CURBING THE COVID-19 OUTBREAK IN REALTIME

Abbott RealTime SARS-CoV-2

April 30th, 2020
Abbott’s commitment to fight the COVID-19 pandemic

**Launched in the US and in EMEA:**
- **RealTime SARS-CoV-2 assay** for m2000 received CE-IVD, US: FDA EUA. Scalable, automated process for flexible testing volumes (24-96 samples) and up to 470 patient samples in 24 hours.

**Launched in the US:**
- ID NOW SARS-CoV-2 assay EUA

**Launched in the US and in EMEA:**
- SARS-CoV-2 IgG

**In development:**
- Alinity m SARS-CoV-2
- SARS-CoV-2 IgM

Panbio COVID 19 IgG / IgM
**m2000 SYSTEM – Sub-Saharan Africa Placements & Capabilities**

**m2000 RealTime System**

**Menu**
- RealTime HIV-1 Viral Load
- RealTime HIV-1 Qualitative
- RealTime MTB
- RealTime MTB RIF/INH
- RealTime HCV Viral Load
- maxCycle HIV/HCV
- RealTime HCV Genotyping II
- RealTime HBV Viral Load
- RealTime CMV
- RealTime EBV

**Menu Cont**
- RealTime High Risk HPV
- RealTime CT & CT/NG
- m2000sp open mode extraction capability
- m2000rt open mode capability
- **RealTime SARS-CoV-2**

Reliable (<2 calls/year)
Efficient use of controls and floor space
Abbott RealTime SARS-CoV-2 Specimen Types

Nasal swab, Nasopharyngeal swab (NP) or Oropharyngeal swab (OP):

- Swab material: Sterile Dacron/nylon swab (Do not use calcium alginate swabs or swabs with wooden shafts, as they may contain substances that inactivate some viruses and inhibit PCR testing)
- Once sample is collected, the tip of the swab should be placed in a viral transport media tube (should contain 1-3mL of sterile viral transport medium)

Common collection devices:

BD Universal Viral Transport Kits

COPAN UTM Viral Transport

Abbott RealTime SARS-CoV-2 Sample Preparation

**Primary Tubes**
- Collection devices may be loaded directly onto the m2000sp
- Swabs must be removed prior to loading
- Custom rack calibration available to minimize required dead volume

**Secondary Tubes**
- Transfer 0.9-1.3mL of the viral/universal transport media from the collection device into either the m2000sp reaction vessel or transport tube
- Custom rack calibration available to minimize required dead volume

**Note:**
- Laboratories should follow their own procedures for handling respiratory viruses before starting sample preparation on the m2000sp
Abbott RealTime SARS-CoV-2 Reagent Preparation

Abbott mSample Preparation System\textsubscript{DNA}
(LN 06K12-24)

- \textit{mLysis\textsubscript{DNA}} - Add 35 mL ethanol to each bottle of \textit{mLysis\textsubscript{DNA}}
- \textit{mMicroparticles\textsubscript{DNA}}
- \textit{mWash1\textsubscript{DNA}} - Add 23 mL ethanol to each bottle of \textit{mWash1\textsubscript{DNA}}
- \textit{mWash2\textsubscript{DNA}} - Add 70 mL ethanol to each bottle of \textit{mWash2\textsubscript{DNA}}
- \textit{mElution\textsubscript{DNA} Buffer}
Abbott RealTime SARS-CoV-2 Dual Target Assay Design

- Dual Target, Single Stranded Linear Probes
- RdRp (RNA dependent RNA polymerase) and N-gene

CDC assay probes¹

Charité Berlin / WHO²
  - Screening assay probes
  - Confirmation assay probes
  - Discriminatory assay probes

Abbott assay probes³

3. Abbott RealTime SARS-CoV-2 Assay PI: 51-608442/R1
Automated Sample Handling Reduces Potential Sources of Error and Contamination

Simple workflow with minimal sample handling
Maintains ‘Chain of Custody’ and Provides confidence in results
A clear interpretation of results enables laboratories to provide results to clinicians to quickly determine patient management and care.
Abbott RealTime SARS-CoV-2: Results

Plate Details

Plate Information
- **Plate Name:** TEST2
- **Plate Status:** Completed
- **Run Completion Time:** 3/15/2020 7:20:34 PM
- **Amplification & Detection Application:** m2000_SARS-2 - 1.0
- **Operator:** fse
- **m2000sp Reagent Lot / Exp Date:** 10000658 / 5/31/2021
- **Plate Comment:**

Graph Settings
- **Calibrator:**
- **Sample:**
- **Control:**
- **Empty Well:**
- **Assay:** SARS-CoV-2
- **Curve:** Target
- **Type:** Baselined
- **Y-Axis Scale:** Linear

Graph of Delta Rn vs Cycle Number

10

STOPPED
- **Field Service Engineer:** fse

English
Maximizing m2000sp/rt System Throughput

Abbott m2000 capacity of batches and tests per day

<table>
<thead>
<tr>
<th></th>
<th>1st Shift</th>
<th>2nd Shift</th>
<th>3rd Shift</th>
</tr>
</thead>
<tbody>
<tr>
<td>With 1 m2000 system</td>
<td>up to 2 batches up to 188 tests</td>
<td>up to 3 batches up to 282 tests</td>
<td>up to 5 batches up to 470 tests</td>
</tr>
<tr>
<td>With 2 m2000 systems</td>
<td>up to 4 batches up to 376 tests</td>
<td>up to 6 batches up to 564 tests</td>
<td>up to 10 batches up to 940 tests</td>
</tr>
<tr>
<td>With 3 m2000 systems</td>
<td>up to 6 batches up to 564 tests</td>
<td>up to 9 batches up to 846 tests</td>
<td>up to 15 batches up to 1410 tests</td>
</tr>
</tbody>
</table>

Source: Abbott data on file

*Run 1-5 = 94 tests + 2 Controls/Run*
Abbott RealTime SARS-CoV-2 Performance Characterization

- Limit of Detection
- Reactivity (Inclusivity)
- Cross-Reactivity
- Clinical Performance
• Recombinant virus containing SARS-CoV-2 RNA was serially diluted in simulated nasal matrix (SNM).

• LOD was confirmed by testing 4 panel members with target concentrations at 400, 300, 200, and 100 copies/mL.

• LOD of the Abbott RealTime SARS-CoV-2 is 100 copies/mL with ≥ 95% detection

Table 1. LOD Determination Using Recombinant Virus Containing SARS-CoV-2

<table>
<thead>
<tr>
<th>Virus Copies/mL</th>
<th>GE/Reaction(^1)</th>
<th>Total Valid Replicates</th>
<th>Positive Replicates</th>
<th>Positive Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>400</td>
<td>12.5</td>
<td>21</td>
<td>21</td>
<td>100</td>
</tr>
<tr>
<td>300</td>
<td>9.4</td>
<td>21</td>
<td>21</td>
<td>100</td>
</tr>
<tr>
<td>200</td>
<td>6.2</td>
<td>21</td>
<td>21</td>
<td>100</td>
</tr>
<tr>
<td>100</td>
<td>3.1</td>
<td>21</td>
<td>20</td>
<td>95.2</td>
</tr>
</tbody>
</table>

\(^1\)Genome equivalent per reaction (GE/reaction) was determined from calibration curve established using genomic RNA from SARS-Related Coronavirus 2, Isolate USAWA1/2020 (BEI Resources, Catalog No. NR-52285).

• Inclusivity was demonstrated by comparing the Abbott RealTime SARS-CoV-2 assay primers and probes to an alignment of all SARS-CoV-2 sequences available in Genbank as of March 5, 2020.

• The regions of the test’s primers and probes were compared by in silico analysis to verify sequence homology with circulating SARS-CoV-2 strains.

• A total of 78 sequences from 10 countries (Australia, Belgium, Brazil, China, Finland, Nepal, South Korea, Sweden, Taiwan, and USA) had sequence coverage of at least one of the test’s primers or probes for the comparison.

• Amongst the 78 sequences, there were also 6 strains without any country information listed in Genbank.

All of the primers and probes in the test had 100% homology to all of the available circulating SARS-CoV-2 sequences.

In Silico Analysis

• Related pathogens, high prevalence disease agents, and normal or pathogenic flora that are reasonably likely to be encountered in the clinical specimen have been evaluated in silico to identify the % homology between the selected probe/primer sequences and the sequence present in the microorganism.

• *The conclusion of this analysis is that there is limited opportunity for cross-reactivity to allow for false-positive reporting or affect performance of SARS-CoV-2 virus detection.*

Laboratory Testing

- Cross reactivity performance of Abbott RealTime SARS-CoV-2 assay was evaluated by testing 31 whole organisms or appropriate representative samples.

- No cross-reactivity of the RealTime SARS-CoV-2 assay with the selected microorganisms was observed at the concentrations tested.

A clinical evaluation study was performed to evaluate the performance of the Abbott RealTime SARS-CoV-2 Assay using nasopharyngeal swab specimens.

- 61 contrived positive specimens at approximately 1X to 2X LOD and 20x LOD were tested. Samples were contrived by spiking known concentrations of recombinant virus containing SARS-CoV-2 RNA sequences into negative patient specimens.
- 34 negative specimens were tested.
- Positive and Negative Percent Agreement were 100%, respectively.

### Table 3. Clinical Evaluation of the Abbott RealTime SARS-CoV-2 Assay

<table>
<thead>
<tr>
<th>SARS CoV-2 Concentration</th>
<th>Number Tested</th>
<th>Number Detected</th>
<th>% Detection</th>
</tr>
</thead>
<tbody>
<tr>
<td>1x to 2X LOD(^a)</td>
<td>20</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>20X LOD</td>
<td>40</td>
<td>40</td>
<td>100</td>
</tr>
<tr>
<td>Negative(^b)</td>
<td>31</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

\(^a\) One replicate was invalid and excluded from the analysis; \(^b\) Three replicates were invalid and excluded from the analysis.

## Abbott RealTime SARS-CoV-2 Assay

<table>
<thead>
<tr>
<th>Assay Specifications</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology</td>
<td>Qualitative Multiplex RT-PCR</td>
</tr>
<tr>
<td>Probe Design</td>
<td>Single Stranded Linear Probes</td>
</tr>
<tr>
<td>Target Region</td>
<td>Dual Target, RdRp and N-genes</td>
</tr>
<tr>
<td>Assay Runtime*</td>
<td>&lt; 7 hours for 96 results</td>
</tr>
<tr>
<td>Throughput*</td>
<td>470 patient samples in 24 hours</td>
</tr>
<tr>
<td>Specimen type</td>
<td>Nasal, Nasopharyngeal and Oropharyngeal swabs</td>
</tr>
<tr>
<td>Result Interpretation</td>
<td>Positive / Negative</td>
</tr>
<tr>
<td>Sample input volume</td>
<td>0.5mL</td>
</tr>
<tr>
<td>Internal Control (IC)</td>
<td>Armored RNA (Pumpkin), Added to each specimen and control</td>
</tr>
<tr>
<td>Controls</td>
<td>One negative and One positive control per run</td>
</tr>
</tbody>
</table>

Abbott RealTime SARS-CoV-2 Assay

- **Dual Target**
  - HIGHLY conserved target regions

- **Automated**
  - MINIMIZE manual processes

- **Positive or Negative**
  - SIMPLE & CLEAR result interpretation