to ascertain whether exposure to a certain factor is likely to cause specified events. Prospective cohort studies (which track participants forward in time) are more reliable than retrospective cohort studies.

Case-control study

A case-control study involves identifying people with a disease or condition (cases) and people from the same population who do not have that disease or condition (controls) and looking at how exposure to a suspect agent differed between the two groups. The exposure could be an environmental factor, a behavioural factor, or exposure to a drug or other therapeutic intervention. Case-control studies are retrospective (i.e. look back in time), whereas cohort studies are usually prospective (i.e. look forward in time).

A case-control study can be used to identify risks and trends and suggest possible causality for a disease or a particular outcome (e.g. adverse drug effect).

Case-control studies can generate odds ratios (ORs) only, not relative risk (RR).

Terminology[4–7]

Absolute risk

Absolute risk is the probability that a person will experience a specified outcome during a specified period.

In contrast with common usage, the word 'risk' may refer to adverse events (such as myocardial infarction) or desirable events (such as cure).

Absolute risk difference

Absolute risk difference is the difference in absolute risk of an outcome between the control group and the treatment group. This may be an absolute risk increase (ARI) or an absolute risk reduction (ARR).

An absolute risk difference of zero indicates no difference between the groups.

ARI is used when the risk in the treatment group exceeds the risk in the control group. It is calculated by subtracting the AR in the control group from the AR in the treatment group.

ARR is used when the risk in the control group exceeds the risk in the treatment group. It is calculated by subtracting the AR in the treatment group from the AR in the control group

Bias

Bias refers to systematic deviation of study results from the true results due to the way(s) in which the study is conducted. It can arise from systematic differences in the groups that are compared (selection bias); the care that is provided or exposure to other factors apart from the intervention of interest (performance bias); withdrawals or exclusions of people entered into the study (attrition bias); or how outcomes are assessed (detection bias). Bias does not necessarily carry an imputation of prejudice, such as the investigators' desire for particular results.

Confidence interval

The range of values within which the true value for a population (as estimated by subjects in studies) is likely to lie is called the confidence interval (CI). Most often a 95% confidence interval is calculated. If, for example, the relative risk (as measured in a study) of breast cancer after five years' HRT use is calculated as RR = 3.0 (95% CI: 2.5–3.8), this is interpreted as meaning that there is a 95% chance that the true relative risk lies somewhere in the CI range of 2.5–3.8. If the CI includes 1.0 in its range—e.g. RR = 3 (95% CI: 0.8–3.4)—the estimated RR is not statistically significant at that probability.

Cost–benefit analysis

Cost–benefit analysis assesses whether the cost of an intervention is worth the benefit by measuring both in monetary units.

Cost-effectiveness analysis

Cost-effectiveness analysis measures both costs and benefits of alternatives that have a common health outcome (e.g. stroke) to find the strategy with the best ratio of benefits to costs. Results are reported as cost per unit effect (e.g. cost per episode of stroke prevented).

Cost-minimisation analysis

Cost-minimisation analysis calculates the cost of two or more alternatives that have the same outcome in order to identify the lowest cost option. With medicines, this type of evaluation usually involves comparing efficacy and safety.

Cost–utility analysis

Cost–utility analysis provides a common unit of measurement when options being compared have different outcomes. Outcome measures involving length and quality of life such as quality-adjusted life-years (QALYs) are used. Results are often expressed as cost per QALY gained.

Direct and indirect costs

Direct costs can be directly associated with resource use for a health service or commodity. 'Indirect costs' often refers to productivity losses.