

Hellenic Complex Systems Laboratory

Calculator for Diagnostic Accuracy Measures

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Calculator for Diagnostic Accuracy Measures

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Search Terms: sensitivity, specificity, diagnostic test, clinical accuracy, diagnostic accuracy, positive predictive value, negative predictive value, likelihood ratio, odds ratio

Short Description of the Demonstration

This Demonstration calculates various accuracy measures of a diagnostic test for a disease. This is done for differing negative and positive test results of nondiseased and diseased populations. The measures calculated are the sensitivity, the specificity, the positive predictive value ("PPV"), the negative predictive value ("NPV"), the (diagnostic) odds ratio ("OR"), the likelihood ratio for a positive test result ("LR+"), and the likelihood ratio for a negative test result ("LR-"). The negative and positive test results of the nondiseased and diseased populations are selected using the sliders.

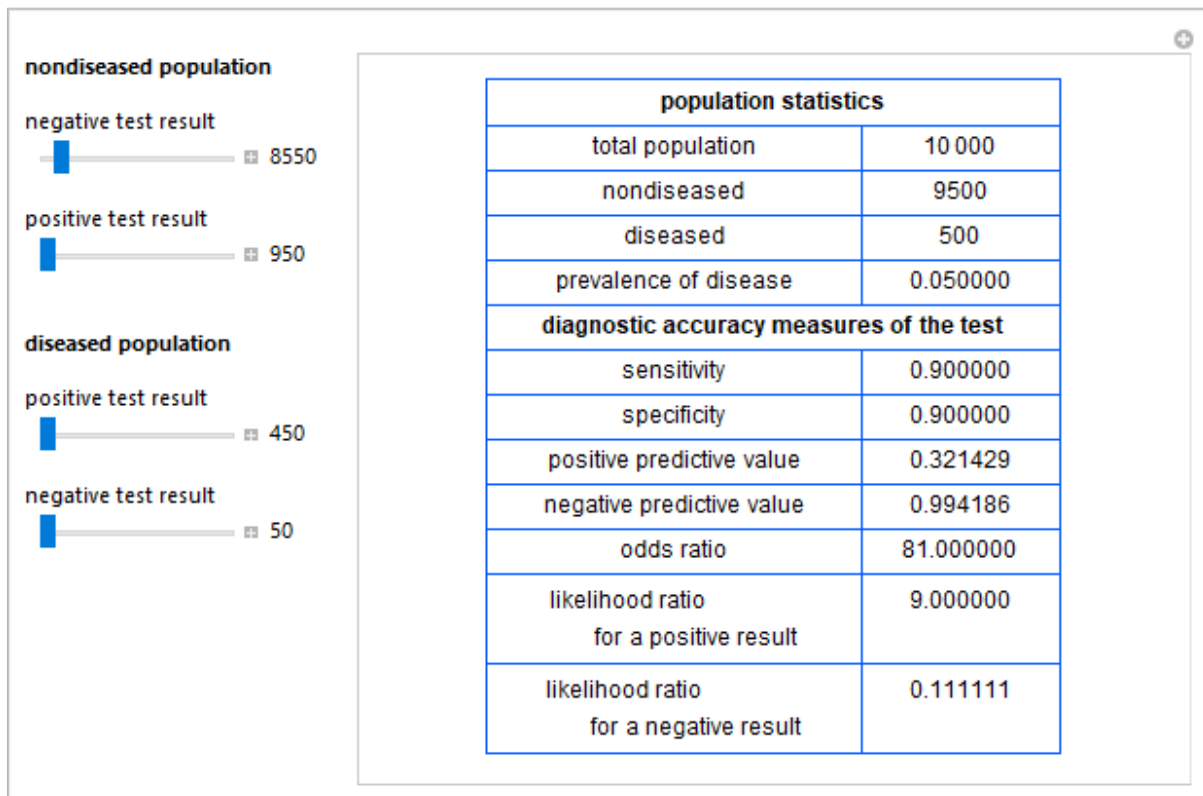


Figure 1: Population statistics and diagnostic accuracy measures of a diagnostic test, with the settings shown at the left.

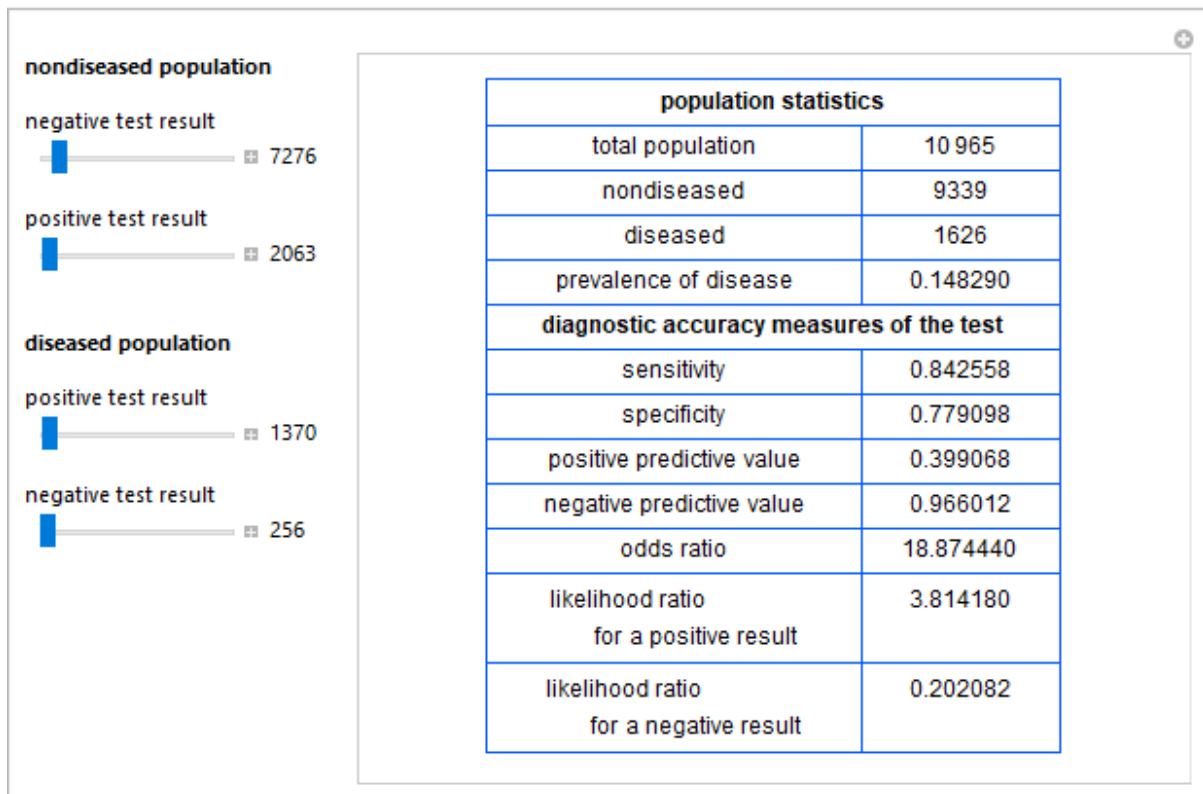


Figure 2: Population statistics and diagnostic accuracy measures of a diagnostic test, with the settings shown at the left.

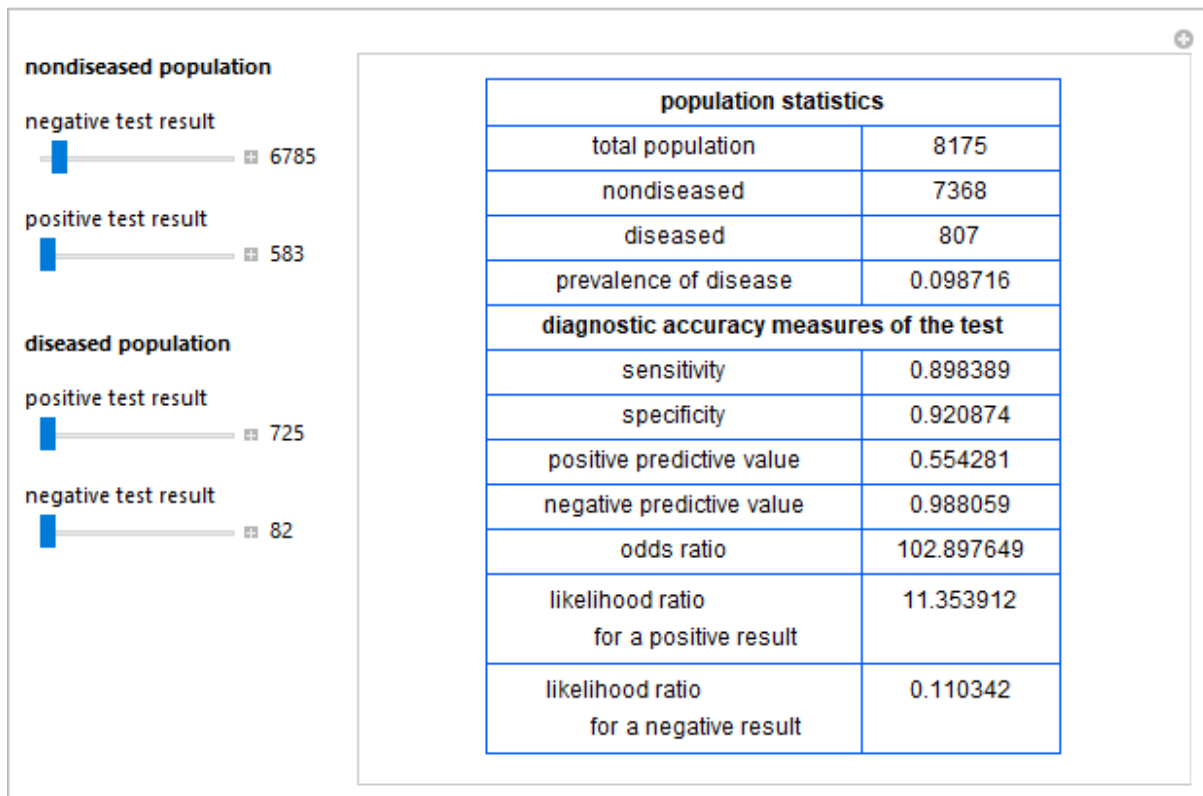


Figure 3: Population statistics and diagnostic accuracy measures of a diagnostic test, with the settings shown at the left.

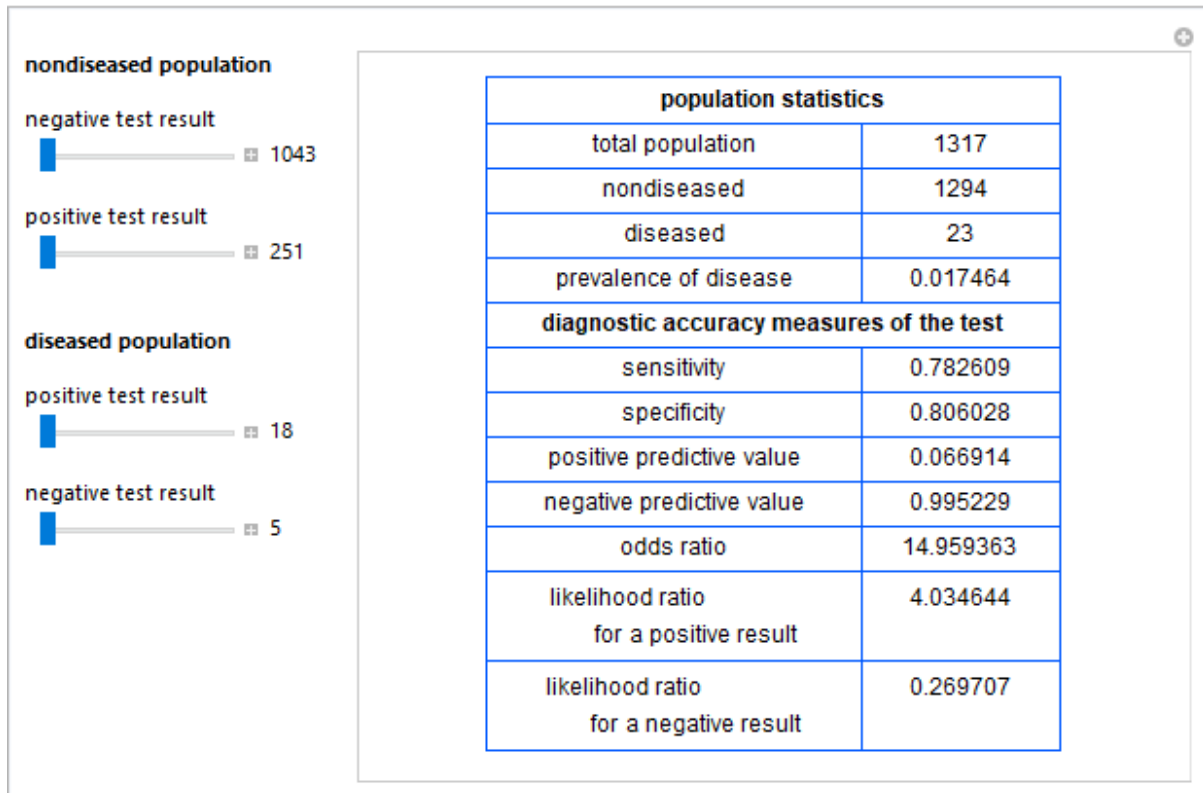


Figure 4: Population statistics and diagnostic accuracy measures of a diagnostic test, with the settings shown at the left.

Details

Sensitivity is the fraction of the diseased population with a positive test result, while specificity is the fraction of the nondiseased population with a negative test result. Positive predictive value is the fraction of the population with a positive test result that is diseased, while negative predictive value is the fraction of the population with a negative test result that is nondiseased. Prevalence of the disease is the ratio of the diseased population to the total (nondiseased and diseased) population. If we denote by *sens* the sensitivity, *spec* the specificity, and *pr* the prevalence, we have:

$$OR = \frac{\frac{sens}{1 - sens}}{\frac{1 - spec}{spec}}$$

$$LR+ = \frac{sens}{1 - spec}$$

$$LR- = \frac{1 - sens}{spec}$$

The Demonstration is appropriate as an educational tool for medical students.

Source Code

Programming language: Wolfram Language

Availability: The updated source code is available at:

<https://www.hcsl.com/Tools/Demonstrations/CalculatorForDiagnosticAccuracyMeasures.nb>

Software Requirements

Operating systems: Microsoft Windows, Linux, Apple iOS

Other software requirements: Wolfram Player®, freely available at: <https://www.wolfram.com/player/> or Wolfram Mathematica®.

System Requirements

Processor: x86-64 compatible CPU.

System memory (RAM): 4GB+ recommended.

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<https://demonstrations.wolfram.com/CalculatorForDiagnosticAccuracyMeasures/>

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