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Alveo be.well COVID-19 Test: Clinical Study IFU

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1 Works for me dx.doi.org/10.17504/protocols.io.bjrckm2w

Coronavirus Method Development Community

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ABSTRACT

Summary and Explanation

The Alveo be.well COVID-19 test performed on the be.well analyzer in conjunction with the be.well mobile app is a molecular diagnostic test for the qualitative detection of RNA from SARS-CoV-2 in direct nasal swab samples. This test was developed in response to the Public Health Emergency declared by Health and Human Services Secretary Alex M. Azar II on January 31, 2020, calling for the entire United States to aid the nation's healthcare community in responding to 2019 novel coronavirus. To perform the Alveo be.well COVID-19 test, a direct nasal swab sample is collected from a patient who meets clinical criteria per CDC guidelines to aid in the diagnosis of infection with SARS-CoV-2.

Principles of the Test

The Alveo be.well COVID-19 test is a rapid molecular test which utilizes isothermal nucleic acid amplification technology and Electrical Impedance Sensors (EIS) to detect the presence of SARS-CoV-2 in under an hour. An Alveo-designed SARS-CoV-2 primer set is used to detect RNA from SARS-CoV-2 in direct nasal swab specimens from patients suspected of COVID-19 by their healthcare provider.

While following steps in the be.well mobile app, a provided mid-turbinate nasal swab is used to collect sample from each nostril of the patient per current CDC guidelines. The sample swab is stirred within a vial of assay buffer and then discarded. The sample mixture is then transferred into a be.well COVID-19 disposable cartridge using a disposable fixed volume transfer pipette. The cartridge is sealed, inserted into the be.well analyzer, and the test begins automatically. As the test runs, the sample is heated and isothermal amplification reactions take place. Amplification is detected based on a change in the EIS signal in each reaction volume. Test results are reported to the be.well mobile app and to the HIPAA-compliant, secure cloud database

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MATERIALS

NAME	CATALOG #	VENDOR
FLOQSwabs® 56750CS01 Contoured Pediatric Flocked Swab w/Stopper in Peel Pouch with 50mm Breakpoint	56750CS01	Copan
Assay Buffer in Vial	TBD	Alveo Technologies Inc.
Alveo be.well COVID-19 Test Disposable Cartridge	TBD	Alveo Technologies Inc.
Samco™ Exact Volume Transfer Pipettes 400 µL	967TS	Thermo Fisher Scientific

STEPS MATERIALS

NAME	CATALOG #	VENDOR
FLOQSwabs® 56750CS01 Contoured Pediatric Flocked Swab w/Stopper in Peel Pouch with 50mm Breakpoint	56750CS01	Copan
Assay Buffer in Vial	TBD	Alveo Technologies Inc.
Alveo be.well COVID-19 Test Disposable Cartridge	TBD	Alveo Technologies Inc.
Samco™ Exact Volume Transfer Pipettes 400 µL	967TS	Thermo Fisher Scientific

EQUIPMENT

NAME	CATALOG #	VENDOR
Analyzer	TBD SKU	
Apple iPhone 8, 8+, or SE with iOS 13	Authorized Resellers	

DISCLAIMER:

For Investigational Use Only. The performance characteristics of this device have not been established.

Proposed Intended Use

1 Proposed Intended Use

The Alveo be.well COVID-19 test is a rapid molecular test utilizing a single-use cartridge, multi-use analyzer, and a HIPAA-compliant mobile application for the qualitative detection of RNA from SARS-CoV-2 in direct nasal swab specimens from individuals suspected of COVID-19 by their healthcare provider. Upon authorization, testing is intended for laboratories certified under the Clinical Laboratory Improvement Amendments of 1988 (CLIA), 42 U.S.C. §263a, to perform moderate complexity / high complexity tests. The Alveo be.well COVID-19 test is also intended for use, once authorized, at the Point of Care (POC), i.e., in patient care settings operating under a CLIA Certificate of Waiver, Certificate of Compliance, or Certificate of Accreditation.

Results are for the identification of SARS-CoV-2 RNA. SARS-CoV-2 RNA is generally detectable in upper respiratory samples during the acute phase of infection. Positive results are indicative of the presence of SARS-CoV-2 RNA; clinical correlation with patient history and other diagnostic information is necessary to determine patient infection status. Positive results do not rule out bacterial infection or co-infection with other viruses. The agent detected may not be the definite cause of disease. Laboratories within the United States and its territories are required to report all positive results to the appropriate public health authorities.

Negative results do not preclude SARS-CoV-2 infection and should not be used as the sole basis for patient management decisions. Negative results must be combined with clinical observations, patient history, and epidemiological information.

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The Alveo be.well COVID-19 test is intended for use by clinical professionals or trained operators who are proficient in performing tests with the be.well system. **The Alveo be.well COVID-19 test is For Investigational Use Only.** The performance characteristics of this device have not been established.

Materials

2 Materials Provided

Each test kit contains sets of the following components:

Alveo be.well COVID-19 Test Kit Components

1. **Nasal Swabs**: sterile swabs used for sample collection
2. **Vials of Assay Buffer**: single-use vials, each containing 500 µL of assay buffer
3. **Disposable Pipettes**: single-use, fixed volume transfer pipettes used to transfer sample from vial to cartridge
4. **Disposable be.well COVID-19 Cartridges**: single-use, cartridge containing dried reagents to conduct amplification reactions and detection of the presence of SARS-CoV-2

Swab Vial of Assay Buffer Disposable Transfer Pipette Disposable Cartridge

2.1 Test Kit Component Details

To complete an Alveo be.well COVID-19 test, you will need one of each of the following consumables from the test kit (listed here as reagents):

Samco™ Exact Volume Transfer Pipettes 400 µL
by Thermo Fisher Scientific
Catalog #: 967TS

FLOQSwabs® 56750CS01 Contoured Pediatric Flocked Swab w/Stopper in Peel Pouch with 50mm Breakpoint
by Copan
Catalog #: 56750CS01

Assay Buffer in Vial
by Alveo Technologies Inc.
Catalog #: TBD

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Alveo be.well COVID-19 Test Disposable Cartridge
by Alveo Technologies Inc.
Catalog #: TBD

2.2 Storage and Handling of Test Kit Components

- Store and use all be.well test kit components within a temperature range of 5°C-25°C (41°F-77°F) **Room temperature** .
- Open packaging of test kit components only when ready to begin a test.
- Do not reuse kit components.
- Use components before their individual expiration dates.
- Nasal swabs are stored in sterile peel pouches. When opening the pouch, take care to hold by the handle and not to touch the soft tip of the swab.
- Cartridges are stored within foil pouches and are packaged with a small desiccant packet. Discard the desiccant with the packaging after testing.
- Collected nasal swab samples should be tested immediately for best results. If that is not possible, store swab samples in a 15 mL conical tube and refrigerate at **4 °C** to **8 °C** (**39 °F** to **46 °F**) for up to 144 hours from sample collection.
- Samples mixed with assay buffer in the vial must be transferred to a cartridge and loaded into the analyzer within 40 minutes of mixing the sample.

3 Additional Required Materials

You will also need a reusable be.well analyzer and an internet-connected mobile device with the be.well app downloaded (listed here as equipment) and appropriate Personal Protective Equipment (PPE):

Analyzer
Instrument for testing be.well cartridges
Alveo be.well TBD SKU

Apple iPhone 8, 8+, or SE with iOS 13 mobile device with integrated camera, Bluetooth capability, and internet connectivity
Apple Authorized Resellers
Mobile device with camera, capable of downloading the app and internet connectivity

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1. **be.well Analyzer** (1): Available for purchase from Alveo through the be.well mobile app, on our website (www.alveotechnologies.com), or by contacting Customer Support through support@alveotechnologies.com
2. **Mobile Device** (1): Apple® iPhone® 8, 8+, or SE with iOS 13 and an integrated camera, Bluetooth® capability, and internet connectivity to download the be.well mobile app
3. **be.well Mobile App** (1): Download the be.well app to the mobile device
4. **PPE:** Disposable gloves are recommended when working with potentially infectious samples. Additional Personal Protective Equipment may be required by your institution.

Precautions and Limitations

4 Precautions

- **For Investigational Use Only.** The performance characteristics of this devices have not been established.
- Read all instructions for use prior to beginning testing.
- Wash and dry hands before and after testing. Wear gloves and appropriate PPE.

- For use with be.well analyzer and be.well mobile app.
- Use only provided swabs, vials, pipettes, and cartridges to complete the test.
- For use with direct nasal specimens. Do not test samples stored in transport media.
- Samples may be infectious. Use standard practices for handling and disposing of potentially infectious materials for items which have come in contact with the sample: the nasal swab, the vial, the disposable pipette, and the cartridge.
- Single use swabs, vials, pipettes, and cartridges are provided. Do not reuse.
- Follow all local, state, and federal guidelines for disposal of patient samples and used swabs, vials, pipettes, and cartridges.
- Use be.well COVID-19 cartridges, vials, or provided nasal swabs before their individually labeled Use By or expiration dates.
- Do not use any damaged test kit components.
- Store all test materials as described in section 4.2, Storage and Handling.
- Do not touch soft end of swab.
- Any potential obstructions in the patient's nasal passage (jewelry, dried mucus, for example) should be removed before beginning a test with the be.well COVID-19 system.
- Use only the provided disposable transfer pipette to fill the be.well disposable cartridge. This will transfer the correct volume when used properly. Do not attempt to pour sample from the vial into the cartridge.
- Avoid touching the cartridge's electrical contacts.
- Keep the be.well analyzer flat on a level surface while inserting the cartridge, as the test is running, and until the test is complete.
- For best results, read and follow all precautions and instructions for use.
- Contamination of the work area with previous samples may create risk of false positive results due to the highly sensitive nature of the test. Keep work areas clean per your facility's practices.
- Wash and dry hands before and after testing. Wear gloves and appropriate PPE.

5 Limitations

- **For Investigational Use Only.** The performance characteristics of this device have not been established.
- Improper sample handling (through collection, storage, or transport) may lead to false negative, false positive, or invalid results.
- Test results should be interpreted in conjunction with the patient's medical history, clinical signs and symptoms, and the results of other diagnostic tests performed.
- As with other tests, negative results do not rule out SARS-CoV-2 infections and should not be used as the sole basis for patient management decisions.
- Detection of SARS-CoV-2 RNA may be impacted by sample collection methods, patient factors (e.g., presence of symptoms), and/or stage of infection.The Sample Control included in the Alveo be.well COVID-19 test is used to help determine if sufficient sample was collected from the patient.
- False negative or invalid results may occur due to interference or the presence of inhibitors. The Process Control included in the Alveo be.well COVID-19 test is used to help identify whether samples contained enough interfering substances or inhibitors to stop the reaction from proceeding properly.

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- There is no indication of quantity of virus in the sample based on these results. It is a qualitative test.
- If virus is present at levels below the limit of detection of the test, false negative results may occur.
- As with any molecular test, mutations within the target regions of SARS-CoV-2 could affect primer binding and result in failure to detect the presence of virus.
- This test cannot detect potential co-infections or rule out diseases caused by other bacterial or viral pathogens.
- Analyte targets (viral nucleic acid) may persist in vivo, independent of virus viability. Detection of analyte targets does not imply that the corresponding viruses are infectious or are the causative agents for clinical symptoms.
- Performance has not been established in asymptomatic individuals.

Test Instructions

6 How to Test

Please read all instructions for use before opening the cartridge or swab pouches.

6.1 Getting Started

1. Place swab, vial, cartridge, pipette, analyzer, and phone (with software application loaded) on a clean, flat surface.
2. If you have not already loaded the be.well mobile app onto your mobile phone, do so now.
3. Open the be.well app on your phone and follow the prompts to create or enter a username and password, verify a new user profile through your email, then select “Log In”.
4. For each test, scan or enter the ID of the patient, select “Add Patient”, and select that ID under “Who is Sick?”.
5. Select “Start New Test”.
6. If the analyzer is not already turned on or has gone to sleep (lights automatically turn off after 10 minutes of inactivity), look for the button next to the USB charging port. Momentarily press the button to turn on the analyzer. All four dots will begin to flash in blue. If no lights turn on, plug the analyzer in to charge.
7. Pair the analyzer with the mobile app per the prompts at the start of each test.
8. When prompted in the app, open cartridge pouch and hold mobile device camera over the QR label on the cartridge, as if taking a picture. It will automatically scan the cartridge QR code.
9. Follow the instructions below for details on collecting and testing a nasal swab sample.

6.2 Sample Collection and Handling

1. Wash your hands and/or put on appropriate PPE including new gloves for each test.
2. If you haven’t already, place a swab, vial, cartridge, pipette, analyzer, and phone (with app) together on a clean, flat surface.
3. Open the app and follow the prompts to set up a patient ID.
4. When the app instructs you to collect a sample, open the swab package at the “PEEL HERE” arrow (see Figure 1). Hold the swab by the handle (see Figure 2). **Do not touch the soft tip of the swab.**
5. **Collect a mid-turbinate nasal swab sample per CDC guidelines** with the provided flocked tapered nasal swab, sampling from both nares:
6. Tilt patient’s head back 70 degrees. While gently rotating the swab, insert swab less than one inch (about 2 cm) into nostril (until resistance is met at turbinates). Rotate the swab several times against nasal wall and repeat in other nostril using the same swab.
7. A “stopper” indication feature is located between the swab’s flocked tapered tip and the handle (see Figure 2).
8. **Be careful not to touch the soft tip of the swab.**

Figure 1: Open pouch

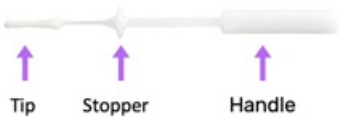

Figure 2: Nasal Swab

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6.3 Sample Prep: Mix sample with assay buffer

1. Holding the swab by its handle, use your other hand to hold the sample prep vial and remove its cap.
2. Insert soft tip of the swab into the vial. **While keeping swab in contact with the wall of the vial, stir the vial's contents 10 times (see Figure 3).**
3. Remove the swab from the vial and recap the vial.
4. Used swabs may contain infectious material. Dispose of the swab per your facility's process.

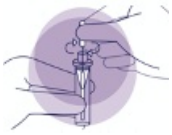

Figure 3: Mix swab in vial

6.4 Sample Transfer: Load disposable pipette

1. Fill disposable transfer pipette to transfer sample from vial to cartridge. Squeeze the top bulb of the transfer pipette and hold it compressed as you insert the tip of the pipette stem into the vial (see Figures 4 and 5).
2. When the tip of the pipette reaches the bottom of the vial, slowly release the top bulb to fill the pipette with liquid from the vial.
3. Visually inspect the long stem of the pipette. **If air gaps or bubbles are present in the long stem of the pipette, empty the pipette contents back into the vial and refill it.** Be sure to fill the pipette stem completely. This will ensure the propert amount of liquid is transferred (**400 µl of sample + buffer** total).
4. Cap vial after the pipette is filled.
5. See below for examples of good fills and underfills (note the air gaps at the tip and throughout the stem). Overflow of some liquid into the bottom bulb of the pipette is not a problem (see examples of a good fill in Figure 6).

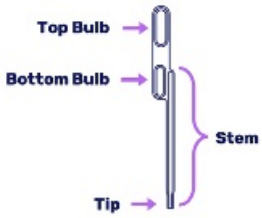

Figure 4: Labeled disposable transfer pipette

Figure 5: Fill pipette

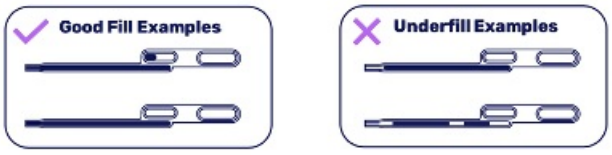

Figure 6: Examples of properly filled pipettes (left) and fills with air gaps (right)

6.5 Sample Transfer: Transfer sample into cartridge

1. Hold cartridge upright (vertically or at a slight tilt) along the long sides. Avoid touching the area with the gold electrical contacts.

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2. Insert the tip of the transfer pipette stem deeply into the sample inlet port, ensuring it is firmly seated (see Figure 7). **Once in place, keep downward pressure on the pipette and do not lift it up as you use it.**
3. **Slowly and gradually squeeze the top bulb of the transfer pipette to dispense all liquid into the cartridge. This should take about 10 seconds** (see Figure 8)**.**
4. **Keep the top bulb compressed as you withdraw the pipette from the cartridge inlet port.** This avoids pulling sample back into the pipette.
5. **Close the cap to seal cartridge** (see Figure 9)**.**
6. Release the top bulb of the pipette. Materials that have contacted the sample may contain infectious material. Dispose of the transfer pipette and capped vial per your facility's process.
7. Change to fresh gloves and advance through the app screens to the "Insert Cartridge" step, if needed.

Figure 7: Insert pipette into cartridge

Figure 8: Slowly transfer the sample by squeezing the top bulb over 10 seconds

Figure 9: Close cartridge cap

6.6 Insert Cartridge into Analyzer

1. Lay the be.well analyzer on a clean, flat surface with the circle of 4 lights visible on top.
2. **Fully insert the closed cartridge into the glowing cartridge bay** (see Figure 10). The four glowing dots will change from a solid to a circular light pattern when the cartridge is fully inserted, and the test will begin.
3. Leave the analyzer in place on the flat surface for the duration of the test. It should take about an hour.
4. Advance through the app to select "Got It" (see Figure 11).
5. On the "Test in Progress" screen in the app, enter the patient's symptoms and then wait on that screen until the test is complete. "Test in Progress" will change to "Test Complete" and "Wait for Results" will change to "View Results" on the app screen.
6. Select "View Results" to see the most recent test result for your patient.
7. If you have exited the Test screen, select the proper Patient ID and view past test results.
8. **When the test is complete, remove the cartridge from the analyzer** and dispose of it per your facility's process.
9. Keep the analyzer clean and available for future tests. Keep the analyzer's battery charged by plugging it in with the USB cable.
10. See notes in sections **Test Results** and **After Testing**, below.

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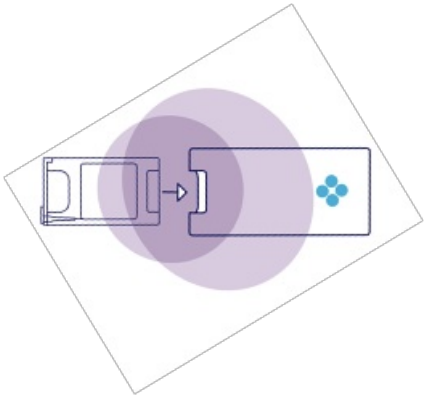

Figure 10: Insert cartridge into analyzer

Figure 11: App screen

Wrap Up Instructions

7 Test Results

Results will be reported through the be.well app as COVID-19 Positive, COVID-19 Negative, or Invalid. If results are positive, SARS-CoV-2 virus was detected. If results are negative, no SARS-CoV-2 virus was detected. If the results are Invalid, patient results cannot be interpreted. This may mean that there was not enough sample collected. You may choose to repeat the test with a new cartridge, new swab, new vial, and freshly collected sample.

8 After Testing

Used swabs, vials, and transfer pipettes may contain infectious material and should be disposed of after testing is complete. Remove and dispose of the used cartridge after a test is complete. The analyzer can be used for future tests.

Store the be.well analyzer, unopened be.well cartridges, unopened nasal swabs, unopened vials of assay buffer, and unused transfer pipettes in a clean, dry place. Avoid getting dust, dirt, or any substances in the analyzer's cartridge bay or USB port.

At the end of each day or if the be.well analyzer becomes dirty, clean the outside surface and bay with a wipe or cloth dampened with EPA-approved disinfectant then allow to air dry. Do not place the analyzer in water or other liquids.

Symbols

9 Symbols

The following symbols may be found on be.well product packaging and labeling:

	Manufacturer		Caution
	Consult instructions for use	LOT	Batch code
	Use-by YYYY-MM-DD	PN	Part number
	Do not use if packaging is damaged	SN	Serial number
2	Single use, do not re-use		Keep dry
	Temperature limits	IVD	In vitro diagnostic device medical device
	Do not dispose of electronics in regular trash	Rx ONLY	Prescription use only

10 The Alveo™ and be.well™ names and logos are trademarks of Alveo Technologies, Inc.

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