

Evidence-based medicine: the basics

Australian pharmacists obtain much of their clinical information from a trusted hierarchy of publishers such as the Therapeutic Guidelines Group and the *Australian Medicines Handbook* and bodies such as the Pharmaceutical Society of Australia, the National Prescribing Service and the Department of Veterans' Affairs. Information from these sources and peak body clinical guidelines has been critically appraised using evidence-based medicine (EBM) principles and is presented in a manner that facilitates its application to individual patients.

Clinical decisions should not be based solely on evidence, however; they should be an integration of:

- the best available evidence
- professional judgment to interpret the relationship between clinical trial participants and individuals in your care
- consideration of patient factors.

Following are some definitions and principles of EBM to assist in the interpretation of trusted clinical information.

Levels of evidence^{1,2}

Evidence can be graded according to its level, quality, relevance and strength. The 'level' of evidence refers to the design of the study used to obtain the evidence. The National Health and Medical Research Council's levels of evidence have been interpreted as:

- I a quality systematic review of two or more randomised control trials
- II well designed randomised controlled trial
- III-1 well-designed pseudo-randomised controlled trials
- III-2 cohort studies
- III-3 comparative studies
- IV case series.

Study types³

Randomised controlled trial

A Randomised Controlled Trial (RCT) with adequate statistical power is considered the gold-standard study design to measure the effects of an intervention. Subjects are randomly allocated to receive either an intervention or a control (e.g. placebo or standard treatment). Randomisation minimises the likelihood that the effects observed are due to factors other than

the intervention. Clinical trials are designed to have one or more endpoints. An endpoint is a measure that determines whether the intervention under study has an effect (e.g. whether a tumour shrinks after receiving chemotherapy).

Blinded study

One commonly used RCT is a blinded study. Blinding is a measure taken to avoid bias. It involves not disclosing which subjects in a study are allocated to which procedure (treatment). If both the experimenter and the subjects are unaware of the treatment allocation, the study is double blind. If, in addition, the statistical analysis is done in ignorance of the group to which subjects belong, the study is sometimes described as triple blind.

Systematic review

Systematic review involves the systematic location and appraisal of studies to allow the evidence from multiple studies to be combined. Systematic reviews are distinct from traditional literature reviews in that they are based on a strict scientific design to minimise bias and ensure reliability. When studies are similar in terms of the study question addressed and methods used, and are not statistically heterogeneous, results from the studies may be combined to calculate a summary estimate of effect.

Systematic review is particularly useful when no large RCTs exist, but a number of small RCTs have been conducted. Systematic reviews that use good quality RCTs are considered high-level evidence.

Not all published systematic reviews have been produced with meticulous care; therefore the findings may sometimes be misleading.

Meta-analysis

Meta-analysis is statistical technique that uses quantitative methods to synthesise and summarise the results of several studies in a single weighted estimate, in which more weight is given to results from higher quality studies. It is the statistical method usually used in systematic review.

Cohort study

A cohort study involves two groups (cohorts) of patients, one which receive the exposure of interest (e.g. smoking) and one which does not, then following these cohorts to observe for the outcome of interest (e.g. lung cancer). Cohort studies are useful when trying