Wrap-up on study design and statistics

P Vineis

BSc Global Health 14/12/2011


Merry Christmas
www.christmas-greetings.com

Lectures and practicals

Paolo Vineis Study Design introduction

Lea Fortunato Small area studies

Marta Blangiardo Confounding, effect modification

M Chadeau and MC Vergnaud Cohort studies

Queenie Chan Case-control studies

Rachel Kelly Strength of evidence

Aneire Khan and Pauline Sheelbeek Intervention studies

Design: essential concepts

- descriptive vs. analytical
- observational vs. experimental
- definition of cohort study and of case-control study
- advantages and disadvantages of the two study designs

Confounding and interaction (effect modification)

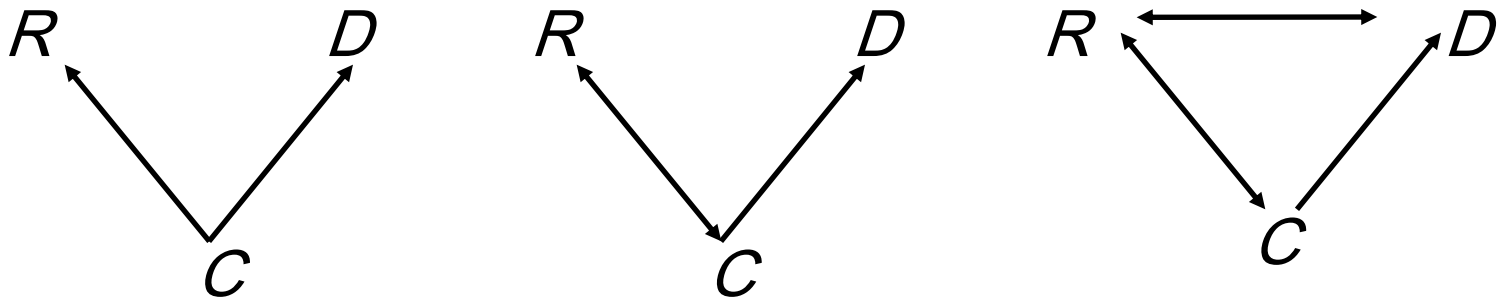
- definition
- how to recognize them
- how to control for confounding
- concept of age standardization

Bias

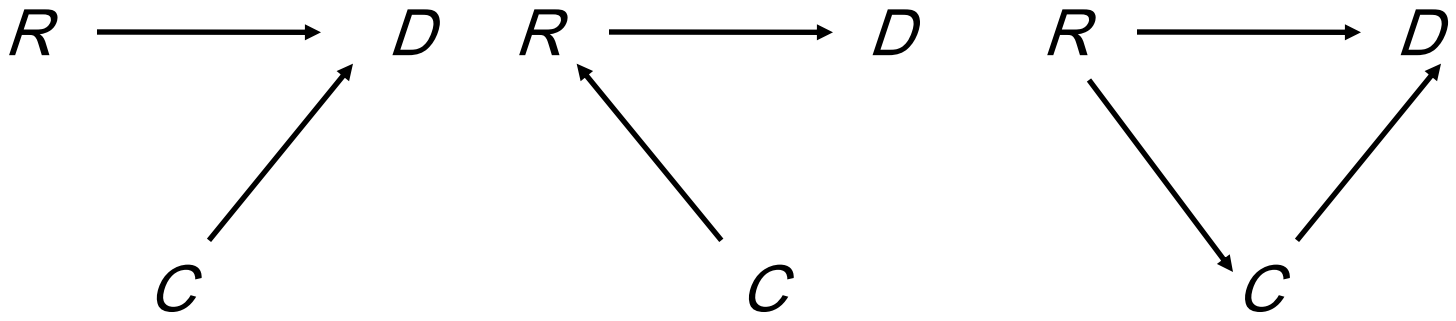
- exposure assessment
- outcome ascertainment
- selection bias
- information bias

Confounding and effect modification

- Situations in which *C* <u>confounds</u> *R* (risk factor)-*D* (disease) relationship



- Situations in which *C* <u>does not</u> confound *R*-*D* relationship



- In bottom-right situation, controlling for confounding factor *C* might destroy *R*-*D* relationship!

Intervention studies

- why to randomize

Data analysis in epidemiology

- concept of rate
- relative risk and odds ratio
- adjusted measures
- power and sample size

Data analysis

Cohort analysis	Exposed (HCWs)	Unexposed (Administrative)
Events	180	60
Person-years	4700	4500
Rate	0.037	0.013

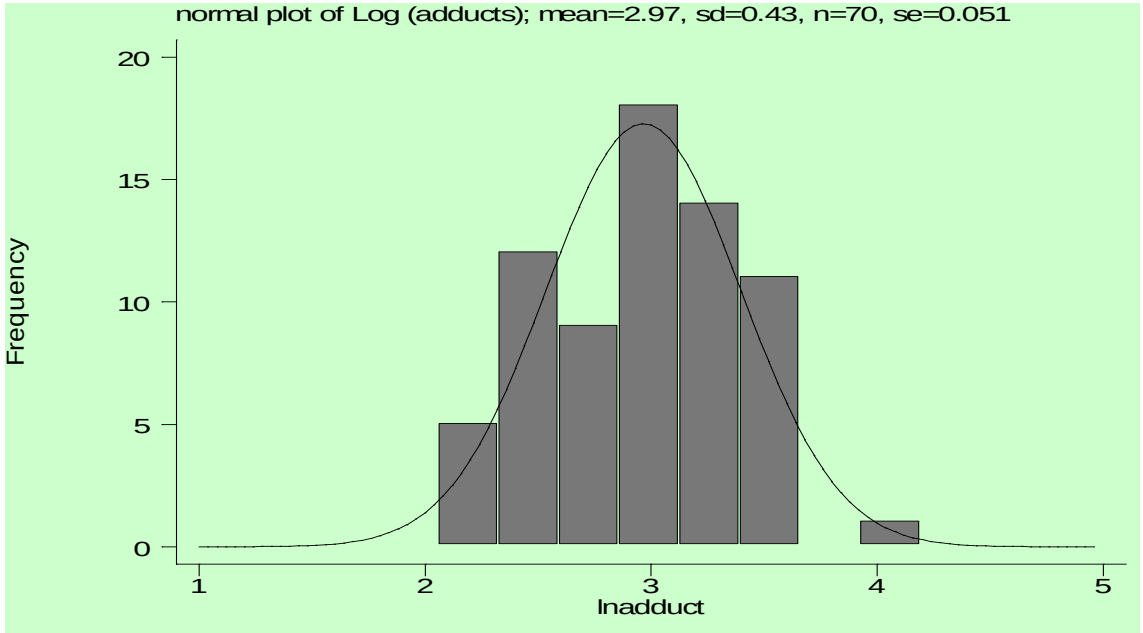
IRR: (180/4700) / (60/4500) = 2.87 (95%CI 2.1- 3.7)

Unexposed and exposed subjects have the same **sampling fraction (10%)**

Cases	180	60
Controls	470	450

OR: (180/470) / (60/450)= (180*450) / (470*60) = 2.87 (95%CI 2.07-4.02)

- SE=SD/ Square root (n)
- mean=2.97, SD=0.43, n=70, SE=0.051
- 95% **confidence interval** for mean of log(adducts) = 2.97+/-1.96*0.051 = (2.87,3.07)
- 95% confidence interval for mean of hpbx = (17.6,21.5)



Sample size & Power Calculation

How large should be the sample to capture a significant effect of exposure (avoid type II error)?

- Expected risk among unexposed (e.g. 5%)
- Expected effect of exposure & variability (e.g. RR 2; RR Upper Bound 3)
- Type I error level (e.g. 95%CI or 90%CI)