Alternative Session 6
How to Draw Graphs

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Objectives

On successful completion of this session, you should be able to:

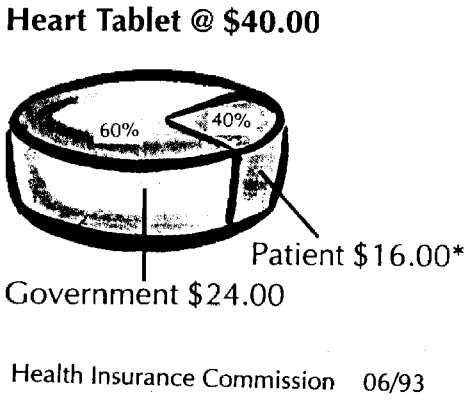
- explain a graph so that another student can draw a copy of that graph;
- explain terms such as nicotine, tar, absorption, nicotine yields;
- explain changes in nicotine levels as shown in graphs;
- write sentences which interpret tables and graphs related to nicotine and tar;
- use a scatter plot for prediction.

Reference to modules

1B, 3A, 4A, 4B and 5A

6.1 Introduction

In writing assignments or reports, or in reading, whether it be from newspapers, books or journals you often need to study, interpret or draw graphs. Graphs must contain clear, precise and meaningful information for the reader. Too often graphs are misinterpreted or are misleading because of an inaccurate or imprecise presentation. Consider the pie graph below.



While data may be accurate, the impression given by the picture does not match the data.

This week you must draw a graph from another students' verbal explanation. These sections are quite important as it relates to your assignment on smoking. You should have studied the readings on p 7.13 – 7.15. (Alternatively have the article read and analysed in the *English for Academic Purposes* class).

Remember a completed copy of this session needs to be handed in with your assignment.

Describing graphs is a good exercise in practising vocabulary and being exact in explanation.

It is important that you answer in sentences so you can practise the **syntax** of the sentences.

6.2 The Problem

In this exercise you are to study one graph carefully. You are then to describe the graph to your partner so that he/she can draw the graph from your description, without looking at your graph.

> Work in pairs when you do the exercise, one student will open his/her books at Graph A and the other will have a blank piece of paper in front of him/her. When complete, reverse roles using Graph B.
>
> You should explain the graphs (orally) in your own words to a partner. Do you understand all the terms?

You must make sure the directions are clear and precise.
(Review vocabulary)

Your partner must have a **neat** and **clear** graph.
(Think of the tools to help you do this)

When you have finished, swap roles with your partner and use the second graph.

When interpreting a graph it is important to be able to read the information accurately and to draw conclusions from the information. When both of these graphs have been drawn accurately, answer the questions which follow each graph.

Graph A

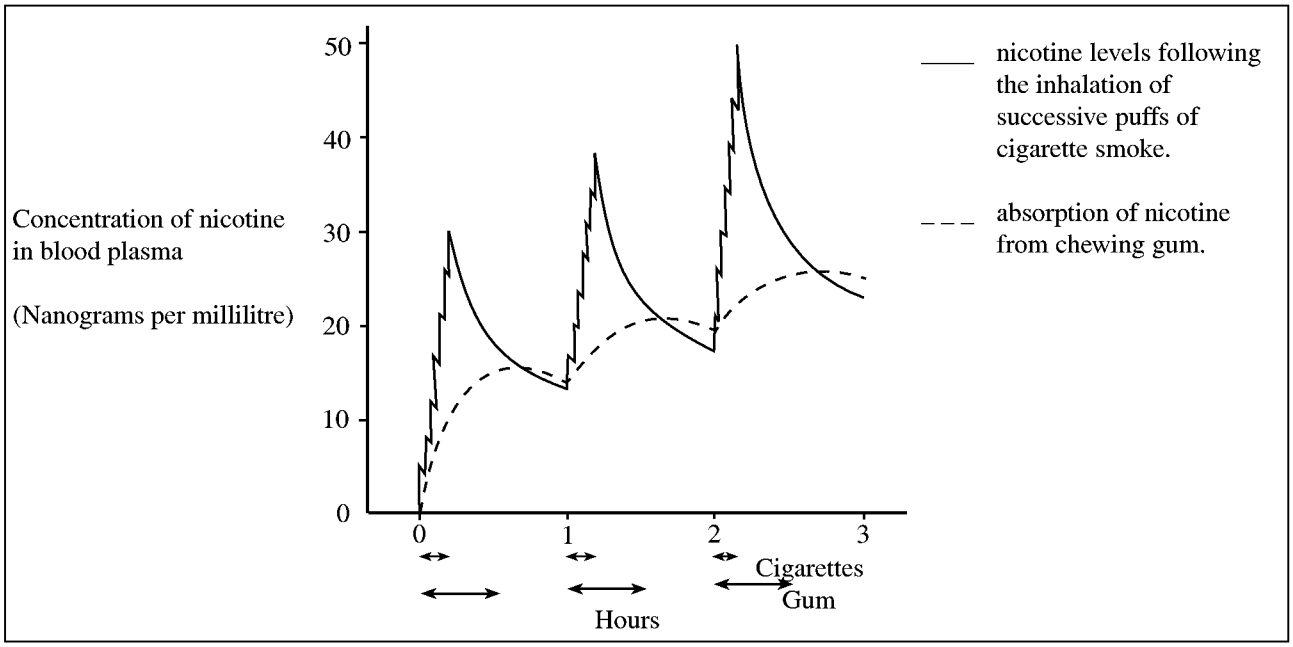


Figure 6. Absorption of nicotine (as measured by the rise in blood levels) with different methods of nicotine administration.

Questions for graph A (work in groups)

Figure 6.1 shows the idealized patterns of nicotine absorption following various methods of administration.

(a) For the above graph define the following

nicotine _____

inhalation _____

absorption _____

blood plasma _____

(b) Below the horizontal axis there are two sets of arrows. Explain what each mean.

_____

_____

(c) After finishing one cigarette, how many nanograms of nicotine are in one mL of blood? _____

(d) If a person had only smoked one cigarette, when would you expect the nicotine levels to be zero? _____

(e) Complete the sentence:

In chewing nicotine gum, the nicotine concentration increases rapidly at first then the rate of increase slows. It reaches a peak _____

_____

_____

Graph B

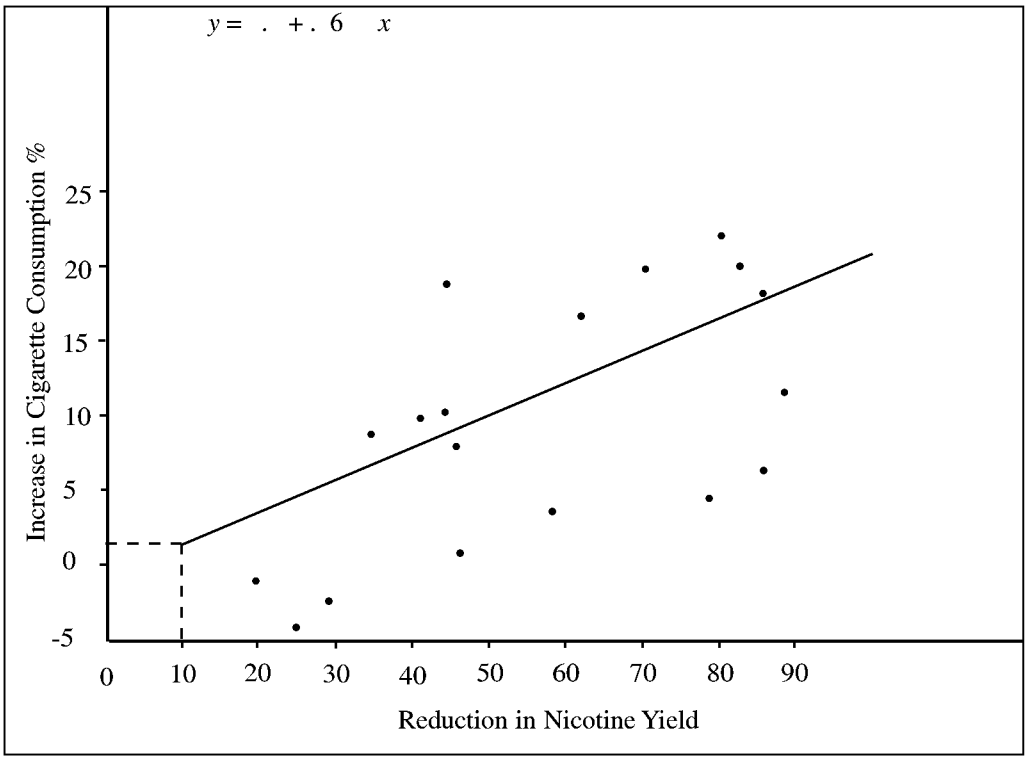


Figure 6. Increase in cigarette consumption related to change in nicotine yields: data from experiments.

From the graph you can see that the greater the reduction in nicotine yield the greater the increase in number of cigarettes smoked. However the increases are relatively small. From the graph, the dotted lines drawn show that 1 % reduction in standard delivery might produce a rise in consumption of only 1%.

Questions for Graph B

Figure 6.2 shows the relationship between changes in nicotine yield and changes in cigarette consumption. While there is a great deal of scatter in the points a trend is clearly apparent.

Use the graph to answer the following questions.

(a) A 5 % reduction in nicotine yield might produce a rise in cigarette consumption of _____%

(b) A person changed from cigarettes containing 2.1mg of nicotine to ones that contained 1.3 mg. What increase in cigarette consumption would you expect?_____

(c) If a person who changed to lower nicotine cigarettes increased consumption from 25 cigarettes per day to 3 cigarettes per day. What reduction in nicotine yield would you expect it to be?_____

(d) The equation in the top left hand corner of the graph is called a regression equation[1] which is the equation to the line of best fit.

(i) What do the variables x and y stand for? _____

(ii) Use the equation to calculate the increase in cigarette consumption in (a) and (b) - do your answers match? _____

(iii) Does your answer to (c) satisify the regression equation?

_____

[1] the regression equation is not covered in your materials, but is an important part of statistics courses

6.3 Mathematics Writing Exercise

1. (a) From Fig. 6.1, describe the changes in nicotine concentration over a three hour period of a person who has smoked 3 cigarettes.

(b) Describe the changes in nicotine concentrations of a person who has absorbed nicotine through chewing gum.

(c) Contrast changes in concentration levels of nicotine of the above two people.

(d) Draw a graph similar to Fig. 6.1 which depicts the changes in nicotine concentrations over a six hour period of either

(i) a heavy smoker or

(ii) a light smoker.

(e) Write a story which matches the graph. (be imaginative!)

2. Below is a table showing the percentage of brands of cigarettes with different levels of tar from 1969 to 1991.

Tar Content Reduction

Tar, nicotine and carbon monoxide levels are tested by the Australian Government Analytical Laboratories.

The amount of tar and nicotine in Australian produced cigarettes has fallen substantially since 1969 as a consequence of campaigns initiated by various anti-smoking groups. Smokers' awareness of the health effects of smoking has stimulated demand for lower tar products.

	Percentage of brands in each range				
Year	1-12 mg	13-18 mg	19-24 mg	Over 24 mg	Brands tested
1969	4	29	53	15	59
1974	18	72	1	nil	61
198	36	6	4	nil	132
1984	65	35	nil	nil	169
1986	8	2	nil	nil	172
1988 [1]	72	22	1	5	2
1991	86	12	nil	2	2 7

Table 6. Tar content by year, 969 to 99

Source: Department of Human Services and Health

[1]All brands registering in the two higher ranges for 988 were imported.

(a) Draw a graph of the information. Consider the following

What are the variables on the *x*-axis? _____; and on the *y*-axis? _____

What scale would you use on the *x*-axis? _____; and on the *y*-axis? _____

(b) Study the four points below which refer to table 6.1 and the graph. Complete the sentences.

- In 1969 the majority of cigarette brands tested in Australia _____ _____.
- As a consequence of anti-smoking campaigns and demands for lower tar products, most Australian cigarette manufacturers _____ _____ to less than 19 mg by 1974. However, the majority of brands produced from 1974 to 198 continued to be _____.
- In August 1982, when tar and nicotine labelling _____ introduced, _____ tobacco industry entered _____ a voluntary agreement _____ the Federal Government in which upper limits of 18 mg _____ tar and 1.6 mg of nicotine _____ cigarette _____ set.
- Since 1984, most Australian cigarette brands have been _____.

3. In groups, study the table below and write 4 comments relating to the table.

	Males by type of smoker			**Females by type of smoker**		
Measures to reduce tobacco use	Never/past smoker	Current smoker	Total	Never/past smoker	Current smoker	Total
Enforce law against serving underage customers	94	91	93	93	9	92
Ban smoking in the workplace	86	53	74	92	67	84
Ban smoking in restaurants	84	49	71	83	42	69
Ban smoking in shopping centres	8	51	69	77	54	69
Ban smoking in pubs/clubs	55	12	39	57	14	42
Ban smoking in the open air public places	21	3	14	22	6	16

Table 6. Percentage who support measures to reduce smoking by types of smokers and gender, 99

Source: 99 National Drug Strategy household Survey.

-
-
-
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As a class

Write the comments on the board and discuss

- the correct English
- the four most suitable points which could be included in a report.

Alternative Session 7
How is Smoking Bad for You?

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