

# Careers in Biostatistics

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The Children's

Excellence in  
clinical care,  
research and  
education



**Murdoch Childrens  
Research Institute**

*Healthier Kids. Healthier Future.*

# My background

- BSc (Hons), Mathematics & Statistics
- 2½ years work experience in CSIRO
- PhD (including Masters) in Statistics
- 1 year lecturing in Statistics
- 2 years lecturing & research in Biostatistics & Public Health
- 21 years research, teaching & training in:
  - Biostatistics & epidemiology
  - Child & adolescent health
  - Clinical research
  - A little basic biology

# Current positions

- Director, Clinical Epidemiology & Biostatistics, Murdoch Children's Research Institute (Royal Children's Hospital)
  - Involved in numerous research projects (examples⇒)
  - Manage group of statisticians and data management experts
  - Organise training programs
- Professorial Fellow, Centre for MEGA Epidemiology, Melbourne School of Population Health, University of Melbourne
  - Coordinate Master of Biostatistics program

# General themes

- Data, data everywhere...
- Technology both for producing data and for processing it
- ANALYSIS (making sense) of data is not the same as processing it
- Scientific approach required to make sense of data
- Rapid (and continuing) increase in demand for analysis over supply

*“Some people hate the very name of statistics, but I find them full of beauty and interest. Whenever they are not brutalised but handled by the higher methods, and are warily interpreted, their power of dealing with complicated phenomena is extraordinary. They are the only tools by which an opening can be cut through the formidable thicket of difficulties that bars the path of those who pursue the Science of man.”*

Francis Galton, “Natural Inheritance” (1889)

# Importance of statistical ideas

- Provide the logical underpinning of scientific conclusions wherever **comparisons** are made, in the presence of **variability** in the subjects of study
- Important intellectual activity, NOT just analysis of data and presentation of results

# Examples of projects

- Clinical trials: does this treatment (or vaccine) work?
  - Premature babies: e.g. CPAP vs intubation
  - Cystic fibrosis: early detection of lung infections
  - Rotavirus vaccination
- Epidemiological investigations
  - Adolescent health: sex, drugs, alcohol...
  - Barwon Infant Study: early life causes of allergy
  - Longitudinal Study of Australian Children
  - Potential side-effects of rotavirus vaccine
  - Predicting severe illness in sick newborns in developing countries

# COIN: a randomised trial of CPAP or intubation at birth



The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

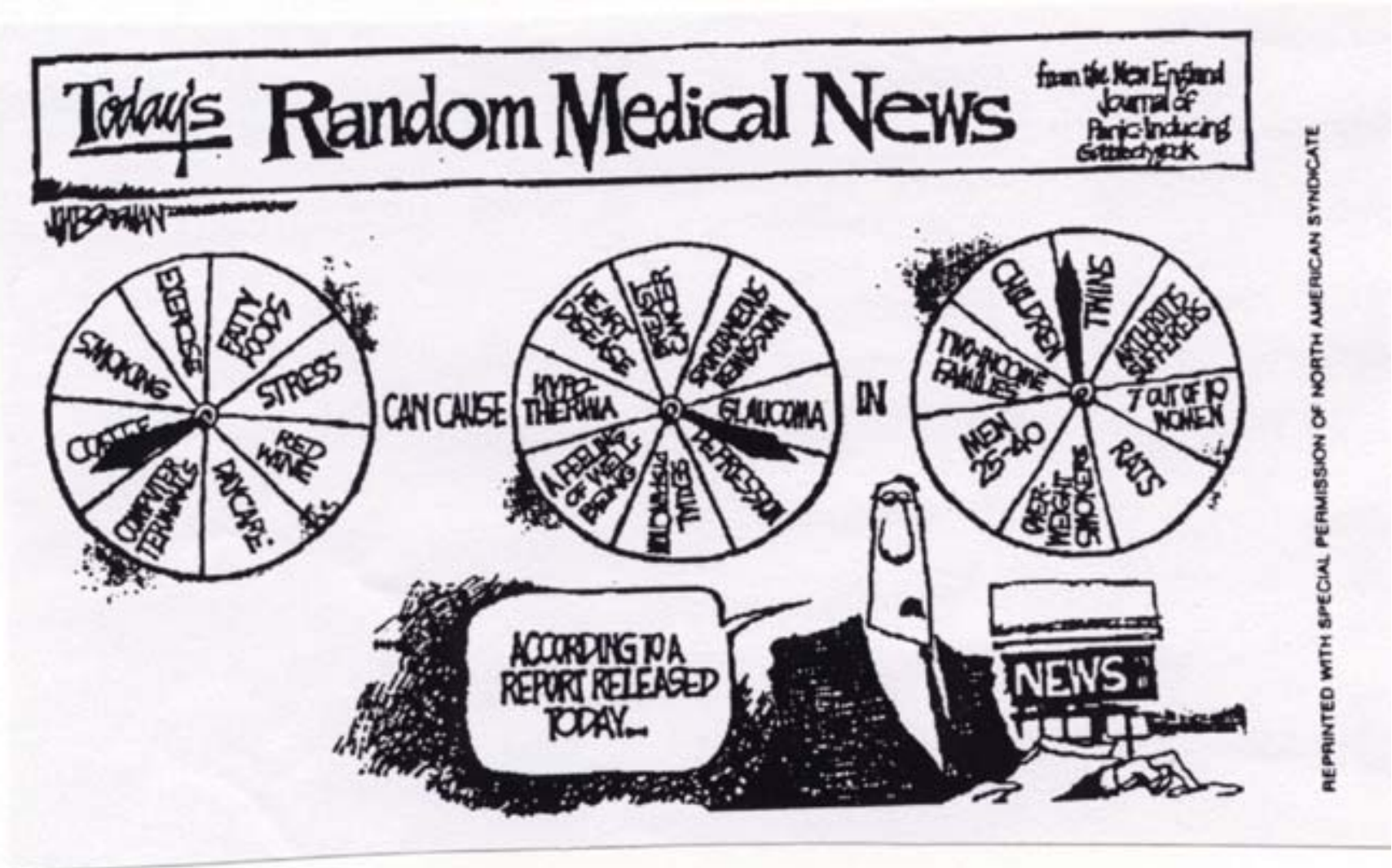
## Nasal CPAP or Intubation at Birth for Very Preterm Infants

Colin J. Morley, M.D., Peter G. Davis, M.D., Lex W. Doyle, M.D.,  
Luc P. Brion, M.D., Jean-Michel Hascoet, M.D., and John B. Carlin, Ph.D.,  
for the COIN Trial Investigators\*

- Very prem babies have poorly developed lungs, need extra oxygen
- How to deliver: a tube to the lungs, or “CPAP”
- Trial (experiment) with 600 babies <28 weeks’ gestation
- Results? Not clearcut! Require careful statistical analysis...



# What we contribute to?



Sterne & Davey Smith, BMJ 2001.

# Summary

- My career: biostatistics & epidemiology  
= the numbers of health and disease
- Attractions:
  - Variety of topics and challenges: ***never bored!***
  - Helping to solve problems of real-world importance
  - ***Earn a big salary***

# And if you don't believe me...

- How about the Chief Economist of Google Corporation:

“I keep saying the sexy job in the next ten years will be statisticians. People think I'm joking, but who would've guessed that computer engineers would've been the sexy job of the 1990s?”

(Hal Varian, The McKinsey Quarterly, January 2009)

# Future prospects

- “Big Data”
  - A buzzword in many areas of science and even in the business world (see next slide)
  - Technology outstripping analytic capacity
- In biomedical research, this growing area (Big biological Data) is known as **bioinformatics**:
  - The science of analysing high-density biological data, e.g. genomic sequences

# What do you need?

- Training generally required at least to Masters level
  - Solid grounding in statistical theory and methods (provides technical skills for modelling variation)
  - Try to gain exposure to real-world problems, e.g. opportunities in medical faculty
  - PhD important for research career
- Important attributes needed
  - Capacity for clear thinking
  - Interest in solving problems
  - Excellent communication!