

# The test is positive: What are the odds it's wrong?



## How believable are test results?

The ELISA (Enzyme Linked ImmunoSorbent Assay) tests can be used to detect whether a person has certain conditions, such as being pregnant, or being HIV positive. The tests detect specific components in the blood which indicate that the person has the given disease or condition.

The tests are cheap and easy to administer. Sometimes, however, the result is a false positive - the test is positive, but the person does not have the condition - or a false negative - the test is negative, but the person does have the condition.

Here is a headline about the ELISA test used in detecting HIV:

**“99 out of 100 people with a positive test do not have HIV!”**

At the time of this headline:

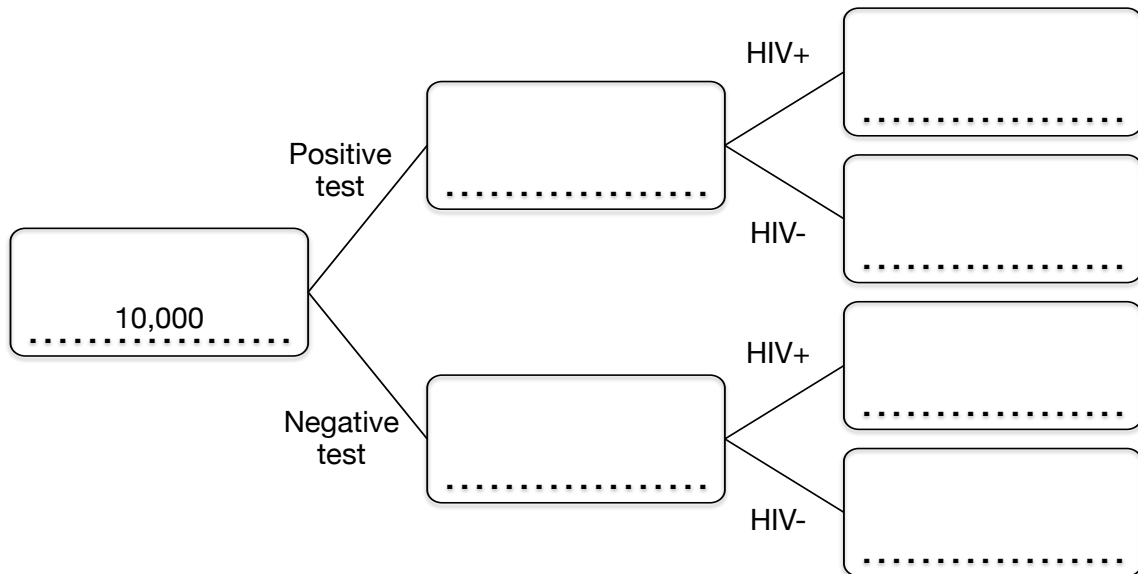
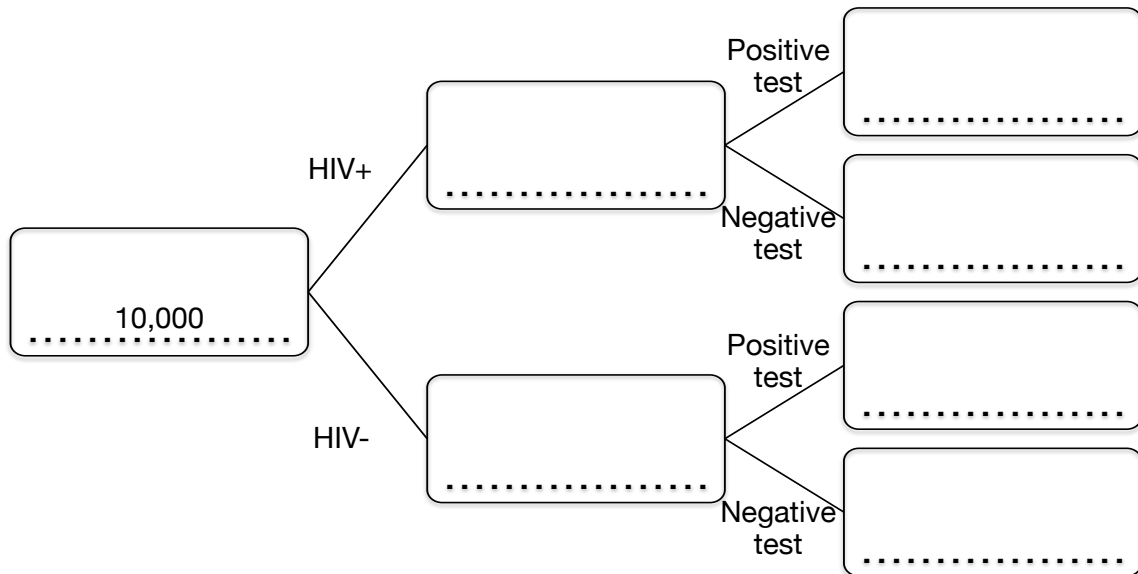
- The false positive rate was 1% – this means that for every 100 people getting a positive result, 99 would indeed be HIV positive, but 1 would be HIV negative.
- The test was expected to be positive in virtually all cases where the person was infected.
- The rate of infection was approximately 1 per 10,000 people in low-risk groups who were tested.

Given that the test was accurate in 99% of cases, how can it also appear to be inaccurate in such a huge proportion of cases?

Complete the table and the tree diagrams to analyse the figures for a random sample of 10,000 people tested, assuming that there are no false negative results so all negative tests do mean that the person is HIV negative.

	Positive test result	Negative test result	Total
Person is actually HIV +			
Person is actually HIV –			
Total			10,000

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What is the probability that a person with a positive test result is actually HIV negative?

*NB: There are other HIV tests available which can be used to confirm the result of an ELISA test. This would not be the only test used where there was a positive result or a real concern that a person might indeed be HIV+.*