Measures of Disease Frequency

Prevalence:
Measures what proportion of the population is affected

$$\text{Prevalence} = \frac{\text{\# of cases}}{\text{Total population}}$$

Incidence:
Measures the frequency with which an event occurs in a population over a time period

$$\text{Incidence} = \frac{\text{\# of new cases over time}}{\text{Population at risk over the same time period}}$$

Epidemiology Pocket Guide

Basic epidemiology information...
...at your fingertips

Brought to you by the
Virginia Department of Health
and the North Carolina Center for
Public Health Preparedness

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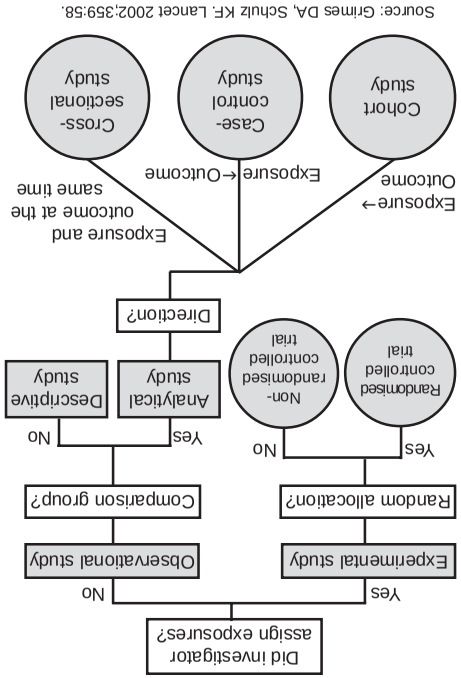
Classification of Study Designs



Source: Grimes DA, Schulz KF. Lancet 2002;359:58.

2 x 2 Tables

	Outcome		
Exposure	Yes	No	Total
Yes	*a*	*b*	*a + b*
No	*c*	*d*	*c + d*
Total	*a + c*	*b + d*	*a + b + c + d*

a = number who are exposed and have the outcome

b = number who are exposed and do not have the outcome

c = number who are not exposed and have the outcome

d = number who are not exposed and do not have the outcome

a + b = total number who are exposed

c + d = total number who are not exposed

a + c = total number who have the outcome

b + d = total number who do not have the outcome

a + b + c + d = total study population

Measures of Association

Assess the strength of association between an exposure and an outcome

$$\textbf{Relative Risk (RR)} = \frac{\frac{a}{a+b}}{\frac{c}{c+d}}$$

$$\textbf{Odds Ratio (OR)} = \frac{a * d}{b * c}$$

Interpreting RR and OR:
= 1 indicates no association
> 1 indicates a positive association
< 1 indicates a negative association

Tests of Significance

Indicate the reliability of the association

95% Confidence Intervals (CI):
A range of possible values for the measure of association (RR/OR) that has a 95% chance of containing the true measure

- For a true association, 95% CI should not include 1.0
- Range below 1.0 indicates less risk of outcome in exposed population
- Range above 1.0 indicates greater risk of outcome in exposed population

p-values:
Indicate how likely it would be for the observed measure (RR/OR) to occur by chance in absence of a true association

- Small p-values (< 0.05) indicate that the observed measure most likely was due to a true association between exposure and outcome