

# LumiraDx™ SARS-CoV-2 Ag Test

**For Professional Use Only**  
**For Emergency Use Authorization (EUA) Only**  
**For In Vitro Diagnostic Use Only**

**REF** Test strips and swabs L01600069024, L01600069048

**REF** Test strips no swabs L016000109012, L016000109024, L016000109048

**IVD** **Rx Only**

**SPEC-32311 R8 ART-00570 R9** Date of Revision 2022/07

## LumiraDx SARS-CoV2 Ag Test

The LumiraDx Severe Acute Respiratory Syndrome (SARS) CoV2 Antigen (Ag) Test Strips (hereafter referred to as Test Strips) are to be used with the LumiraDx Platform. The LumiraDx Platform is a point of care system for professional use which is used for *in vitro* diagnostic tests. It comprises a portable LumiraDx Instrument and a LumiraDx Test Strip for the required test. This test is for **HEALTHCARE PROFESSIONAL USE ONLY** and allows users to perform tests using small sample volumes and to view results quickly on the Instrument touchscreen.

### Intended use:

The LumiraDx SARS-CoV2 Ag Test is a rapid microfluidic immunoassay device designed to detect the presence of the nucleocapsid protein antigen directly from SARS-CoV-2 in either anterior nasal swab or nasopharyngeal swab samples, without transport media. The test procedure involves collecting an anterior nasal swab or nasopharyngeal swab sample using a recommended swab which is eluted into a vial containing the Extraction Buffer. A single drop of the sample in Extraction Buffer is added to the Test Strip using the vial dropper cap provided. The LumiraDx Instrument is programmed to perform the test protocol using the dried reagents contained within the strip. The test result is determined from the amount of fluorescence the Instrument detects within the measurement zone of the Test Strip. The concentration of the analyte in the sample is proportional to the fluorescence detected. The results are displayed on the Instrument touchscreen within 12 minutes from the addition of the sample.

### Materials provided:

- LumiraDx Test Strips packed individually in sealed desiccant foil pouches.
- LumiraDx Test Product Insert
- RFID (Radio frequency ID) Tag held inside the Test Strip carton
- Extraction Buffer Vials
- Dropper Lids
- LumiraDx SARS-CoV2 Ag Test Quick Reference Instructions
- Sterile Nasal Collection Swabs (Provided only with the following product codes L01600069024, L01600069048)

### Materials required but not provided with the Test Strip carton:

- LumiraDx Instrument/Standard nasal swab collection equipment is required if using a LumiraDx SARS-CoV2 Ag Test kit which do not include swabs. (L016000109012, L016000109024, L016000109048) Please visit [lumiradx.com](https://lumiradx.com) for information on validated swabs for use with the LumiraDx SARS-CoV2 Ag Test.
- Standard nasopharyngeal swab collection equipment. Please visit [lumiradx.com](https://lumiradx.com) for information on validated swabs for use with the LumiraDx SARS-CoV2 Ag Test
- LumiraDx SARS-CoV2 Ag Quality Controls (as required to meet local and organisational compliance)
- LumiraDx Connect if connectivity required (refer to LumiraDx Connect User Manual)

### Warnings and precautions

- For *in vitro* diagnostic use only
- For prescription use only.
- This product has not been FDA cleared or approved, but has been authorized by FDA under an Emergency Use Authorization (EUA) for use by authorized laboratories; use by laboratories certified under the CLIA that meet the requirements to perform moderate, high or waived complexity tests. This product is authorized for use 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.
- The emergency use of this product is only authorized for the duration of the declaration that circumstances exist justifying the authorization of emergency use of *in vitro* diagnostic tests for detection and/or diagnosis of COVID-19 under Section 564(b)(1) of the Federal Food, Drug, and Cosmetic Act, 21 U.S.C. § 360bbb-3(b)(1), unless the declaration is terminated or authorization is revoked sooner.
- This product has been authorized only for the detection of proteins from SARS-CoV-2, not for any other viruses or pathogens.
- Do not open the test strip until ready for immediate use.
- Discard and do not use any damaged or dropped Test Strips or other materials. Check the integrity of the individual swab packaging for damage. If damaged discard and do not use. Discard and do not use any damaged or dropped Nasal collection swabs
- Do not use supplied Nasal swabs for Nasopharyngeal sample collection
- To avoid sample contamination avoid touching the swab sampling head before and after sample collection.
- Inadequate or inappropriate sample collection, storage, and transport can result in incorrect results.
- The test cannot be visually interpreted; the LumiraDx Instrument must be used to generate results.
- Do not use the kit components beyond the expiration date
- Do not reuse any kit components.
- Do not mix components from different kit lots.
- Samples must be processed as indicated in the Sample Extraction and Performing a Test sections of this Product Insert. Failure to follow the instructions for use can result in inaccurate results.

### Caution: For *in vitro* diagnostic use.

 Before you start testing, if you are new to the LumiraDx Instrument and LumiraDx Platform, you must read the LumiraDx Platform User Manual, the LumiraDx SARS-CoV2 Ag Test Quick Reference Instructions and this entire Product Insert. In addition please watch the LumiraDx Platform Training Video available at [lumiradx.com](https://lumiradx.com).

### Summary and explanation of the Test:

The World Health Organisation (WHO) have named the disease caused by SARS-CoV-2 virus as coronavirus 2019 or COVID-19<sup>1</sup>. The most common symptoms of COVID-19 are fever, tiredness, and dry cough. Some patients may have aches and pains, nasal congestion, headache, conjunctivitis, sore throat, diarrhea, loss of taste or smell, or rash on skin or discoloration of fingers or toes. These symptoms are usually mild and begin gradually. Some people become infected but do not develop any symptoms and do not feel unwell. However,

the disease can develop rapidly and have high morbidity in certain populations, especially those with underlying health conditions. The disease can spread from person to person through small droplets from the nose or mouth which are spread when a person with COVID-19 coughs or exhales. Most estimates of the incubation period for COVID-19 range from 2-14 days<sup>2</sup>.

The use of a LumiraDx SARS-CoV2 Ag Test will enable the physician to verify infection quickly, begin proper treatment and to initiate isolation precautions helping prevent further spread of infection.

### Principle of the assay:

The LumiraDx SARS-CoV2 Ag Test is a single use fluorescence immunoassay device designed to detect the presence of the nucleocapsid protein antigen directly from SARS-CoV-2 in either anterior nasal swab or nasopharyngeal swab samples, without transport media.

The test procedure involves collecting an anterior nasal swab or nasopharyngeal swab sample using a recommended swab which is eluted into a vial containing the Extraction Buffer. A single drop of the sample in Extraction Buffer is added to the Test Strip using the vial dropper cap provided. The LumiraDx Instrument is programmed to perform the test protocol using the dried reagents contained within the strip. The test result is determined from the amount of fluorescence the Instrument detects within the measurement zone of the Test Strip. The concentration of the analyte in the sample is proportional to the fluorescence detected. The results are displayed on the Instrument touchscreen within 12 minutes from the addition of the sample.

### Materials provided:

- LumiraDx Test Strips packed individually in sealed desiccant foil pouches.
- LumiraDx Test Product Insert
- RFID (Radio frequency ID) Tag held inside the Test Strip carton
- Extraction Buffer Vials
- Dropper Lids
- LumiraDx SARS-CoV2 Ag Test Quick Reference Instructions
- Sterile Nasal Collection Swabs (Provided only with the following product codes L01600069024, L01600069048)

### Materials required but not provided with the Test Strip carton:

- LumiraDx Instrument/Standard nasal swab collection equipment is required if using a LumiraDx SARS-CoV2 Ag Test kit which do not include swabs. (L016000109012, L016000109024, L016000109048) Please visit [lumiradx.com](https://lumiradx.com) for information on validated swabs for use with the LumiraDx SARS-CoV2 Ag Test.
- Standard nasopharyngeal swab collection equipment. Please visit [lumiradx.com](https://lumiradx.com) for information on validated swabs for use with the LumiraDx SARS-CoV2 Ag Test
- LumiraDx SARS-CoV2 Ag Quality Controls (as required to meet local and organisational compliance)
- LumiraDx Connect if connectivity required (refer to LumiraDx Connect User Manual)

### Warnings and precautions

- For *in vitro* diagnostic use only
- For prescription use only.
- This product has not been FDA cleared or approved, but has been authorized by FDA under an Emergency Use Authorization (EUA) for use by authorized laboratories; use by laboratories certified under the CLIA that meet the requirements to perform moderate, high or waived complexity tests. This product is authorized for use 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.
- The emergency use of this product is only authorized for the duration of the declaration that circumstances exist justifying the authorization of emergency use of *in vitro* diagnostic tests for detection and/or diagnosis of COVID-19 under Section 564(b)(1) of the Federal Food, Drug, and Cosmetic Act, 21 U.S.C. § 360bbb-3(b)(1), unless the declaration is terminated or authorization is revoked sooner.
- This product has been authorized only for the detection of proteins from SARS-CoV-2, not for any other viruses or pathogens.
- Do not open the test strip until ready for immediate use.
- Discard and do not use any damaged or dropped Test Strips or other materials. Check the integrity of the individual swab packaging for damage. If damaged discard and do not use. Discard and do not use any damaged or dropped Nasal collection swabs
- Do not use supplied Nasal swabs for Nasopharyngeal sample collection
- To avoid sample contamination avoid touching the swab sampling head before and after sample collection.
- Inadequate or inappropriate sample collection, storage, and transport can result in incorrect results.
- The test cannot be visually interpreted; the LumiraDx Instrument must be used to generate results.
- Do not use the kit components beyond the expiration date
- Do not reuse any kit components.
- Do not mix components from different kit lots.
- Samples must be processed as indicated in the Sample Extraction and Performing a Test sections of this Product Insert. Failure to follow the instructions for use can result in inaccurate results.

- Do not open the kit contents until ready for use. Use within 60 minutes of opening the pouch.
- All components of this kit should be discarded as Biohazard waste according to Federal, State and local regulatory requirements.
- Refer to the product safety data sheet for risk and safety phrases and disposal information. The product safety data sheet is available via our website at <https://lumiradx.com/us-en/what-we-do/diagnostics/test-technology/antigen-test>.
- Exercise the normal precautions required for handling all laboratory reagents. Wear protective clothing such as laboratory coats, disposable gloves, and eye protection when samples are collected and evaluated.
- Proper laboratory safety techniques should be followed at all times when working with SARS-CoV2 patient samples. Patient swabs, used Test Strips and used extraction buffer vials may be potentially infectious. Proper handling and disposal methods should be established by the laboratory in accordance with local, state and federal regulations.
- Reagents encapsulated within the Test Strip are present in extremely small amounts and where any component is of animal origin, the source is certified as free from infectious or contagious material – however should any reagent become exposed to human materials it should be treated as potentially infectious.
- Be careful to minimize the risks of cross-contamination when testing patient specimens, which can cause false positive results. Insufficient cleaning of the workspace, insufficient disinfection of the instrument, or inappropriate use of protective equipment (for example, failing to change gloves between patients) can increase the risk of cross-contamination between specimens with subsequent false positive results. Consider the CDC guidance available at <https://www.cdc.gov/coronavirus/2019-ncov/lab/point-of-care-testing.html> for changing gloves and cleaning work area between specimen handling and processing.
- The chemicals in the extraction buffer may be hazardous to the skin and eye. Please see the table below for safety recommendations for skin and eye irritation. However, as a precaution if the solution contacts the skin or eye, flush with copious amounts of water. If irritation persists, seek medical advice: <https://www.poissonhelp.org> or 1-800-222-1222.

- Refer to the product safety data sheet for risk and safety phrases and disposal information. The product safety data sheet is available via our website at <https://lumiradx.com/us-en/what-we-do/diagnostics/test-technology/antigen-test>.
- Exercise the normal precautions required for handling all laboratory reagents. Wear protective clothing such as laboratory coats, disposable gloves, and eye protection when samples are collected and evaluated.
- Proper laboratory safety techniques should be followed at all times when working with SARS-CoV2 patient samples. Patient swabs, used Test Strips and used extraction buffer vials may be potentially infectious. Proper handling and disposal methods should be established by the laboratory in accordance with local, state and federal regulations.
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### RFID strip code reader

Locate  symbol on Instrument.

The Instrument will sound and a confirmation message will be displayed.

### Installation

Touch back of Test Strip Carton  symbol to install.

The Instrument will sound and a confirmation message will be displayed.

### When indicated by the touchscreen, open the foil pouch just before use and insert the LumiraDx Test Strip into the LumiraDx Instrument. The Instrument will indicate when it is ready for the sample to be applied. The LumiraDx SARS-CoV2 Ag Test results should be evaluated by a Healthcare Professional in the context of all available clinical and laboratory data.

### Instructions for sample collection:

When collecting any type of sample, follow universal collection precautions and guidelines according to your organization. For collection of nasal swabs and nasopharyngeal swabs, follow the Centers for Disease Control and Prevention (CDC) Swab Collection Guidelines and swab manufacturers' recommendations. Users should be trained in appropriate sample collection and handling procedures. The steps that follow apply to an anterior nasal swab and nasopharyngeal swab.

Swabs provided in the kit (L01600069024, L01600069048) For anterior nasal sampling where swabs are provided please use the swabs within the kit.

Swabs not provided in the kit (L016000109012, L016000109024, L016000109048)

Where a swab is not provided within the kit, please visit [lumiradx.com](https://lumiradx.com) for information on swabs that have been validated for use with the LumiraDx SARS-CoV2 Ag Test

Component	Concentration	GHS Code
Hydrochloric acid	< 0.01%	H302, H315, H320
Sodium azide	0.09%	H302, H315, H320

### Storing the Test Strips:

Store the Test Strips in their original carton. You can store the Test Strips at a temperature between 2°C and 30°C (36°F and 86°F). Avoid freezing or storing in any area that could exceed 30°C. When stored properly, the Test Strips can be used until the expiration date printed on the Test Strip foil pouch and the Test Strip carton. Discard the Test Strips if they are passed the expiration date.

### Handling the Test Strips:

When you are ready to perform a test, open the Test Strip carton, take out a Test Strip, and remove it from the foil pouch. Hold the Test Strip by gripping the blue label end with the label facing upward. Do not touch Test Strip Sample Application Area. Do not bend or fold the Test Strip. Do not touch Test Strip contacts. After removing the Test Strip from the foil pouch, it should be used immediately. Do not use the Test Strip if there are any visible signs of damage to the foil pouch such as tears or holes.

### Sample material:

- The following samples can be used with the LumiraDx SARS-CoV2 Ag Test Strip:
- Anterior Nasal Swab Sample (NS)
- Nasopharyngeal Swab Sample (NP)

### The Test device contains:

- Rabbit and mouse monoclonal antibodies
- Fluorescent particles
- Magnetic particles
- Buffer and stabilizing agents

### Preparing the Instrument to perform a Test:

Power on the Instrument by pressing the power button at the rear of the Instrument. You will hear the Instrument powering on, and the display will be a blank black screen for several seconds before starting up. If the screen is just dimmed tap the touch-screen to wake up the Instrument.

Refer to the section on Performing a Test in this Product Insert for information on how to test a Patient sample. The LumiraDx Quick Reference Instructions (QR) provide an illustrated step-by-step procedure on how to run a Test. Operate the LumiraDx Platform at room temperature between 15°C and 30°C (59°F and 86°F) and 10%-75% relative humidity

The Instrument will prompt to install the Lot Calibration File when inserting a new Test Strip Lot. Once installed, the Instrument will have all the information required to process the test, and any future tests from the same Lot of Test Strips.

### Lot Calibration File installation

Lot Calibration Files are required to provide the Instrument with information needed to perform diagnostic tests. This only needs to be completed once for each Test Strip Lot. The Instrument will prompt to install the Lot Calibration File when inserting a new Test Strip Lot.

### RFID strip code reader

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### Installation

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Component	Concentration	GHS Code
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### Storing the Test Strips:

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### Handling the Test Strips:

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### The Test device contains:

- Rabbit and mouse monoclonal antibodies
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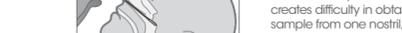
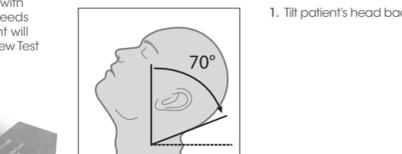
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The Instrument will prompt to install the Lot Calibration File when inserting a new Test Strip Lot. Once installed, the Instrument will have all the information required to process the test, and any future tests from the same Lot of Test Strips.

### Sampling from an anterior nasal swab:



#### Patient demographics

Patient demographics (age, time elapsed since onset of symptoms) are available for the 257 samples used in the study. The table below shows the positive results broken down by age of the patient:

Age	LumiraDx SARS-CoV-2 Ag (n = 81)		
	Total #	Positive	Prevalence
≤ 5 years	13	0	N/A
6 to 21 years	29	6	20.7%
22 to 59 years	200	70	35.0%
≥ 60 years	15	5	33.3%

#### Positive results broken down by days since symptom onset:

Days since symptom onset	Cumulative RT-PCR Positive(+)	Cumulative LumiraDx Positive(+)	PPA	95% Confidence interval	
0	6	6	100.0%	61.0%	100.0%
1	12	12	100.0%	75.8%	100.0%
2	28	28	100.0%	87.9%	100.0%
3	37	37	100.0%	90.6%	100.0%
4	55	54	98.2%	90.4%	99.7%
5	61	60	98.4%	91.3%	99.7%
6	67	66	98.5%	92.0%	99.7%
7	73	72	98.6%	92.6%	99.8%
8	75	74	98.7%	92.8%	99.8%
9	75	74	98.7%	92.8%	99.8%
10	77	76	98.7%	93.0%	99.8%
11	80	79	98.8%	93.3%	99.8%
12	83	81	97.6%	91.6%	99.3%

#### Final data analysis is presented below:

Reference RT-PCR Assay					95% Wilson Score CI			
					LCI	UCI		
LumiraDx SARS-CoV-2 Ag Test	POS	81	6	87	PPA	97.6%	91.6%	99.3%
	NEG	2	168	170	Prevalence	32.3%	26.9%	38.2%
	TOTAL	83	174	257				

PPA - Positive Percent Agreement (Sensitivity)

NPA - Negative Percent Agreement (Specificity)

CI - Confidence Interval

LCI - Lower Confidence Interval

UCI - Upper Confidence Interval

#### Clinical Performance – Nasopharyngeal Swabs

The performance of the SARS-CoV-2 Ag Test was established with 255 nasopharyngeal swabs prospectively collected from individual subjects between August 2020 and September 2020 during the 2020 COVID pandemic. Subjects were presenting with symptoms of COVID-19 being screened for infection. Samples were collected from 6 sites across the United States. Swabs were collected and extracted into the LumiraDx Extraction Buffer. Samples were tested fresh within 1h of collection and tested according to the Product Insert. The performance of the LumiraDx SARS-CoV-2 Ag Test was compared to the results from nasopharyngeal samples collected into 3ml universal transport medium (UTM) and tested with an EUA authorized PCR method.

#### Patient demographics

Patient demographics (age, time elapsed since onset of symptoms) are available for the 255 samples used in the study. The table below shows the positive results broken down by age of the patient:

Age	LumiraDx SARS-CoV-2 Ag (n = 39)		
	Total #	Positive	Prevalence
≤ 5 years	22	0	0.0%
6 to 21 years	59	9	15.3%
22 to 59 years	150	28	18.7%
≥ 60 years	24	2	8.3%

#### Positive and negative results broken down by days since symptom onset:

Days since symptom onset	Cumulative PCR Positive (+)	LumiraDx Positive (+)	PPA	LCI	UCI	NPA	LCI	UCI
0	2	2	100.0%	34.2%	100.0%	100.0%	75.8%	100.0%
1	6	6	100.0%	61.0%	100.0%	100.0%	93.4%	100.0%
2	9	9	100.0%	70.1%	100.0%	100.0%	96.2%	100.0%
3	17	17	100.0%	81.6%	100.0%	98.6%	94.9%	99.6%
4	22	22	100.0%	85.1%	100.0%	98.8%	95.7%	99.7%
5	23	23	100.0%	85.7%	100.0%	98.4%	95.3%	99.4%
6	26	26	100.0%	87.1%	100.0%	98.5%	95.6%	99.5%
7	34	34	100.0%	89.8%	100.0%	98.5%	95.7%	99.5%
8	36	36	100.0%	90.4%	100.0%	98.6%	95.8%	99.5%
9	36	36	100.0%	90.4%	100.0%	98.6%	95.9%	99.5%
10	39	38	97.4%	86.8%	99.5%	98.1%	95.2%	99.3%
11	40	39	97.5%	87.1%	99.6%	97.7%	94.6%	99.0%
12	40	39	97.5%	87.1%	99.6%	97.7%	94.7%	99.0%

#### Final data analysis is presented below:

Reference RT-PCR Assay					95% Wilson Score CI			
					LCI	UCI		
LumiraDx SARS-CoV-2 Ag Test	POS	39	5	44	PPA	97.5%	87.1%	99.6%
	NEG	1	210	211	NPA	97.7%	94.7%	99.0%
	TOTAL	40	215	255	Prevalence	15.7%	11.7%	20.7%

#### Analytical performance

##### Limit of Detection - LOD (analytical sensitivity):

Limit of Detection (LoD) studies determined the lowest detectable concentration of SARS-CoV-2 at which 100% of all (true positive) replicates test positive. The LoD for the LumiraDx SARS-CoV-2 Ag Test was established using limiting dilutions of gamma-irradiated SARS-CoV-2 (BEI Resources NR-52287). The NR-52287 is a preparation of SARS-Related Coronavirus 2 (SARS-CoV-2), isolate USA WAI1/2020, that has been inactivated by gamma-irradiation at 5 x 10<sup>6</sup> RADs. The material was supplied frozen at a concentration of 2.8 x 10<sup>6</sup> TCID<sub>50</sub>/mL.

##### Limit of Detection (LoD) screening

An initial LoD screening study was performed using a 5-fold serial dilutions (six dilutions in total) of the gamma-irradiated virus made in pooled negative human nasal matrix starting at a test concentration of 2 x 10<sup>6</sup> TCID<sub>50</sub>/mL (as shown in table below) and processed for each study as described above. These dilutions were tested in triplicate. The lowest concentration at which all (3 out of 3 replicates) were positive was chosen for LoD Range finding. This was 32 TCID<sub>50</sub>/mL.

SARS-CoV-2 tested (TCID <sub>50</sub> /mL)	Test result
20000	3/3 positive
4000	3/3 positive
800	3/3 positive
160	3/3 positive
32	3/3 positive
6.4	0/3 positive

##### Limit of Detection range finding

Using the 32 TCID<sub>50</sub>/mL concentration, the LoD was further refined using a 2-fold dilution series (four dilutions in total) of the gamma-irradiated SARS-CoV-2 virus made in pooled negative human nasal matrix. These dilutions were tested in triplicate. The lowest concentration at which all (3 out of 3 replicates) were positive was treated as the tentative LoD for the LumiraDx SARS-CoV-2 Ag Test. This was 32 TCID<sub>50</sub>/mL.

SARS-CoV-2 tested (TCID <sub>50</sub> /mL)	Test result
32	3/3 positive
16	0/3 positive
8	1/3 positive
4	0/3 positive

##### Limit of Detection (LoD) confirmation

The LoD of the LumiraDx SARS-CoV-2 Ag Test was then confirmed by testing 20 replicates with concentrations at the tentative Limit of Detection. The final LoD of the LumiraDx SARS-CoV-2 Ag Test was determined to be the lowest concentration resulting in positive detection of twenty (20) out of twenty (20) replicates. Based on this testing the LoD for nasal swab samples was confirmed as: 32 TCID<sub>50</sub>/mL.

Starting Material Concentration	Estimated LOD	No. Positive/Total	% Positive
2.8 x 10 <sup>6</sup> TCID <sub>50</sub> /mL	32 TCID <sub>50</sub> /mL	20/20	100

#### Omicron Testing

The performance of a multiplex SARS-CoV-2 Ag test device, which utilizes the same anti-SARS-CoV-2 antibodies as this device, was evaluated in a comparative performance study using a dilution series of clinical specimens containing live virus, which were positive for the Omicron variant (BA.1.1.529) of SARS-CoV-2. This comparative testing was conducted by the National Institutes of Health (NIH) as a component of the Rapid Acceleration of Diagnostics (RADx) initiative. Compared to an EUA-authorized RT-PCR method, this SARS-CoV-2 Ag test detected 100% of live virus Omicron samples at a Ct-value of 23.6 (n=5). Less than 50% of Omicron dilutions at Ct-values of 24.0 and 24.8 were detected (n=5). Omicron dilutions at lower viral concentrations (Ct-values greater than 24.6 for live virus) were not detected by this similar LumiraDx SARS-CoV-2 Ag test in this study. See summary data table below.

Omicron Pool 2 - Live Dilution	Assay #1		Assay #2		LumiraDx SARS-CoV-2 Ag Test
	Ct-N2 Ave.	Percent Positive (n=5)	Percent Positive (n=5)	Percent Positive (n=5)	
Dilution 1	19.8	100	100	100	
Dilution 2	20.8	100	100	100	
Dilution 3	21.5	100	100	100	
Dilution 4	22.7	100	100	100	
Dilution 5	23.6	100	0	100	
Dilution 6	24.0	60	0	40	
Dilution 7	24.8	0	0	20	
Dilution 8	25.8	0	0	0	
Dilution 9	27.4	0	0	0	
Dilution 10	28.1	0	0	0	
Dilution 11	29.1	0	0	0	

##### Cross-reactivity (analytical specificity) and microbial interference studies

Cross-reactivity and interference of the LumiraDx SARS-CoV-2 Ag Test was evaluated by testing a panel of related pathogens, high prevalence disease agents and normal or pathogenic flora including various microorganisms and viruses and negative matrix that are reasonably likely to be encountered in the clinical sample and could potentially cross-react or interfere with the LumiraDx SARS-CoV-2 Ag Test. Each organism and virus were tested in the absence or presence of heat inactivated SARS-CoV-2 at 3 x LoD.

Microorganism	Source	Concentration	Cross-Reactivity (Yes/No)	Interference (Yes/No)
Human coronavirus 229E	Zeptomatrix	1 x 10 <sup>6</sup> PFU/mL	No (3/3 negative)	No (3/3 positive)
Human coronavirus OC43	Zeptomatrix	1 x 10 <sup>6</sup> PFU/mL	No (3/3 negative)	No (19/20 positive)
Human coronavirus NL63	Zeptomatrix	9.87 x 10 <sup>3</sup> PFU/mL	No (3/3 negative)	No (3/3 positive)
MERS coronavirus	Zeptomatrix	7930 PFU/mL	No (2/2 negative)	No (3/3 positive)
Adenovirus (e.g. C1 Ad. 71)	Zeptomatrix	1 x 10 <sup>6</sup> PFU/mL	No (3/3 negative)	No (3/3 positive)
Human Metapneumovirus (hMPV)	Zeptomatrix	1 x 10 <sup>6</sup> PFU/mL	No (3/3 negative)	No (3/3 positive)
Parainfluenza virus Type 1	Zeptomatrix	1 x 10 <sup>6</sup> PFU/mL	No (3/3 negative)	No (3/3 positive)
Parainfluenza virus Type 2	Zeptomatrix	1 x 10 <sup>6</sup> PFU/mL	No (3/3 negative)	No (3/3 positive)
Parainfluenza virus Type 3	Zeptomatrix	1 x 10 <sup>6</sup> PFU/mL	No (3/3 negative)	No (3/3 positive)
Parainfluenza virus Type 4a	Zeptomatrix	1 x 10 <sup>6</sup> PFU/mL	No (3/3 negative)	No (3/3 positive)
Influenza A H3N2 (Wisconsin/67/05)	Zeptomatrix	8.82 x 10 <sup>4</sup> PFU/mL	No (3/3 negative)	No (3/3 positive)
Influenza A H1N1	Zeptomatrix	1 x 10 <sup>6</sup> PFU/mL	No (3/3 negative)	No (3/3 positive)
Influenza B (Malaysia/2506/04)	Zeptomatrix	2.92 x 10 <sup>4</sup> PFU/mL	No (3/3 negative)	No (19/20 positive)
Enterovirus	Zeptomatrix	1 x 10 <sup>6</sup> PFU/mL	No (3/3 negative)	No (3/3 positive)
Respiratory syncytial virus	Zeptomatrix	1 x 10 <sup>6</sup> PFU/mL	No (3/3 negative)	No (3/3 positive)
Rhinovirus	Zeptomatrix	4.17 x 10 <sup>6</sup> PFU/mL	No (3/3 negative)	No (3/3 positive)
<i>Haemophilus influenzae</i>	Zeptomatrix	1 x 10 <sup>6</sup> CFU/mL	No (3/3 negative)	No (3/3 positive)
<i>Streptococcus pneumoniae</i>	Zeptomatrix	1 x 10 <sup>6</sup> CFU/mL	No (3/3 negative)	No (3/3 positive)
<i>Streptococcus pyogenes</i>	Zeptomatrix	1 x 10 <sup>6</sup> CFU/mL	No (3/3 negative)	No (3/3 positive)
<i>Candida albicans</i>	Zeptomatrix	1 x 10 <sup>6</sup> CFU/mL	No (3/3 negative)	No (3/3 positive)
Pooled human nasal wash	LumiraDx	14% v/v	No (3/3 negative)	No (3/3 positive)
<i>Bordetella pertussis</i>	Zeptomatrix	1 x 10 <sup>6</sup> CFU/mL	No (3/3 negative)	No (3/3 positive)
<i>Mycoplasma pneumoniae</i>	ATCC	1 x 10 <sup>6</sup> CFU/mL	No (3/3 negative)	No (3/3 positive)
<i>Chlamydia pneumoniae</i>	ATCC	1 x 10 <sup>6</sup> CFU/mL	No (3/3 negative)	No (3/3 positive)
<i>Legionella pneumophila</i>	Zeptomatrix	1 x 10 <sup>6</sup> CFU/mL	No (3/3 negative)	No (3/3 positive)
<i>Mycobacterium tuberculosis</i>	Zeptomatrix	1 x 10 <sup>6</sup> CFU/mL	No (3/3 negative)	No (3/3 positive)
<i>Pneumocystis jirovecii</i>	Zeptomatrix	1 x 10 <sup>6</sup> CFU/mL	No (3/3 negative)	No (3/3 positive)
<i>Pseudomonas Aeruginosa</i>	Zeptomatrix	1 x 10 <sup>6</sup> CFU/mL	No (3/3 negative)	No (3/3 positive)
<i>Staphylococcus Epidermidis</i>	Zeptomatrix	1 x 10 <sup>6</sup> CFU/mL	No (3/3 negative)	No (3/3 positive)
<i>Streptococcus Salivarius</i>	Zeptomatrix	1 x 10 <sup>6</sup> CFU/mL	No (3/3 negative)	No (3/3 positive)
<i>Staphylococcus aureus</i>	ATCC	1 x 10 <sup>6</sup> CFU/mL	No (3/3 negative)	No (3/3 positive)

To estimate the likelihood of cross-reactivity with SARS-CoV-2 of organisms that were not available for wet testing, *in silico* analysis using the Basic Local Alignment Search Tool (BLAST) managed by the National Center for Biotechnology Information (NCBI) was used to assess the degree of protein sequence homology.

- For Human Coronavirus HKU1, homology exists between the SARS-CoV-2 nucleocapsid protein and Human Coronavirus HKU1. BLAST results showed 30 sequence IDs, all nucleocapsid protein, showing homology. Sequence ID AGW27840.1 had the highest alignment score and was found to be 39.1% homologous across 76% of the sequences, this is relatively low but cross-reactivity cannot be fully ruled out.

- For SARS-Coronavirus, high homology exists between the SARS-CoV-2 nucleocapsid protein and SARS-Coronavirus. BLAST results showed 68 sequence IDs, mostly nucleocapsid protein, showing homology. Sequence ID AAR87518.1, had the highest alignment score isolated from a human patient and was found to be 90.76% homologous across 100% of the sequence. This is high and cross-reactivity is likely.

- For MERS-Coronavirus, high homology exists between the SARS-CoV-2 nucleocapsid protein and MERS-Coronavirus. BLAST results showed at least 114 sequence IDs, mostly nucleocapsid protein, showing homology. Sequence IDs AHY61344.1 and AWH65950.1, had the highest alignment scores isolated from a human patient and were found to be 49.4% and 50.3% homologous across 88% of the sequence. Whilst this potentially represents moderate cross-reactivity testing of the MERS virus at 7930 PFU/mL showed no reactivity (see table above).

##### Endogenous interference studies

A study was performed to demonstrate that potentially interfering substances that may be found in the upper respiratory tract in symptomatic subjects (including over the counter medications) do not cross-react or interfere with the detection of SARS-CoV-2 in the LumiraDx SARS-CoV-2 Ag Test. Each substance was tested in triplicate in the absence or presence of SARS-CoV-2 at 3 x LoD. Substances for testing were selected based on the respiratory samples guidance in [http://www.accessdata.fda.gov/cdrh\\_docs/reviews/K112177.pdf](http://www.accessdata.fda.gov/cdrh_docs/reviews/K112177.pdf). The final concentration of the substances tested are documented in the table below.

Interfering substance	Concentration	Interference (Yes/No)
Benzocaine	150 mg/dL	No (3/3 Negative, 3/3 Positive)
Blood (human)	5%	No (3/3 Negative, 3/3 Positive)
Mucin	5 mg/mL	No (3/3 Negative, 3/3 Positive)
Naso GEL (NeillMed)	5% v/v	No (3/3 Negative, 3/3 Positive)
CVS Nasal Drops (phenylephrine)	15% v/v	No (3/3 Negative, 3/3 Positive)
Afrin (Oxymetazoline)	15% v/v	No (3/3 Negative, 3/3 Positive)
CVS Nasal Spray (Cromolyn)	15% v/v	No (3/3 Negative, 3/3 Positive)
Zicam Cold Remedy	5% v/v	No (3/3 Negative, 3/3 Positive)
Homeopathic (Alkaloi)	10 % v/v	No (3/3 Negative, 3/3 Positive)
Sore Throat Phenol Spray	15% v/v	No (3/3 Negative, 3/3 Positive)
Tobramycin	3.3 mg/dL	No (3/3 Negative, 3/3 Positive)
Mupirocin	0.15 mg/dL	No (3/3 Negative, 3/3 Positive)
Fluicasonone	0.000126 mg/dL	No (5/5 Negative, 4/4 Positive)
Tamiflu (Osetamivir phosphate)	500 mg/dL	No (3/3 Negative, 3/3 Positive)
Budesonide	0.00063 mg/dL	No (3/3 Negative, 3/3 Positive)
Biotin	0.35 mg/dL	No (3/3 Negative, 3/3 Positive)
Methanol	150 mg/dL	No (19/20 Negative, 3/3 Positive)
Acetylsalicylic Acid	3 mg/dL	No (3/3 Negative, 3/3 Positive)
Diphenhydramine	0.0774 mg/dL	No (3/3 Negative, 3/3 Positive)
Dexamethorphan	0.00156 mg/dL	No (19/20 Negative, 3/3 Positive)
Dexamethasone	1.2 mg/dL	No (3/3 Negative, 3/3 Positive)
Mucinex	5%	No (3/3 Negative, 3/3 Positive)

##### High dose hook effect

High Dose Hook Effect studies determine the level at which false negative results can be seen when very high levels of target are present in a tested sample. To determine if the LumiraDx SARS-CoV-2 Ag Test suffers from any high dose hook effect, increasing concentrations of gamma-irradiated SARS-CoV-2 virus (BEI Resources NR-52287) were tested up to a concentration of 1.4 x 10<sup>6</sup> TCID<sub>50</sub>/mL. In this study, the starting material was spiked into a volume of pooled human nasal matrix obtained from healthy donors and confirmed negative for SARS-CoV-2. At each dilution, 50 µL samples were added to swabs and the swabs processed for testing on the LumiraDx SARS-CoV-2 Ag Test as per the Product Insert using the procedure appropriate for patient nasal swab samples.

No impact on test performance or high dose hook effect was observed up to 1.4 x 10<sup>6</sup> TCID<sub>50</sub>/mL of gamma-irradiated SARS-CoV-2 with the LumiraDx SARS-CoV-2 Ag Test.

Test dilution	Concentration (TCID <sub>50</sub> /mL)	Mean signal (ADC Units)
1	0	495
2	62.5	26100.6
3	250	63013.8
4	1000	83451.8
5	1.4 x 10 <sup>6</sup>	86220

##### Point of care use

The LumiraDx SARS-CoV-2 Ag Test was used by 8 untrained users in 4 sites across the United States. Untrained users tested 132 patients and ran 148 tests.

##### References:

- World Health Organisation [www.who.int](http://www.who.int)
- Centers for Disease Control and Prevention [www.cdc.gov](http://www.cdc.gov)

#### Symbols glossary

	Temperature limitation
	Manufacturer
	In Vitro Diagnostic Medical Device
	Catalogue Number
	Batch code/Lot Number
	Indicates a medical device that has been sterilized using ethylene oxide
	Indicates the presence of the Radio Frequency Identification (RFID) reader/tag.
	Date of manufacture
	Indicates that a medical device that should not be used if the package has been damaged or opened and that the user should consult the instructions for use for additional information

#### LumiraDx customer services:

For product inquiries and technical support please contact LumiraDx Customer Services by email: [customerservices.US@lumiradx.com](mailto:customerservices.US@lumiradx.com), telephone 1-888-586-4721 or Lumiradx.com

#### For return policy

If there is a problem with the LumiraDx SARS-CoV-2 Ag Test Strips you may be asked to return them. Before returning tests please obtain a return authorization number from LumiraDx Customer Services. This return authorization number must be on the shipping carton for return. For ordinary returns following purchase, please contact LumiraDx Customer Services for terms and conditions: [customerservices.US@lumiradx.com](mailto:customerservices.US@lumiradx.com)

#### Limited warranty

LumiraDx SARS-CoV-2 Ag Test Strips – As per shelf life.

Unused strips and nasal collection swabs must be stored according to the required storage conditions as printed in this product insert and they can be used only up to the expiry date printed on the Test Strip pouch, Test Strip box and swab packaging. For the applicable warranty period, LumiraDx warrants that each product shall be (i) of good quality and free of material defects, (ii) function in accordance with the material specifications referenced in the product insert, and (iii) approved by the proper governmental agencies required for the sale of products for their intended use (the "limited warranty"). If the product fails to meet the requirements of the limited warranty, then as customer's sole remedy, LumiraDx shall either repair or replace, at LumiraDx's discretion, the Test Strips. Except for the limited warranty stated in this section, LumiraDx disclaims any and all warranties, express or implied, including but not limited to, any warranty of merchantability, fitness for a particular purpose and non-infringement regarding the product. LumiraDx's maximum liability with any customer claim shall not exceed the net product price paid by the customer. Neither party shall be liable to the other party for special, incidental or consequential damages, including, without limitation, loss of business, profits, data or revenue, even if a party receives notice in advance that these kinds of damages might result. The Limited Warranty above shall not apply if the customer has subjected the LumiraDx SARS-CoV-2 Ag Test to physical abuse, misuse, abnormal use, use inconsistent with the LumiraDx Platform User Manual or Product Insert, fraud, tampering, unusual physical stress, negligence or accidents. Any warranty claim by Customer pursuant to the Limited Warranty shall be made in writing within the applicable Limited Warranty period.