Statistical Corner

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Question 1:

What is likelihood ratio in diagnostic medicine?

Answer :

Likelihood ratio (LR) in diagnostic medicine is the ratio of the probability of a test result among diseased subjects to the probability of the test result among non-diseased subjects. It measures how much more likely a subject is to get a particular test result (positive, negative, a certain value or a range of values) if the subject has the disease, compared to a subject who does not. Therefore, it can be used to measure the usefulness of a diagnostic test.

Question 2:

How to calculate a likelihood ratio?

Answer:

 From the test results below,

	Diseased	Non-diseased	Total
Test +ve	18	1	19
Test -ve	14	92	106
Total	32	93	125

the positive LR, i.e. the ratio of the probability of tested positive among diseased subjects to the probability of tested positive among non-diseased subjects, can be calculated as we (18/32) / (1/93)=52. Likewise, the negative LR is (14/32)/(92/93) = 0.44. Large positive LR and small negative LR indicate the test is useful for the diagnosis of the disease.

Question 3:

What is the difference between likelihood ratio and other accuracy measures such as predictive values, sensitivity and specificity?

Answer:

Predictive values measure the probability of having a disease or not given a test result. Sensitivity and specificity measures the accuracy of a test in diseased and non-diseased subjects respectively. LR can be calculated from sensitivity and specificity. For example positive LR is sensitivity divided by (1-specificity). They are different from predictive values which are only available when the prevalence of the disease can be calculated. Moreover, LR can deal with tests with more than two possible results, and it can be used to compute the posttest probabilities to aid decision making.