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<th>TYPES OF RESEARCH: A QUICK GUIDE</th>
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**Peer Review**

An editorial process used by certain journals to evaluate research articles or studies submitted for publication. A panel of experts (peers) anonymously assesses the methodological quality, pertinence, value, etc. of submissions, often offering suggestions for revision before making a final decision to reject or accept them. Journals using this process are called peer reviewed (or refereed).

**Primary Research**

An investigation that collects original (primary) data. In scientific and medical research, the study data are then published in a scholarly journal as a primary research study. The authors of the article reporting the study results are also the principal investigators who conducted the research. One example of a primary research study is a randomized controlled trial. (See below.)

**Secondary Research**

Presents a discussion, summary, analysis or review of primary research. Examples of secondary research from the medical field are systematic reviews and meta-analyses. (See below.)

**Quantitative Research**

Studies things that can be counted, and often uses statistical manipulations to process data and summarize results. The main types of quantitative research are: descriptive; correlational/predictive; quasi-experimental/experimental; single-subject; and meta-analysis.

**Qualitative Research**

"[D]erives data from observation, interviews, or verbal interactions and focuses on the meanings and interpretations of the participants." Qualitative studies, such as case studies or case reports, are conducted with no control group involved.

**Literature Review**

A type of secondary research that assesses the research methodologies and significance of a collection of primary research studies on a given topic. State-of-the-art reviews address more current subjects.

**Systematic Review**

Begins with a clearly formulated question and uses systematic methods to identify, select and critically appraise relevant research studies; data from the studies that are included in the review are then collected and analyzed. Statistical methods, such as meta-analysis, may or may not be used in the analysis of results.

**Meta-analysis**

A statistical technique that summarizes the results of several studies into a single estimate of their combined result. It is a key element of many systematic reviews. It is also what is meant by the phrase, "pooling data."

**Epidemiological Study**

An observational study methodology designed to examine associations and commonly hypothesized causal relations. Usually concerned with identifying or measuring the effects of risk factors or exposures. The most common epidemiological study types are cohort, cross-sectional, and case-control studies.

**Cohort Study**

An epidemiological study that looks for a specific disease or outcome of interest in relation to a particular exposure. Investigators identify study subjects (cohorts) who have had a specific exposure (e.g. smoking) and who may be at risk for, but are not known to have, the outcome of interest (e.g. emphysema). The cohorts are followed over time, often for years, and outcomes are compared.
- A prospective cohort study recruits participants with and without the exposure and measures the baseline variables of interest before any outcomes occur, i.e. it follows participants from exposure forward.
- A retrospective (or historical) cohort study identifies participants with the exposure of interest from past medical records; participants are then followed to the present/future to determine outcome.

**Cross-Sectional Study**

An epidemiological study that examines the relationship between diseases (or other health related characteristics) and other variables of interest as they exist in a defined population at one particular time. The temporal sequence of cause and effect cannot necessarily be determined in a cross-sectional study. This contrasts with longitudinal studies which are followed over a period of time.
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<th><strong>Case-Control Study</strong></th>
<th>An epidemiological study that compares people with a <strong>specific disease or outcome of interest (cases)</strong> to people from the same population without that disease or outcome (<strong>controls</strong>). Such studies seek to find associations between the outcome and prior exposure to particular risk factors. This design is particularly useful where the outcome is rare and past exposure can be reliably measured. <strong>Case-control studies</strong> are usually <strong>retrospective</strong> (working from outcome to exposure).</th>
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<td><strong>Case Study and Case Series</strong></td>
<td>A <strong>case study</strong> (or <strong>case report</strong>) reports on a single example which is generally an “interesting” or “unusual” patient or situation. A <strong>case series</strong> is a study reporting on a consecutive collection of patients treated in a similar manner.</td>
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| **Clinical Trial: Phase I, II, III, IV** | Studies of the safety, efficacy, or optimum dosage schedule of one or more diagnostic, therapeutic, or preventive interventions in humans. Study participants are selected according to predetermined criteria of eligibility and are observed for predefined evidence of favorable and unfavorable effects.  
  - **Phase I trials** usually involve @20-80 healthy volunteers to determine an intervention's safety, safe dosage range, and metabolic activity.
  - **Phase II trials** are controlled trials in @100-300 volunteer patients (with disease) to determine the intervention's efficacy and adverse reactions.
  - **Phase III trials** are larger controlled trials in @1,000-3,000 patients to verify the intervention's efficacy and monitor adverse reactions during longer-term use.
  - **Phase IV trials** monitor long-term effects and provide additional information on safety and efficacy, including different regimens for patient groups. |
| **Controlled Clinical Trial** | Involves one or more test treatments, at least one control treatment, specified outcome measures for evaluating the studied intervention, and a bias-free method for assigning patients to the test treatment.  
  - **Control measures** include placebos, active medicines, no-treatment, dosage forms and regimens, historical comparisons, etc.
  - **Methods for assigning patients** to the best treatment include: coin flips, odd-even numbers, patient social security numbers, days of the week, medical record numbers, or other such pseudo- or quasi-random processes. |
| **Randomized Controlled Trial (RCT)** | The same as a **controlled clinical trial**, except more rigorous mathematical techniques, such as the use of a random-numbers table or computer-generated numbers, are used for randomization of study participants. |
| **Cross-Over Study** | Compares two or more treatments or interventions in which the subjects or patients, upon completion of the course of one treatment, are switched to another. In the case of two treatments, A and B, half the subjects are randomly allocated to receive these in the order A, B and half to receive them in the order B, A. A criticism of this design is that effects of the first treatment may carry over into the period when the second is given. |
| **N of 1 Study** | A type of **clinical trial** involving a single patient, and resulting in a single case study. An **N of 1** study can be a **randomized controlled trial** if the order in which an experimental and a control intervention are given to a patient is determined by random allocation. The order of experimental and control interventions can also be fixed by the researcher. |

**Note:** Many of the definitions above are based on the National Library of Medicine’s Medical Subject Headings (MeSH) Browser at [http://www.nlm.nih.gov/mesh/MBrowser.html](http://www.nlm.nih.gov/mesh/MBrowser.html).