Bias – Two broad categories are selection in which errors arise due to differences in how groups are collected and information which is due to misclassification of subjects in the group

- Healthy Worker Effect – Employed people more likely to be healthy than unemployed
- Allocation Bias – Patients selectively placed into groups
- Recall Bias – Information based on individuals memory influenced by intentional and unintentional factors
- Survivor Bias – Losses to follow up in cohort studies and those who remain differ from those that are left
- Publication Bias – Studies chosen as results are statistically significant, larger, more interesting or benefit publisher. Looking for just what you want

Cohort Studies
Recruit disease free individuals, classify based on exposure and monitor disease progress; can be prospective where exposure is determined on follow up or retrospective where it is determined by past records

Advantages – Good for rare exposures, studying multiple outcomes & establishing temporal sequence and gives relative (IRR) & absolute (IR) risk

Disadvantages – Poor for rare outcomes, expensive, time consuming, problems with confounding, risk of follow up loss

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<thead>
<tr>
<th>Cases (Diseased)</th>
<th>Controls (Non-Diseased)</th>
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<tbody>
<tr>
<td>Exposed</td>
<td>a</td>
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<tr>
<td>Unexposed</td>
<td>c</td>
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Analysis of cohort study:
- Calculate IRR
- Calculate error factor
- Calculate confidence intervals
- Comment on null hypothesis, p-Value & statistical significance

Analysis of case control study:
- Calculate odds ratio
- Calculate error factor
- Calculate confidence intervals
- Comment on null hypothesis, p-Value & statistical significance

Randomised Control Trial
Patients randomly allocated to new treatment or old treatment/placebo, randomisation removes confounding by assumption that an equal number of confounding factors are in each group; double blinding is used where possible to remove selection bias. Outcomes measured on ‘intention to treat’ basis meaning patients are still included in the data if they leave the trial. Losses minimised by practical follow up, no coercion and honesty to patients. Compliance maximised by simplified instructions, allowing patients to ask questions and simple & accessible patient involvement.

- Placebo Effect – Even if therapy is irrelevant to condition the attitude towards the illness and the illness itself are improved by something being done about it. Placebo must be identical to other treatment in all aspects but the active ingredient

Meta-Analysis
Analysis of results of two or more primary studies that assessed the hypothesis in the same way. Good as they provide an overall figure for studies, quickly assimilate lots of information for health care professionals and reduce time between research discovery & implementation in clinical use

- Forest Plot – Square size is proportional to weighting of individual studies, the diamond is the pooled odds ratio & its edges represent confidence intervals; the solid line is the null hypothesis.
- Funnel Plots – Assessment of studies used, a well-balanced review has studies evenly distributed throughout funnel shape.