

Medical screening tests

Here are some real examples of medical screening tests.

HIV / AIDS

The current choice for testing for AIDS/HIV is a combination of an ELISA test and a Western blot test. The ELISA test is cheap and sensitive, but not very selective; if positive, it is followed up with the Western blot test.

Used together, the tests have sensitivity = 99.7% and specificity = 98.5%.

If the prevalence of HIV among adults in the USA is about 0.6%, what is the probability that an adult American tested at random and getting a positive result has HIV?

[Hint: set this up in a spreadsheet so that you can change the values for sensitivity, specificity and prevalence.]

In South Africa, the prevalence of HIV among adults is about 10%. How does this affect the interpretation of a positive HIV test?

How would you interpret the results of an HIV test for a Malaysian adult if you didn't know the prevalence of HIV in Malaysia?

Prostate cancer

A cheap and easy screening test for prostate cancer measures the amount of prostate specific antigen (PSA) in a blood sample.

The sensitivity and selectivity of the test depend on the level of PSA which is considered 'normal', but the usual level used is 4 ng/mL (nanograms per millilitre). On that basis, approximate figures are: sensitivity = 85%, specificity = 70%.

If the prevalence of prostate cancer among men over 50 is about 8%, what is the probability that a person tested at random and getting a positive result has prostate cancer?

Some people claim that the rates for the test may be as low as: sensitivity = 35%, specificity = 63%. If that is true, is the test useful for screening?