FIND Evaluation of Green Cross Medical Sciences Corp.

Genedia W COVID-19 Ag

External Report

Version 1.0, 25 April 2021

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Evaluation process – private sector engagement

FIND, the global alliance for diagnostics, seeks to ensure equitable access to reliable diagnosis around the world. It works closely with the private and public sectors and receives funding from donors and some of its industry partners. It has internal fire walls, policies and processes to protect it against any undue influence in its work or the publication of its findings.

More information on our policy and guidelines for working with private sector partners can be found here: https://www.finddx.org/policies/

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
1.0	25 April 2021	First release (UK + Peru data)

1 Product Info:

Manufacturer name	Green Cross Medical Sciences Corp.
Test name	Genedia W COVID-19 Ag
Product code(s)	643G-200-50-1
Pack size(s)	20 tests/kit
Contents of kit	Test device, extraction solution, sample developing filter cap, sterilized swabs (for sample collection), instructions for use
Equipment and consumables required, but not provided	PPE, timer, biohazard container
Product storage (temperature range)	2-30°C
Shelf-life (months)	12 months
Manufacturing site (country)	Republic of Korea

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:	Sensitivity was calculated as the proportion of true positive results detected by Genedia W COVID-19 Ag among all positives by the reference method, and reported as a percentage

	Specificity was calculated as the proportion of true negative specimens, identified as negative by Genedia W COVID-19 Ag among all negatives by the reference method and reported as a percentage. The 95% confidence intervals were calculated to assess the level of uncertainty introduced by sample size, using the Wilson's score method.

3 Evaluation details:

Country of collaborator	**United Kingdom**	**Peru**
Location of clinical site(s) (city, town)	Liverpool John Lennon Airport, United Kingdom	Universidad Peruana Cayetano Heredia
Health care level of site(s)	Drive through testing centre	Community Testing Clinic
Study period (date to date)	2 January – 26 February 2021	14 January –10 February 2021
Study cohort inclusion/exclusion	Inclusion: • 18 years or older, who are undergoing testing for COVID-19 • Symptomatic for COVID-19 • Provided informed consent Exclusion: • Asymptomatic Younger than 18 years	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
Sample type, antigen test	Nasopharyngeal swab	Nasopharyngeal swab
Reference PCR method	TaqPath™ COVID-19 CE-IVD RT-PCR Kit (ThermoFisher Scientific)	2019-nCoV TaqMan RT-PCR Kit (Norgen Biotek Corp)
Sample type, PCR test	Combined Nasal (anterior nares) and oropharyngeal swabs	Nasopharyngeal swab

4 Results:

4.1 Study cohort

Country	United Kingdom	Peru
Total N (valid PCR results)	391	108
Age [mean (min-max), N]	42.62 (18-83), 391	37.8 (18-80), 108
Gender [%F, (n/N)]	57.2%, (215/376)[1]	48.1%, (53/108)
Symptoms present [%Yes, (n/N)]	100% (391/391)	100%, (108/108)
Hospitalized (n, % Yes)	Not applicable	Not applicable
Days from symptom onset [median (Q1-Q3); N]	2 (1-3), 388[2]	5 (3.8-7), 108
Days < 0-3 (n, %)	320, 82%	27, 25%
Days 4-7 (n, %)	45, 12%	66, 61%
Days 8+ (n, %)	23, 6%	15, 14%
Positivity [%, (n/N)]	24% (92/391)	50%, (54/108)
PCR Ct [median (Q1-Q3); N]	21.4 (18.9-25.7), 92	22.5 (18.1-27.1), 54
Ct > 33 (n, %)	4, 4%	3, 6%
Ct > 30 (n, %)	10, 11%	9, 17%
Ct > 25 (n, %)	26, 28%	21, 39%

[1] Gender missing for n=15

[2] Day of symptom onset missing for n=3

4.2 Estimation of Clinical Performance

Country	United Kingdom	Peru
Clinical Sensitivity (95% CI), N	54.3% (44.2, 64.1), 92	72.2% (59.1, 82.4), 54
Sensitivity days ≤7, N	54.1% (43.6, 64.3), 85	77.8% (63.7, 87.5), 45
Sensitivity Ct ≤ 33, N	58.1% (47.6, 68), 86	76.5% (63.2, 86), 51
Sensitivity Ct ≤ 25, N	70.3% (58.2, 80.1), 64	87.9% (72.7, 95.2), 33
Clinical Specificity (95% CI), N	99% (97.1, 99.7), 299	98.1% (90.2, 99.7), 54

Invalid rate (%, n/N)	0% (0/391)	0% (0/108)

4.2.1 Estimation of analytical performance

	Lowest dilution detected	Verified LOD concentration	Viral Copy equivalent	Supplier-reported LOD
Analytical Sensitivity	5.0 x 10^3 pfu/ml ~ 7.1 x 10^3 $TCID_{50}$/ml	5.0 x 10^3 pfu/ml	9.78 x 10^6 **copies/ml** applied to test	7.5 x 10^2 TCID50/ml ~ 5.28 x 10^2 pfu/ml

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