






Air Traveler COVID-19 Testing: PCR vs RADT

Considerations for each technology's suitability

Attribute	What Matters	PCR 	RADT
How They Work 	COVID-19 testing technologies can either detect the genetic material of the virus, or check for antigens associated with the virus.	Polymerase chain reaction (PCR) tests detect virus genetic materials. Small amounts of the virus are amplified to make them easier to detect.	Rapid antigen detection tests (RADT) look for specific viral antigen proteins on the surface of the virus.
Test Sensitivity & Accuracy 	COVID-19 tests should be highly sensitive, meaning that they can detect the low viral amounts that may be present in people who can spread the virus even if they don't have symptoms.	PCR tests are the gold standard—the most sensitive and accurate tests available. ¹ Real-time PCR is most sensitive, and Direct/Fast PCR is also highly sensitive.	RADT tests are less sensitive than PCR tests. Because of this, they can produce false negatives, clearing people who are actually carrying the virus. ^{2,3} RADTs are more appropriate for testing people with symptoms, due to their higher viral load levels.
Time-to-Results and Scalability 	Air travelers need test results within 48-72 hours before boarding their flights. The testing method must scale up efficiently to handle the quick turnaround and high volume demands for air travel tests.	PCR tests are scalable. One instrument can run up to 382 samples simultaneously while providing individual results for each air traveler, within the 48-72 hour window.	RADT tests take approximately 15-30 minutes and are run one at a time on each piece of equipment, so they may not be scalable if a large population needs to be tested.
The Verdict 	Air traveler testing requires: <ul style="list-style-type: none"> • High accuracy • Fast turnaround times • Scalability to match the volume of air travelers 	PCR tests are sensitive, highly accurate, and can produce results for air travelers within 48-72 hours before their flights.	RADT tests are suitable for smaller groups of people who are displaying symptoms.

References:

1. Smyrlaki I, Ekman M, Lentini A et al. (2020) Massive and rapid COVID-19 testing is feasible by extraction-free SARS-CoV-2 RT-PCR. *Nat Commun* 11(1):4812. <https://www.nature.com/articles/s41467-020-18611-5>
2. Centers for Disease Control and Prevention. Interim guidance for antigen testing for SARS-CoV-2. <https://www.cdc.gov/coronavirus/2019-ncov/lab/resources/antigen-tests-guidelines.html>
3. Evaluation of Abbott BinaxNOW Rapid Antigen Test for SARS-CoV-2 Infection at Two Community-Based Testing Sites — Pima County, Arizona, November 3–17, 2020 <https://www.cdc.gov/mmwr/volumes/70/wr/mm7003e3.htm>

More info at thermofisher.com/air-travel-testing