EMERGENCY USE AUTHORIZATION (EUA) SUMMARY
KPMAS COVID-19 TEST
(Kaiser Permanente Mid-Atlantic States)

For *In vitro* Diagnostic Use
Rx Only
For use under Emergency Use Authorization (EUA) only

Anterior nasal swab specimens collected at home (which includes on-site at KPMAS facilities) by individuals using the KPMAS COVID-19 Self-Collection Kit will be tested with the KPMAS COVID-19 Test at Kaiser Permanente Mid-Atlantic States laboratory located at 6111 Executive Blvd., Rockville, MD 20850, or another laboratory designated by Kaiser Permanente Mid-Atlantic States which is certified under the Clinical Laboratory Improvement Amendments of 1988 (CLIA), 42 U.S.C. §263a, and meets requirements to perform high complexity tests.

INTENDED USE

The KPMAS COVID-19 Test is a real-time reverse transcription polymerase chain reaction (rRT-PCR) test intended for the qualitative detection of nucleic acid from SARS-CoV-2 in anterior nasal swab specimens collected at home (which includes on-site at KPMAS facilities) using the KPMAS COVID-19 Self-Collection Kit by any individuals age 18 years and older (self-collected), 14 years and older (self-collected under adult supervision), or 2 years and older (collected with adult assistance), including individuals without symptoms or other reasons to suspect COVID-19.

Testing is limited to laboratories designated by Kaiser Permanente Mid-Atlantic States that 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.

Testing with the KPMAS COVID-19 Test is intended for use by qualified clinical laboratory personnel specifically instructed and trained in the techniques of rRT-PCR

assays and in vitro diagnostic procedures. The KPMAS COVID-19 Test is only for use under the Food and Drug Administration's Emergency Use Authorization.

DEVICE DESCRIPTION AND TEST PRINCIPLE

1) ***Device Description:***

The KPMAS COVID-19 Self Collection Kit enables the at-home (which includes on-site at KPMAS facilities) collection of anterior nasal swab specimens from individuals age 18 years and older (self-collected), age 14 years and older (self-collected under adult supervision), or age 2 years and older (collected with adult assistance). Specimens that are collected at home are transported to KPMAS Regional Laboratory, Rockville, MD for real-time RT-PCR testing with the KPMAS COVID-19 Test. Specimens that are collected on-site may be tested with the KPMAS COVID-19 Test at KPMAS Regional Laboratory, Rockville, MD, or alternatively, may be shipped from KPMAS to another designated laboratory for testing according to the KPMAS COVID-19 Test. Specimens are collected using the KPMAS COVID-19 Self-Collection kit for testing at KPMAS or a designated laboratory when determined that testing is appropriate and a prescription is generated by the treating physician. The KPMAS COVID-19 Self Collection Kit includes the following materials:

Table 1: KPMAS COVID-19 Self-Collection Kit materials

At Home: Sample collection and shipping instructions OR On Site: Sample collection instructions
Information Sheet: In person Drop-Off Option*
Biohazard bag (95kPa) containing
Specimen label with patient's name, date of birth, and medical record number
Nasal (polyester) swab
Saline collection tube
Absorbent sheet
Medium alcohol prep pad
Shipping box*
FedEx UN3373 Pak (pre-paid, pre-labeled with return address)*
Clean table mat*

*Not included for on-site collection

The KPMAS COVID-19 Self-Collection Kit is kitted by KPMAS.
Kit components, manufacturer and suppliers are listed in the table below.

Table 2: Kit components used to collect clinical specimen

Name	Description	Quantity	Material Supplier
Nasal Swab	polyester nasal swab (Puritan or Copan Q, or SteriPak swab)	1	BD Fisher Scientific, SteriPak
Saline in tube (pre-packaged from manufacturer)*	0.85% saline (BD BBL saline or Remel saline)	1 (3 ml)	Becton Dickinson and Company, TEKNOVA
Saline in tube (aliquoted in house)**	0.9% saline (Braun) in 15mL Conical Tube (Falcon)	1 (3 ml)	Cardinal Health Fisher Scientific

*Only one saline in tube will be packaged.
** Saline is aliquoted under sterile condition. Manufacturer's expiration date is indicated on each aliquoted saline tube.

The KPMAS COVID-19 Self-Collection Kit was reviewed by the Department of Transportation for adherence to shipping requirements for hazardous materials. The kit was found to be acceptable and appropriate for shipping within the United States.

2) ***Test Principle:***

The KPMAS COVID-19 Self-Collection Kit will be dispensed to the KPMAS Health Plan patients upon request either through self-referral (Kp.org; E-visit) or by the patient's medical provider. The kit will be either picked up by the patient or mailed to the patient's home address for at-home collection, or it will be provided at the designated KP facilities for on-site self-collection. To provide guidance and ensure proper self-collection of the anterior nasal swab, a link to an instructional video will be provided to the patient upon kit request and the link is also provided in the kit instruction sheet. Guidance by a trained healthcare provider via telemedicine (at-home collection) or in person (on-site collection) will be also available upon request. At-home collected anterior nasal swab samples will be dropped off at any designated on-site collection bin or KPMAS laboratory, or shipped to the KPMAS Regional Laboratory, Rockville, MD overnight via FedEx for testing.

After accessioning at KPMAS facilities, specimens collected at-home or on-site (at KPMAS facilities) may be tested with the KPMAS COVID-19 Test using the FDA EUA authorized cobas SARS-CoV-2 assay run on the Roche Cobas 6800/8800 instrument system, which is an automated rRT-PCR based platform. Alternatively, specimens that

are collected at-home or on-site may be transferred to a designated laboratory for testing according to the KPMAS COVID-19 Test. The test result will be released into the patient's electronic medical chart, which will be viewable by the member and the patient's primary care physician at kp.org or KP mobile app. Individuals with positive or presumptive positive results will also be sent a text message or contacted by the patient's medical provider or care coordinator to discuss the result in a timely manner. Individuals or their authorized health proxy/family member will be contacted by lab staff, the patient's medical provider, or the care coordinator to discuss options for sample recollections, i.e., reshipment of another KPMAS COVID-19 Self-Collection Kit or appointment for drive-thru testing at a designated KPMAS medical center, should the sample be unacceptable for testing or test result is invalid.

The KPMAS COVID-19 Self- Collection Kit is comprised of an anterior nasal swab, sample tube containing 0.9% saline (3 mL), alcohol pad, absorbent sheet, 2D Barcode label (with patient's name, date of birth, and medical record number), biohazard bag, clean table mat (at-home kit only), small shipping box (at-home kit only), and pre-labeled FedEx UN3373 Pak (at-home kit only). Instructions are included in the kit to direct the home or on-site users on how to appropriately collect the anterior nasal swab specimen, place specimen into the saline transport tube, properly package the specimen, and how to drop off the specimen at the designated KPMAS collection bin/laboratory or to mail the specimen back to the laboratory using the pre-labeled FedEx return envelope. Each KPMAS COVID-19 Self-Collection Kit is intended to be returned at ambient conditions on the same day or the day following sample collection in accordance with the standards as put forth by the CDC and WHO for the transport of suspected COVID-19 samples.

Allcollected specimens to be tested either at KPMAS Regional Laboratory or another designated laboratory will undergo review for integrity of packaging, adequacy of sample volume, legible patient labeling, and time between specimen collection and delivery to the KPMAS facility (less than 48 hours) prior to accessioning and acceptance for testing. See *Accessioning SOP* for details.

KPMAS Regional Laboratory, Rockville, MD, is a High Complexity certified laboratory (Clinical Laboratory Improvement Amendments of 1988(CLIA), 42 U.S.C. §263a using the KPMAS COVID-19 Test which is comprised of an FDA authorized NAAT test per the authorized labeling.

3) ***Medical Oversight and Process to be Used:***

Medical Oversight of the process is provided by KPMAS healthcare teams. An electronic order for home collection kit will be placed in the patient's electronic medical chart, if the patient is eligible for COVID-19 testing based on the inclusion criteria. The kit will be prepared by KPMAS and either mailed to the patient's home address or picked up by the patient at a designated facility location. A link to the instruction video clip will be emailed to the patient to guide collection. In addition, an option to schedule a 15-minute telemedicine appointment will be available at the time of kit request, however, a video visit visualization by a healthcare provider is not required.

The Clinical Directors of various specialties at KPMAS will examine quality metrics, address workflow issues, and enhance all process elements needing improvements, as necessary. Physicians and healthcare providers will be routinely trained on all aspects of care programs, to ensure delivery of quality care to patients. The Chief Medical Officer of KPMAS ultimately oversees all aspects of the care program and conducts routine checks on all facets of patient care support.

PATIENT INCLUSION/EXCLUSION CRITERIA

Applies to patients using KPMAS COVID-19 Self-Collection Kit.
These criteria are based on current CDC and KPMAS testing guidelines.

Exclusion:

- Patients outside of KPMAS Health Plan or affiliated health care systems
- Individuals with severe symptoms (will be directed to seek immediate care)

Inclusion:

- Patients with "mild" symptoms
- Individuals with known exposure, sick contact, or living in area of Community Spread, with no symptoms
- Patients with scheduled imaging study or inpatient/outpatient procedure, with no symptoms or known exposure
- Patients that are asymptomatic

INSPECTION OF SPECIMENS

The KPMAS SOP for specimen receipt and accessioning for the COVID-19 Self-Collection Kit is summarized below.

Applies to specimens received from patients using the KPMAS Self- Collection Kit:
Specimens received through the KPMAS COVID-19 Self-Collection Kit will be checked for the following criteria before accessioning of the specimen:

- All containers (FedEx packaging (excluded for on-site specimen drop-off), biohazard bags, and nasal swab in saline collection tube with specimen volume > 0.6 mL) intact and undamaged
- Patient label with date and time of collection
- Specimen received at KPMAS within 48 hours of collection

If any of the above criteria are not met, then specimens will not be accepted for testing. The patient will be contacted by the laboratory staff, call center, or the ordering provider regarding collection of another specimen.

4) ***Test results and interpretation***

CONTROLS TO BE USED WITH KPMAS COVID-19 rRT-PCR TEST

1. A negative control is needed to eliminate the possibility of sample contamination on the assay run and is used on every assay run of 94 samples. Roche cobas SARS-CoV-2 Negative Control kit will be used.

2. A positive control is needed to verify that the assay run is performing as intended and is used on every assay run of 94 samples. Roche cobas SARS-CoV-2 Positive Control kit will be used. The positive control does not detect the presence of human clinical sample as this target is not included in the positive control.

3. The Internal Control is included in cobas SARS-CoV-2 reagents to help identify the specimens containing substances that may interfere with nucleic acid isolation and PCR amplification. The internal control does not detect the presence of human clinical sample.

INTERPRETATION OF RESULTS

All test controls should be examined prior to interpretation of patient results. If the controls are not valid, the patient results cannot be interpreted. Results are reported as Positive, Presumptive Positive, Negative, or Invalid (Table 3).

Table 3: Result interpretation

Target 1	Target 2	Result	Interpretation
+	+	Positive	Result for SARS-CoV-2 RNA is Detected
+	Invalid	Positive	Result for SARS-CoV-2 RNA is Detected
Invalid	+	Positive	Result for SARS-CoV-2 RNA is Detected
+	-	Presumptive Positive	Result for SARS-CoV-2 RNA is Detected. A positive Target 1 result and a negative Target 2 result is suggestive of 1) a sample at concentrations near or below the limit of detection of the test, 2) a mutation in the Target 2, target region, or 3) other factors.
-	+	Presumptive Positive	Result for SARS-CoV-2 RNA is Presumptive Positive. A negative Target 1 result and a positive Target 2 result is suggestive of 1) a sample at concentrations near or below the limit of detection of the test, 2) a mutation in the Target 1 target region in the oligo binding sites, or 3) infection with some other Sarbecovirus (e.g., SARS-CoV or some

Target 1	Target 2	Result	Interpretation
			other Sarbecovirus previously unknown to infect humans), or 4) other factors. For samples with a Presumptive Positive result, additional confirmatory testing may be conducted, if it is necessary to differentiate between SARS-CoV-2 and SARS-CoV-1 or other Sarbecovirus currently unknown to infect humans, for epidemiological purposes or clinical management.
-	-	Negative	Result for SARS-CoV-2 RNA is Not Detected
Invalid	Invalid	Invalid	Sample should be retested. If the result is still invalid, a new specimen should be obtained.
-	Invalid	Invalid	Sample should be retested. If the result is still invalid, a new specimen should be obtained.
Invalid	-	Invalid	Sample should be retested. If the result is still invalid, a new specimen should be obtained.

In the case of positive or presumptive positive results:

- Call or text message will be sent by care coordinator or physician to notify the results promptly. Secure electronic communication in accordance with the patient's preference noted in the medical chart may also be made by care coordinator or physician via Kp.org. promptly from the time of receiving the test results.
- Outreach communications include: result of the test, counseling on the disease and next steps based on immediate symptoms including isolation vs in-person or emergency care, and the opportunity to have a telehealth consult with a physician or trained healthcare provider.
- Results are reported by KPMAS to all public health agencies as required.

In the case of negative results:

- Call or secure electronic communication will be made by care coordinator or physician via Kp.org promptly from the time of receiving the test results.
- Results are reported by KPMAS to all public health agencies as required.

In the case of invalid result (either due to HSC control failure or cobas SARS-CoV-2 internal control failure):

- Call or text message will be sent by care coordinator or physician to notify the results promptly. Secure electronic communication in accordance with the patient's preference noted in the medical chart may also be made by care coordinator or physician via Kp.org promptly from the time of receiving the test results.

- Patient will be asked to re-collect specimen with a new KPMAS COVID-19 Self-Collection Kit (at-home or on-site) or visit one of the designated drive-through sites for sample collection by a trained healthcare provider, if clinically indicated.

All individuals will have the opportunity to follow up with physicians or trained healthcare providers with regards to what to watch for, specific symptoms, self-quarantine questions as appropriate, and when to seek care with necessary parameters provided.

PERFORMANCE EVALUATION

1) *KPMAS COVID-19 Self-Collection Kit Sample Stability Studies:*

Summer Profile Specimen Stability Study:

The Summer Profile Specimen Stability Study of the anterior nasal swab sample transported in saline has been conducted by the Quantigen Biosciences, with support from The Gates Foundation and UnitedHealth Group.

Quantigen Biosciences has granted a right of reference to any sponsor wishing to pursue an EUA to leverage their COVID-19 swab stability data, for Summer Profile Specimen Stability of anterior nasal swabs in saline, as part of that sponsor's EUA request.

Briefly, anterior nasal swabs were dipped in one of two concentrations (2XLoD and 10XLoD) of SARS- CoV-2 positive patient sample pools. Swabs were then placed into 1 mL of saline and incubated at 40℃ for 12 hours, followed by 32℃ for 18 or 42 hours, respectively. Samples were tested using an EUA authorized assay at time 0, 30, and 54 hours post-incubation (Table 4).

Table 4: Average Ct values for each time point for both sample dilutions

Swab	Time Point	N	MS2	N Gene	ORF1ab	S Gene
2xLoD swab in Saline	0h	5	23.74	32.23	30.03	31.80
10xLoD swab in Saline	0h	5	23.27	29.46	27.58	28.67
2xLoD swab in Saline	30h	20	26.00	32.69	31.33	34.59
10xLoD swab in Saline	30h	10	26.19	29.54	28.37	28.69
2xLoD swab in Saline	54h	20	25.70	32.03	31.09	32.10
10xLoD swab in Saline	54h	10	26.11	28.73	27.25	25.09

All positive samples were still positive after 50 hours and the average Ct values for the N gene and ORF1ab gene did not change more than 3Ct. While the S gene, in some cases, did change more than 3 Ct this did not change the final result as only 2 out of 3 genes need to be positive to call the sample positive. This data supports stability of the sample over the time course and is broadly applicable to other authorized COVID-19 diagnostic tests using nucleic acid amplification technology.

Winter Profile Specimen Stability Study:

A Winter Profile Specimen Stability Study was conducted to evaluate the effect of winter temperature variation on the stability of SARS-CoV-2 RNA during transport of anterior nasal swab specimens collected with the KPMAS COVID-19 Self-Collection kit.

Prior to conducting the study, KPMAS conducted an LoD study to determine the LoD of the cobas SARS-CoV-2 assay in their laboratory using samples prepared with quantified inactivated virus (Zeptometrix, Cat# NATSARS (COV2)-ERC) in negative clinical nasal swab matrix. The study included initial testing of three replicates at each of multiple decreasing viral concentrations to determine the lowest concentration for which all replicates were detected. Confirmatory LoD testing was then conducted at that lowest concentration with 20 replicates. The LoD was confirmed as 38 copies/mL with both assay targets detected for 20/20 replicates.

The Winter Profile Specimen Stability Study was conducted using anterior nasal swabs in 3 mL saline collected from 40 asymptomatic volunteers. Samples were tested with the cobas SARS-CoV-2 assay to verify the absence of SARS-CoV-2.

Study samples were then prepared using the same quantified inactivated SARS-CoV-2 material (Zeptometrix, Cat# NATSARS (COV2)-ERC) for a total of 20 low-positive samples (2x LoD) and 10 moderate-positive samples (10x LoD). A total of 10 negative nasal swab samples were also included.

Samples were subjected to three freeze/thaw cycles as shown in the following table.

Table 5: Three freeze/thaw cycles in Winter Profile Specimen Stability Study

Temperature (°C)	Cycle Period	Time (hours)	
		Cycle Period (hours)	Total Time 1
-10	1	8	8
Room Temp	2	4	12
-10	3	2	14
10	4	36	50
-10	5	6	56

At T_0 and after three freeze/thaw cycles (56 hours), all samples were tested with the cobas SARS-CoV-2 assay. Results showed that Targets 1 and 2 of the cobas SARS-CoV-2 assay were detected for 100% of positive samples (20/20 for 2x LoD samples and 10/10 for 10x LoD samples) and were not detected for 100% (10/10) of negative samples. There was also no significant change in Ct values between T_0 and 56 hours. Results from the study are presented in the following table.

Table 6: Winter Profile Specimen Stability

	T0 (baseline)				
	n	**Epithelial Cells Identified (%)**	**Mean Ct. Target 1**	**Mean Ct. Target 2**	**Detectable Rate (%)**
Negative	10	100	n/a	n/a	0
2xLoD SARS-CoV-2	20	100	33.72	36.04	100
10xLoD SARS-CoV-2	10	100	32.4	34.41	100

	T56hr (Post-Stability)				
	n	**Epithelial Cells Identified (%)**	**Mean Ct. Target 1**	**Mean Ct. Target 2**	**Detectable Rate (%)**
Negative	10	100*	n/a	n/a	0
2xLoD SARS-CoV-2	20	100*	33.89	36.13	100
10xLoD SARS-CoV-2	10	100*	32.11	34.32	100

*Numerous epithelial cells were identified at T0 and T=56hr. No noticeable morphologic degenerative changes were identified.

Results from the Summer Profile and Winter Profile Specimen Stability Studies demonstrated that positive anterior nasal swab samples in saline transport medium are stable with over-night or 48-hour shipping and the findings support the stability of nasal swab specimens collected using the KPMAS COVID-19 Self-Collection Kit.

2) ***Human Usability Studies for the KPMAS COVID-19 Self-Collection Kit:***

The usability of KPMAS COVID-19 Self-Collection Kit was tested with 30 individuals with no symptoms or no known exposure. The participants were of varying ages (16-83), ethnicity, and education levels. The participants had no prior experience with self-collection or medical/laboratory training background.

This study took place in a simulated environment. The entire workflow was performed by each individual participant using the kit, including sample self-collection and packing of the sample in the pre-labeled FedEx UN7337 Pak. Each participant was asked to read and follow the provided instructions for sample collection and packaging. A physician was also present in the same room to observe the participant, but no guidance was provided to the participants. Each participant was asked to complete a questionnaire regarding the ease of use of the kit and sample collection as well as understanding the consequences if steps were not performed correctly. All sample packages were dropped off at a FedEx pick up location nearest to the study site.

Upon receipt of the samples in the laboratory, samples were tested on an EUA authorized assay, that includes internal human sample control (RNaseP) to determine adequacy of

sample collected by participants. The authorized assay was used for this study because the study was performed prior to implementation of the touch prep method. The acceptance criteria for the study were:

- 100% of samples delivered to the laboratory within 24 hours of specimen drop off,
- Ct values of RNaseP less than 40 for at least 95% of self-collected samples (specimen adequacy), and
- confirmation of usability/ease of the kit by at least 95% of participants.

Results:

- 100% of participants confirmed the ease of use of the kit, method of self-collection, and clarity of provided instructions. In addition, 100% of participants demonstrated understanding of the consequences of not following steps and collecting inadequate sample.
- 100% of samples were successfully delivered to the KPMAS Regional Laboratory in less than 24 hours without specimen leakage or damage via FedEx overnight services.
- 100% of samples demonstrated Ct values of RNaseP less than 35 (mean: 26.0, median: 26.1, range: 21.5-34.7).

3) Usability Study in Pediatric Population

To expand the Intended Use of the KPMAS COVID-19 Self-Collection Kit to include at-home-collection of anterior nasal swab specimens from minors ages 2-17, KPMAS laboratory conducted a usability study with 51 minors including 35 minors age 2-13 years and 16 minors age 14-17. The participants in the study were KPMAS Health Plan members, in which both the minors and the adult/guardians (18+) had never used the KPMAS COVID-19 Self-Collection Kit prior to this study. The adult/guardians were of varying ages (21-55), ethnicity, and educational background, and had no prior medical or laboratory training. In all cases, the adult/guardian accompanied the participating minors during sample collection. Table 7 includes the ages of minors that were included in the study.

Table 7: Study participants by Age

Age	Number of Participants	Age	Number of Participants
2	2	10	3
3	1	11	4
4	2	12	3
5	4	13	3
6	3	14	3
7	3	15	3
8	4	16	7
9	3	17	3

Each minor's adult/guardian ordered the KPMAS COVID-19 Self-Collection Kit via E-visit in Kp.org. The kit was mailed to the participant's home address. Each kit was sent with a sample label with a randomly assigned participant ID.

Participants age 14-17 were instructed to self-collect an anterior nasal swab specimen, label the collection tube, and package the specimen, all while under adult/guardian (18+) supervision. Adult/guardians (18+) were instructed to collect specimens from minors age 2-13, label the collection tube, and package the specimen. In all cases, adult/guardians were asked to drop-off sample at FedEx drop box. A passive observer (physician) observed the process via telemedicine without providing instructions. Any adverse events observed during specimen collection were documented by the passive observer. Participants age 14-17 who performed self-collection and adult/guardians who collected samples from minors age 2-13 were asked to fill out the Usability questionnaire.

Upon receipt of the samples at the KPMAS Rockville Regional Laboratory, each study sample was inspected for proper packaging and shipping (<48 hours from collection), integrity of sample tube, proper labeling, saline quantity (>0.6 mL), and presence of sample swab and direction of the polyester tip inside the collection tube by the study coordinator. A touch prep of swab was made on a glass slide from each sample, stained with Diff-Quik staining solutions, and examined under the light microscope for presence of human epithelial cells to evaluate specimen adequacy for testing with the KPMAS COVID-19 Test.

Results:

Study results showed that 100% (51/51) of specimens were received at the KPMAS laboratory within 48 hours of collection and met the accessioning criteria, with all packaging intact, collection dates and times properly placed on collection tubes, and all specimens containing at least 0.6 mL saline. All specimens were positive for the Human Specimen Control (human epithelial cells present by microscopic examination) and therefore were deemed acceptable for testing with the KPMAS COVID-19 Test.

For participants age 2-13, the adult/guardians that performed the specimen collection provided 100% correct responses to all questions in the Usability questionnaire. The overall response to the questionnaire indicated that all kit components were present when shipped to the participants, and that instructions were easy to follow for specimen collection and packaging.

Participants age 14-17 also provided 100% correct responses to all questions in the Usability questionnaire, with 16/16 participants indicating that all components were present in the collection kit, and that the participants did not need assistance from their guardian/parent during specimen collection or packaging. Results from the study demonstrated that the instructions for collection and packaging were easy to follow for this age group.

The passive observer from KPMAS that viewed the collection process via telemedicine did not report any adverse events or issues with collection or specimen packaging.

In summary, the Usability study data demonstrated that the KPMAS COVID-19 Self-Collection Kit is appropriate for self-collection of anterior nasal swab specimens from a pediatric population age 14-17 under adult/guardian (18+) supervision and for adult/guardian (18+) collection of anterior nasal swab specimens from minors age 2-13.

Removal of Human Specimen Control (HSC)

Initial authorization of the KPMAS COVID-19 Test with the KPMAS COVID-19 Self-Collection Kit (for home-collection) included a requirement for a telemedicine visit with a healthcare provider to ensure adequate collection of anterior nasal swab specimens, since an endogenous RNaseP internal control is not included in the cobas SARS-CoV-2 test.

An alternate method to verify specimen adequacy for unobserved self-collection of anterior nasal swab specimens using the KPMAS COVID-19 Self-Collection Kit was validated by KPMAS Regional Laboratory, Rockville, MD. This method includes microscopic examination of home self-collected anterior nasal swab specimens for presence/absence of nasal mucosal epithelial cells (Human Specimen Control (HSC) touch prep testing).

To determine whether the requirement for HSC touch prep testing could be removed for specimens that are collected at home (unsupervised), KPMAS assessed results for anterior nasal swab specimens that were collected at home, using the KPMAS COVID-19 Self-Collection Kit, then shipped to KPMAS for testing with the KPMAS COVID-19 Test. A total of 2507 individual samples (unobserved, home-collected) and test results were evaluated, where specimens collected from individuals ranging in age from 2-81+ years. Adults (18+) performed self-collection without supervision. Minors 14-17 performed self-collection with adult/guardian supervision, and specimens for minors 2-13 were collected by an adult/guardian.

As shown in Table 8, HSC testing showed the presence of epithelial cells for 100% (2507/2507, 95% CI: 99.9% - 100.0%)) of unobserved, home-collected specimens; therefore, no invalid results due to HSC failure were observed across all age groups. These results support removal of the requirement to perform HSC testing for specimens that are self-collected unobserved (adult)/self-collected under adult supervision (minors aged 14-17)/collected by adult (minors aged 2-13).

Table 8. HSC testing result by age group

Patient Age Group	Human Cells Present on TP (%)	SARS-CoV-2 Positive (%)	Invalid
2-13 (adult collection)	321/321 (100%)	25/321 (7.6%)	0 (0%)
14-17 (self, adult supervised collection)	87/87 (100%)	8/87 (9.0%)	0 (0%)
18+ (self collection)	2099/2099 (100%)	155/2099 (7.7%)	0 (0%)
Total	2507/2507 (100%)	188/2507 (7.2%)	0/2507 (0%)

The following test report limitation will be included for all specimens that are collected at home:

> *Specimens that are collected using the KPMAS COVID-19 Self-Collection Kit were not tested with an internal control to confirm that the specimen was properly collected. As such, unobserved collected specimens using the KPMAS COVID-19 Self-Collection Kit from SARS-CoV-2 positive individuals may yield negative results if the specimen was not collected properly*.

4) ***Roche cobas SARS-CoV-2 assay Analytical and Clinical Performance Evaluation:***

The analytical and clinical performance of the Roche cobas SARS-CoV-2 assay has been demonstrated by Roche in the Emergency Use Authorization submission authorized on 03/12/2020. The details of the performance of the authorized Roche cobas SARS-CoV-2 assay can be found here: https://www.fda.gov/media/136049/download. Roche granted Right of Reference to KPMAS for Roche's authorized Roche cobas SARS-CoV-2 assay.

5) ***Asymptomatic Testing Claim: Clinical Concordance Validation for Asymptomatic Positive and Negative Samples***

A post-authorization study was performed at KPMAS Regional Laboratory, Rockville, MD to evaluate assay performance of anterior nasal swab specimens collected from asymptomatic individuals. Presence or absence of symptoms was asked and visually verified by the healthcare provider observing the specimen collection. This information was documented in the patient's electronic medical chart. Bilateral anterior nasal swab specimen was collected using a flocked or polyester swab and transported in a collection tube containing 3 mL of physiologic (0.9%) saline at 2-9ºC. All samples were tested on the cobas 6800 instrument in accordance with the manufacturer's guidelines. Twenty consecutively collected asymptomatic samples that tested positive or presumptive positive and 100 consecutively collected asymptomatic samples that tested negative in the cobas 6800 instrument were re-tested using another EUA authorized molecular assay.

As shown in Table 9, 19 of 20 asymptomatic positive or presumptive positive specimens in cobas 6800 also resulted positive in the comparator platform. One specimen, which tested positive in cobas 6800 but resulted negative in the comparator assay, demonstrated high Ct values at 35.26 (ORF1ab) and 37.62 (E-gene).

As shown in Table 8, 100 of 100 asymptomatic specimens that tested negative in cobas 6800 also resulted negative in the comparator platform.

Positive Percent Agreement 19/19 = 100% (95% Confidence Interval; 83.19% - 100.00%)
Negative Percent Agreement 100/101 = 99.01% (95% Confidence Interval; 94.60% - 99.80%)

Table 9: Comparison of asymptomatic clinical samples in two EUA authorized assays

Asymptomatic Anterior Nasal Swab Specimens		**EUA Authorized Assay**	
		Positive	Negative
cobas® 6800	Positive	19	1
	Negative	0	100

Sample ID	**cobas® 6800**		**EUA Authorized Assay**	
	ORF1ab Ct	**E-gene Ct**	**E-gene Ct**	**N2 Ct**
Average Ct (±Stdev)	27.91 (±5.93)	29.95 (±6.70)	28.33 (±7.33)	32.40 (±7.73)

Limitations:

- Specimens that are collected at home will not be tested with an internal control to confirm that the specimen was properly collected. Specimens collected at home (without guidance from telemedicine) from SARS-CoV-2 positive individuals may yield negative results if the specimen was not collected properly.

- Performance with specimens collected from individuals 18 years and older by an adult in the home has not been evaluated.

- 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.

Warnings:

- For *in vitro* diagnostic use.
- For prescription use only.
- This product has not been FDA cleared or approved; but has been authorized for emergency use by FDA under an EUA for use by authorized laboratories;

- 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 Cosmetic Act, 21 U.S.C. § 360bbb3(b)(1), unless the declaration is terminated or authorization is revoked sooner.