

FIND Evaluation of InTec PRODUCTS, INC.

Rapid SARS-CoV-2 Antigen Tests

External Report

Version 2.1, [21 November 2022]

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Evaluation process – private sector engagement

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For the COVID-19 response, FIND has commissioned independent evaluations of in vitro diagnostics following an Expression of Interest (EOI) process available on FIND's website by which all test submissions were scored according to their regulatory status and time to market; the manufacturing and distribution capacity of the supplier; and the supplier-reported clinical and analytical performance.

Document history

Document version	Date	Comment
2.0	06 May 2022	Second release
2.1	10 November 2022	Data added for HUG site in Switzerland

1 Product Info:

Manufacturer name	InTec PRODUCTS, INC.
Test name	Rapid SARS-CoV-2 Antigen Tests
Product code(s)	ITP16010-TC25
Pack size(s)	25 tests per kit
Contents of kit	Buffer tube, cassette, disposable swab, instructions for use, tube holder
Equipment and consumables required, but not provided	Timer, PPE
Product storage (temperature range)	2-30°C, room temperature
Shelf-life (months)	24 months
Manufacturing site (country)	China

2 Study details:

Study design:	Prospective diagnostic evaluation studies across multiple, independent sites to determine the accuracy of COVID-19 antigen RDTs, using consecutive enrolment. Interim analyses are performed at 25% and 50% enrolment, and the evaluation is stopped if tests do not meet 95% specificity. Presence of symptoms, date of symptom onset and hospitalization status is collected for all enrolled participants.
Index assays:	Novel lateral flow format tests that detect recombinant SARS-CoV-2 antigens.
Reference method:	Results of the index test are compared to the routine, diagnostic RT-PCR result, which is used for clinical management
Limit of detection:	Analytical sensitivity, i.e. Limit of detection, was performed at the Liverpool School of Tropical Medicine in which standardized serial dilutions of cultured viral isolate were prepared. Proprietary swab provided in the kit was soaked in viral dilution series. Dilutions were tested in triplicate and the LOD was defined as the last dilution where all repeats were interpreted as positive.
Clinical performance:	<p>Sensitivity was calculated as the proportion of true positive results detected by Rapid SARS-CoV-2 Antigen Tests among all positives by the reference method, and reported as a percentage</p> <p>Specificity was calculated as the proportion of true negative specimens, identified as negative by Rapid SARS-CoV-2 Antigen Tests among all negatives by the reference method and reported as a percentage.</p> <p>The 95% confidence intervals were calculated to assess the level of uncertainty introduced by sample size, using the Wilson's score method.</p>

3 Evaluation details:

Country of collaborator	Uganda	Switzerland
Location of clinical site(s) (city, town)	<ul style="list-style-type: none"> Mulago National Referral Hospital Kiruddu National Referral Hospital Mbarara Regional Referral Hospital Masaka Regional Referral Hospital 	University Hospital of Geneva
Health care level of site(s)	National or regional referral hospitals	Community Testing Clinic
Study period (date to date)	16 November 2021 – 17 January 2022	5 September – 21 October 2022
Study cohort inclusion/exclusion	Adults with acute respiratory illness who meets WHO case definition of a COVID-19 suspected case presenting to temporary testing locations around clinical sites. Provided informed consent	Adults in community meeting Department of Public Health definition of a suspected COVID-19 case and being tested for SARS-CoV-2 part of routine medical care. Provided informed consent
Sample type, antigen test	Nasal swab	Nasal swab
Reference PCR method	cobas® SARS-CoV-2 Test (Roche Diagnostics)	cobas® SARS-CoV-2 Test (Roche Diagnostics)
Sample type, PCR test	Nasopharyngeal swab	Nasopharyngeal swab

4.0 Results:

4.1 Study cohort

Country	Uganda	Switzerland
Total N (valid PCR results)	411	155
Age [mean (min-max), N]	36.8 (18-92), 411	43.1 (18-84), 155
Gender [%F, (n/N)]	47.1%, (193/410)	52.3%, (81/155)
Symptoms present [%Yes, (n/N)]	100%, (411/411)	98.3%, (57/58) ¹
Hospitalized (n, % Yes)	Not applicable	Not applicable
Days from symptom onset [median (Q1-Q3); N]	4 (3-5), 411	2 (1.5-4), 55 ¹
Days < 0-3 (n, %)	178, 43%	38, 69%

Days 4-7 (n, %)	199, 48%	11, 20%
Days 8+ (n, %)	34, 8%	6, 11%
Positivity [%, (n/N)]	26%, (107/411)	36%, (56/155)
PCR Ct [median (Q1-Q3); N]	28.6 (24-33), 107	21.8 (19.75-27.22), 56
Ct > 33 (n, %)	26, 24%	5, 9%
Ct > 30 (n, %)	44, 41%	8, 14%
Ct > 25 (n, %)	74, 69%	20, 36%

¹ Symptom data only available for PCR positive individuals

4.2 Estimation of Clinical Performance

Country	Uganda	Switzerland
Clinical Sensitivity (95% CI), N	86% (78.2, 91.3), 107	85.7% (74.3, 92.6), 56
Sensitivity days ≤7, N	86.1% (78.1, 91.6), 101	87.2% (74.8, 94), 47
Sensitivity Ct ≤ 33, N	97.5% (91.4, 99.3), 81	90.2% (79, 95.7), 51
Sensitivity Ct ≤ 25, N	100% (89.6, 100), 33	100% (90.4, 100), 36
Clinical Specificity (95% CI), N	99.3% (97.6, 99.8), 304	99% (94.4, 99.8), 98
Invalid rate (%, n/N)	0% (0/411)	0.6% (1/155)

4.3 Estimation of analytical performance

- Supplier-reported LOD = 4.25×10^2 TCID₅₀/mL ~ 2.98×10^2 pfu/ml (wild type)
- Verified LOD

Variant (lineage)	Lowest dilution detected	Verified LOD concentration	Viral Copy equivalent
UK wild type (B1)	1.0×10^3 pfu/ml ~ 1.41 x 10 ³ TCID ₅₀ /ml	1.0×10^3 pfu/ml	2.1×10^5 genome copies/ml applied to test
Alpha (B.1.1.7)	2.5×10^1 pfu/ml ~ 3.525 x 10 ¹ TCID ₅₀ /ml	2.5×10^1 pfu/ml	9.5×10^3 genome copies/ml applied to test
Gamma (P1)	1.0×10^1 pfu/ml ~ 1.41 x 10 ¹ TCID ₅₀ /ml	1.0×10^1 pfu/ml	3.1×10^3 genome copies/ml applied to test
Delta (B.1617.2)	2.5×10^2 pfu/ml ~ 3.525 x 10 ² TCID ₅₀ /ml	2.5×10^2 pfu/ml	9.9×10^5 genome copies/ml applied to test
Omicron (BA.1)	5.0×10^2 pfu/ml ~ 7.05 x 10 ² TCID ₅₀ /ml	5.0×10^2 pfu/ml	8.83×10^5 genome copies/ml applied to test

Note: viral dilution was applied directly to the test cassette, not to the provided swab