



## Cancer Research Methods Workshop

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## Matching

### Matching

- The process of selecting the comparison group (unexposed subjects in a cohort study or controls in a case-control study) such that they have the same or similar distribution of a potential confounder(s) as the index group
- Two types of matching schemes
  - individual matching
  - frequency matching

### Matching (cont.)

- On the surface, the principle of matching to remove confounding influences appears simple
- However, particularly for individually matched case-control studies, the analytic approach to eliminate confounding is not intuitive (requires specialized analytic methods to produce accurate inferences)

### Advantages of matching

- As with restriction, matching is useful when anticipating strong confounders and studying relatively weak associations
- Matching may be the only way to guarantee some degree of control for confounding
  - e.g., in a study of prostate cancer, matching on age will help to assure that cases and controls have the same or similar age distribution (otherwise, controls might have too broad an age range with little overlap with cases)
- Matching on a strong confounder tends to increase the statistical power (efficiency) of the study

### Other effects of matching

- The independent effects of the matching factors cannot be studied
- Multiplicative interaction can be assessed using the homogeneity of effect strategy
- Study population is no longer a representative sample of the source population
- Matched analysis is necessary, especially when individual matching is done

## Matched OR and 95% CI

		Control	
		Exp	Unexp
Case	Exp	A pairs <sup>(1)</sup>	B pairs <sup>(2)</sup>
	Unexp	C pairs <sup>(3)</sup>	D pairs <sup>(4)</sup>
			N total # of matched pairs

$$OR_m = B / C$$

$$SE_{(LnOR_m)} = \sqrt{\frac{1}{B} + \frac{1}{C}}$$

$$95\% \text{ CI} = \exp[LnOR_m \pm 1.96 * SE_{(LnOR_m)}]$$