Study Classification

I. By Purpose

- **Descriptive**: Describes characteristics or events.

Example: Prevalence of TBI in a population.

- **Analytical**: Tests hypotheses and looks for associations.

Example: Smoking and glioblastoma correlation.

- **Exploratory**: Investigates new or poorly understood areas.

Example: Unusual symptoms in post-COVID patients.

- **Explanatory**: Attempts to explain mechanisms or causation.

Example: Role of IDH mutation in glioma prognosis.

II. By Design

A. Observational Studies

- **Cross-sectional**: One-time snapshot.

Pros: Fast, low-cost.

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  _Cons_: No temporal or causal inference.
* **Case-control**: Retrospective, comparing affected vs. unaffected.
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  _Pros_: Good for rare diseases.
  _Cons_: Recall and selection bias.
* **Cohort**: Follows exposed vs. unexposed over time.
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  _Pros_: Strong evidence for causality.
  _Cons_: Expensive, long-term.
* **Ecological**: Based on group/population data.
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  _Note_: Risk of ecological fallacy.
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B. Experimental Studies

- **Randomized Controlled Trial (RCT)**: Gold standard for intervention studies.
- **Non-randomized Trial**: Allocation not random; higher risk of bias.
- **Crossover Trial**: Same subjects receive all interventions in sequence.

III. By Timing

- **Prospective**: Follows subjects into the future.
- **Retrospective**: Uses past data to analyze outcomes.
- **Ambispective**: Combines both.

IV. By Data Type

- **Quantitative**: Numerical data (e.g., lab results, scores).
- **Qualitative**: Textual/descriptive (e.g., interviews, observations).
- **Mixed Methods**: Combination of both.

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Last update: **2025/06/03 10:09**