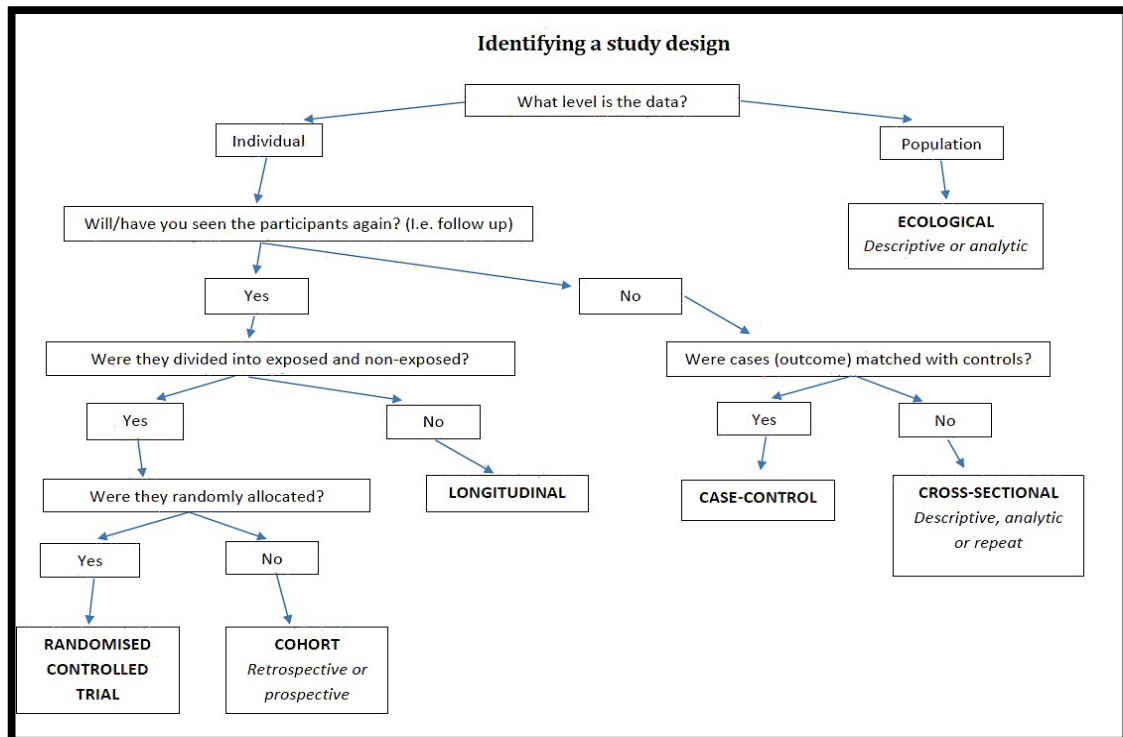HSH205 – Epidemiology and Biostatistics

Topic 1: Why study Epidemiology?
Main Concept
5 ways in which epidemiology contributes to public health and health promotion: 1. Determining the extent of ill health or disease in a community 2. Identifying the cause of ill health and the risk factors for disease 3. Studying the natural history and prognosis of ill health 4. Investigating disease outbreaks or epidemics 5. Evaluating existing and new preventive and therapeutic programs and services 6. Developing the foundation for developing public policy and regulation

Identifying a study design

Topic 1 and 2: Descriptive Epidemiology
Main Concept (1)
Descriptive studies: Focuses on describing: key descriptors of **person, place and place.** ▪ Health states and events ▪ Distribution of health states and events in defined populations ▪ Trends in health states over time ▪ Natural history and prognosis of health states 3 main types of descriptive studies ▪ Cross-sectional ▪ Repeat cross-sectional ▪ Longitudinal

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Main Concept (2)
Sampling and sample quality in descriptive studies:
From population of interest -
1. Sampling frame – Represents population
2. Sample selected using sampling frame – Sampling method
3. Sample recruited – Response rate
4. Data collected – Missing data
Main Concept (3)
High quality descriptive studies:
▪ Defined population
▪ Sampling frame that is an accurate listing of the population
▪ Random sample
▪ High response rate (>70%) and retention rate (where relevant)
▪ Little missing data

Topics 3 – 6: Analytical Epidemiology
Main Concept (1)
Analytical studies:
▪ Designed to answer **WHY** questions: Is the study factor a cause of (or risk factor for, or protective against) the outcome?
▪ Involve comparisons between groups 2 x 2 tables principal tool for comparisons
- Exposed to outcome
- Unexposed to outcome
Main Concept (2)
2 main branches of analytical studies:
Observational
▪ Analytical Cross-Sectional
▪ Ecological
▪ Cohort
▪ Case-Control
Experimental
▪ RCT's
▪ Community Or Cluster Trials

Topic 7: Data Collection
Main Concept (1)
Measurement in epidemiology:
Levels of measurement:
▪ Nominal
▪ Ordinal
▪ Interval
▪ Ratio

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Main Concept (2)
Data Collection Methods: ▪ Questionnaires ▪ Records / registries ▪ Diaries ▪ Physiological measures ▪ Environmental physical and / or chemical analysis

Topic 8: Association and Causation
Main Concept (1)
Data quality: ▪ Reliability ▪ Validity ▪ Precision
Main Concept (2)
How is data quality measured? ▪ Random error ▪ Sampling error ▪ Sample size and error ▪ An apparent association or lack of association may be the result of bias, confounding or chance rather than causal ▪ Bias can be minimised by good study design ▪ Confounding can be controlled through study design and/or analysis ▪ Likelihood that an association is causal can be assessed
Main Concept (3)
Systematic error or bias ▪ Systematic errors in a study due to way in which participants are chosen for study and/or retained in study ▪ Two main types of systematic error: selection bias and measurement bias ▪ Systematic error resulting from way in which measures of exposure and/or outcome are made: - Differential and non-differential misclassification
Main Concept (4)

Confounding
▪ Comparing groups which are unequal for another variable so that estimate of effect of exposure on outcome of interest is distorted because it is mixed with the effect of an extraneous factor
▪ To be a confounder the extraneous factor must:
   - be a risk factor for the outcome of interest
   - be associated with the exposure of interest
   - not be on the casual pathway

Main Concept (5)
Determining cause and effect ▪ Hill's criteria for causation ▪ Rule out bias, confounding, chance