

Common Epidemiological Equations

The following are some common equations used in epidemiology that were covered in module 1.

Prevalence

$$\frac{\text{number of people with the disease}}{\text{size of population}}$$

Cumulative incidence

$$\frac{\text{number of people who develop the disease}}{\text{the number of people who were initially at risk}}$$

Incidence rate

$$\frac{\text{number of incident events}}{\text{the amount of person-time at risk for disease or condition}}$$

Case fatality

$$\frac{\text{number of deaths}}{\text{total number of cases with the disease}}$$

Cumulative mortality

$$\frac{\text{number of deaths}}{\text{number initially at risk for dying of that disease}}$$

Proportional mortality

$$\frac{\text{number of deaths}}{\text{total number of deaths}}$$

Relative risk

$$\frac{\text{risk of the disease in exposed}}{\text{risk of the disease in the unexposed}}$$

	Outcome	No outcome	
Exposed	A	B	A + B
Unexposed	C	D	C + D

$$\text{Cumulative incidence in exposed (CI}_e\text{)} = \frac{A}{A + B}$$

$$\text{Cumulative incidence in unexposed (CI}_u\text{)} = \frac{C}{C + D}$$

$$\text{Relative risk (RR)} = \frac{A / A + B}{C / C + D}$$

Odds ratio

	Outcome	No outcome
Exposed	A	B
Unexposed	C	D

$$\text{Odds of outcome in exposed group} = \frac{A}{B}$$

$$\text{Odds of outcome in unexposed group} = \frac{C}{D}$$

$$\text{Odds ratio (OR)} = \frac{A \times D}{B \times C}$$