Diagnosis

Concepts and Glossary

Cross-sectional study

The observation of a defined population at a single point in time or time interval. Exposure and outcome are determined simultaneously.

Sensitivity

- Proportion of people with the target disorder who have a positive test.

- It is used to assist in assessing and selecting a diagnostic test/sign/symptom.

Specificity

- Proportion of people without the target disorder who have a negative test.
- It is used to assist in assessing and selecting a diagnostic test/sign/symptom.

Likelihood ratio (LR)

- The likelihood that a given test result would be expected in a patient with the target disorder compared with the likelihood that that same result would be expected in a patient without the target disorder

- **LR+** = sensitivity/(1-specificity)

- **LR-** = (1-sensitivity)/specificity

Pre-test probability/prevalence

The proportion of people with the target disorder (defined or confirm with gold standard) in the population at risk at a specific time (point prevalence) or time interval (period prevalence)

Pre-test odds

- The odds that the patient has the target disorder before the test is carried out

- pre-test probability/ (1 – pre-test probability).

Post-test odds

- The odds that the patient has the target disorder after the test is carried out

- pre-test odds $\times$ likelihood ratio.
  - pre-test odds $\times$ **LR+**
  - pre-test odds $\times$ **LR-**

Post-test probability

- The proportion of patients with that particular test result who have the target disorder
- post-test odds/(1 + post-test odds).

Positive predictive value

Proportion of people with a positive test who have the target disorder

Example

- Suppose you have a patient with anemia and a serum ferritin of 60 mmol/L.

- You come across a systematic review* of serum ferritin as a diagnostic test for iron deficiency anemia, with the results summarised as follows in the table

Summary Table

	Disorder Present	Disorder Absent	Total
Test Positive	731 a	270 b	1001 a+b
Test Negative	78 c	270 d	1578 c+d
Total	809 a+c	1500 b+d	2578 a+b+c+d

Calculation(一)

- **Sensitivity** = a/(a+c)= 731/809 = 90%
- **Specificity** = d/(b+d)= 1500/1770 = 85%
- **LR+** = sensitivity/(1-specificity)= [a/(a+c)] / [b/(b+d)]= 90%/15% = 6
- **LR-** = (1-sensitivity)/specificity = [c/(a+c)] / [d/(b+d)]= 10%/85% = 0.12

Calculation(二)

- **LR+** = 6 , **LR-** = 0.12
- Pre test probability=0.8
  - Pre test odds=0.8/0.2=4
  - Post odds(+)=4×6=24
  - Post Probability(+)=24/(1+24)=0.96
  - Post odds(-)=4×0.12=0.48
  - Post probability (-)=0.96/(1+0.96)=0.49

SnNout

- When a sign/test/symptom has a high **S**ensitivity, a **N**egative result rules **out** the diagnosis.

- For example, the sensitivity of a history of ankle swelling for diagnosing ascites is 93%; therefore if a person does not have a history of ankle swelling, it is highly unlikely that the person has ascites.

SpPin

- When a sign/test/symptom has a high **S**pecificity, a **P**ositive result rules **in** the diagnosis.

- For example, the specificity of a fluid wave for diagnosing ascites is 92%; therefore if a person does have a fluid wave, it rules in the diagnosis of ascites.