

D = “having the disease”

N = “not having the disease”

$$P(D) = 0.005, \quad P(N) = 0.995$$

$$P_D(T_+) = 0.90, \quad P_N(T_+) = 0.05$$

$$P(T_+) = P(D) * P_D(T_+) + P(N) * P_N(T_+) = 0.005*0.90 + 0.995*0.05 = 0.05425$$

By Bayes’s theorem:

$$P_{T_+}(D) = \frac{P_D(T_+)P(D)}{P(T_+)} = \frac{0.90 * 0.005}{0.05425} \approx \mathbf{0.08295}$$

The probability of having the disease given that the test is positive is approximately **8.295%**