





# UNDERSTANDING FALSE POSITIVE AND FALSE NEGATIVE RESULTS

Laboratory tests help clinicians and public health professionals to identify and respond to conditions. Test results depend on many variables and interpreting them in context is essential. False results may occur with any laboratory test.

## FALSE POSITIVE

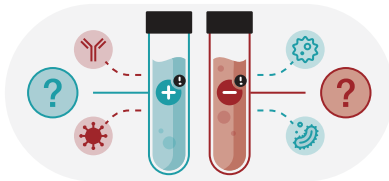
 Incorrect identification of a condition in a person who **does not have** the condition.

## FALSE NEGATIVE

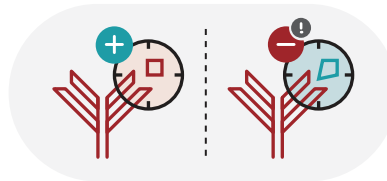
 Failure to detect a condition in a person who **does have** the condition.

## WHY FALSE RESULTS HAPPEN

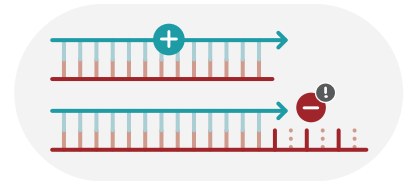
Many variables can affect the likelihood of false test results, including:



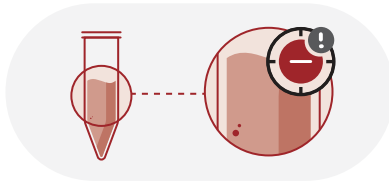
**Non-specific interactions:** Artifacts in sample can interfere.



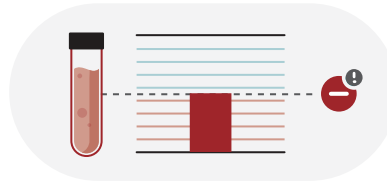
**Cross-reactivity:** Reactions to substances other than the target.



**Mutation:** Changes in genetic material that cause tests to not work.



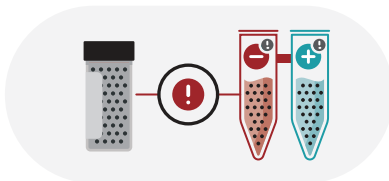
**Low quantity of tested target:** Target source material (e.g., DNA/RNA, antibodies) in such small levels they are not detected.



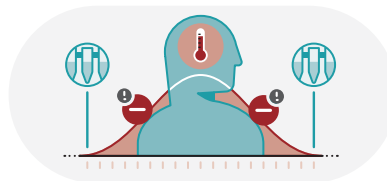
**Borderline results:** Test results that are close to the threshold.



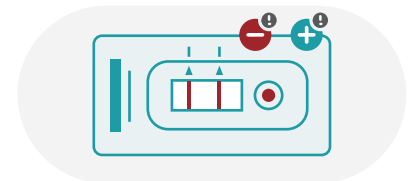
**Improper handling:** Errors in sample collection, identification, processing or storage.



**Interference:** Medications, food and other substances can impact detection of target substances.



**Timing:** Test administration too early or too late after symptom onset.



**Test performance:** A test's sensitivity and specificity can impact the reliability of its results.

ALL VARIABLES ARE DISEASE-, PERSON- AND TEST-DEPENDENT

# WORKING WITH FALSE TEST RESULTS

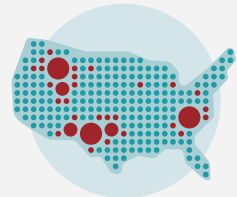
Both positive and negative false results can have very real individual health and public health implications. Understanding the circumstances around false results can help direct how they're acted on.

## CONTEXT MATTERS WHEN INTERPRETING TEST RESULTS



**Individual contexts**

- Personal risk factors
- Showing symptoms



**Community context**

Frequency of the target condition in the population.

## FALSE RESULTS AND CORRESPONDING TRADEOFFS

Because no test is perfect, using clinician judgment is essential to choosing the best option.

### FALSE POSITIVE

Results may be more tolerable when:

Cautionary measures can protect individuals and communities.

### FALSE NEGATIVE

Results may be more tolerable when:

The condition is not highly contagious and/or other context can help guide decisions.

## FALSE POSITIVE RESULTS CAN LEAD TO:

- Unnecessary or incorrect treatment
- Emotional burden
- Incorrect understanding of disease spread in a population

## FALSE NEGATIVE RESULTS CAN LEAD TO:

- Delayed diagnoses or disease management
- Risk of continued spread of contagious disease
- Lack of appropriate public health monitoring

*Not an exhaustive list*



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### Sources:

- Centers for Disease Control and Prevention: [www.fda.gov/media/134920/download](http://www.fda.gov/media/134920/download)
- American Academy of Pediatrics: [www.aapublications.org/news/2021/01/08/covid-test-false-negatives-010821](http://www.aapublications.org/news/2021/01/08/covid-test-false-negatives-010821)
- UCHealth: [www.uchealth.com/en/media-room/videos/reasons-for-a-false-positive-or-false-negative-covid-19-test-result](http://www.uchealth.com/en/media-room/videos/reasons-for-a-false-positive-or-false-negative-covid-19-test-result)
- Merck Manual Professional Version: [www.merckmanuals.com/professional/special-subjects/clinical-decision-making/understanding-medical-tests-and-test-results](http://www.merckmanuals.com/professional/special-subjects/clinical-decision-making/understanding-medical-tests-and-test-results)

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