

Prospective observational study

An **observational study**, often **longitudinal** in nature, for which the consequential outcomes of interest occur after study commencement (including the creation of a study protocol and analysis plan, and study initiation).

Classification

Prospective observational studies collect data **forward in time** without intervening. They are a key design for real-world clinical research.

□ Main Subtypes of Prospective Observational Studies

1. Prospective Cohort Study

- Follows a defined group (**cohort**) over time.
- Groups may be based on exposure or risk.
- Outcomes are observed without intervention.
- Example: 100 elderly patients undergoing neurosurgery for brain metastases, followed for complications.

2. Registry-Based Prospective Study

- Data collected through **multi-institutional registries**.
- Reflects real-world practice.
- May include various exposures and outcomes.
- Example: Registry of CNS metastases patients receiving different treatments.

3. Prospective Case Series

- Descriptive follow-up of similar patients.
- No comparison group.
- Example: Series of patients undergoing awake craniotomy.

4. Prospective Case-Control Study

- Participants selected based on **future outcomes**.
- Past exposures compared retrospectively.
- Often nested within a cohort.
- Example: Patients who develop radiation necrosis vs. those who don't.

5. Prospective Longitudinal Study

- Repeated measures over time.

- Focus on temporal evolution (e.g., function, biomarkers).
- Example: Tracking cognition for 12 months after surgery.

Summary Table

Subtype	Groups Compared?	Outcome Over Time?	Intervention?	Typical Use
Prospective Cohort study	Yes	Yes	No	Exposure-outcome analysis
Registry-Based study	Optional	Yes	No	Real-world multicenter data
Prospective Case Series	No	Yes	No	Descriptive outcomes
Prospective Case-Control	Yes	Retro from outcome	No	Risk factors (nested case-control)
Prospective Longitudinal study	No/Optional	Yes (repeated)	No	Tracking change over time

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