■ Demonstração: RR ≈ OR quando P(D) ⟶ 0 (doença rara)

$$RR = \frac{p_{(1)1}}{p_{(2)1}} = \frac{P(D|E)}{P(D|\bar{E})} = \frac{\frac{P(D \cap E)}{P(E)}}{\frac{P(D \cap \bar{E})}{P(\bar{E})}} = \frac{\frac{P(E|D)P(D)}{P(E)}}{\frac{P(\bar{E}|D)P(D)}{P(\bar{E})}}$$

Note que $P(D \cap E) = P(E \cap D) = P(E|D)P(D)$

$$P(D \cap \bar{E}) = P(\bar{E} \cap D) = P(\bar{E}|D)P(D)$$

$$= \frac{\frac{P(E|D)P(D)}{P(E \cap D) + P(E \cap \bar{D})}}{\frac{P(\bar{E} \cap D)}{P(\bar{E} \cap D) + P(\bar{E} \cap \bar{D})}} = \frac{\frac{P(E|D)P(D)}{P(E|D)P(D) + P(E|\bar{D})P(\bar{D})}}{\frac{P(\bar{E} \cap D)}{P(\bar{E}|D)P(D) + P(\bar{E}|\bar{D})P(\bar{D})}}$$

Como $P(\bar{D}) = 1 - P(D)$

$$= \frac{\frac{P(E|D)P(D)}{P(E|D)P(D) + P(E|\bar{D})[1 - P(D)]}}{\frac{P(\bar{E}|D)P(D)}{P(\bar{E}|D)P(D) + P(\bar{E}|\bar{D})[1 - P(D)]}}$$

$$= \frac{P(E|D)P(D)\{P(\bar{E}|D)P(D) + P(\bar{E}|\bar{D})[1 - P(D)]\}}{P(\bar{E}|D)P(D)\{P(E|D)P(D) + P(E|\bar{D})[1 - P(D)]\}}$$

$$= \frac{P(E|D)\{P(\bar{E}|D)P(D) + P(\bar{E}|\bar{D}) - P(\bar{E}|\bar{D})P(D)\}}{P(\bar{E}|D)\{P(E|D)P(D) + P(E|\bar{D}) - P(E|\bar{D})P(D)\}}$$

$$= \frac{P(E|D)\{P(\bar{E}|\bar{D}) + P(D)[P(\bar{E}|D) - P(\bar{E}|\bar{D})]\}}{P(\bar{E}|D)\{P(E|\bar{D}) + P(D)[P(E|D) - P(E|\bar{D})]\}}$$

0

0

Como $P(D) \to 0$, segue que

$$RR = \frac{p_{(1)1}}{p_{(2)1}} \approx \frac{P(E|D)P(\bar{E}|\bar{D})}{P(\bar{E}|D)P(E|\bar{D})} = \frac{p_{1(1)}p_{2(2)}}{p_{2(1)}p_{1(2)}} = OR$$