

Bayes Theorem pages 48-52

		Has the disease (D)	Dose not have the disease (\bar{D})	Total
The result of the test	Positive (T)	<p>Correct decision $n(T \cap D)$</p> <p>Sensitivity $P(T/D) = \frac{n(T \cap D)}{n(D)}$</p>	<p>False decision $n(T \cap \bar{D})$</p> <p>false positive $P(T/\bar{D}) = \frac{n(T \cap \bar{D})}{n(\bar{D})}$</p>	n(T)
	Negative (\bar{T})	<p>False decision $n(\bar{T} \cap D)$</p> <p>false negative $P(\bar{T}/D) = \frac{n(\bar{T} \cap D)}{n(D)}$</p>	<p>Correct decision $n(\bar{T} \cap \bar{D})$</p> <p>Specificity $P(\bar{T}/\bar{D}) = \frac{n(\bar{T} \cap \bar{D})}{n(\bar{D})}$</p>	n(\bar{T})
Total		n(D)	n(\bar{D})	n(Ω)

Note that from the table: $P(\bar{T}/D) + P(T/D) = 1$ and $P(\bar{T}/\bar{D}) + P(T/\bar{D}) = 1$

i.e. false negative + Sensitivity = 1 and Specificity + false positive = 1

The probability of the relevant disease in the general population, $P(D)$ (or $P(D') = 1 - P(D)$) which is obtained from another independent study.

Predictive value Positive:

$$P(D/T) = \frac{P(T/D) * P(D)}{\text{نفس البسيط} + \text{نفس البسيط} (D \rightarrow \bar{D})}$$

$$= \frac{P(T/D) * P(D)}{P(T/D) * P(D) + P(T/\bar{D}) * P(\bar{D})} = \frac{\text{Sensitivity} * P(D)}{\text{Sensitivity} * P(D) + (1 - \text{Specificity}) * P(\bar{D})}$$

Predictive value Negative:

$$P(\bar{D}/\bar{T}) = \frac{P(\bar{T}/\bar{D}) * P(\bar{D})}{\text{نفس البسيط} + \text{نفس البسيط} (\bar{D} \rightarrow D)}$$

$$= \frac{P(\bar{T}/\bar{D}) * P(\bar{D})}{P(\bar{T}/\bar{D}) * P(\bar{D}) + P(\bar{T}/D) * P(D)} = \frac{\text{Specificity} * P(\bar{D})}{\text{Specificity} * P(\bar{D}) + (1 - \text{Sensitivity}) * P(D)}$$