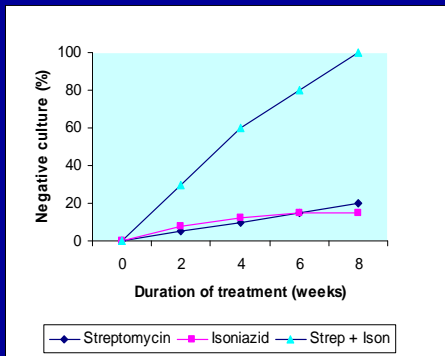
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Effect of streptomycin, isoniazid, and streptomycin plus isoniazid on *Mycobacterium Tuberculosis*

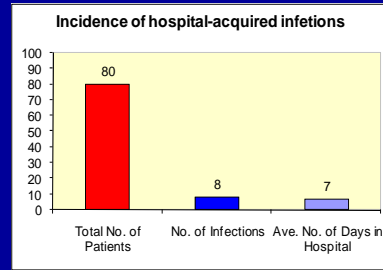
Percentage of negative cultures at:				
Treatment	2 wk	4 wk	6 wk	8 wk
Streptomycin	5	10	15	20
Isoniazid	8	12	15	15
Streptomycin + Isoniazid	30	60	80	100

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Effect of streptomycin, isoniazid, and streptomycin plus isoniazid on *Mycobacterium tuberculosis* KHN_g



“Among the test group of 80 patients who were hospitalized for an average of 7 days, 8 acquired infections.”

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Tables

Structure of a table

Side heading	Column heading	
	Column subheading* (unit)	Column subheading [†] (unit)
Row 1 entry	9.12 (2.10)	9.85 (2.45)
Row 2 entry	17.23 (2.50)	17.15 (2.35)
Row 3 entry	16.73 (3.23)	19.12 (3.25)
Row 4 entry	15.68 (2.54)	18.15 (3.15)

Standard errors of the mean are given in parentheses.

* Footnote a.

[†] Footnote b.

smj

Is this a proper table?

Effect of aeration on growth of *Streptomyces coelicolor*

Temp (°C)	No. of Expt.	Aeration of Growth medium	Growth ^a
24	5	+ ^b	78
24	5	-	0

^a as determined by optical density (Klett units).

^b Symbols: +, 500-ml Erlenmeyer flasks were aerated by having a graduate student blow into the bottles for 15 min out of each hour; -, identical test conditions, except that the aeration was provided by an elderly professor.

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The results could read:

“Aeration of the growth medium was essential for the growth of *Streptomyces coelicolor*. At room temperature (24 °C), no growth was evident in stationary (un-aerated) cultures, whereas substantial growth (OD, 78 Klett units) occurred in shaken cultures.”

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How to arrange tabular material

The data should be organised so that the

not across.

like elements read down

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Which is a better table? A or B?

Table A. Characteristics of antibiotic-producing Streptomyces

Determination	S. fluoricolor	S. griseus	S. coelicolor	S.nocolor
Optimal growth temp (°C)	-10	24	28	92
Color of mycelium	Tan	Gray	Red	Purple
Antibiotic produced	Fluoricil-linmycin	Streptomycin	Rhol-mondelay	Nomycin
Yield of antibiotic (mg/ml)	4,108	78	2	0

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Table B. Characteristics of antibiotic-producing Streptomyces

Organism	Optimal growth temp (°C)	Color of mycelium	Antibiotic produced	Yield of antibiotic (mg/ml)
S. fluoricolor	-10	Tan	Fluoricillimyscin	4,108
S. griseus	24	Gray	Streptomycin	78
S. coelicolor	28	Red	Rholmondelay	2
S. nocolor	92	Purple	Nomycin	0

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Illustrations

- Illustrations (also known as figures) are visual representations of the results obtained from a scientific study.
- 2 types of illustrations: graphs and pictorial images

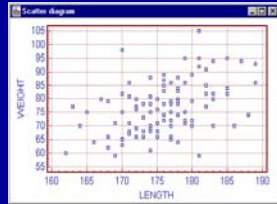
Some common types of graphs

- Scattergram
- Bar chart
- Histogram
- Pie chart
- Line graph
- 3D plot
- Box and whisker plot

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Scattergram

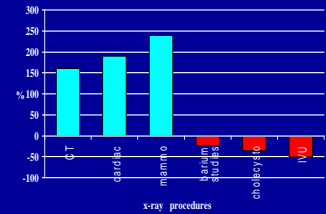
- To present measurements on two (or more) variables that are related; the values of the variables as the y axis are dependent on the values of the variable plotted along the x axis.



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Bar Chart

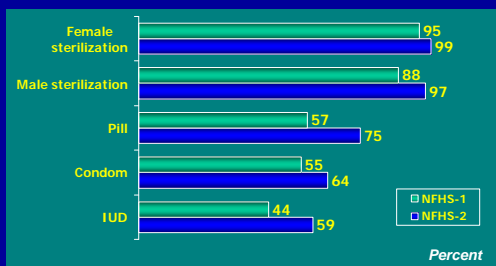
- Used for discrete, grouped data of ordinal or nominal scale.



Trends in some x-ray examinations in Malaysia (1994)

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Which modern methods are most familiar to married women?

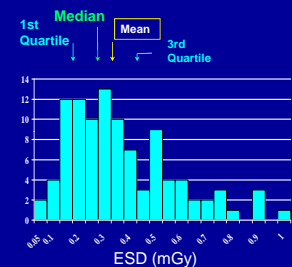


National family health survey 2 - Bihar

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Histogram

- A specialized type of bar chart. Individual data points are grouped together in classes to show the frequency of data in each class.
- High bars indicate more points in a class, and low bars indicate less points.

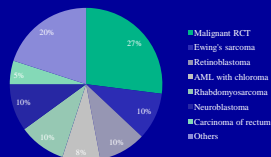


Entrance Surface Dose for Chest PA Examination

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Pie Chart

- Pie charts are used to show classes or groups of data in proportion to the whole data set. The entire pie represents all the data, while each slice represents a different class or group within the whole.
- Each category (slice) should show significant variations.
- The number of categories should be small (3 to 10).



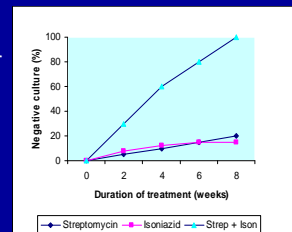
Pie chart shows the distribution of the different types of tumours

(SMJ 2008 49(12):999)

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Line Graph

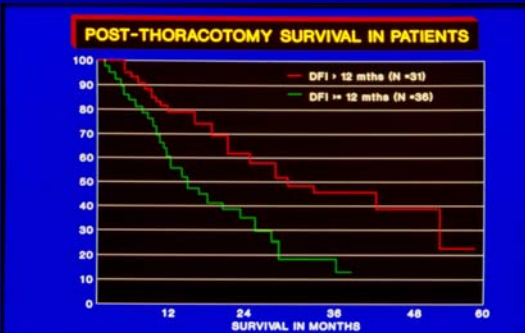
- Similar in some ways to scattergrams, with the condition that the values of the x variable have their own sequence. Those values are a sample from a continuous series, such as time, temperature or pressure.
- May display several dependent variables on the same graph.



Effect of streptomycin, isoniazid, and streptomycin plus isoniazid on *Mycobacterium tuberculosis*

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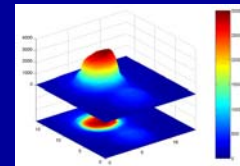
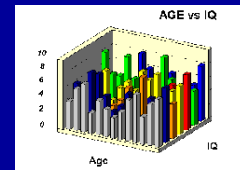
Survival Curve



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3D Plot

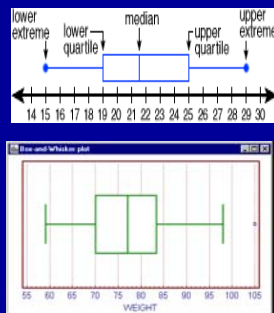
- Plot 3 variables that may be interdependent.
- If the data are grouped use a 3D column chart where the base axes are the 2 independent variables.
- If the dependent data values are a sample from a continuous distribution use a surface plot (continuous surface or as a series of contour lines).



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Box and Whisker Plot

- Display statistical summary of a variable:
 - median,
 - quartiles (hinges),
 - extremes,
 - outliers
- Type of distribution - symmetrical

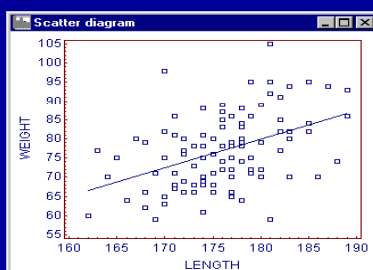


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Other Examples of Graphical Presentations

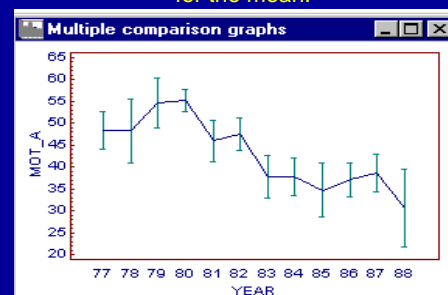
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Scatter Plot with Regression Line



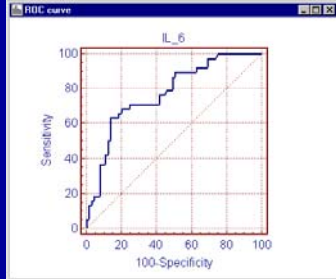
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Chart with the evolution of sperm motility during 12 years. The means for every year are connected by a line. Error bars represent a 95% confidence interval for the mean.

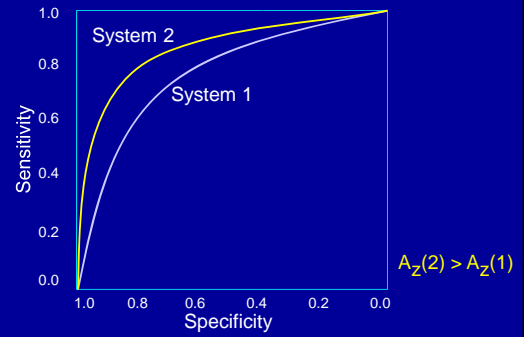


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Receiver Operating Characteristic (ROC) Curve

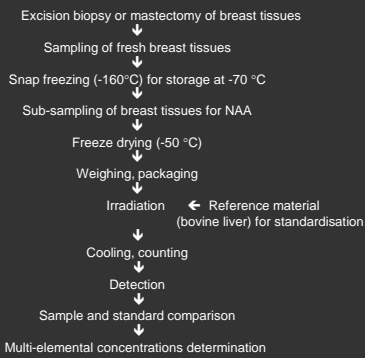


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A set of two ROC curves from two separate display systems showing that System 2 has a superior performance than System 1 for detecting a particular pathology

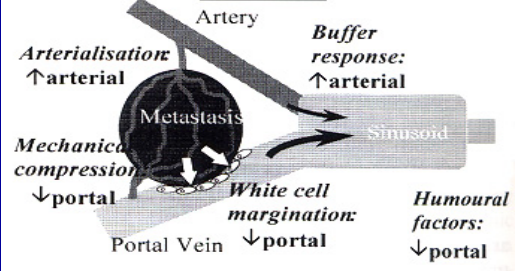
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Flow diagram illustrating the process of multielemental neutron activation analysis of breast tissues.
Ng et al. Brit J Radiol 70: 375-382, 1997

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Altered Hepatic Perfusion with Metastases



Factors contributing to altered hepatic perfusion with metastases

Brit J Radiol 75 Jan, 2002

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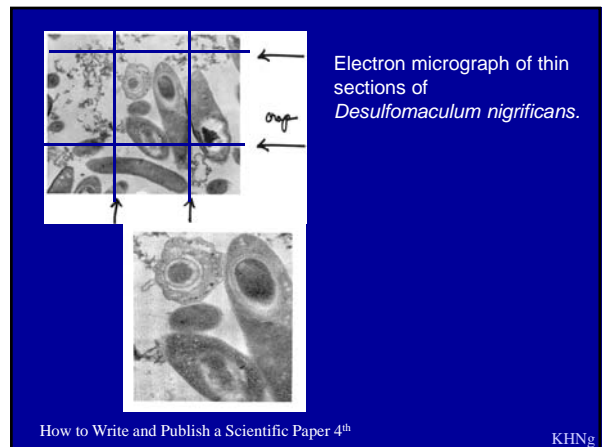
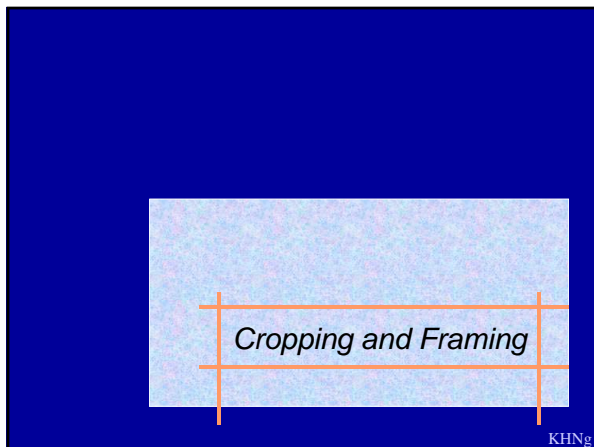
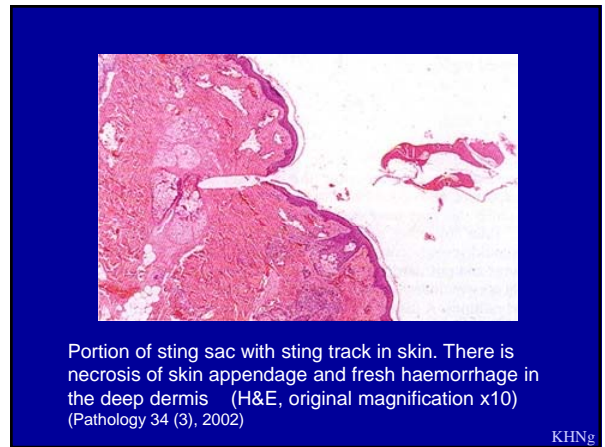
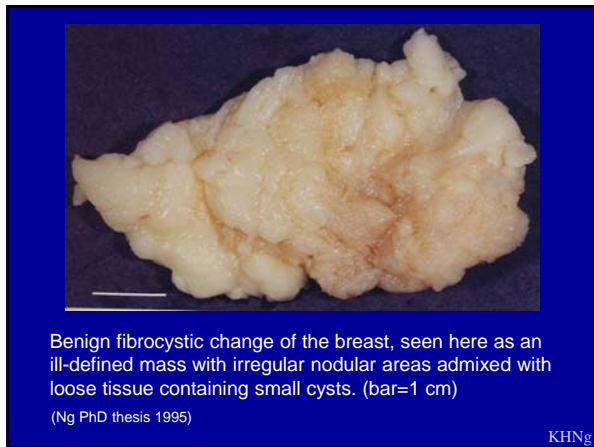
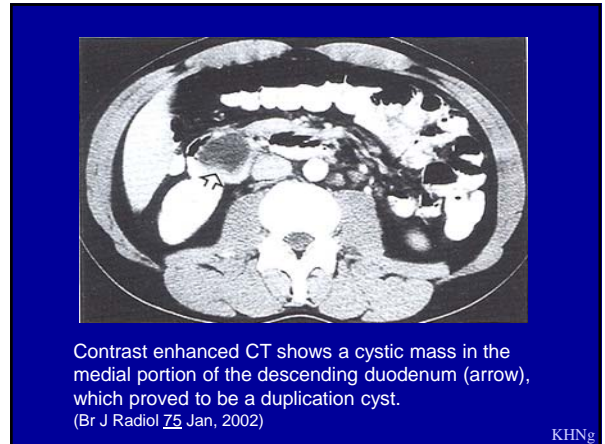


ECG, after correction of hypercalcaemia (Ca^{2+} 8.2 mg/dL), shows normal QTc and no J-waves.
(Sing Med J 2008; 49(2):160-164)

Photographs and Micrographs

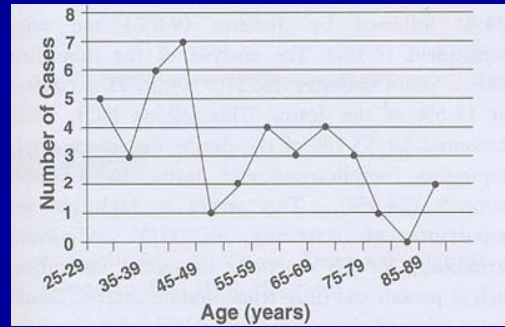


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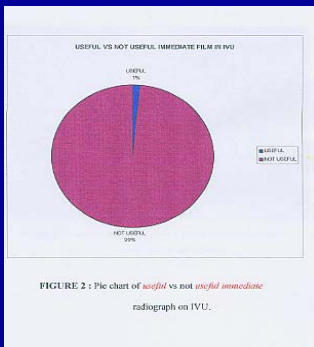
Some Pitfalls of Graphical Presentation

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Age profile of deceased patients treated for TB

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Could be replaced by

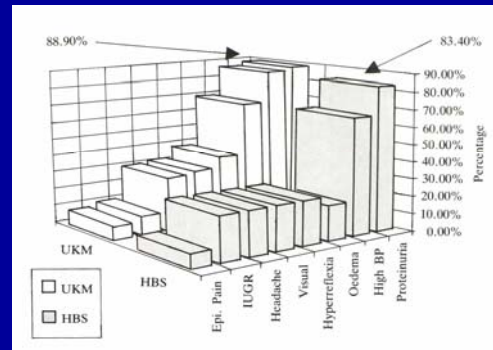
"Only 1% of the immediate films are useful for IVU"

FIGURE 2 : Pie chart of useful vs not useful immediate radiograph on IVU.

Project Report

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Pseudo Perspective Bar Graph



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Defect-free, %

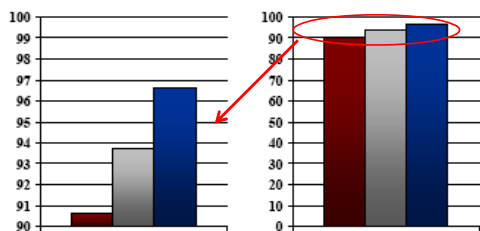


Figure 9. Percent of defect-free Si wafers; ■ is competitive method A; ■ is competitive method B; ■ is our method.

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Rule of Thumb to Remember

Present the data in the text, or in a table, or in a figure.
Never present the same data in more than one way.
(With some exceptions)

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