The Perspective on Bio-Nano Interface Technology for Covid-19

Table S1. FDA-EUA authorized serology Test performance of different products

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| Developer | Test | Technology | Target | Antibody | Performance Measure | Estimate of Performance | 95% Confidence Interval |
| Abbott | Alinityi SARS-CoV-2 IgG | High Throughput CMIA | Nucleocapsid | IgG | Sensitivity (PPA) | 100% (34/34) | (89.9%; 100%) |
| IgG | Specificity (NPA) | 99.0% (99/100) | (94.6%; 99.8%) |
| IgG | PPV at prevalence = 5% | 84.0% | (46.7%; 96.3%) |
| IgG | NPV at prevalence = 5% | 100% | (99.4%; 100%) |
| Abbott | Architect SARS-CoV-2 IgG | High Throughput CMIA | Nucleocapsid | IgG | Sensitivity (PPA) | 100% (88/88) | (95.8%; 100%) |
| IgG | Specificity (NPA) | 99.6% (1066/1070) | (99.0%; 99.9%) |
| IgG | PPV at prevalence = 5% | 92.9% | (83.4%; 98.1%) |
| IgG | NPV at prevalence = 5% | 100% | (99.8%; 100%) |
| Autobio | Anti-SARS-CoV-2 Rapid Test | Lateral Flow | Spike | IgM | Sensitivity (PPA) | 95.7% (289/302) | (92.8%; 97.5%) |
| IgM | Specificity (NPA) | 99.7% (311/312) | (98.2%; 99.9%) |
| IgG | Sensitivity (PPA) | 99.0% (299/302) | (97.1%; 99.7%) |
| IgG | Specificity (NPA) | 99.4% (310/312) | (97.7%; 99.8%) |
| Combined | Sensitivity (PPA) | 99.0% (299/302) | (97.1%; 99.7%) |
| Combined | Specificity (NPA) | 99% (309/312) | (97.2%; 99.7%) |
| Combined | PPV at prevalence = 5% | 84.4% | (64.6%; 94.6%) |
| Combined | NPV at prevalence = 5% | 99.9% | (99.8%; 100%) |
| Babson Diagnostics, Inc | Babson Diagnostics aC19G1 | High Throughput CLIA | Spike | IgG | Sensitivity (PPA) | 100% (29/29) | (88.3%; 100%) |
| IgG | Specificity (NPA) | 100% (100/100) | (96.3%; 100%) |
| IgG | PPV at prevalence = 5% | 100% | (55.7%; 100%) |
| IgG | NPV at prevalence = 5% | 100% | (99.4%; 100%) |
| Bio-Rad Laboratories, Inc | Platelia SARS-CoV-2 Total Ab | ELISA | Nucleocapsid | Pan-Ig | Sensitivity (PPA) | 92.2% (47/51) | (81.5%; 96.9%) |
| Pan-Ig | Specificity (NPA) | 99.6% (684/687) | (98.7%; 99.9%) |
| Pan-Ig | PPV at prevalence = 5% | 91.7% | (76.7%; 98.1%) |
| Pan-Ig | NPV at prevalence = 5% | 99.6% | (99.0%; 99.8%) |
| Biohit Healthcare (Hefei) | Biohit SARS-CoV-2 IgM/IgG Antibody Test Kit | Lateral Flow | Nucleocapsid | IgM | Sensitivity | 96.7% (29/30) | (83.3%; 99.4%) |
| IgM | Specificity | 95.0% (76/80) | (87.8%; 98.0%) |
| IgG | Sensitivity | 96.7% (29/30) | (83.3%; 99.4%) |
| IgG | Specificity | 95.0% (76/80) | (87.8%; 98.0%) |
| Combined | Sensitivity | 96.7% (29/30) | (83.3%; 99.4%) |
| Combined | Specificity | 95.0% (76/80) | (87.8%; 98.0%) |
| Combined | PPV at prevalence = 5% | 50.4% | (26.5%; 72.7%) |
| Combined | NPV at prevalence = 5% | 99.8% | (99.0%; 100%) |
| Cellex, Inc. | qSARS-CoV-2 IgG/IgM Rapid Test | Lateral Flow | Spike and Nucleocapsid | Combined | Sensitivity (PPA) | 93.8% (120/128) | (88.2%; 96.8%) |
| Combined | Specificity (NPA) | 96.0% (240/250) | (92.8%; 97.8%) |
| Combined | PPV at prevalence = 5% | 55.2% | (39.2%; 69.8%) |
| Combined | NPV at prevalence = 5% | 99.7% | (99.3%; 99.8%) |
| DiaSorin | LIAISON SARS-CoV-2 S1/S2 IgG | High Throughput CMIA | Spike | IgG | Sensitivity (PPA) | 97.6% (40/41) | (87.4%; 99.6%) |
| IgG | Specificity (NPA) | 99.3% (1082/1090) | (98.6%; 99.6%) |
| IgG | PPV at prevalence = 5% | 88.0% | (76.7%; 92.9%) |
| IgG | NPV at prevalence = 5% | 99.9% | (99.3%; 100%) |
| Emory Medical Laboratories | SARS-CoV-2 RBD IgG test | ELISA | Spike | IgG | Sensitivity (PPA) | 100% (30/30) | (88.7%; 100%) |
| IgG | Specificity (NPA) | 96.4% (615/638) | (94.6%; 97.6%) |
| IgG | PPV at prevalence = 5% | 59.3% | (46.6%; 68.6%) |
| IgG | NPV at prevalence = 5% | 100% | (99.4%; 100%) |
| EUROIMMUN | SARS-COV-2 ELISA (IgG) | ELISA | Spike | IgG | Sensitivity | 90.0% (27/30) | (74.4%; 96.5%) |
| IgG | Specificity | 100% (80/80) | (95.4%; 100%) |
| IgG | PPV at prevalence = 5% | 100% | (46.0%; 100%) |
| IgG | NPV at prevalence = 5% | 99.5% | (98.6%; 99.8%) |
| Hangzhou Biotest Biotech | RightSign COVID-19 IgG/IgM Rapid Test Cassette | Lateral Flow | Spike | IgM | Sensitivity | 100% (30/30) | (88.7%; 100%) |
| IgM | Specificity | 100% (80/80) | (95.4%; 100%) |
| IgG | Sensitivity | 93.3% (28/30) | (78.7%; 98.2%) |
| IgG | Specificity | 100% (80/80) | (95.4%; 100%) |
| Combined | Sensitivity | 100% (30/30) | (88.7%; 100%) |
| Combined | Specificity | 100% (80/80) | (95.4%; 100%) |
| Combined | PPV at prevalence = 5% | 100% | (50.5%; 100%) |
| Combined | NPV at prevalence = 5% | 100% | (99.4%; 100%) |
| Hangzhou Laihe Biotech | LYHER Novel Coronavirus (2019-nCoV) IgM/IgG Antibody Combo Test Kit (Colloidal Gold) | Lateral Flow | Spike | IgM | Sensitivity | 96.7% (29/30) | (83.3%; 99.4%) |
| IgM | Specificity | 100% (80/80) | (95.4%; 100%) |
| IgG | Sensitivity | 100% (30/30) | (88.7%; 100%) |
| IgG | Specificity | 98.8% (79/80) | (93.3%; 99.8%) |
| Combined | Sensitivity | 100% (30/30) | (88.7%; 100%) |
| Combined | Specificity | 98.8% (79/80) | (93.3%; 99.8%) |
| Combined | PPV at prevalence = 5% | 81.4% | (40.9%; 96.0%) |
| Combined | NPV at prevalence = 5% | 100% | (99.4%; 100%) |
| Healgen | COVID-19 IgG/IgM Rapid Test Cassette | Lateral Flow | Spike | IgM | Sensitivity | 100% (30/30) | (88.7%; 100%) |
| IgM | Specificity | 100% (80/80) | (95.4%; 100%) |
| IgG | Sensitivity | 96.7% (29/30) | (83.3%; 99.4%) |
| IgG | Specificity | 97.5% (78/80) | (91.3%; 99.3%) |
| Combined | Sensitivity | 100% (30/30) | (88.7%; 100%) |
| Combined | Specificity | 97.5% (78/80) | (91.3%; 99.3%) |
| Combined | PPV at prevalence = 5% | 67.8% | (35.0%; 88.4%) |
| Combined | NPV at prevalence = 5% | 100% | (99.4%; 100%) |
| InBios | SCoV-2 Detect IgG ELISA | ELISA | Spike | IgG | Sensitivity (PPA) | 97.8% (44/45) | (88.4%; 99.6%) |
| IgG | Specificity (NPA) | 99.0% (94/95) | (94.3%; 99.8%) |
| IgG | PPV at prevalence = 5% | 83.1% | (44.9%; 96.6%) |
| IgG | NPV at prevalence = 5% | 99.9% | (99.4%; 100%) |
| Mount Sinai Hospital Clinical Laboratory | Mt. Sinai Laboratory COVID-19 ELISA Antibody Test | 2-Step ELISA | Spike | Combined | Sensitivity (PPA) | 92.5% (37/40) | (80.1%; 97.4%) |
| Combined | Specificity (NPA) | 100% (74/74) | (95.1%; 100%) |
| Combined | PPV at prevalence = 5% | 100% | (46.2%; 100%) |
| Combined | NPV at prevalence = 5% | 99.6% | (98.9%; 99.9%) |
| Ortho-Clinical Diagnostics, Inc. | VITROS Anti-SARS-CoV-2 IgG test | High Throughput CLIA | Spike | IgG | Sensitivity (PPA) | 90.0% (36/40) | (76.9%; 96.0%) |
| IgG | Specificity (NPA) | 100% (407/407) | (99.1%; 100%) |
| IgG | PPV at prevalence = 5% | 100% | (81.8%; 100%) |
| IgG | NPV at prevalence = 5% | 99.5% | (98.8%; 99.7%) |
| Ortho-Clinical Diagnostics, Inc. | VITROS Immunodiagnostic Products Anti-SARS-CoV-2 Total Reagent Pack and Calibrator | High Throughput CLIA | Spike | Pan-Ig | Sensitivity (PPA) | 100% (49/49) | (92.7%; 100%) |
| Pan-Ig | Specificity (NPA) | 100% (400/400) | (99.0%; 100%) |
| Pan-Ig | PPV at prevalence = 5% | 100% | (83.0.%; 100%) |
| Pan-Ig | NPV at prevalence = 5% | 100% | (99.6%; 100%) |
| Roche | Elecsys Anti-SARS-CoV-2 | High Throughput ECLIA | Nucleocapsid | Pan-Ig | Sensitivity (PPA) | 100% (29/29) | (88.3%; 100%) |
| Pan-Ig | Specificity (NPA) | 99.8% (5262/5272) | (99.7%; 99.9%) |
| Pan-Ig | PPV at prevalence = 5% | 96.5% | (93.9%; 98.1%) |
| Pan-Ig | NPV at prevalence = 5% | 100% | (99.4%; 100%) |
| Siemens Healthcare Diagnostics | ADVIA Centaur SARS-CoV-2 Total (COV2T) | High Throughput CMIA | Spike | Pan-Ig | Sensitivity (PPA) | 100% (47/47) | (92.4%; 100%) |
| Pan-Ig | Specificity (NPA) | 99.8% (1586/1589) | (99.4%; 99.9%) |
| Pan-Ig | PPV at prevalence = 5% | 96.5% | (89.8%; 98.8%) |
| Pan-Ig | NPV at prevalence = 5% | 100% | (99.6%; 100%) |
| Siemens Healthcare Diagnostics | Atellica IM SARS-CoV-2 Total (COV2T) | High Throughput CMIA | Spike | Pan-Ig | Sensitivity (PPA) | 100% (42/42) | (91.6%; 100%) |
| Pan-Ig | Specificity (NPA) | 99.8% (1089/1091) | (99.3%; 99.9%) |
| Pan-Ig | PPV at prevalence = 5% | 96.7% | (87.9%; 99.1%) |
| Pan-Ig | NPV at prevalence = 5% | 100% | (99.6%; 100%) |
| Siemens Healthcare Diagnostics | Dimension EXL SARS-CoV-2 Total antibody assay (CV2T) | High Throughput ELISA | Spike | Pan-Ig | Sensitivity (PPA) | 100% (79/79) | (95.4%; 100%) |
| Pan-Ig | Specificity (NPA) | 99.9% (1527/1529) | (99.5%; 100%) |
| Pan-Ig | PPV at prevalence = 5% | 97.6% | (91.3%; 99.3%) |
| Pan-Ig | NPV at prevalence = 5% | 100% | (99.8%; 100%) |
| Siemens Healthcare Diagnostics | Dimension Vista SARS-CoV-2 Total antibody assay (COV2T) | High Throughput ELISA | Spike | Pan-Ig | Sensitivity (PPA) | 100% (79/79) | (95.4%; 100%) |
| Pan-Ig | Specificity (NPA) | 99.8% (1526/1529) | (99.4%; 99.9%) |
| Pan-Ig | PPV at prevalence = 5% | 96.3% | (89.7%; 98.7%) |
| Pan-Ig | NPV at prevalence = 5% | 100% | (99.8%; 100%) |
| Vibrant America Clinical Labs | Vibrant COVID-19 Ab Assay | High Throughput CLIA | Spike and Nucleocapsid | Combined | Sensitivity (PPA) | 98.1% (52/53) | (90.1%; 99.7%) |
| Combined | Specificity (NPA) | 98.6% (494/501) | (97.1%; 99.3%) |
| Combined | PPV at prevalence = 5% | 78.7% | (62.4%; 88.6%) |
| Combined | NPV at prevalence = 5% | 99.9% | (99.5%; 100.0%) |
| Wadsworth Center, New York State Department of Health | New York SARS-CoV Microsphere Immunoassay for Antibody Detection | MIA | Nucleocapsid | Pan-Ig | Sensitivity (PPA) | 88.0% (95/108) | (80.5%; 92.8%) |
| Pan-Ig | Specificity (NPA) | 98.8% (428/433) | (97.3%; 99.5%) |
| Pan-Ig | PPV at prevalence = 5% | 79.4% | (61.1%; 90.7%) |
| Pan-Ig | NPV at prevalence = 5% | 99.4% | (99.0%; 99.6%) |

Positive and Negative Predictive Values (PPV and NPV).