These notes are copies of the overhead transparencies and material worked on the board in lectures, and are intended as a guide to this course.
3 handouts today
- Computing Guide
- Introduction to R
- Article on clinical trials.

(first computing prac is next Monday 9:10 am)

Chapter 1: Introduction

1.1 What is epidemiology?

- No standard definition. Broadly, it is the study of disease and death in human populations.
- Falls into 2 parts: infectious and chronic
- Underpinnings are mathematical.
- Problem: not often experimental
- \[ \rightarrow \text{leads to problems with statistical analysis and interpretation.} \]

In particular, can establish association but not causation.
Common question: is a disease associated with age, sex, ... lifestyle factors and experience, environment, etc.

Greatest achievement of statistical epidemiology:

establishing link between smoking and lung cancer.

Epidemiology encompasses

* environmental epi.
* genetic epi.
* monitoring surgical performance.
Examples of chronic diseases:

- asthma, heart disease, cancer.

- Do radioactive particles cause childhood leukaemia?
  N.S. 19/7

- Are there long-term adverse effects of eating GM crops?
  N.S. 26/7

- Does traffic pollution cause asthma?

- Will wearing ties make you go blind?
Examples of infectious diseases:
measles, malaria, meningitis.

- Which MMR vaccination strategies are optimal?

- Are mosquito nets or insecticides more effective at preventing malaria?

- How great is the threat of bioterrorism? anthrax smallpox
Diseases are global: if you catch a cold in Africa, the first sneeze may be back in Adelaide.

HIV/AIDS one of biggest threats:
- Globally, one of top 5 causes of death.
- Main burden on developing nations.
- Swaziland: infection rate 40% 
  - life expectancy 38 yrs 
  - 10% households headed by children
HIV/AIDS disease progression

HIV infection → seroconversion → antibodies detectable → diagnosis → AIDS → death

- incubation period
  - median ∼ 10 years
  - long and variable
  - treatment effects, AZT, HAART
1.2 Clinical trials: are designed medical experiments.

Avoid difficulties of stat. epi. Also have long history (see handout).

E.g. would prescription heroin prevent long-term drug use?

E.g. does tamoxifen prevent primary breast cancer in women?

The key step is randomization: use of chance to allocate patients to treatments.

Idea: patients differ only by accidents of rand. or the randomizations received.