EPIB601: McGill University, Montreal
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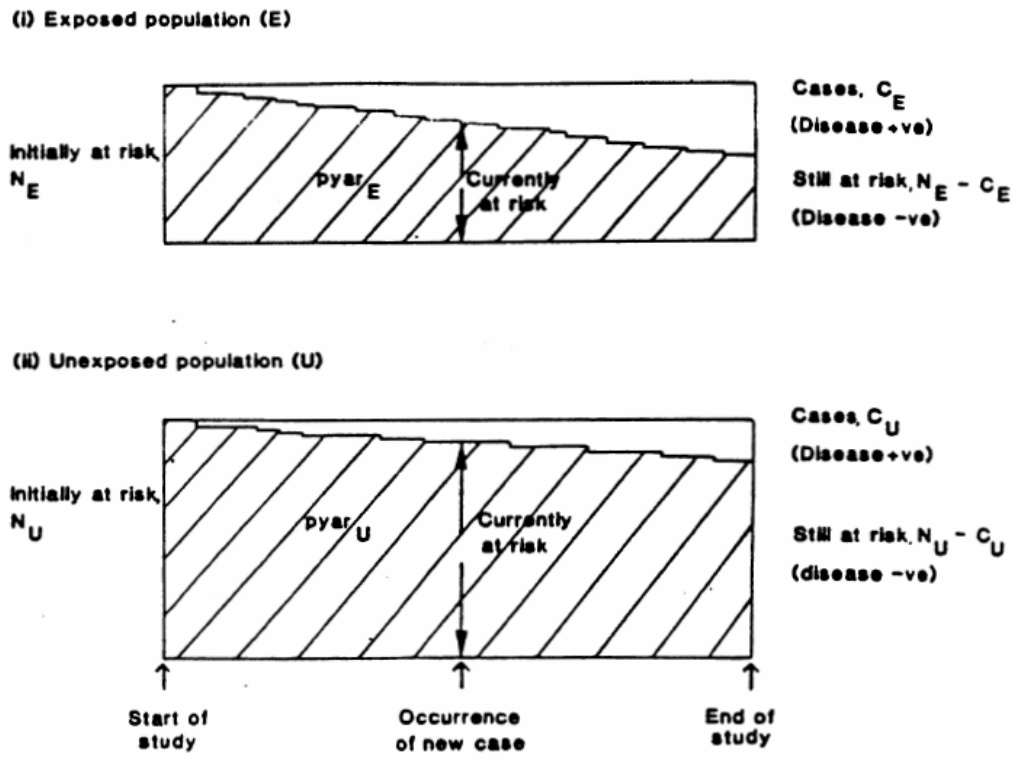
Types of case-control designs



Sampling design	**Cases sampled from**	**Controls sampled from**	**Definition (formulae based on the above notation)**	**Effect measure that is estimated**
Cumulative sampling (traditional case control study or cumulative-incidence case-control study)	Cases that are found (cumulated) at the end of the follow-up period ("survivors" among cases)	People disease-free throughout the study period ("survivors" at the end of the follow-up)	$\frac{C_E / N_E - C_E}{C_U / N_U - C_U}$	Odds ratio (OR) *– which might be a good approximation of the risk ratio if the disease is rare (requires rare disease assumption)*
Case-base sampling (case-cohort or case-referent study)	Cases that are found (cumulated) at the end of the follow-up period ("survivors" among cases)	The baseline cohort at the start of the risk period (regardless of future disease status)	$\frac{C_E / N_E}{C_U / N_U}$	Cumulative incidence ratio (CIR) *- does not require rare disease assumption*
Risk set sampling or incidence density sampling (nested case-control study or incidence density case-control study)	Incident (new) cases that occur in the study base during follow-up	People currently at risk - in the risk set at the time an incident case occurs in the study base	$\frac{C_E / Pyar_E}{C_U / Pyar_U}$	Incidence density ratio (IDR) *- does not require rare disease assumption*

Figure and table adapted from: Rodrigues & Kirkwood. *Int J Epidemiol* 1990

Traditional case-control design:

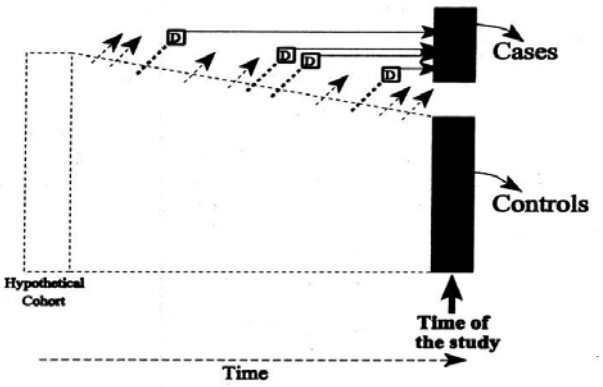


Figure 1–18 Hypothetical case-based case-control study, assuming that cases and controls are selected from a hypothetical cohort, as in Figure 1–13. The case group is assumed to include all cases that occurred in that hypothetical cohort up to the time when the study is conducted ("D" with horizontal arrows ending at the "case" bar): that is, they are assumed to be all alive and available to participate in the study; controls are selected from among those without the disease of interest (noncases) at the time when the cases are identified and assembled. Broken diagonal lines with arrows represent losses to follow-up.

Controls sampled from people disease-free throughout the study period ("survivors" at the end of the follow-up)

Case-cohort design:

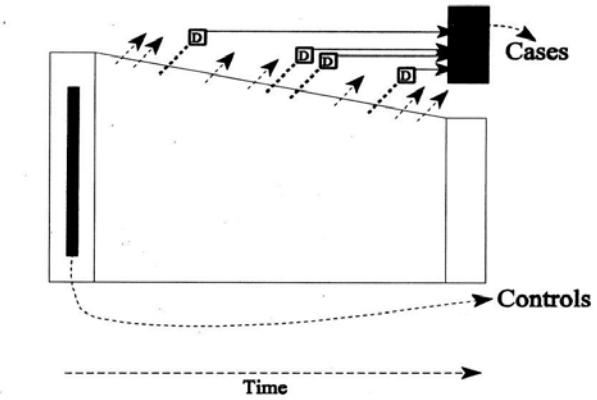


Figure 1–20 Case-control study in which the controls are selected from the baseline cohort (case-cohort study). Cases are represented by "D" boxes. Broken diagonal lines with arrows represent losses to follow-up.

Controls sample from the baseline cohort (regardless of future disease status)

Nested case-control design:

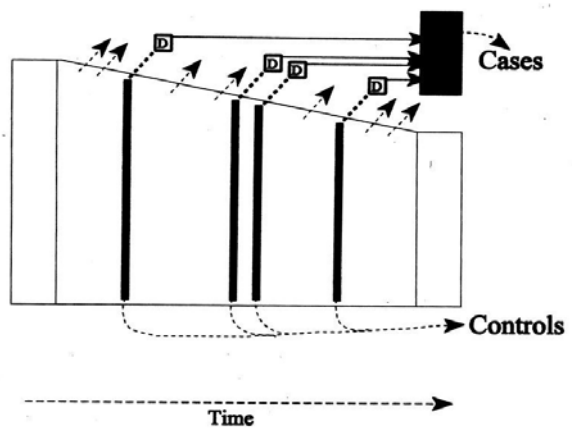


Figure 1–21 Nested case-control study in which the controls are selected at each time when a case occurs (incidence density sampling). Cases are represented by "D" boxes. Broken diagonal lines with arrows represent losses to follow-up.

Controls sampled from people currently at risk - in the risk set at the time an incident case occurs in the study base

Figures from: Szklo & Nieto. Epidemiology: beyond the basics. Aspen Publishers, 2000