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Cohort Studies, Case Control Studies & RCTs

Cohort studies, case control studies and randomized controlled trials, different in design, are useful for different types of questions.

When people read about a research study, they may not pay attention to how the study was designed. But to understand the quality of the findings, it's important to know a bit about study design.

According to the widely-accepted hierarchy of evidence, the most reliable evidence comes from systematic reviews, followed by evidence from randomized controlled trials, cohort studies and then case control studies.

The latter three are research studies that fall into one of two main categories: observational studies or experimental studies.

Observational studies:

Observational studies are ones where researchers observe the effect of a risk factor, diagnostic test, treatment or other intervention without trying to change who is or isn't exposed to it. Cohort studies and case control studies are two types of observational studies.

> **Cohort study:** For research purposes, a cohort is any group of people who are linked in some way. For instance, a birth cohort includes all people born within a given time frame. Researchers compare what happens to members of the cohort that have been exposed to a particular variable to what happens to the other members who have not been exposed.
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> **Case control study:** Here researchers identify people with an existing health problem ("cases") and a similar group without the problem ("controls") and then compare them with respect to exposure.

Experimental studies:

Experimental studies are ones where researchers introduce an intervention and study the effects. Experimental studies are often randomized, meaning the subjects are grouped by chance.

Randomized controlled trial (RCT): Eligible people are randomly assigned to two or more groups. One group receives the intervention (such as a new drug) while the control group receives nothing or an inactive placebo. The researchers then study what happens to people in each group. Any difference in outcomes can then be linked to the intervention.

Strengths and weaknesses:

The strengths and weaknesses of a study design should be seen in light of the kind of question the study sets out to answer. Sometimes, observational studies are the only way researchers can explore certain questions. For example, it would be unethical to design a randomized controlled trial deliberately exposing workers to a potentially harmful situation. If a health problem is a rare condition, a case control study (which begins with the existing cases) may be the most efficient way to identify potential causes. Or, if little is known about how a problem develops over time, a cohort study may be the best design.

However, the results of observational studies are, by their nature, open to dispute. They run the risk of containing confounding biases. Example: A cohort study might find that people who meditated regularly were less prone to heart disease than those who didn't. But the link may be explained by the fact that people who meditate also exercise more and follow healthier diets. In other words, although a cohort is defined by one common characteristic or exposure, they may also share other characteristics that affect the outcome.

The RCT is still considered the "gold standard" for producing reliable evidence because little is left to chance. But there's a growing realization that such research is not perfect, and that many questions simply can't be studied using this approach. Such research is time-consuming and expensive — it may take years before results are available. Also, intervention research is often restricted by how many participants researchers can manage or how long participants can be expected to live in controlled conditions. As a result, an RCT would not be the right kind of study to pick up on outcomes that take a long time to appear or that are expected to affect a very minute number of people.