Test Report
Panbio™ COVID-19 Ag RAPID TEST DEVICE– Brazil Study (CLDG-0807)

Review / Approval

Action	Function	Name	Date	Signature
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Related Documents

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R-IN-00481	Clinical Protocol: Clinical Evaluation of the Panbio™ COVID-19 Ag Rapid Test Device in Suspected Subjects using Nasopharyngeal Specimen (CLDG-0807)

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List of Abbreviations

AA	Work Instruction (German: Arbeitsanweisung)
Ag	Antigen
AJG	Abbott Rapid Diagnostics Jena GmbH
CDC	Centers for Disease Control
CLSI	Clinical and Laboratory Standards Institute
COVID-19	Coronavirus Disease
CI	Confidence Interval
EC	Ethics Committee
EDC	Electronic Data Capture system
EUA	Emergency Use Authorization
FDA	Food and Drug Administration
FS	Fingerstick
GCP	Good Clinical Practice
h	Hour(s)
ID	Identifier
IFU	Instruction for Use
IRB	Institutional Review Board
min	Minutes
µL	Microliter(s)
mL	Milliliter(s)
No.	number
RT-PCR	Reverse Transcription Polymerase Chain Reaction
QM	Quality Management
QRG	Quick Reference Guide
RA	Regulatory Affairs
R&D	Research and Development
SARS-CoV-2	Severe Acute Respiratory Syndrome Coronavirus 2
SIV	Site Initiation Visit
SOP	Standard Operating Procedure
TBD	To Be Determined
VA	Process Instruction (German: Verfahrensanweisung)
VTM	Viral Transport Media
VWB	Venous Whole Blood
WHO	World Health Organisation

1 Test Plan Section

1.1 Introduction

An outbreak of respiratory illness of unknown etiology in Wuhan City, Hubei Province, China was initially reported to WHO on December 13, 2019. Chinese authorities identified a novel coronavirus (2019-nCoV), which had resulted in thousands of confirmed human infections in multiple provinces throughout China and in several Southeast Asian countries, Europe and more recently the United States. Cases of severe illness and death have been reported. The International Committee for Taxonomy of Viruses (ICTV) renamed the virus SARS-CoV-2.

The Panbio™ COVID-19 Ag Rapid Test device is a lateral flow immunochromatographic test on the Panbio™ COVID-19 Ag platform, intended as an aid to diagnose COVID-19 disease in patients infected by SARS-CoV-2 virus. The Panbio™ COVID-19 Ag platform uses a cassette containing a lateral flow test strip. The Panbio™ COVID-19 Ag Rapid Test device is an in vitro diagnostic rapid test for the qualitative detection of Antigens to SARS-CoV-2 in human tissue fluids obtained from nasal or nasopharyngeal swabs. The Panbio™ COVID-19 Ag Rapid Test device is for professional use only and is intended for use by trained healthcare professionals in point of care and hospital settings to aid in the diagnosis of SARS-CoV-2 infection. The product may be used in laboratory and non-laboratory environments that meet the requirements specified in the product's Instructions for Use (IFU).

Study Locations

The study is being conducted at approximately 5 clinical sites located in Rio de Janeiro and other Brazilian states. As of now, testing has been performed at 4 sites. Sites were selected based on Investigation criteria. The applicable Institutional Review Board(s) (IRB) / Ethics Committee(s) (EC) reviewed and approved the study protocol, informed consent forms and/or assent forms (as applicable), and all other material provided to study subjects prior to site activation. The total study duration was expected to be approximately three months with the first subject targeted to be enrolled during study commencement in July/August 2020.

Study Design

The goal of the study was to enroll 600-700 subjects or until approximately 120 subjects that test positive for COVID-19 via the reference method and approximately 480 subjects that test negative for COVID-19 via an Emergency Use Authorization (EUA) from the FDA, CE marking, or in-country equivalent validation reference method with COVID-19 assay approval/clearance for nasopharyngeal specimens.

Operators collected two (2) nasopharyngeal swabs from each subject from whom informed consent had been obtained. An operator in this study is defined as a trained healthcare professional who routinely conducts nasopharyngeal sampling as part of their other standard of care and clinical duties. Subjects from all age groups meeting the eligibility criteria were enrolled; enrollment for the elderly group (≥65 years of age) was limited to approximately 9% of total enrollment. The first nasopharyngeal swab was placed in VTM immediately following collection and sent to the Reference Laboratory; results from the Reference Laboratory could

be utilized for standard of care purposes. The second nasopharyngeal swab was tested immediately following collection using a Panbio™ COVID-19 Ag Rapid Test Device per the IFU.

- Specimen testing was randomized according to the last digit of the subject's birth year. Subjects with an odd numbered birth year had the first swab taken from the left nostril and subjects with an even numbered birth year had the first swab taken from the right nostril.
- Swab 1 was placed in viral transport medium (VTM) immediately following collection.
  - Sites used their standard of care swabs, VTM and techniques to collect the Nasopharyngeal sample and provided the sample to the Reference Laboratory per their institutional process. Once the sites received the results (including Ct score), the site entered the data into the study database.
- Swab 2 was placed into the specimen collection tube provided in the Panbio™ COVID-19 Ag kit. The sample was tested immediately following collection using a Panbio™ COVID-19 Ag test according to the Instructions for Use. Upon completion of the test, the test results were photographed for documentation.

- The specimen collection was as follows:
  - Patients with odd numbered birth year had the first swab inserted into the left nostril.
  - Patients with even numbered birth year had the first swab inserted into the right nostril.

    Nasopharyngeal Swab 1: Entered several centimeters into the nostril with a slow, steady motion and moved along the floor of the nose, parallel to the palate (straight back, but not up the nose) until resistance was encountered, or the distance was equivalent to that from the ear to the nostril of the patient, indicating contact with the nasopharynx. Gently rubbed and rolled the swab 3 -4 times and AFTER SEVERAL SECONDS, withdrew the swab to make the sample absorb sufficiently on the swab.

    If the specimen collection was successful, this was repeated for the alternate nostril with Nasopharyngeal Swab 2.

    a. If the resistance was encountered at the level of the turbinate, a finger was placed on the tip of the patient's nose and depressed slightly, once resistance was met, the swab was passed into the pharynx relatively easily.
    b. If a deviated septum or blockage created difficulty in obtaining the specimens from one or both nostrils, the subject's participation in the study was discontinued.

Test operators were instructed to avoid contamination of the swabs during the collection process

The reference testing for nasopharyngeal swab specimens eluted into VTM could be tested in batches with a minimum frequency testing of twice a week as long as this did not conflict with reference method IFU. Reference Laboratory testing must not exceed 12 days from the date of collection of samples. To minimize laboratory bias, each participating site with local/institutional laboratories or designated laboratories were required to send their reference samples to only one selected laboratory per institution (local laboratory or study central laboratory). In the event

of extraordinary circumstances where the selected laboratory testing was not available, the institution could use another laboratory that met the criteria described under *Reference Testing* in section 1.5.1.5.

Participating sites received training on performing the investigational device testing, study protocol, the product's Quick Reference Guide (QRG) and the product's Instructions For Use (IFU) by the Sponsor. Site Initiation Visit (SIV) training was provided to each site prior to site activation to include a review of study roles and responsibilities, subject informed consent procedures, data management and monitoring activities, and other study conduct activities. The first two (2) subjects enrolled and tested at each site by the operator(s) denoted the operator's Familiarization Period; the Familiarization Period allowed operator(s) to familiarize themselves with the study protocol and study procedures. The operator(s) participating in the Familiarization Period were designated as the trainers for the site.

Subject demographic data, exposure information (self-reported), symptomology data (self-reported, including duration of symptoms), current medication(s) to treat symptoms that may be attributed to COVID-19, RT-PCR results from Reference Labs and Panbio™ COVID-19 Ag Rapid Test results were collected on study source documents and recorded (entered) in a database. Sites were asked to take a photograph of each completed test device with the subject ID and test result displayed. The photograph was taken at the time the test was read. Due to current travel restrictions, and depending on the quality of the exposure, the sponsor could use the photograph as a source document to resolve monitoring queries in lieu of on-site monitoring.

Monitoring

Due to the current travel restrictions and social distancing guidelines enacted by country, state and local governments, this study was managed, conducted and monitored using electronic tools such as WebEx meetings for the conduct of site visits (including site qualification, site initiation, monitoring and close out visits), email or document sharing platforms for the transfer and sharing of source documents for monitoring of study data, and other remote tools to ensure compliance with the study protocol, the product's IFU and QRG, CDC guidelines, GCP and all applicable regulations.

1.2 Study Objectives

The objectives of this study were:

- The primary objective of this study was to estimate the clinical sensitivity and specificity of the Panbio™ COVID-19 Ag Rapid Test based on the results obtained from the reference method in suspected COVID-19 patients using nasopharyngeal specimens.

1.3 Guidelines and Statements

This test/study was performed according to the following guidelines and standards:

- CLSI EP12-A2 (2008): User Protocol for Evaluation of Qualitative Test Performance
- FDA Policy for Coronavirus Disease-2019 Tests During the Public Health Emergency (Revised) 11-05-2020.
- Working Document of Commission Services (European Commission) (16-04-2020)

1.4 Archiving

Original data and associated documents were archived according to the institutional Standard Operation Procedures (SOP) at the Federal University of Rio de Janeiro (UFRJ), Rio de Janeiro, Brazil. Electronic copies of data and associated documents provided by study sponsor from Abbott Rapid Diagnostics Lake Forest (Abbott Park, Illinois, US) are archived at Abbott Rapid Diagnostics Jena GmbH, Orlaweg 1, D-07743 Jena, Germany according to VA-0000 (Control of Documents & Records).

1.5 Test Protocol

All specifications concerning the test environment, prerequisites, test design and acceptance criteria are defined in this section.

1.5.1 Test Environment and Materials

The following prerequisites were fulfilled to perform this study.

1.5.1.1 Test Environment

The study was conducted at the Federal University of Rio de Janeiro (UFRJ), Rio de Janeiro, Brazil including sites at Marica centro, Marica Itaipuacu, Macae, and Rio de Janeiro, in laboratories certified under the Clinical Laboratory Improvement Amendments (CLIA) of 1988, 42 U.S.C. 263a. The laboratory facility allows the user(s) to perform moderate and high complexity diagnostic tests, as well as to perform rapid diagnostics assays in near patient care settings such as a physician's office.

1.5.1.2 Personnel

Different aspects of the study were performed by the following persons:

Table 1: Test Personnel

Function	Name (First, Last)	Title
Study PI	Dr. Amilcar Tanuri	Professor
Co-PI	Dr. Orlando C Ferreira Jr.	Professor
Co-PI	Dr. Terezinha M.P.P. Castineiras	Professor
Co-PI	Dr. Rafael M. Galliez	Professor
Laboratory supervisor	Dr. Diana Mariani	Testing Lab Coordinator
Sample collection and performing Panbio™ COVID-19 Ag Rapid Test	Numerous*	Nurse
Clinical affairs coordinator and transfer study results	Julian C. Braz	Director Global Clinical Affairs (ARDx)
Calculation and release of calculated test results	Kerstin Scheubert	Manager Assay Development Statistics & V&V Coordination (AJG)
Review of calculated test results	Andreas Löhmer	OpEx Lead (AJG)

*Professional nurses approved to collect nasopharyngeal samples

Study Participants

Male or female subjects of all ages; enrollment for elderly group (ages ≥65 years) were limited to approximately 9%.

Clinical site staff identified potential subjects based on meeting the inclusion criteria and not meeting any of the exclusion criteria. The site verified and documented each subject's eligibility based the specified inclusion / exclusion criteria. Once a potential subject was identified, the site explained the study to each potential subject and obtained proper informed consent prior to performing any study related activity. Study procedures were performed immediately after the informed consent process. In order to have a representative distribution of age in the study, not more than approximately 9% of study participants were 65 years or older (elderly group); this percentage is equivalent to the distribution of age worldwide. The Sponsor will inform the investigational sites to stop enrolling subjects into the elderly group once the study has enrolled approximately 63 (700 X 0.09 = 63) of these subjects in the study.

The enrollment criteria were the following:

- **Inclusion Criteria**

  Subject was suspected by study staff to have contracted COVID-19 disease in the last 7 days of enrollment. Patient had:

  - Symptoms consistent with COVID-19, or
  - Had been in contact with patients diagnosed with COVID-19, and were suspected by the study staff to potentially have COVID-19, or
  - Travelled to COVID-19 endemic area(s), and were suspected by the study staff to potentially have COVID-19

- **Exclusion Criteria**

  a. Participant was Subject with active nose bleeds.
  b. Subjects with facial injuries/trauma or a condition that created a mechanical barrier to safely obtain samples.
  c. Subject was currently enrolled in a study to evaluate an investigational drug.
  d. Subject had previously participated in this study.
  e. Subject was unable or unwilling to provide informed consent.
  f. Nasopharyngeal specimen extraction (for any reason) within the last 24 hours of enrollment.
  g. Vulnerable populations as deemed inappropriate for study by site Principal Investigator.

- **Participant Withdrawal and Replacement**

  a. The study investigator withdrew the subject from the study due to the subject's health status or concerns for the subject safety. All data and testing results obtained prior to the subject's withdrawal could be used in the study analysis.
  b. Either of the 2 specimen swabs could not be obtained from the subject for whatever reason.
  c. The Panbio™ COVID-19 Ag Rapid Test returned an invalid result.
  d. The Panbio™ COVID-19 Ag Rapid Test was read prior to 15 minutes or after 20 minutes (from the time the sample and buffer was applied to the Panbio™ COVID-19 Ag Rapid Test).

e. Samples are obtained from a subject; but subject was later suspected of having COVID-19 for more than 7 days.
f. Subject withdrew his/her consent. All data and testing results obtained prior the subject's notification of withdrawn consent could be used.
g. A valid reference method result could not be obtained for any reason.

- **Subject Involvement Endpoint/Follow-Up**
  All Subjects who were consented, enrolled, and provided two swab specimens had completed participation in this study. There was no further follow-up required.

1.5.1.3 Samples/ Specimens

For each of the participants prior to specimen collection, the operator clearly identified each specimen collection container and related study documentation with the unique number for each patient.

- Swab Handling

The Operator took necessary precautions to ensure that each of the nasopharyngeal collection swabs were distinguished from each other, based on the testing randomization detailed under *Study Design* in section 1.1, and that they remained free from contaminants. The nasopharyngeal swab used with the Panbio™ COVID-19 Ag Rapid Test Device was tested immediately following collection per the instructions provided in the Quick Reference Guide (QRG) and Information For Use (IFU). The swabs following swabs were used:

Table 2: Swabs

Description/Name	Part Number	Lot Number	Manufacturer/Supplier
Positive Control Swab	A41AW1S	41AW1F010	Myungjin sponge
Negative Control Swab	A41AWNS	41AWNF010	Myungjin sponge
FLOCKED SWAB (COVID-19 AG)	P60-010/030/001	NFS1200601	Noble Bio

The nasopharyngeal swab intended for reference testing was eluted in VTM (or other transport media) immediately following sample collection (within 10 minutes of collection), or per institutional standard of care procedures.

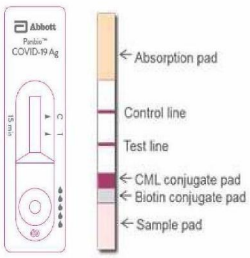
1.5.1.4 Rapid Test Devices and Comparative Methods

In this study, the following SARS-CoV-2 assays were used:

Table 3: Rapid Test Devices

Description/Name	Catalogue Number	Lot Number	Manufacturer/Supplier
Abbott Panbio™ COVID-19 Ag RAPID TEST DEVICE	Cat. No. I 41FK10	41ADF009A	Abbott Rapid Diagnostics Jena GmbH

- Abbott Panbio™ COVID-19 Ag RAPID TEST DEVICE:



The Panbio™ COVID-19 Ag Rapid Test results were interpreted based on the instructions provided in the Quick Reference Guide (QRG) and the product's Instructions for Use (IFU). If no band appeared on the control line, it may have been due to an error in the performance of the test including insufficient sample volume. As a part of the quality control check, the Operator confirmed the observation of a purple line on the control line (C) marker prior to interpreting the results (see Figure 2 above). Samples that did not produce a control (C) line were considered invalid. Samples generating an Invalid result were not retested. Invalid results were recorded in the subject source document. Test results were identified by the Subject ID number and recorded in the study source documents. Data collected in the study source documents were entered into the study database.

The Panbio™ COVID-19 Ag Rapid Test results obtained from this study were not used for decisions regarding Subject diagnosis or medical care.

- Control Testing

Every time a new Panbio™ COVID-19 Ag Rapid Test kit was opened, the site performed 2 external control tests using the positive and negative control swabs. A Panbio™ COVID-19 Ag Rapid Test Device was used to test the positive control swab and another Panbio™ COVID-19 Ag Rapid Test Device was used to test the negative control swab. External controls were tested according to the instructions provided in the QRG and IFU. This documented two valid external control results (1 positive and 1 negative) for every time a new Panbio™ COVID-19 Ag Rapid Test kit was opened. All control testing results were recorded in the appropriate study source document. All materials used were within their defined shelf life.

If either of the external control tests failed, the operator repeated the test using a new control swab (for the control level that failed) and a new Panbio™ COVID-19 Ag Rapid Test Device. The operator was allowed to retest the external controls up to three times. If, after 3 attempts, a site could not get a valid result from either the positive or negative control, the operator could not perform subject testing and contacted the sponsor immediately.

- Reference Testing

The site followed standard of care practices to handle, process, transport, and/or ship the samples to the laboratories.

For the purposes of this study, the performance of the Panbio™ COVID-19 Ag Rapid Test Device was evaluated against the results of the standard of care at the study site. These methods received in-country equivalent validation, with COVID-19 assay approval/clearance for nasopharyngeal specimens. In the event of extraordinary circumstances where the selected laboratory testing was not available, the institution could use another laboratory that met the criteria described in this section. Reference method testing and associated control testing was conducted per product instructions by the Reference Laboratory. The reference method used the Maxwell® 16 Viral Total Nucleic Acid Purification Kit for viral RNA isolation. For real time polymerase chain reaction, the CDC primer and probe set (N1, N2 and RP) was used. The viral amplification and detection reactions were performed using GoTaq® Probe 1-Step RT-qPCR. Each reaction contained 10 µL of mix with CRX, 3.1 µL nuclease free water, 1.5 µL prime time, 0.4 µL enzyme and 5 µL RNA for a total volume of 20 µL. The therrmocycling conditions were 50ºC for 30 minutes (1 cycle), 95ºC for 10 minutes (1 cycle), 95ºC for 30 seconds and 58ºC for 60 seconds (45 cycles).

All laboratories that provided RT-PCR results in this study were collectively called "Reference Labs" for the purpose of this protocol. The testing of VTM reference samples was performed in batches with a minimum frequency testing of twice a week, as long as this did not conflict with the reference method IFU. All Reference Labs tested the VTM reference sample within 12 days of collection. Samples tested with the reference method by the Reference Labs as described above were used for standard of care purposes and were all EUA approved. The reference method used for determining RT-PCR results was documented in the EDC. Results from reference method testing were provided to the Sponsor by entering the data into the study database.

1.5.1.5 Materials

- Panbio™ COVID-19 Ag Rapid Test kits in sufficient quantity to complete the study: packaged in sets of 25 (25 reagents, 25 nasopharyngeal swabs) with a Quick Reference Guide (QRG)
- Additional sterile nasopharyngeal swabs in sufficient quantity to complete the study.
- Panbio™ COVID-19 Ag Positive Control swabs in sufficient quantity to complete the study
- Panbio™ COVID-19 Ag Negative Control swabs in sufficient quantity to complete the study
- Regulatory Study documents: final study protocol, Panbio™ COVID-19 Ag Rapid Test IFU.

1.5.1.6 EDC

Study data was entered in the electronic database by the study staff. The data recorded in study database was source-verified from study related source documents. The investigator

ensured that all data in the study database was complete, accurate, and consistent with source documentation.

For each Subject, the following required data was collected at the clinical site and added to the database:

- Subject ID number
- Date and time of consent / assent
- Demographic information
- Site setting (i.e., point of care facility or hospital)
- Eligibility criteria including days since symptom onset or suspected exposure
- Date and time of specimen collections
- Results of Panbio™ COVID-19 Ag Rapid Test
- Reference Lab testing results including Ct value and Reference Method
- Subject exposure information (self-reported)
- Symptomology data (self-reported, including duration of symptoms)
- Current medication(s) to treat symptoms that may be attributed to COVID-19

1.5.1.7 Software

The following software/versions were used:

Table 4: Software

Description/Name	Version Number	Manufacturer/Supplier
Microsoft Office	364	Microsoft Inc., USA
R	3.6.1	The R Foundation

1.5.2. Test Design/Parameters

This study was intended to use human samples obtained from the nasopharyngeal cavity in suspected COVID-19 subjects to establish the clinical sensitivity and specificity of the Panbio™ COVID-19 Ag Rapid Test by comparison to the reference method used by a testing laboratory. The study collected 2 nasopharyngeal swabs from each subject enrolled, with one swab being tested immediately after collection using the Panbio™ COVID-19 Ag Rapid Test Device and the other swab being placed in viral transport medium (VTM) immediately after collection and used for standard of care testing. The testing procedure was randomized to determine from which nostril (left or right) the first specimen swab was collected.

1.5.3. Evaluation of Data and Statistical Methods

1.6 Primary and Secondary Analyses

The primary analysis was to estimate the sensitivity and specificity of the Panbio™ COVID-19 Ag Rapid Test versus the reference method in suspected COVID-19 subjects (onset of

symptoms reported ≤ 7 days). The results of Panbio™ COVID-19 Ag was evaluated against the results of the reference method. The data will be analyzed to determine sensitivity and specificity versus the reference method, including the 95% two-sided confidence intervals.

Two separate secondary analyses were performed:

1. The first secondary analysis was conducted to estimate the sensitivity and specificity of the Panbio™ COVID-19 Ag Rapid Test versus the reference method in a population of suspected COVID-19 subjects. The data was analyzed to determine sensitivity and specificity versus the reference method, including the 95% two-sided confidence intervals. Data obtained during the Familiarization Period as described in the section above was excluded from the analysis.
2. The second secondary analysis was to estimate the sensitivity and specificity of the Panbio™ COVID-19 Ag Rapid Test versus the reference method in subjects enrolled in the study with no symptoms at the time of presentation but were suspected of COVID-19 disease. The results of Panbio™ COVID-19 Ag was evaluated against the results of the reference method. The data was analyzed to determine sensitivity and specificity versus the reference method, including the 95% two-sided confidence intervals. Data obtained during the Familiarization Period as described in under *Study Design* in section 1.1 will be excluded from the analysis.

1.7 Acceptance Criteria and Power Analysis

There were no formal acceptance criteria for this study. For the purpose of powering the study, the device's sensitivity and specificity performance characteristics for nasopharyngeal swabs were expected to meet the following objectives when comparing to the reference method.

Study objectives were:

- Sensitivity >80% at the lower limit of the two-sided 95% confidence interval.
- Specificity >95% at the lower limit of the two-sided 95% confidence interval.

Enrollment requirements (at the study prevalence) was a minimum of N=120 reference positive suspected subjects and a minimum of N=480 reference negative subjects.

Sensitivity estimate:

Power Analysis of One Proportion
Numeric Results for testing H0: P = P0 versus H1: P > P0
Test Statistic: Exact Test

Power	N	Proportion Given H0 (P0)	Proportion Given H1 (P1)	Target Alpha	Actual Alpha	Beta	Reject H0 If R ≥ This
0.8560	120	0.8000	0.9000	0.0250	0.0218	0.1440	105

Specificity estimate:

Power Analysis of One Proportion
Numeric Results for testing H0: P = P0 versus H1: P > P0
Test Statistic: Exact Test

Power	N	Proportion Given H0 (P0)	Proportion Given H1 (P1)	Target Alpha	Actual Alpha	Beta	Reject H0 If R ≥ This
0.9377	480	0.9500	0.9800	0.0250	0.0176	0.0623	466

In the tables above, N is the sample size drawn from the population and R/N is the point estimate of the proportion in the sample drawn from the population. The last column of the table is the minimum value of R required to achieve the objective of the study. Alpha is the probability of achieving the objective when the population proportion is P0. Power is the probability of achieving the objective when the population proportion is P1. Beta is 1 – Power. [PASS 13 Power Analysis and Sample Size Software (2014). NCSS, LLC. Kaysville, Utah, USA, ncss.com/software/pass.]

2 Deviations from Clinical Protocol

None.

3 Test Report Section

This section shows interim test results for Subjects tested until August 11th, 2020.

3.1 Date of Test Performance

Testing was performed from August 3rd to August 11th, 2020.

3.2 Characteristics of study cohorts

This version of the test report shows the interim test results for:

- samples from 60 Reference Positive Suspected Subjects tested using the Panbio™ COVID-19 Ag Rapid Test compared to the RT-PCR result
- samples from 181 Reference Negative Subjects tested using the Panbio™ COVID-19 Ag Rapid Test compared to the RT-PCR result
- one Subject (Subject ID 20COV 2938) was measured >7 days post onset of symptoms. As required by the clinical protocol (CLDG-0807) this patient was excluded. Result for Panbio™ COVID-19 Ag Rapid Test as well as for the reference RT-PCR method were in concordance and negative for this sample.
- two Subjects (Subject IDs 17473 and 17505) showed Ct values of reference RT-PCR were between 37 and 40 for both target regions N_1 and N_2. According to the laboratory

protocol of the sites results of those samples are inconclusive (see Appendix C). Thus, a valid reference method result could not be obtained, and the two samples were excluded. Results for Panbio™ COVID-19 Ag Rapid Test as well as for the reference RT-PCR method were in concordance and negative for those two samples.

The categorization of the participants regarding "days post onset symptoms" is presented in Table 4.

Table 5: Categorization of Participants

Category	N	Site			
		Macae	Marica centro	Marica Itaipuacu	Rio de Janeiro
Total	**244**	**115**	**45**	**28**	**56**
Reference Positive Suspected Subjects	**60**	**21**	**13**	**10**	**16**
0-3 days post onset symptoms	21	4	5	5	7
4-7 days post onset symptoms	39	17	8	5	9
No symptoms	0	0	0	0	0
SARS-CoV-2 negative cohort	**181**	**93**	**31**	**17**	**40**
0-3 days post onset symptoms	54	24	8	11	11
4-7 days post onset symptoms	125	69	23	4	29
No symptoms	2	0	0	2	0
Excluded	**3**	**1**	**1**	**1**	**0**
Replaced	**0**	**0**	**0**	**0**	**0**

3.3 Test Results

Table 5 shows interim test results for all Subjects tested until August 11th, 2020.

Table 6: Test Results. Discrepant Results in bold.

Status	Subject ID	Panbio™ COVID-19 Ag Rapid Test Result	RT-PCR Result
Reference Positive Suspected Subjects	17067	Positive	Positive
	17214	Positive	Positive
	17358	Positive	Positive
	17359	Positive	Positive
	17360	Positive	Positive
	17368	Positive	Positive
	17373	Positive	Positive
	17379	Positive	Positive
	17440	Positive	Positive
	17449	**Negative**	**Positive**
	17452	Positive	Positive
	17457	Positive	Positive
	17459	Positive	Positive
	17461	Positive	Positive
	17462	Positive	Positive
	17464	Positive	Positive
	17470	Positive	Positive
	17471	Positive	Positive
	17474	Positive	Positive
	17475	Positive	Positive
	17477	Positive	Positive
	17480	Positive	Positive
	17485	Positive	Positive
	17490	Positive	Positive
	17497	Positive	Positive
	17499	Positive	Positive
	17500	Positive	Positive
	17504	Positive	Positive
	17514	Positive	Positive
	17515	Positive	Positive
	17519	Positive	Positive
	17550	Positive	Positive
	17553	Positive	Positive
	17554	Positive	Positive
	17562	Positive	Positive
	17566	Positive	Positive
	17570	Positive	Positive

Status	Subject ID	Panbio™ COVID-19 Ag Rapid Test Result	RT-PCR Result
	17575	**Negative**	**Positive**
	17579	Positive	Positive
	20COV 2857	Positive	Positive
	20COV 2868	Positive	Positive
	20COV 2878	**Negative**	**Positive**
	20COV 2885	Positive	Positive
	20COV 2935	Positive	Positive
	20COV 2936	Positive	Positive
	20COV 2937	Positive	Positive
	20COV 2940	Positive	Positive
	20COV 2947	Positive	Positive
	20COV 2955	Positive	Positive
	20COV 2956	Positive	Positive
	20COV 3043	Positive	Positive
	20COV 3048	Positive	Positive
	20COV 3060	Positive	Positive
	20COV 3191	Positive	Positive
	20COV 3193	Positive	Positive
	20COV 3195	Positive	Positive
	20COV 3221	Positive	Positive
	20COV 3231	**Negative**	**Positive**
	20COV 3234	Positive	Positive
	20COV 3242	Positive	Positive
Reference Negative Subjects	17068	Negative	Negative
	17073	Negative	Negative
	17078	Negative	Negative
	17084	Negative	Negative
	17085	Negative	Negative
	17088	Negative	Negative
	17089	Negative	Negative
	17090	Negative	Negative
	17183	Negative	Negative
	17185	Negative	Negative
	17249	Negative	Negative
	17263	Negative	Negative
	17361	Negative	Negative
	17362	Negative	Negative
	17363	Negative	Negative
	17364	Negative	Negative
	17366	Negative	Negative
	17367	Negative	Negative
	17370	Negative	Negative

Status	Subject ID	Panbio™ COVID-19 Ag Rapid Test Result	RT-PCR Result
	17371	Negative	Negative
	17372	Negative	Negative
	17374	Negative	Negative
	17375	Negative	Negative
	17376	Negative	Negative
	17380	Negative	Negative
	17381	Negative	Negative
	17382	Negative	Negative
	17447	Negative	Negative
	17448	Negative	Negative
	17450	Negative	Negative
	17451	Negative	Negative
	17453	Negative	Negative
	17454	Negative	Negative
	17455	Negative	Negative
	17456	Negative	Negative
	17458	Negative	Negative
	17460	Negative	Negative
	17463	Negative	Negative
	17465	Negative	Negative
	17466	Negative	Negative
	17467	Negative	Negative
	17468	Negative	Negative
	17469	Negative	Negative
	17472	Negative	Negative
	17476	Negative	Negative
	17478	Negative	Negative
	17481	Negative	Negative
	17482	Negative	Negative
	17483	Negative	Negative
	17484	Negative	Negative
	17486	Negative	Negative
	17487	Negative	Negative
	17488	Negative	Negative
	17489	Negative	Negative
	17491	Negative	Negative
	17492	Negative	Negative
	17493	Negative	Negative
	17494	Negative	Negative
	17495	Negative	Negative
	17496	Negative	Negative
	17498	Negative	Negative

Status	Subject ID	Panbio™ COVID-19 Ag Rapid Test Result	RT-PCR Result
	17501	Negative	Negative
	17502	Negative	Negative
	17503	Negative	Negative
	17506	Negative	Negative
	17507	Negative	Negative
	17508	**Positive**	**Negative**
	17509	Negative	Negative
	17510	Negative	Negative
	17511	Negative	Negative
	17512	Negative	Negative
	17513	Negative	Negative
	17516	Negative	Negative
	17517	Negative	Negative
	17518	Negative	Negative
	17547	Negative	Negative
	17548	Negative	Negative
	17549	Negative	Negative
	17551	Negative	Negative
	17552	Negative	Negative
	17555	Negative	Negative
	17556	Negative	Negative
	17560	Negative	Negative
	17569	Negative	Negative
	17571	Negative	Negative
	17576	Negative	Negative
	17577	Negative	Negative
	17578	Negative	Negative
	20COV 2856	Negative	Negative
	20COV 2858	Negative	Negative
	20COV 2859	Negative	Negative
	20COV 2860	Negative	Negative
	20COV 2861	Negative	Negative
	20COV 2863	Negative	Negative
	20COV 2866	Negative	Negative
	20COV 2869	Negative	Negative
	20COV 2872	Negative	Negative
	20COV 2879	Negative	Negative
	20COV 2883	Negative	Negative
	20COV 2886	Negative	Negative
	20COV 2888	Negative	Negative
	20COV 2890	Negative	Negative
	20COV 2893	Negative	Negative

Status	Subject ID	Panbio™ COVID-19 Ag Rapid Test Result	RT-PCR Result
	20COV 2932	Negative	Negative
	20COV 2933	Negative	Negative
	20COV 2939	Negative	Negative
	20COV 2941	Negative	Negative
	20COV 2942	Negative	Negative
	20COV 2943	Negative	Negative
	20COV 2945	Negative	Negative
	20COV 2946	Negative	Negative
	20COV 2948	Negative	Negative
	20COV 2950	Negative	Negative
	20COV 2951	Negative	Negative
	20COV 2952	Negative	Negative
	20COV 2953	Negative	Negative
	20COV 2954	Negative	Negative
	20COV 2957	Negative	Negative
	20COV 3033	Negative	Negative
	20COV 3034	Negative	Negative
	20COV 3036	Negative	Negative
	20COV 3037	Negative	Negative
	20COV 3038	Negative	Negative
	20COV 3039	Negative	Negative
	20COV 3040	Negative	Negative
	20COV 3041	Negative	Negative
	20COV 3044	Negative	Negative
	20COV 3046	Negative	Negative
	20COV 3047	Negative	Negative
	20COV 3049	Negative	Negative
	20COV 3050	Negative	Negative
	20COV 3051	Negative	Negative
	20COV 3052	Negative	Negative
	20COV 3053	Negative	Negative
	20COV 3055	Negative	Negative
	20COV 3056	Negative	Negative
	20COV 3057	Negative	Negative
	20COV 3058	Negative	Negative
	20COV 3059	Negative	Negative
	20COV 3061	Negative	Negative
	20COV 3062	Negative	Negative
	20COV 3065	Negative	Negative
	20COV 3066	Negative	Negative
	20COV 3067	Negative	Negative
	20COV 3068	Negative	Negative

Status	Subject ID	Panbio™ COVID-19 Ag Rapid Test Result	RT-PCR Result
	20COV 3069	Negative	Negative
	20COV 3170	Negative	Negative
	20COV 3192	Negative	Negative
	20COV 3194	Negative	Negative
	20COV 3196	Negative	Negative
	20COV 3197	Negative	Negative
	20COV 3199	Negative	Negative
	20COV 3200	Negative	Negative
	20COV 3202	Negative	Negative
	20COV 3203	Negative	Negative
	20COV 3204	Negative	Negative
	20COV 3205	Negative	Negative
	20COV 3206	Negative	Negative
	20COV 3207	Negative	Negative
	20COV 3208	Negative	Negative
	20COV 3209	Negative	Negative
	20COV 3212	Negative	Negative
	20COV 3213	Negative	Negative
	20COV 3214	Negative	Negative
	20COV 3215	Negative	Negative
	20COV 3216	Negative	Negative
	20COV 3217	Negative	Negative
	20COV 3218	Negative	Negative
	20COV 3219	Negative	Negative
	20COV 3220	Negative	Negative
	20COV 3222	Negative	Negative
	20COV 3223	Negative	Negative
	20COV 3224	Negative	Negative
	20COV 3225	Negative	Negative
	20COV 3227	Negative	Negative
	20COV 3228	Negative	Negative
	20COV 3229	Negative	Negative
	20COV 3230	Negative	Negative
	20COV 3235	Negative	Negative
	20COV 3236	Negative	Negative
	20COV 3239	Negative	Negative

3.4 Analysis of Results

3.4.1 Clinical Agreement between Panbio™ COVID-19 Ag Rapid Test and RT-PCR Test

For this analysis, all Subjects (including the two asymptomatic subjects) are considered. When comparing the results of Panbio™ COVID-19 Ag Rapid Test Device with the RT-PCR results, we observe a 93.3% sensitivity and a 99.4% specificity, as shown in Table 7.

Table 7: Clinical Agreement between Panbio™ COVID-19 Ag Rapid Test and RT-PCR Test

		RT-PCR Test		
		Positive	**Negative**	**Total**
Panbio™ COVID-19 Ag Rapid Test	**Positive**	56	1	57
	Negative	4	180	184
	Total	60	181	241
		Sensitivity	**Specificity**	
		93.3% [83.8%; 98.2%]	**99.4%** [97.0%; 100.0%]	
		Accuracy		
		97.9% [95.2%; 99.3%]		

The four False Negative Test Results show relatively high Ct values on the reference RT-PCR test ranging from 31.90 to 35.81 for the N_1 target region, and from 34.53 to 37.15 for the N_2 target region. In the whole study, only one more Subject shows a Ct value ≥ 31.90 for the N_1 target region, and no other Subject shows a Ct value ≥ 34.53 for the N_2 target region. See Figure 1 for visualization of Ct values.

Only one False Negative Subject shows a Ct value below 33 (Subject ID 20COV 3231 with Ct value for the N_1 target region = 31.90 and Ct value for the N_2 target region = 36.35). Based on the minimum Ct value of the N_1 target region and the N_2 target region, Panbio™ COVID-19 Ag Rapid Test has 98.2% sensitivity on subjects with Ct values ≤ 33 (n=57) and 0.0% sensitivity on subjects with Ct values >33 (n=3). Reference iv. suggests that Ct values >33 are not contagious.

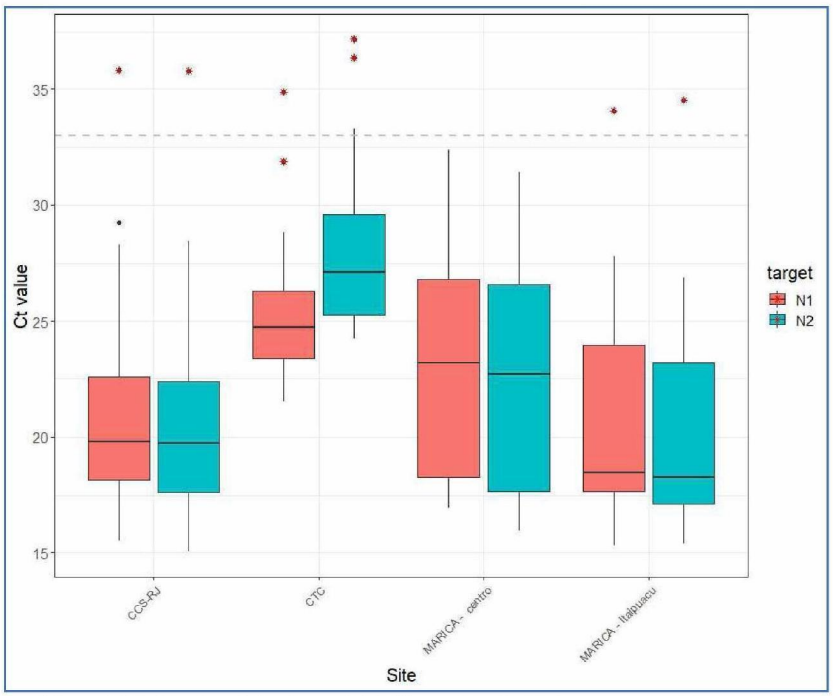


Figure 1: Distribution of Ct values of RT-PCR positive Subjects grouped by Target and Site. Ct values for False Negative test results are labeled with red asterisks. Horizontal grey dashed line marks Ct value 33, that was recently used to define infectivity (see Ref. iv).

Note: Per clinical protocol CLDG-0807, the primary analysis is restricted to symptomatic Subjects. As only two of the 241 tested patients were asymptomatic, and for both patients the Panbio™ COVID-19 Ag Rapid Test Result matches the RT-PCR Test Result (both negative), this does not make a significant difference for clinical agreement values. Thus, only results for the secondary analysis for which asymptomatic Subjects are included, are shown.

3.4.2 Clinical Agreement between Panbio™ COVID-19 Ag Rapid Test and RT-PCR Test grouped by "Days post onset symptoms"

To demonstrate clinical performance of the Panbio™ COVID-19 Ag Rapid Test for different stages of infection, Subjects were categorized into 3 groups: asymptomatic subjects, subjects

tested up to 3 days post onset symptoms and subjects tested 4 to 7 days post onset symptoms. Results for sensitivity, specificity and accuracy are shown in Table 8.

Table 8: Clinical Agreement between Panbio™ COVID-19 Ag Rapid Test and RT-PCR Test grouped by "Days post onset symptoms".

Days post onset symptoms	#Subjects	#Positive Subjects	#True Positive Subjects	Sensi-tivity [95% CI]	#Negative Subjects	#True Negative Subjects	Speci-ficity [95% CI]	Accuracy [95% CI]
0-3	75	21	21	100.0% [83.9%; 100.0%]	54	54	100.0% [93.4%; 100.0%]	100.0% [95.2%; 100.0%]
4-7	164	39	35	89.7% [75.8%; 97.1%]	125	124	99.2% [95.6%; 100.0%]	97.0% [93.0%; 99.0%]
No Symptoms	2	0	0	N/A	2	2	100.0% [15.8%; 100.0%]	100.0% [15.8%; 100.0%]

Results show excellent sensitivity for subjects tested up to 3 days post onset symptoms. Sensitivity seems to decrease for subjects tested later than 3 days post onset symptoms. However, the sample size is small, thus the significance of this conclusion is limited.

3.5 Open Issues, Failures, Measures

None.

4 Summary and Conclusion

In this study, clinical performance characteristics to support conformity assessment procedure for the Panbio™ COVID-19 Ag rapid test device were evaluated in four clinical facilities. Over 9 days, 244 participants were attending the study from which 241 fulfilled eligibility criteria. Eligible participants were sorted in two cohorts, RT-PCR Positive Suspected Subjects (N=60) and RT-PCR Negative Subject (N=181).

Evaluation of clinical diagnostic agreement between Panbio™ COVID-19 Ag rapid test and RT-PCR (CDC) indicate that sensitivity is 93.3% with 95% CI [83.8%; 98.2%] and specificity is 99.4% with 95% CI [97.0%; 100.0%]. The (informal) sensitivity and specificity acceptance criteria (lower limit of the two-sided 95% confidence interval >80% and >95%, respectively) were fulfilled.

Panbio™ COVID-19 Ag Rapid Test showed 98.2% sensitivity for subjects with Ct values ≤ 33 (N=57) and 0.0% sensitivity for subjects with Ct values >33 (N=3). Reference iv. suggests that Ct values >33 were reported to be not contagious.

This is an interim test report. The final test report will be provided as soon as the remaining patients are enrolled and tested.

5 References

i. Centers for Disease Control and Prevention. https://www.cdc.gov/coronavirus/2019ncov/index.html. Accessed February 9, 2020.
ii. bioRxiv. (https://www.biorxiv.org/content/10.1101/2020.02.07.937862v1). Accessed March 3, 2020.
iii. https://www.statista.com/statistics/265759/world-population-by-age-and-region/
iv. La Scola, B. *et al.* Viral RNA load as determined by cell culture as a management tool for discharge of SARS-CoV-2 patients from infectious disease wards. *Eur J Clin Microbiol Infect Dis* **39**, 1059-1061, doi:10.1007/s10096-020-03913-9 (2020).

6 Appendices

Appendix A – Raw Data

- R-QV-00750_AppendixA_Abbott Ag test Final AT data set.xlsx

Appendix B – Data Analysis Scripts

- R-QV-00750_AppendixB_Statistics.r

Appendix C – Laboratory Protocol

- R-QV-00750_AppendixC_Laboratório de virologia Molecular protocolo SoC.docx