Serology PPV/NPV Interactive

Load `device_level_tests.csv` in the same folder (exported from the FDA device-level Excel file). Choose a device, adjust prevalence, or add a confirmatory test.

Inputs

Device (from FDA CSV): — Select a device —

Abacus Pharma International • SARS-CoV-2 IgM/IgG AB Antibody Rapid Test (Immunochromatography) • n(sens)=30 • n(spec)=80 • cluster=3

Sensitivity 76.7% — 76.7

Specificity 98.8% — 98.8

Prevalence (%) 10.0% — 10

☐ Two-test confirmatory strategy

Assumes independence: $sens_C = s_1 \times s_2$; $spec_C = 1 - (1-sp_1)(1-sp_2)$

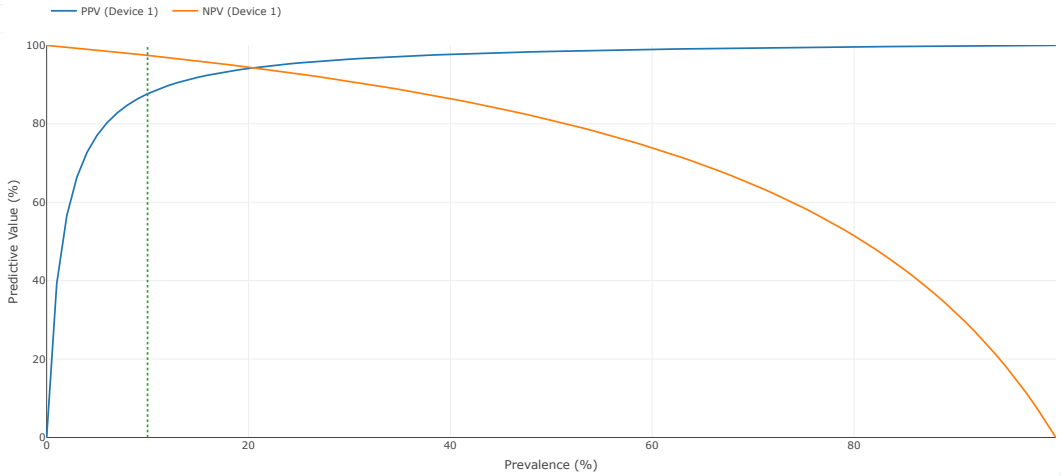
Reset | Reload CSV

At prevalence **10.0%**

PPV: **87.7%** NPV: **97.4%**

Tip: Drag to zoom, double-click to reset. Press p to save PNG.

PPV/NPV vs. Prevalence



Calculated Table for Current Settings

Assumes a cohort of **1,000** people at the current prevalence. Values update as you move the sliders.

Scenario	Prevalence	Sensitivity	Specificity	True Positives	False Positives	True Negatives	False Negatives	PPV	NPV
Test 1	10.0%	76.7%	98.8%	77	11	889	23	87.7%	97.4%

Note: TP, FP, TN, and FN are rounded to whole numbers for display. PPV and NPV are calculated from exact (unrounded) values, so manual calculations from the displayed integers may differ slightly.

Counterintuitive Scenarios

These presets demonstrate surprising and counterintuitive PPV/NPV behaviors. Click a button to load the scenario, then follow the instructions:

1. Low Prevalence: Small Specificity Drop Crushes PPV
Setup: Advaite RapCov test (Sn=86.7%, Sp=98.8%) at 10% prevalence with PPV=88.9%, NPV=98.5%.
Try this: Move the **Specificity slider** down from 98.8% to 93.8% and watch PPV collapse from 88.9% to 60.8%—a 28% drop from just 5% less specificity! NPV stays relatively stable (98.5% to 98.4%). Then **drag the Specificity slider** back up to see the dramatic recovery at low prevalence.

2. Mid Prevalence: Changes Have Minimal Effect
Setup: AutoBio test at 50% prevalence (Sn=93.3%, Sp=98.8%, PPV=98.7%, NPV=93.6%).
Try this: Move the **Sensitivity slider** down 5% to 88.3%—NPV barely changes from 93.6% to 89.4% (only 4.2% drop). Now move the **Specificity slider** down 5% to 93.8%—PPV only drops from 98.7% to 93.3% (5.4% drop). At mid-prevalence, the system is stable and test quality matters less!

3a. Extreme Low Prevalence: Great Test, Terrible PPV
Setup: H-Guard test with excellent metrics (Sn=96.7%, Sp=93.8%) at just 5% prevalence.
Try this: Check the PPV—it's only 45.1%! A positive test is wrong more often than right. Now **drag the Prevalence slider** from 5% up to 20% and watch PPV improve dramatically to 79.6%. This shows why screening rare diseases with even good tests produces many false positives.

3b. Extreme High Prevalence: Great Test, Terrible NPV
Setup: Same H-Guard test (Sn=96.7%, Sp=93.8%) at 95% prevalence.
Try this: Check the NPV—only 59.9%! Two in five negative tests are wrong. Now **drag the Prevalence slider** down from 95% to 80% and watch NPV improve to 87.7%. At high prevalence, even excellent tests struggle to rule out disease because nearly everyone has it.

4. Confirmatory Testing: Worse Test Improves PPV
Setup: Phamatech test (Sn=86.7%, Sp=93.8%) with Polystat confirmatory test (Sn=76.7%, Sp=91.3%—both worse!) at 10% prevalence.
Try this: Notice combined PPV jumped to 93.2% vs 60.8% for the first test alone—a 32.4% improvement! NPV drops only slightly from 98.4% to 96.4% (just 2%). Now **uncheck the "Two-test confirmatory" box** to see the single test performance, then **re-check it** to see how requiring both tests to be positive filters out false positives, despite lower individual test quality.