

# COVID-19 Testing

Testing is the biggest challenge in the US. New tests are being launched everyday. Here's how to think about it.



## RT-PCR (Reverse Transcription - Polymerase Chain Reaction)

- Gold standard for accurately diagnosing COVID-19, per CDC and FDA.
- Detects presence or lack of virus RNA in a test sample.
- Tests run on large, expensive instruments in highly certified diagnostic labs.
- Samples can be collected using various devices across the anatomy.

### Examples:

- Nasopharyngeal sample collected using a long flocked swab. [↗](#)
- Short swabs of the front of the nostril and mid-nostril, per UnitedHealth Group study. [↗](#)
- New Saliva sample collection addresses supply chain challenges. [↗](#)

## POCT (Point of Care Tests ) Molecular Diagnostic Tests

- Tests use molecular diagnostics to detect presence of genetic material from virus.
- Tests are run on analyzers about the size of a toaster in the hospital or physician's office.
- Samples are run one-at-a-time and results can be obtained in 5 minutes to 1 hour.

### Examples:

- Detect COVID-19 in as little as 5 minutes. [↗](#)
- Combating the coronavirus pandemic – rapid test for COVID-19. [↗](#)



## Semi-quantitative serology (IgM/IgG/IGA) Tests

- Determines whether an Immunoglobulin (IgG/IgM/IGA) antibody is present.
- Test is conducted on standard ELISA laboratory analyzers.
- Requires blood samples collected via venipuncture or fingerstick.
- Tests are more accurate, and more expensive than rapid test strips.

### Examples:

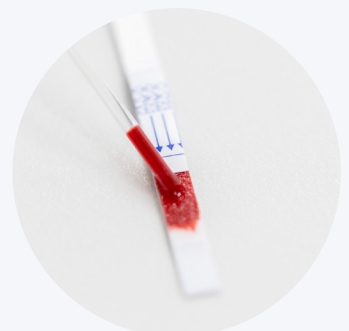
- Description of serology assays. [↗](#)
- Major lab offering. [↗](#)
- BioIQ Offering. [↗](#)

## Rapid IgG/IgM Tests

- Determines whether an Immunoglobulin (IgG/IgM) antibody is present.
- Immunoglobulin protects against bacterial and viral infections.
- Tests provide results from a drop of blood in as little as 5 minutes.
- Tests are less accurate than RT-PCR tests and cannot be used to diagnose COVID-19.
- Tests are less expensive than tests run on laboratory equipment (RT-PCR or POCT).

### Examples:

- US companies, labs rush to produce blood test for coronavirus immunity – The NY Times. [↗](#)
- UK coronavirus home testing to be made available to millions – The Guardian. [↗](#)
- Test widely used in South Korea. [↗](#)



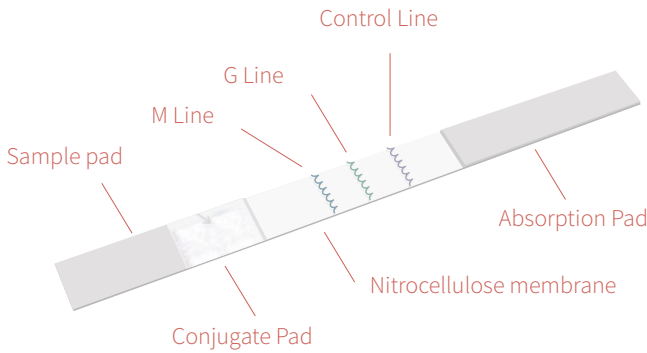
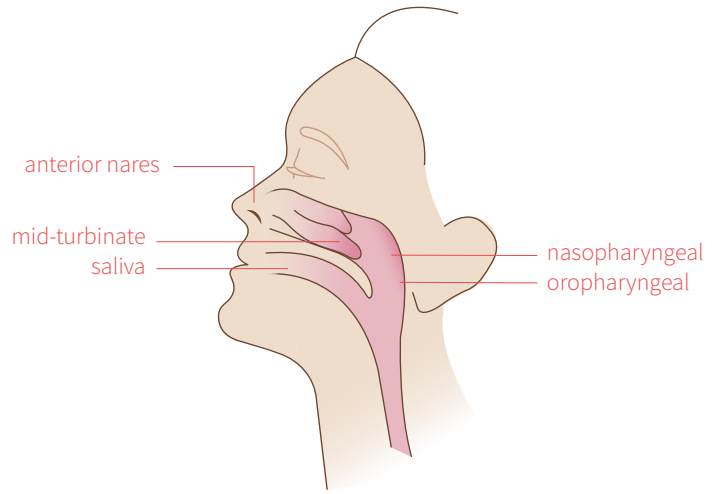
## Do I have the virus?

### RT-PCR Testing

Lab or Point of Care Testing

#### Sample collection types including:

- Nasopharyngeal flocked swab
- Mid-nostril short swab (mid-turbinate)
- Nostril Swab (anterior nares)
- Saliva specimen



## Did I have the virus?

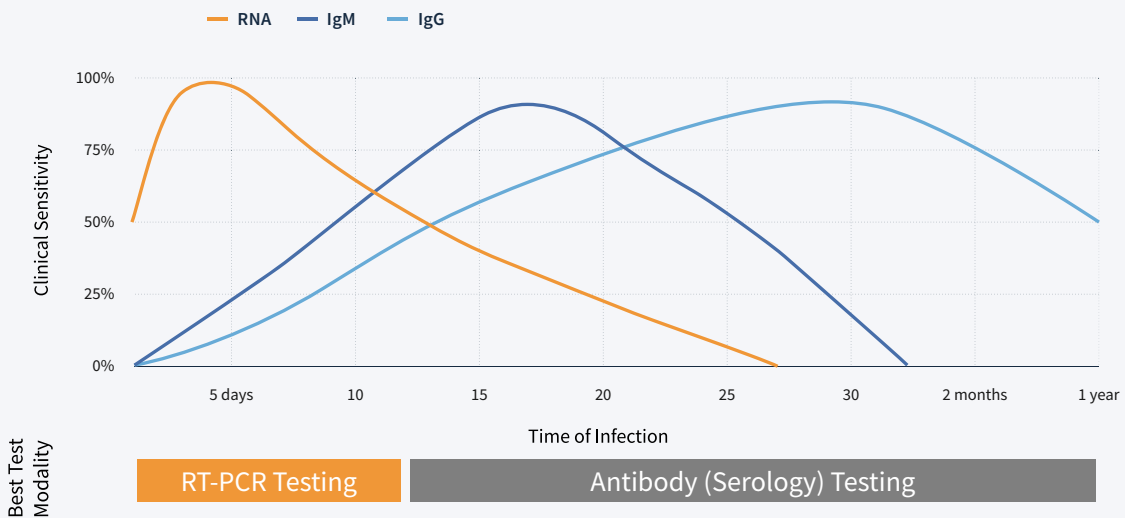
### Antibody Testing (IgM/IgG)

Lab or Rapid Test Strip

#### Sample collection types including:

- Venipuncture whole blood or serum
- Fingerstick

## Sensitivity of key biomarkers for COVID-19



## Testing Models

These tests all have beneficial clinical uses and can be done in a variety of settings for a variety of purposes. They can even be combined depending upon what you would like to test for. Testing models and locations include:



### Home Self-Collection

Saliva or nasal samples are collected with or without telehealth oversight and sent to the lab for RT-PCR testing



### Testing Tent

A sample is collected to send to the lab for RT-PCR testing or a POCT test is completed.



### Drive Through

Can be a combination of rapid IgG/IgM and / or sample collection for RT-PCR testing.



### Home Visit

A sample is collected by a clinician and sent to the lab for RT-PCR testing.



### Worksite

Nurses or clinicians leverage worksite areas or occupational medicine clinics for sample collection for RT-PCR and/or antibody testing.

## Test Comparison

Test	Description	Source Technician	Uses	Pros	Cons	Notes
RT-PCR (Reverse Transcriptase - Polymerase Chain Reaction)	Extracts, then amplifies the amount of RNA, then compares it to standard	Nasal/oral swab (flocked or newer synthetic). Bronchial/alveolar lavage. Trained clinician.	Acute illness screening and testing. Virus exposure, carriage.	Gold standard. Lab high sensitivity. Clinical high sensitivity. Experience with test.	Turnaround time. Equipment and skilled staff needed. Central lab needed.	Specificity unknown in current clinical situations – concern re: false negative rate. Working on alternative collection methods.
Point of Care Molecular Testing (POCT)	Extracts, then amplifies the amount of RNA, then compares it to standard.	Nasal/oral swab (flocked or newer synthetic). Bronchial/alveolar lavage.	Acute illness screening and testing. Virus exposure, carriage. Test done real-time in a clinical setting.	Utilizes recommended molecular diagnostic testing principles. Results obtained in 15-45 minutes.	Limited sensitivity / specificity. Serial testing limits capacity to 1-4 tests per hour.	Leading devices have generated concerns regarding safety (to lab personnel) and accuracy.
Semi-Quantitative Antibody Testing	Blood/serum assay for IgM and/or IgG using ELISA testing.	Blood or serum. Technician/physician.	Acute exposure and illness.	Can test immune response and suggest acute reason for illness. May suggest immunity as research evolves and with serial testing over time.	Actual concurrent viral load and infectability uncertain.	Immunity may not be long lasting.
Rapid Point of Care Antibody Testing (POCT)	IgM/IgG Qualitative antigen testing. Use drop of blood (from a fingerstick) in as little as 5 minutes.	Variable sources, blood at the moment is main source. Point of care admin and results.	Acute illness screening and testing, indicates if you have been exposed.	Quick. Rapid turnaround. Doctors office or locality-based testing. Potentially scalable at clinician office level.	No experience at scale. Unknown clinical sensitivity and specificity. Not applicable for “immunity” testing.	Can be used as a screening test to be followed with confirmatory test if needed.

To learn about the BioIQ COVID-19 solution visit:  
<https://www.bioiq.com/covid-19-solution/>