EMERGENCY USE AUTHORIZATION (EUA) SUMMARY
HELIX SARS-CoV-2 TEST

For *in vitro* Diagnostic Use
Rx Only
For Use Under Emergency Use Authorization (EUA) Only

The Helix SARS-CoV-2 Test will be performed at Helix located at 6925 Lusk Blvd, San Diego, CA 92121 and 9875 Towne Centre Dr San Diego, CA 92121, which are certified under the Clinical Laboratory Improvement Amendments of 1988 (CLIA), 42 U.S.C. §263a and meet the requirements to perform high complexity tests as described in the Laboratory Standard Operating Procedures that were reviewed by the FDA under this EUA.

INTENDED USE

The Helix SARS-CoV-2 Test is an in vitro diagnostic real-time reverse transcription polymerase chain reaction (rRT-PCR) test for the qualitative detection of nucleic acid from SARS-CoV-2 in anterior nasal swab specimens that are self-collected without supervision using the Helix COVID-19 Self-Collection Kit by individuals 18 years or older who are suspected of COVID-19 by a healthcare provider. Testing is limited to Helix located at 6925 Lusk Blvd, San Diego, CA 92121 and 9875 Towne Centre Dr San Diego, CA 92121, which are certified under the Clinical Laboratory Improvement Amendments of 1988 (CLIA), 42 U.S.C. §263a and meet requirements to perform high complexity tests.

Results are for the identification of SARS-CoV-2 RNA. The SARS-CoV-2 RNA is generally detectable in anterior nasal swab specimens 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 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.

The Helix SARS-CoV-2 Test is intended for use by qualified clinical laboratory personnel specifically instructed and trained in the techniques of real-time PCR and *in vitro* diagnostic procedures. The Helix SARS-CoV-2 Test and Helix COVID-19 Self-Collection Kit are only for use under the Food and Drug Administration's Emergency Use Authorization.

DEVICE DESCRIPTION AND TEST PRINCIPLE

Device Description

a. Helix SARS-CoV-2 Test

The Helix SARS-CoV-2 Test is a modification of the TaqPath COVID-19, FluA, FluB Combo Kit (EUA202953) and is designed to detect RNA from SARS-CoV-2 in anterior nasal swab specimens that are self-collected using the Helix COVID-19 Self-Collection Kit. The Helix SARS-CoV-2 Test uses the same oligonucleotides as the TaqPath COVID-19, FluA, FluB Combo Kit. However, results for influenza A and influenza B are not reported.

Thermo Fisher Scientific has provided Helix a Right of Reference to the inclusivity and cross-reactivity data contained in the TaqPath COVID-19, FluA, FluB Combo Kit (EUA202953). The Helix SARS-CoV-2 Test, in contrast to the TaqPath COVID-19, FluA, FluB Combo Kit is an extraction-free assay. Additional modifications to the previously authorized assay include the addition of RNase P primers and a probe that are multiplexed with all the other assay oligonucleotides. Further, MS2 phage is not added to clinical specimens but only the negative control (MS2 primers/probe remain in the PCR amplification mixture). The assay is also run on the QuantStudio 7 Flex Real-Time PCR System and detection of influenza A and B analytes is masked using specific software. The Helix SARS-CoV-2 Test will only report SARS-CoV-2 results.

Helix has developed two proprietary software applications (QuantStudio Automation (QSA) and Report Service) to assist with results reporting. QSA directs the Thermo Fisher Design and Analysis (DA2) software command line tool to analyze the RT-PCR output data file (.eds format), analysis settings and export settings to produce a results file for each plate of samples run on the QuantStudio 7. The QSA software uses predefined and validated quality control thresholds to assess the DA2 output to disposition each sample as positive/negative. Report Service reads the output of the data analysis and picks the appropriate report template (i.e., SARS-CoV-2 only) and obtains the patient information that matches the specimen ID. Report Service then populates the fields in the PDF report template with the appropriate patient data and final result.

b. Helix COVID-19 Self-Collection Kit

The Helix COVID-19 Self-Collection Kit consists of a packaged sterile swab, sterile collection tube containing 2 mL of transport medium (0.85% physiological saline), biohazard bag with absorbent pad, and printed Instructions For Use (IFU) that show how to collect and return the anterior nasal swab sample to a designated drop-off box for shipment to the testing laboratory. Each sample collected using the Helix COVID-19 Self-Collection Kit must be deposited in the on-site drop-off box for return shipment to a Helix laboratory under ambient conditions for processing and testing with the Helix SARS-CoV-2 Test within 48 hours of collection. At the end of each day, trained personnel will prepare all self-collected samples within the drop-off collection box for bulk shipment to Helix using a UN3373 labeled outer cardboard box. Appropriate standard operating procedures (SOPs) are implemented to account for leaky collection tubes to prevent cross-contamination among collected samples.

The components of the Helix COVID-19 Self-Collection Kit and associated instructions for specimen collection are based on those previously authorized in conjunction with the Helix COVID-19 Test (EUA201636). Helix has leveraged usability study data from EUA201636 in support of the current EUA.

<u>Locker System for the Helix COVID-19 Self-Collection Kit</u>

a. Helix COVID-19 Self-Collection Kit Ordering and Processing

The Helix COVID-19 Self-Collection Kit will be provided in locker units at participating authorized distributors as part of the Increasing Community Access to Testing (ICATT) program. The Helix COVID-19 Self-Collection Kit will be available by prescription to individuals who request testing for SARS-CoV-2 through the authorized distributor's online registration platform. Individuals seeking a collection kit register with the authorized distributor, complete an assessment questionnaire and schedule a time/location to arrive at the locker unit and perform the collection process using the Helix COVID-19 Self-Collection Kit.

The registration process triggers a physician order for the test. Healthcare providers (HCP) who are licensed and have prescriptive authority in their respective states, determine eligibility based on current CDC testing guidelines. Upon successful registration, the individual will receive an instructional video on how to navigate the locker workflow as well as a copy of the Helix COVID-19 Self-Collection Kit instructions via email and SMS text. The individual will also be provided secure access details (including a unique verification code/patient identifier) that indicate how to open the locker, retrieve the collection kit, and initiate the self-collection process. The collection time is captured as the time the patient authenticates their identity at the locker and accesses their collection kit. The collection time and corresponding test order are transmitted to Helix in a digital format so that accessioning personnel only process samples that are received within the validated stability window. A unique barcode is placed on the collection tube during loading of the locker unit that links to the individual's test order.

At a participating pharmacy, the individual arrives at the outside locker unit at their scheduled appointment time and enters their identification information. If the patient identifiers are recognized and match the registration details, the specific locker unit will unlock. The individual retrieves the Helix COVID-19 Self-Collection Kit and will be directed to play the collection instructions on the locker video monitor. The video can be replayed, and a paper copy of the instructions is also provided with the kit. Once the sample has been collected and packaged in the provided biohazard bag, the sample must immediately be placed into a secure on-site drop-off box that is located close to the locker and whose temperature is monitored. At the conclusion of each day, collected specimens are packaged in bulk by appropriately trained couriers for overnight shipment at ambient temperature to Helix for processing. An overview of the locker system workflow is displayed below in Figure 1.

If any component of the collection kit is dropped during sample collection or if the allotted collection period has timed-out, the customer will be instructed to end the process, return to their car, and call the support number provided on the outside of the locker unit. The phone number will allow the individual to interact with an employee of the authorized distributor in the specific location at which the locker is situated. If possible, pharmacy staff will restock the locker and re-initiate the process with new collection materials. If re-stocking is not possible, the patient will be instructed to reschedule and return to the store at the new appointment time.

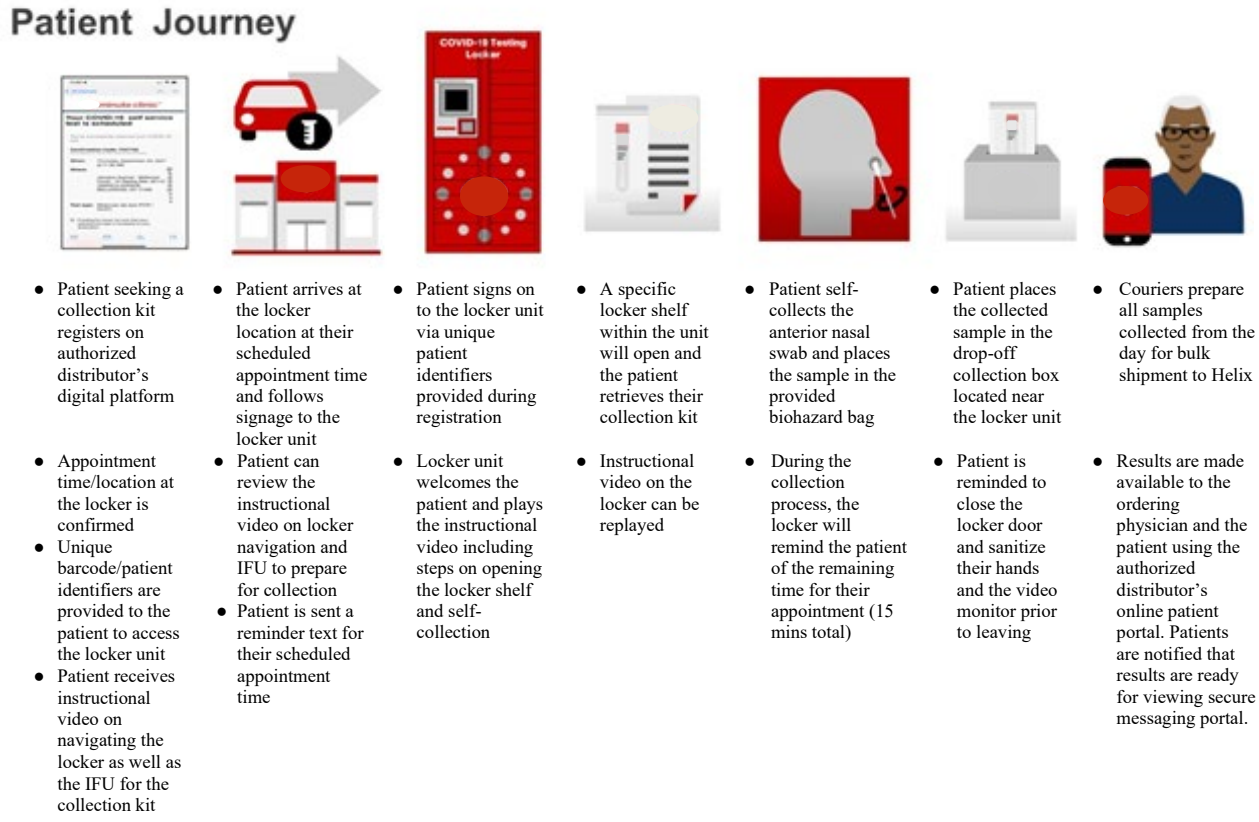

Figure 1. Overview of the Locker System Workflow that Dispenses the Helix COVID-19 Self-Collection Kit

Test results are reported to the ordering physician and to the relevant public health authorities in accordance with local, state and federal requirements using appropriate LOINC and SNOMED codes. Helix sends the final test results to the authorized distributor's Electronic Health Record (EHR) system where they are accessible by the ordering physician and patient.

b. Specimen Transport and Storage

Anterior nasal swabs collected in physiological saline (0.85%) using the Helix COVID-19 Self-Collection Kit are stored and transported under ambient temperature and must be tested within 48 hours of collection.

c. Specimen Accessioning

Specimens received in the laboratory undergo heat inactivation for safe handling prior to being removed from the biohazard bags and accessioned for testing. Once samples complete heat inactivation, the acceptability of each specimen is determined via visual inspection and predefined acceptance criteria applied by trained operators. A summary of the criteria used for specimen accessioning is provided in Table 1. All acceptable specimens are processed by the laboratory. The laboratory supervisor is notified of any specimens that do not meet the accessioning acceptance criteria and procedures are implemented to gather missing information, as appropriate. If the measures to remediate specimen rejection cannot be rectified, the individual will be sent a test cancellation report due to specimen non-conformance with the option to re-collect the specimen. In this scenario, the individual must re-register and schedule a new appointment time for re-collection.

Table 1. Accessioning Criteria Applied to Specimens Received for Analysis with the Helix SARS-CoV-2 Test

Rejection Reason	Description
Collection tube has a missing or damaged unique identifier	Missing barcode or illegible/damaged barcode
Collection tube integrity is unacceptable	Damaged, cracked, leaking, or empty tubes (no saline)
Duplicate barcode	Two separate collection tubes have the same barcode
Non-conforming swab type	Specimen contains a swab that is not validated for Helix's workflow
Non-Helix specimen type	Use of sample collection and transport devices other than those authorized
Multiple swabs	Specimen with two or more collection swabs
Inverted swab	The soft tip of the swab is upward facing rather than down at the bottom of the collection tube in saline
Expired shipping time (unviable for testing)	Specimen received outside of validated stability window
High transport medium volume	Volume of saline exceeds 2.0 mL
Operator error	Failure to process due to operator mishandling (e.g., accidentally dropped, underwent excessive heat inactivation)
Missing sample	Test requisition form and barcode are received; however, the sample (swab) is missing
Missing requisition	Specimen is received but for which there is no test requisition*
Improper packaging	Specimen not received in a biohazard bag containing one vial with transport medium and one swab
Expired collection kit	Specimen was collected using a collection kit that exceeded its assigned expiration date

*If there is a missing test requisition form (TRF) but the sample passes all other accessioning criteria, the sample is processed. During the processing period, Helix's customer service will attempt to resolve the TRF with the ordering physician's office. If the issue can be resolved with the ordering office and an electronic TRF can be submitted, the sample will be processed, and results returned. However, if the missing TRF cannot be resolved, the results will not be returned to the patient.

d. Specimen Testing

The Helix SARS-CoV-2 Test is a modified version of the TaqPath COVID-19, FluA, FluB Combo Kit and includes primers and probes for the detection of the SARS-CoV-2 nucleocapsid and spike protein genes. The assay also includes oligonucleotides for the detection of one influenza A and one influenza B target in addition to human RNase P nucleic acid as an endogenous control for specimen adequacy and process integrity. However, influenza A and B results are masked automatically by selecting the appropriate report template using the Report Service software.

Crude samples are diluted and undergo heat lysis prior to RT-PCR. Amplified products are detected in a multiplex reaction using TaqMan fluorescent probes that are labeled with a fluorophore and a quencher. The 5′ exonuclease activity of the Taq polymerase hydrolyses the probes during the annealing/extension phase of PCR amplification, leading to generation of target-specific fluorescent signal.

The Helix SARS-CoV-2 Test is validated for use with the Hamilton Microlab STAR robot liquid handler (software Venus 3 version 4.5.0.7797). All sample processing steps including dilution of crude sample and preparation of the RT-PCR plate are automated by the Hamilton

liquid handler.

RT-PCR amplification is performed in a 384-well format using an Applied Biosystems QuantStudio 7 Flex Real-Time PCR System and Thermo Fisher Scientific Design and Analysis software version 2.4.0. Helix also uses proprietary software applications (QSA and Report Service) to analyze the plate results and provide the appropriate test report template (masking influenza results) to the ordering physician and patient.

e. Result Reporting

All test results are reported to the requesting healthcare provider via the authorized distributor's Electronic Health Record (EHR) system and public health authorities in accordance with local, state, and federal requirements. Individuals will be notified by a secure messaging service when their results are available and must log-in to their account on the patient portal to retrieve their results and obtain guidance for appropriate next steps. When viewing their results, the patient can access the Patient Fact Sheet by clicking on the link within the Helix report that is displayed in the patient portal. A hard copy of the Patient Fact Sheet is also provided at the locker unit.

INSTRUMENTS USED WITH THE TEST

Table 2. Instruments and Software for Use with the Helix SARS-CoV-2 Test

Instrument	Manufacturer	Software Version
Microlab STAR Liquid Handling System	Hamilton	Software Venus 3 version 4.5.0.7797
QuantStudio 7 Flex Real-Time PCR System	Applied Biosystems (Thermo Fisher)	1.3
Design and Analysis Software	Thermo Fisher Scientific	2.4.0

REAGENTS AND MATERIALS

Table 3. Reagents and Materials Used for Sample Preparation and to Perform the Helix SARS-CoV-2 Test

Reagent/Material	Manufacturer/ Supplier	Catalogue/Part Number
TaqPath COVID-19, FluA, FluB Combo Kit (primers/probes, positive control, MS2 phage)	Thermo Fisher Scientific	A49868
RNase P/RPP30 (Custom TaqMan GEx assay, QSY probe labeled with JUN, large scale 967 µL 60X, HPLC purification)	Thermo Fisher Scientific	CCU002NR/7434658 (custom order)
UltraPlex 1 Step ToughMix	QuantaBio	95166-01K
Tris-Borate-EDTA	Fisher Scientific	BP2430-1
Saline, 0.85%, 1 L	Hardy Diagnostics	U157
Saline sample tube, saline fill 1 mL in a 5 mL cryotube	Affordable IHC Instruments	1mL-SL-5mL
Easy-Peel Foil, Laminate, Roll, 78 mm x 610 m	Thermo Fisher Scientific	AB-3739
Microseal F	Bio-Rad	MSF-1001
Nalgene Square Media Bottles, PET, Sterile 1 L	VWR	16010-104

Reagent/Material	Manufacturer/ Supplier	Catalogue/Part Number
Nunc 384-Well Polypropylene DeepWell Storage Plate (DWP)	Thermo Fisher Scientific	269390
Reagent Reservoirs 300 mL Sterile	Integra	6328
Reservoir Base 300 mL	Integra	6305
Serological pipettes	--	--
Thermo Adhesive PCR Sealing Foil Sheets	Thermo Fisher Scientific	AB-0626
Applied Biosystems Microamp Adhesive Film Applicator	Thermo Fisher Scientific	43-331-83
Pipette tips, filtered	--	--
1000 µL CO-RE filtered tips	--	--
300 µL CO-RE filtered tips	--	--
50 µL CO-RE filtered tips	--	--
"Tip Isolator" Microplate 96 Square Deep Well 2 mL	VWR	75870-792
Graduated Cylinder 250 mL	VWR	65000-008
Flanged Plug Caps for 12 mm Tubes	Fisher Scientific	22-171-664
Clear Advantage 300 mL reagent reservoir base	Integra	6305
Clear Advantage 300 mL reagent reservoir insert	Integra	6328
5 mL skirted tubes	--	--
2 mL Screw Cap Micro Tubes, Sarstedt	--	--
50 mL Falcon Conical Centrifuge Tubes	--	--
25 mL Polystyrene Reservoir, individually wrapped, Divided, Disposable	--	--
Miscellaneous Instruments	**Manufacturer/Supplier**	**Catalogue/Part Number**
Eppendorf Plate Centrifuge 5810R	Eppendorf	5810R
Analog Vortex Mixer	VWR	10153-838
ALPS 3000 Heat Sealer	Thermo Fisher Scientific	AB-3000
Kinex ES-200 Capper	Kinex Cappers	--
Tube Clamping Device	DynamC	HX01-ME0001-1
Mixmate Vortex Mixer	Eppendorf	22674200
Pipet-Aid XP Pipette Controller	VWR	4-000-101
Mastercycler X50t thermal cycler	Eppendorf	6306000010

Table 4. Helix COVID-19 Self-Collection Kit Components

Component[1]	Description	Supplier	Part Number
Swab	Synthetic nylon flocked anterior nares swab with acrylonitrile butadiene styrene (ABS) shaft	Miraclean Technology Co., Ltd.	20A00GA52
Saline collection tube	Sterile polypropylene tube containing 2 mL of 0.85% physiological saline	G-Biosciences assembled by Thomas Scientific	Saline: 076N Collection Tube: XHLX005
Specimen biohazard bag	Biohazard bag with absorbent pad	Therapak	40007
Instructions	Printed pamphlet	Helix	Not Applicable

[1]1 of each component per kit

[a] An alcohol sanitizing wipe which is not a component of the Helix COVID-19 Self-Collection Kit is provided on each individual locker shelf along with the Helix COVID-19 Self-Collection Kit components.

CONTROLS

Table 5. Assay Controls Used With the Helix SARS-CoV-2 Test

Control	Description	Manufacturer	Purpose	Frequency of Use
Positive Control	RNA control that contains targets specific to the SARS-CoV-2, influenza A, and influenza B genomic regions targeted by the assays	Thermo Fisher Scientific (Cat. # A49868, Part # 956123)	Monitors for substantial reagent failure including primer and probe integrity	2 per RT-PCR plate
Negative Control	0.85% physiological saline and MS2 Phage Control	Saline; Hardy Diagnostics (Cat. # U157) MS2 Phage: Life Technologies (Cat. # 100092698)	Monitors for reagent and/or environmental contamination during RNA plating and reaction setup	2 per RT-PCR plate
RNase P (RPP30)	Endogenous human RNase P nucleic acid	N/A	Monitors for specimen adequacy and process integrity	Per patient sample or positive control

INTERPRETATION OF RESULTS

Assay Controls

The criteria for interpretation of the results obtained with the assay controls are shown in Table 6. All controls must produce the expected results to enable interpretation of the results from testing of patient samples. Two negative controls and two positive controls are processed with every batch of samples.

Table 6. Interpretation of Results for Assay Controls

Assay Control Name	Assay Targets				
	SARS-CoV-2	Influenza A	Influenza B	MS2	RNase P
Positive Control	Positive	Positive	Positive	N/A	Negative
Negative Control	Negative	Negative	Negative	Positive	N/A

N/A; Not Applicable

Clinical Specimens

The criteria for interpretation of clinical specimen test results are shown in Table 7 below.

Table 7. Interpretation of Results From Clinical Specimens

Assay Targets[1]		Interpretation	Action
SARS-CoV-2	RNase P		
Positive	Positive or Negative	SARS-CoV-2 Detected	Report results to CDC/state, sender, and patient.
Negative	Positive	SARS-CoV-2 Not Detected	Report results to CDC/state, sender, and patient.
Negative	Negative	Invalid	Repeat extraction and RT-PCR. If result is still "invalid", consider collecting a new specimen. If result remains "invalid" report to sender.

[1] Positive and negative results for influenza A and B are not reported.

Table 8. Target Call Criteria for Controls and Samples Shown in Tables 6 and 7, Respectively

Target Call (SARS-CoV-2, Influenza A[1], Influenza B[1])		
Cq Cut-off	**Cq Confidence**	**Interpretation**
≤ 39	≥ 0.8	Positive
> 39	Any value	Negative
≤ 39	< 0.8	Negative
RNase P		
Cq Cut-off	**Cq Confidence**	**Interpretation**
≤ 45	≥ 0.3	Positive
≤ 45	< 0.3	Negative
MS2		
Cq Cut-off	**Cq Confidence**	**Interpretation**
≤ 45	≥ 0.3	Positive
≤ 45	< 0.3	Negative

[1] Influenza A and B target calls are only applicable to the positive control.

PERFORMANCE EVALUATION

1) **Limit of Detection (LoD) - Analytical Sensitivity:**

The LoD of the Helix SARS-CoV-2 Test was determined using dilutions of gamma-irradiated SARS-CoV-2 (Thermo Fisher, Cat # BP24301) in negative clinical anterior nasal swab matrix (i.e., anterior nasal swab in saline). To estimate the LoD, three contrived specimens at each of 5 different concentrations were tested. The lowest concentration at which all three replicates produced positive results was determined to be the preliminary LoD (Table 9). The preliminary LoD was then confirmed by testing an additional 20 replicates at the estimated LoD

concentration in addition to one higher concentration (Table 10). The confirmed LoD of the Helix SARS-CoV-2 Test was 500 GCE/mL of starting sample.

Table 9. Preliminary LoD Estimation

GCE/mL	Positive (Hit Rate)	Mean Cq	
		SARS-CoV-2[a]	RNase P
250	3/3	35.72	24.83
500	3/3	34.82	24.94
1000	3/3	33.93	25.01
2000	3/3	32.67	25.07
4000	3/3	31.60 35.6 (0.73)	24.98

[a] Includes detection of the S and/or N genes; Both probes are labeled with the same fluorophore.
GCE/mL; Genomic Copy Equivalents per milliliter
The estimated LoD is highlighted in yellow.

Table 10. LoD Confirmation

GCE/mL	Positive (%)	Mean Cq (SD)	
		SARS-CoV-2[a]	RNase P
250	17/20 (85.0)	36.58 (1.65)	24.93 (0.09)
500	20/20 (100.0)	35.26 (0.49)	24.92 (0.09)

[a] Includes detection of the S and/or N genes; Both probes are labeled with the same fluorophore.
GCE/mL; Genomic Copy Equivalents per milliliter
SD; Standard Deviation
The confirmed LoD is highlighted in yellow.

2) Inclusivity (Analytical Reactivity):

The Helix SARS-CoV-2 Test uses primer and probe sequences for the detection of the spike protein and nucleocapsid genes that were authorized for use in the TaqPath COVID-19, FluA, FluB Combo Kit (EUA202953). Thermo Fisher has provided Helix a Right of Reference to the performance data contained in the EUA request for the TaqPath COVID-19, FluA, FluB Combo Kit, including the *in silico* analysis of SARS-CoV-2 inclusivity.

Due to the presence of a mutation in the target region, the Helix SARS-CoV-2 Test is not predicted to detect the spike protein gene of the omicron variant (B.1.1.529). However, detection of the nucleocapsid gene is not affected and overall test sensitivity is not expected to be impaired.

3) Cross-Reactivity (Analytical Specificity), Microbial Interference, and Interfering Substances:

As noted above, Thermo Fisher has provided Helix a Right of Reference to the performance data contained in the EUA request for the TaqPath COVID-19, FluA, FluB Combo Kit (EUA202935).

However, in contrast with the TaqPath COVID-19, FluA, FluB Combo Kit, the Helix SARS-CoV-2 Test does not include a nucleic acid extraction procedure but does include additional primers for amplification/detection of RNase P. Testing of leftover clinical samples (see below) demonstrated no evidence of significant cross-reaction or assay interference from respiratory

flora or the specimen matrix. However, as a condition of authorization, Helix will perform additional wet testing of common respiratory pathogens and commensal species to characterize the potential for non-specific amplification and/or interference more fully, as well as to evaluate the potential for competitive interference with the detection SARS-CoV-2 from the presence of influenza A and/or B. To characterize the performance of the Helix SARS-CoV-2 Test, Helix will also conduct an Interfering Substances Study with endogenous and exogenous substances that may be found in anterior nasal swab specimens, as a further condition of authorization.

4) Specimen Shipping Stability:

The stability of anterior nasal swab specimens in 0.9% saline was previously evaluated by Quantigen Biosciences (with support from The Gates Foundation and UnitedHealth Group) under simulated shipping conditions that included exposure to temperature extremes that may reasonably be anticipated during specimen transport. Quantigen Biosciences has granted a right of reference to these stability data. The results of the study support the stability of anterior nasal swab specimens for up to 48 hours at ambient temperature.

Helix will conduct an additional post-authorization study to verify the stability of SARS-CoV-2 RNA in specimens collected using the Helix COVID-19 Self-Collection Kit that are transported under both high and low ambient temperature conditions, including multiple freeze-thaw cycles.

5) Collection Device Reagent Stability (Shelf-Life):

The 0.85% sterile saline collection tube within the Helix COVID-19 Self-Collection Kit is manufactured by a third party. The manufacturer's claimed shelf-life/expiration date is 2 years from the date of manufacturing when the product is stored at the recommended temperature. Therefore, the kit's expiration date will be two years from the date of manufacture of the saline solution and is displayed on the front of the biohazard bag. A specific accessioning criterion is to ensure that the kit's expiration date has not been exceeded.

As a further risk mitigation, Helix will complete an additional post authorization study on the saline-filled collection tubes to verify their stability upon exposure to temperature extremes that may be experienced when they are stored in a locker prior to use.

6) Usability:

A usability study was previously performed by Helix (as part of EUA201636) to evaluate the ease-of-use of the Helix COVID-19 Self-Collection Kit for collection of specimens from individuals 18 years and older. The study included 43 participants who self-collected an anterior nasal swab specimen according to the Instructions For Use. Sample collection was performed in a simulated home environment and the collected samples were shipped to the laboratory for testing for the presence of human RNase P nucleic acid. Forty one out of 43 samples (95.3%) received in the laboratory were accepted for testing and all 41 (100%) produced a positive result for the RNase P target, indicating collection of an acceptable sample. Under the current submission, the instructions for specimen collection remain unchanged.

As a condition of authorization, Helix will submit a report to the FDA (within 30 days of authorization) summarizing any testing performed with the Helix COVID-19 Self-Collection Kit including how many kits were requested and registered online via the patient portals operated by the authorized distributor(s). Helix will also document the number of samples that

were bulk shipped for testing, how many specimens were rejected during accessioning and the reasons for rejection, the SARS-CoV-2 positivity rate, the invalid rate (due to RNase P failure), as well as the number of calls reported to Helix's customer service and staff at the authorized distributor(s), along with the nature of the calls.

7) Clinical Evaluation:

The clinical performance of the Helix SARS-CoV-2 Test was evaluated using leftover anterior nasal swab specimens that were collected in 0.85% saline from individuals suspected of COVID-19 by a healthcare provider. A total of 45 positive and 62 negative samples that were previously tested with an FDA authorized RT-PCR assay were used in this study. The results of the Helix SARS-CoV-2 Test against the authorized comparator showed 95.6% positive percent agreement (PPA) and 98.4% negative agreement (NPA) (see Table 11 below). The data set contained sufficient low positive SARS-CoV-2 samples, as determined based on the Ct values obtained with the comparator assay.

Table 11. Performance of the Helix SARS-CoV-2 Test with Anterior Nasal Swabs Collected From Symptomatic Subjects Using the Helix COVID-19 Self-Collection Kit

Symptomatic Subjects		FDA Authorized Molecular SARS-CoV-2 Assay		
		Positive	**Negative**	**Total**
Helix SARS-CoV-2 Test	**Positive**	43	1	**44**
	Negative	2[1]	61	**63**
	Total	**45**	**62**	**107**
Positive Percent Agreement		**95.6% (43/45); 85.2-98.8%**[2]		
Negative Percent Agreement		**98.4% (61/62); 91.4-99.7%**[2]		

[1] Low positive samples based on the mean Ct at the comparator assay LoD
[2] Two-sided 95% score confidence interval

WARNINGS

- For *in vitro* diagnostic use.
- For prescription use.
- This product has not been FDA cleared or approved but has been authorized for emergency use by FDA under an EUA for use by the authorized laboratory.
- This product has been authorized only for the detection of nucleic acid from SARS-CoV-2, not for any other viruses or pathogens.
- 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* diagnostics for detection and/or diagnosis of COVID-19 under Section 564(b)(1) of the Federal Food, Drug and Cosmetics Act, 21 U.S.C. § 360bbb-3(b)(1), unless the declaration is terminated or the authorization is revoked sooner.

LIMITATIONS

- Potential competitive interference amongst on- (SARS-CoV-2, influenza A, influenza B) and off-panel analytes has not been evaluated.
- Potential assay interference due to the presence of endogenous and exogenous substances, including live influenza virus vaccines such as FluMist, has not been evaluated.
- The Helix SARS-CoV-2 Test performance has only been established with anterior nasal swabs collected in saline as described in the Intended Use section. Testing other sample types may cause inaccurate results.

- The performance of this test was established based on the evaluation of a limited number of clinical specimens. Clinical performance has not been established with all circulating variants but is anticipated to be reflective of the prevalent variants in circulation at the time and location of the clinical evaluation. Performance at the time of testing may vary depending on the variants circulating, including newly emerging strains of SARS-CoV-2 and their prevalence, which change over time.
- Due to the presence of a mutation in the target region, the Helix SARS-CoV-2 Test is not expected to detect the S gene of the omicron variant (B.1.1.529). However, due to the design of the test, there will not be a distinct S-gene detection pattern to signal the potential presence of the omicron variant, nor is overall test sensitivity expected to be affected.
- Detection of RNase P indicates that human nucleic acid is present and implies that human biological material was collected and successfully extracted and amplified. It does not necessarily indicate that the specimen is of appropriate quality to enable detection of SARS-CoV-2.