

# Types of Observational Study

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**Prospective Study** (Clinical Trials, Cohort Studies): exposed and un-exposed groups are identified and followed over time to compare incidence of disease.

**Retrospective Study** (Case-Control Study): diseased and disease-free subjects are identified and their exposure history investigated.

**Cross-sectional Study:** Sample of  $n$  subjects of unknown disease and exposure status is identified and disease status and prior exposure status are assessed simultaneously.

		Disease Status		
		$D$	$\bar{D}$	
Exposure Status	$E$	$n_{11}$	$n_{12}$	$n_{1+}$
	$\bar{E}$	$n_{21}$	$n_{22}$	$n_{2+}$
		$n_{+1}$	$n_{+2}$	$n$

	<u>Prospective</u>	<u>Retrospective</u>	<u>Cross-sectional</u>
Row totals:	fixed	random	random
Col. totals:	random	fixed	random
Grand total:	fixed	fixed	fixed

Longitudinal study:

A longitudinal study is an observational research method in which data is gathered for the same subjects repeatedly over a period of time. Longitudinal research projects can extend over years or even decades.

Case controls studies	Cohort studies
Direction of inquiry from effect to cause	Direction of inquiry from cause to effect
Starts with the disease	Starts with people exposed to the risk factor or suspected cause
Usually the 1 <sup>st</sup> approach to the testing of hypothesis, but also useful for exploratory studies	Reserved for the testing of precisely formulated hypothesis
Fewer study subjects	Larger number of subjects
Quick	Long follow-up, delayed results
Suitable for rare diseases	Inappropriate when disease or exposure under investigation is rare
Generally, yields only Odds ratio	Yields incidence rates, relative risk, attributable risk
Cannot yield information about disease other than that under study	Can give information about more than one disease outcome
Inexpensive	Expensive



## Longitudinal vs. cross-sectional studies

Comparators	Longitudinal	Cross-Sectional
Time / sequence	Several points in time – <i>'film strip'</i>	One point in time – <i>'snapshot'</i>
Sampling	Same sample	Different sample
Level of analysis	Change at the individual / hh level	Snapshot of a given point in time
Case examples	APRA tracker study	
	APRA WS1 two-wave panel study	APRA WS1 first wave panel study

	<b>Longitudinal Method</b>	<b>Cross-sectional Method</b>
<b>Method</b>	Repeated study of the same individuals over time to track developmental changes	Comparison of individuals from different age groups or developmental stages at the same time
<b>Study plan</b>	Study the same group of individuals at 20 years of age, at 40 years, and at 60 years	Study three groups of participants at the same time: a group of 20-year-olds, a second group of 40-year-olds, and a third group of 60-year-olds
<b>Strengths and weaknesses</b>	Permits study of the same individuals over time, but is costly, time-consuming, and may be limited in the generalizability of the findings beyond the original study group	Less costly and more efficient than longitudinal studies, but subject to unrecognized factors that may distinguish the groups (other than age) and cohort effects (differences between groups reflecting historical rather than developmental factors)