510(k) SUBSTANTIAL EQUIVALENCE DETERMINATION
DECISION SUMMARY
ASSAY AND INSTRUMENT

I Background Information:

A 510(k) Number

K212213

B Applicant

Cepheid

C Proprietary and Established Names

Xpert Xpress MVP, GeneXpert Dx System, GeneXpert Infinity System

D Regulatory Information

Product Code(s)	Classification	Regulation Section	Panel
PQA	Class II	21 CFR 866.3975 - Device That Detects Nucleic Acid Sequences From Microorganisms Associated With Vaginitis And Bacterial Vaginosis	MI - Microbiology

II Submission/Device Overview:

A Purpose for Submission:

To obtain a substantial equivalence determination for the Cepheid Xpert Xpress MVP test

B Measurand:

The assay detects and identifies nucleic acids of the following organisms:

- Organisms associated with BV (detected organisms not reported individually):
  - *Atopobium* spp. (*A. vaginae*, *Atopobium* novel species CCUG 55226)
  - Bacterial Vaginosis-Associated Bacterium 2 (BVAB2)
  - *Megasphaera*-1

- *Candida* spp. (*C. albicans*, *C. tropicalis*, *C. parapsilosis*, *C. dubliniensis)*, *Candida glabrata*; species not differentiated)
- *Candida glabrata*/*Candida krusei* (species not differentiated)
- *Trichomonas vaginalis*

C Type of Test:

The Cepheid Xpert MVP test, performed on the automated Xpert instrument systems, is a real-time RT-PCR assay for the detection of the above listed bacterial analytes in vaginal specimens obtained from symptomatic individuals.

III Intended Use/Indications for Use:

A Intended Use(s):
See Indications for Use below.

B Indication(s) for Use:
The Xpert Xpress MVP test, performed on the GeneXpert Instrument Systems, is an automated qualitative in vitro diagnostic test for the detection of DNA targets from anaerobic bacteria associated with bacterial vaginosis (BV), Candida species associated with vulvovaginal candidiasis, and Trichomonas vaginalis. The Xpert Xpress MVP test uses clinician-collected and self-collected vaginal swabs (collected in a clinical setting) from patients who are symptomatic for vaginitis/vaginosis. The Xpert Xpress MVP test utilizes real-time polymerase chain reaction (PCR) for the amplification of specific DNA targets and utilizes fluorogenic target-specific hybridization probes to detect and differentiate DNA from:

- Organisms associated with bacterial vaginosis (detected organisms not reported individually)
  - *Atopobium* spp. (*Atopobium vaginae, Atopobium* novel species CCUG 55226)
  - Bacterial Vaginosis-Associated Bacterium 2 (BVAB2)
  - *Megasphaera*-1
- *Candida* spp. (*C. albicans, C. tropicalis, C. parapsilosis, C. dubliniensis,* species not differentiated)
- *Candida glabrata/Candida krusei* (species not differentiated)
- *Trichomonas vaginalis*

The Xpert Xpress MVP test is intended to aid in the diagnosis of vaginal infections in women with a clinical presentation consistent with bacterial vaginosis, vulvovaginal candidiasis, or trichomoniasis.

C Special Conditions for Use Statement(s):

Rx - For Prescription Use Only

D Special Instrument Requirements:

GeneXpert Dx or GeneXpert Infinity Systems

IV Device/System Characteristics:

A Device Description:

The Xpert Xpress MVP test is an automated *in vitro* diagnostic test for qualitative detection of DNA targets from anaerobic bacteria associated with bacterial vaginosis, *Candida* species associated with vulvovaginal candidiasis, and *Trichomonas vaginalis*, the agent of trichomoniasis. The Xpert Xpress MVP test is performed on GeneXpert Instrument Systems. The GeneXpert Instrument Systems automate and integrate sample preparation, nucleic acid extraction and amplification, and detection of the target sequences in simple or complex samples using real-time PCR assays. The systems consist of an instrument, computer, and preloaded software for running tests and viewing the results. The systems require the use of single-use disposable cartridges that hold the PCR reagents and host the PCR process.

The Xpert Xpress MVP test includes reagents for the detection of DNA from BV organisms, *Candida* species, and *Trichomonas vaginalis* from vaginal swab samples. A Sample Processing Control (SPC) and a Probe Check Control (PCC) are also included in the cartridge utilized by the GeneXpert System instrument. The SPC is present to control for adequate processing of the sample and to monitor for the presence of potential inhibitor(s) in the PCR reaction. The SPC also ensures that the PCR reaction conditions (temperature and time) are appropriate for the amplification reaction and that the PCR reagents are functional. The PCC verifies reagent rehydration, PCR tube filling, and confirms that all reaction components are present in the cartridge including monitoring for probe integrity and dye stability.

The Xpert Xpress MVP test is indicated for testing vaginal swab specimens collected with the Xpert Swab Specimen Collection Kit. The following specimens collected from symptomatic individuals: self-collected vaginal swabs (collected in a clinical setting) and clinician-collected vaginal swabs. The swab transport reagent included in the Xpert Swab Specimen Collection Kit is designed to collect and preserve patient specimens to allow transport to the laboratory prior to analysis with the Xpert Xpress MVP test.

The specimen is briefly mixed by vigorously shaking the collection tube 3 to 4 times. Using the supplied transfer pipette, the sample is transferred to the sample chamber of the Xpert Xpress MVP cartridge. The GeneXpert cartridge is loaded onto the GeneXpert Instrument System platform, which performs automated sample processing, and real-time PCR for the detection of DNA. Summary and detailed test results are obtained within 60 minutes and are displayed in tabular and graphic formats.

Materials Provided

The Xpert Xpress MVP kit (XPRSMVP-10) contains sufficient reagents to process 10 specimens or quality control samples and the Xpert Xpress MVP kit (XPRSMVP-120) contains sufficient reagents to process 120 specimens or quality control samples.

The kit contains the following:

Xpert Xpress MVP cartridges with integrated reaction tubes	**10 per kit**	**120 per kit**
• Bead 1, Bead 2, and Bead 3	1 of each per cartridge	1 of each per cartridge

• Lysis Reagent (Guanidinium thiocyanate)	1.3 mL per cartridge	1.3 mL per cartridge
• Sodium Hydroxide	0.48 mL per cartridge	0.48 mL per cartridge
• Binding Reagent	1.5 mL per cartridge	1.5 mL per cartridge
• Wash Reagent	0.48 mL per cartridge	0.48 mL per cartridge
• Elution Reagent	2.0 mL per cartridge	2.0 mL per cartridge
Transfer Pipettes	**12 per kit**	**144 per kit**
CD • Assay Definition File (ADF) • Instructions to import ADF into GeneXpert software • Instructions for Use (For use with the GeneXpert Dx and Infinity Systems only)	**1 per kit**	**1 per kit**

Materials Required but Not Provided:

- Samples must be collected and transported with the Xpert Swab Specimen Collection kit (catalog number SWAB/G-50).
- GeneXpert Dx instrument or GeneXpert Infinity Systems (catalog number varies by configuration): GeneXpert instrument, computer, barcode scanner, operator manual.
  - For GeneXpert Dx System: GeneXpert Dx software version 4.7b or higher
  - For GeneXpert Infinity-80 and Infinity-48s systems: Xpertise software version 6.4b or higher

B Principle of Operation:

The Xpert Xpress MVP test is a nucleic acid-based test using real-time PCR. After addition of the specimen to the sample chamber of the Xpert Xpress MVP cartridge, the cartridge is loaded onto the GeneXpert Instrument System platform. The instrument then performs automated sample processing including DNA extraction followed by amplification, detection, and reporting of results. The results are interpreted automatically by the GeneXpert System and are shown in the View Results window. Potential results and interpretation are presented in Table 1. The Xpert Xpress MVP test uses an algorithm that includes three BV-associated organism targets. The BV results algorithm is presented in Table 2.

Table 1. Xpert Xpress MVP Results and Interpretation

Result	Interpretation
BV NEGATIVE **Candida group NOT DETECTED** **Candida glab-krus NOT DETECTED** **TV NOT DETECTED**	Indicator DNA target(s) related to bacterial vaginosis (BV) organisms is/are not detected (see Table 2); Candida group (*C. albicans* and/or *C. tropicalis* and/or *C. parapsilosis* and/or *C. dubliniensis*) target DNA is not detected; Candida glab-krus (*Candida glabrata* and/or *C. krusei*) target DNA is not detected; and *Trichomonas vaginalis* (TV) target DNA is not detected. • SPC: PASS; SPC has a Ct within the valid range and endpoint above the threshold setting. • PCC: PASS; all probe check results pass.
BV POSITIVE **Candida group DETECTED** **Candida glab-krus DETECTED** **TV DETECTED**	Indicator DNA target(s) related to bacterial vaginosis (BV) organisms is/are detected (see Table 2); Candida group (*C. albicans* and/or *C. tropicalis* and/or *C. parapsilosis* and/or *C. dubliniensis*) target DNA is detected; Candida glab-krus (*Candida glabrata* and/or *C. krusei*) target DNA is detected; and *Trichomonas vaginalis* (TV) target DNA is detected. • BV, Candida group, Candida glab-krus, and TV: Ct values are within the valid range. • SPC: NA (not applicable); SPC signal is not part of the result interpretation algorithm if the target DNA is detected since SPC signal may be suppressed due to competition with BV, Candida group, Candida glab-krus, and TV targets. • PCC: PASS; all probe check results pass.
INVALID	Presence or absence of the target DNA cannot be determined. • BV, Candida group, Candida glab-krus, and TV: one or more of the analyte results is INVALID. • SPC: FAIL or NA. • PCC: PASS; all probe check results pass. **Note:** If SPC shows NA, the INVALID may be caused by a test parameter failure. Repeat test according to the instructions.
ERROR	Presence or absence of BV, Candida group, Candida glab-krus, and TV target DNA cannot be determined. • BV, Candida group, Candida glab-krus, and TV: NO RESULT • SPC: NO RESULT • PCC: FAIL; all or one of the probe check results fail. **Note:** If the probe check passes or shows NA, the error may be caused by the maximum pressure limit exceeding the acceptable range, insufficient sample volume or by a system component failure. Repeat test according to the instructions.

Result	Interpretation
NO RESULT	Presence or absence of BV, Candida group, Candida glab-krus, and TV target DNA cannot be determined. A **NO RESULT** indicates that insufficient data were collected. For example, cartridge integrity test failed, the operator stopped a test that was in progress or a power failure occurred. • BV, Candida group, Candida glab-krus, and TV: NO RESULT • SPC: NO RESULT • PCC: NA (not applicable) **Note:** If the probe check shows NA, the error may be caused by the maximum pressure limit exceeding the acceptable range and terminates the run prior to probe check. Repeat test according to the instructions in Section 16.2.

Table 2: BV Results Algorithm [a]

BV Organisms			BV Result
***Atopobium* spp.** [b] (Ct value within the valid Ct range)	***Megasphaera*-1** (Ct value within the valid Ct range)	**BVAB2** (Ct value within the valid Ct range)	
+	**+**	**-**	**BV Positive**
+	**-**	**+**	**BV Positive**
+	**+**	**+**	**BV Positive**
+ (high concentration)	**-**	**-**	**BV Positive**
-	**+/-**	**+/-**	**BV Negative**

[a] Algorithm results are either BV positive or BV negative.

[b] *Atopobium vaginae* and/or *Atopobium* novel species CCUG 55226.

C Instrument Description Information:

1. Instrument Name:

   GeneXpert Dx System: GeneXpert Dx software version 4.7b or higher
   GeneXpert Infinity-80 and Infinity-48s systems: Xpertise software version 6.4b or higher

2. Specimen Identification:

   To perform a test, the user selects the 'Create Test' or 'Orders' icon, scans the cartridge barcode, enters the sample ID or scans the sample ID barcode, and loads the cartridge into the instrument module that has a green blinking light (for the GeneXpert Dx Systems) or onto the conveyor belt (for the GeneXpert Infinity Systems) to start the test.

3. Specimen Sampling and Handling:

   Vaginal swab specimens are collected using the Xpert Swab Collection Kit. At the testing facility, the operator mixes the specimen by vigorously shaking 3 to 4 times. A transfer pipette provided with the Xpert Xpress MVP test is used to transfer an aliquot of the

specimen into the sample Chamber of the test cartridge. After closing the cartridge lid, the operator loads the cartridge onto the applicable GeneXpert instrument for testing.

4. Calibration:

   Routine calibration of the GeneXpert instrument systems is performed periodically by Cepheid Field Service Engineers.

5. Quality Control:

   Each test includes a Sample Processing Control (SPC) and Probe Check Control (PCC).

   Sample Processing Control (SPC) – The SPC is comprised of DNA from a non-targeted microorganism that is processed along with the sample to verify that sample processing is adequate. Additionally, this control detects sample-associated inhibition of the real-time PCR assay, ensures that the PCR reaction conditions (temperature and time) are appropriate for the amplification reaction, and that the PCR reagents are performing acceptably. The SPC should be positive in a negative sample and can be negative or positive in a positive sample. The SPC passes if it meets the validated acceptance criteria.

   Probe Check Control (PCC) – Before the start of the PCR reaction, the GeneXpert System measures the fluorescence signal from the probes to monitor bead rehydration, reaction tube filling, probe integrity, and dye stability. The PCC passes if it meets the validated acceptance criteria.

   External Controls – External controls are not provided with the Xpert Xpress MVP test. External control materials should be used in accordance with local, state, federal regulations, and accreditation requirements.

V Substantial Equivalence Information:

A Predicate Device Name(s):
BD MAX Vaginal Panel

B Predicate 510(k) Number(s):
K191957

C Comparison with Predicate(s):

Device & Predicate Device(s):	K212213	K191957
Device Trade Name	Xpert Xpress MVP	BD MAX Vaginal Panel
General Device Characteristic Similarities		
Intended Use/Indications For Use	The Xpert Xpress MVP test, performed on the GeneXpert Instrument Systems, is a rapid, automated qualitative *in vitro* diagnostic test for the detection	The BD MAX Vaginal Panel performed on the BD MAX System is an automated qualitative *in vitro* diagnostic test for the direct detection of DNA

	of DNA targets from anaerobic bacteria associated with bacterial vaginosis (BV), *Candida* species associated with vulvovaginal candidiasis, and *Trichomonas vaginalis*. The Xpert Xpress MVP test uses clinician- collected and self-collected vaginal swabs (collected in a clinical setting) from patients who are symptomatic for vaginitis/ vaginosis. The Xpert Xpress MVP test utilizes real-time polymerase chain reaction (PCR) for the amplification of specific DNA targets and utilizes fluorogenic target-specific hybridization probes to detect and differentiate DNA from: Organisms associated with bacterial vaginosis (detected organisms not reported individually) • *Atopobium* spp. (*Atopobium vaginae, Atopobium* novel species CCUG 55226) • Bacterial Vaginosis-Associated Bacterium 2 (BVAB2) • *Megasphaera*-1 *Candida* spp. (*C. albicans, C. tropicalis, C. parapsilosis, C. dubliniensis*, species not differentiated) *Candida glabrata/Candida krusei* (species not differentiated) *Trichomonas vaginalis* The Xpert Xpress MVP test is intended to aid in the diagnosis of vaginal infections in women	targets from bacteria associated with bacterial vaginosis (qualitative results reported based on detection and quantitation of targeted organism markers), *Candida* species associated with vulvovaginal candidiasis, and *Trichomonas vaginalis* from vaginal swabs in patients who are symptomatic for vaginitis/vaginosis. The test utilizes real-time polymerase chain reaction (PCR) for the amplification of specific DNA targets and utilizes fluorogenic target-specific hybridization probes to detect and differentiate DNA from: Bacterial vaginosis markers (Individual markers not reported) • *Lactobacillus* spp. (*L. crispatus* and *L. jensenii*) • *Gardnerella vaginalis* • *Atopobium vaginae* • Bacterial Vaginosis Associated Bacteria-2 (BVAB-2) • *Megasphaera-1* *Candida* spp. (*C. albicans*, *C. tropicalis*, *C. parapsilosis*, *C. dubliniensis*) *Candida glabrata* *Candida krusei* *Trichomonas vaginalis* The BD MAX Vaginal Panel is intended to aid in the diagnosis of vaginal infections in women with a clinical presentation consistent with bacterial vaginosis, vulvovaginal candidiasis and trichomoniasis.

	with a clinical presentation consistent with bacterial vaginosis, vulvovaginal candidiasis, or trichomoniasis.	
Specimen Type	Same	Clinician and patient-collected vaginal swabs
Assay Technology	Same	Real-time PCR
Automated Extraction, Detection and Result Interpretation	Same	Yes
Assay Results	Same	Qualitative

Device & Predicate Device(s):	K212213	K191957
Device Trade Name	Xpert Xpress MVP	BD MAX Vaginal Panel
General Device Characteristic Differences		
Instrument System	Cepheid GeneXpert Instrument Systems	BD MAX System
Specimen Collection Device	Cepheid Xpert Swab Specimen Collection kit	MAX UVE Specimen Collection Kit
Organisms Detected	Organisms associated with bacterial vaginosis (detected organisms not reported individually) • *Atopobium* spp. (*Atopobium vaginae*, *Atopobium* novel species CCUG 55226) • Bacterial Vaginosis-Associated Bacterium 2 (BVAB2) • *Megasphaera*-1 *Candida* spp. (*C. albicans, C. tropicalis, C. parapsilosis, C. dubliniensis*) *Candida glabrata/Candida krusei* *Trichomonas vaginalis*	Bacterial vaginosis markers (Individual markers not reported) • *Lactobacillus* spp. (*L. crispatus* and *L. jensenii*) • *Gardnerella vaginalis* • *Atopobium vaginae* • Bacterial Vaginosis Associated Bacteria-2 (BVAB-2) • *Megasphaera*-1 *Candida* spp. (*C. albicans*, *C. tropicalis*, *C. parapsilosis*, *C. dubliniensis*) *Candida glabrata* *Candida krusei* *Trichomonas vaginalis*
Testing Format	Specimens tested individually	Specimens tested in batches

VI Standards/Guidance Documents Referenced:

- Guidance for Industry and FDA Staff – General Principles of Software Validation, January 11, 2002.
- Guidance for Industry and FDA Staff – Class II Special Controls Guidance Document: Instrumentation for Clinical Multiplex Systems, March 10, 2005.
- Guidance for Industry and FDA Staff – Content of Premarket Submissions for Management of Cybersecurity in Medical Devices, October 2014.
- Guidance for Industry and FDA Staff – Off-the-shelf Software Use in Medical Devices, September 27, 2019
- Guidance for Sponsors, Institutional Review Boards, Clinical Investigators and FDA Staff- Guidance on Informed Consent for In Vitro Diagnostic Device studies Using Leftover Human Specimens that are Not Individually Identifiable, April 25, 2006.

VII Performance Characteristics (if/when applicable):

A Analytical Performance:

1. Precision/Reproducibility:

Reproducibility Study:

A study was conducted to evaluate the reproducibility of the Xpert Xpress MVP test at three testing sites (two external sites and one internal site). A panel of ten panel members spanning the relevant limit of detection (LoD) spectrum or, in the case of BV, near cut-off concentrations for BV analytes, *Candida* group, *Candida glabrata*/*Candida krusei*, and *Trichomonas vaginalis* was tested by two operators over six days at three sites using three lots of Xpert Xpress MVP test cartridges. The total number of tests for each panel member was 144 (3 sites x 3 lots × 2 days × 2 operators × 2 runs × 2 replicates). The three concentrations for each intended target included two positive levels (moderate positives at ~3× LoD/near cut-off concentration, low positives at ~1× LoD/near cut-off concentration). One negative panel member was also evaluated. For the BV target, a high negative level (<1×, near cut-off concentration) was also included. Each BV panel member contained a mixture of *Atopobium vaginae*, *Megasphaera*-1 plasmid DNA and BVAB-2 plasmid DNA at concentrations of <1x, 1x and 3x near the cutoff concentration for each BV analyte. A listing of panel members and the study acceptance criteria for each panel member are presented in Table 3.

Table 3: Reproducibility Study, Panel Members and Acceptance Criteria

Panel Member	Level	Acceptance Criteria
Negative	Negative	100% negativity
BV*, High Neg	<1x near cut-off concentration	20-80% positivity
BV*, Low Pos	~1x near cut-off concentration	~95% positivity
BV*, Mod Pos	~3x near cut-off concentration	100% positivity
C. albicans, Low Pos	~1x LoD	~95% positivity

C. albicans, Mod Pos	~3x LoD	100% positivity
C. glabrata, Low Pos	~1x LoD	~95% positivity
C. glabrata, Mod Pos	~3x LoD	100% positivity
TV, Low Pos	~1x LoD	~95% positivity
TV, Mod Pos	~3x LoD	100% positivity

*BV samples each contain *Atopobium vaginae*, *Megasphaera* plasmid DNA and BVAB-2 plasmid DNA

Percent agreement for Xpert Xpress MVP target was analyzed across each of the six operators and three test sites. Results are presented in Table 4. The initial Non-Determinate rate (includes invalid results as well as instrument errors) observed in the study was 1.7% and the final ND rate was 0.05%.

Table 4: Reproducibility Study, Qualitative Results

Panel member	Site 01			Site 02			Site 03			Total Agreement with 95% CI
	Op 1	Op 2	Subtotal	Op 1	Op 2	Subtotal	Op 1	Op 2	Subtotal	
Negative	100% (24/24)	100% (24/24)	100% (48/48)	100% (24/24)	100% (24/24)	100% (48/48)	100% (24/24)	100% (24/24)	100% (48/48)	100% (144/144) 97.4% - 100%
BV, High Neg	66.7% (16/24)	83.3% (20/24)	75.0% (36/48)	41.7% (10/24)	62.5% (15/24)	52.1% (25/48)	54.2% (13/24)	45.8% (11/24)	50.0% (24/48)	59.0% (85/144) 50.9% - 66.7%
BV, Low Pos	91.7% (22/24)	100% (24/24)	95.8% (46/48)	95.8% (23/24)	95.8% (23/24)	95.8% (46/48)	100% (24/24)	100% (24/24)	100% (48/48)	97.2% (140/144) 93.1% - 98.9%
BV, Mod Pos	100% (24/24)	100% (24/24)	100% (48/48)	100% (24/24)	100% (24/24)	100% (48/48)	100% (24/24)	100% (24/24)	100% (48/48)	100% (144/144) 97.4% - 100%
C. albicans, Low Pos	95.8% (23/24)	100% (24/24)	97.9% (47/48)	100% (24/24)	100% (24/24)	100% (48/48)	100% (24/24)	100% (24/24)	100% (48/48)	99.3% (143/144) 96.2% - 99.9%
C. albicans, Mod Pos	100% (24/24)	100% (24/24)	100% (48/48)	100% (24/24)	100% (24/24)	100% (48/48)	100% (24/24)	100% (24/24)	100% (48/48)	100% (144/144) 97.4% - 100%
C. glabrata, Low Pos	100% (24/24)	100% (24/24)	100% (48/48)	95.8% (23/24)	100% (24/24)	97.9% (47/48)	100% (24/24)	100% (24/24)	100% (48/48)	99.3% (143/144) 96.2% - 99.9%
C. glabrata, Mod Pos	100% (24/24)	100% (24/24)	100% (48/48)	100% (24/24)	100% (24/24)	100% (48/48)	100% (24/24)	100% (24/24)	100% (48/48)	100% (144/144) 97.4% - 100%
TV, Low Pos	95.8% (23/24)	95.8% (23/24)	95.8% (46/48)	91.7% (22/24)	95.8% (23/24)	93.8% (45/48)	87.5% (21/24)	100% (24/24)	93.8% (45/48)	94.4% (136/144) 89.4% - 97.2%
TV, Mod Pos	100% (24/24)	100% (24/24)	100% (48/48)	100% (24/24)	100% (24/24)	100% (48/48)	100% (24/24)	100% (24/24)	100% (48/48)	100% (144/144) 97.4% - 100%

Abbreviations: Mod, moderate; Neg, negative; Op, operator; Pos, positive

The reproducibility of the Xpert Xpress MVP test was also evaluated in terms of the fluorescence signal expressed in Ct values for each target detected. The mean, standard deviation (SD) and coefficient of variation (CV) between-sites, between-lots, between-days, between-operators, between-runs and within-run for each panel member are presented in Table 5.

Table 5: Summary of Reproducibility Data

Panel Member	Analyte	N[a]	Mean Ct	Site		Lot		Day		Operator		Between-Run		Within-run		Total	
				SD	CV (%)	SD	CV (%)	SD	CV (%)	SD	CV (%)	SD	CV (%)	SD	CV (%)	SD	CV (%)
Negative	SPC	144	32.66	0.06	0.2	0.17	0.5	0	0	0.24	0.7	0	0	0.37	1.1	0.48	1.5
BV, High Neg	Atop gp	144	32.45	0.07	0.2	0.17	0.5	0	0	0.12	0.4	0.05	0.2	0.28	0.9	0.36	1.1
BV, Low Pos		144	31.95	0.03	0.1	0.19	0.6	0	0	0	0	0.27	0.8	0.51	1.6	0.61	1.9
BV, Mod Pos		144	30.56	0	0	0.20	0.7	0.13	0.4	0.10	0.3	0.14	0.4	0.30	1.1	0.42	1.4
BV, High Neg	Mega1-BVAB2	111	41.08	0.26	0.6	0.27	0.7	0	0	0.35	0.9	0	0	1.28	3.1	1.38	3.4
BV, Low Pos		144	36.31	0	0	0.31	0.9	0	0	0	0	0.23	0.6	0.58	1.6	0.70	1.9
BV, Mod Pos		144	35.25	0.16	0.5	0.19	0.5	0.19	0.5	0	0	0	0	0.59	1.7	0.67	1.9
C. albicans, Low Pos	Cgroup	144	36.67	0	0	0.22	0.6	0	0	0.19	0.5	0.56	1.5	0.78	2.1	1.01	2.7
C. albicans, Mod Pos		144	35.00	0.27	0.8	0	0	0	0	0.60	1.7	0.45	1.3	0.55	1.6	0.96	2.8
C. glabrata, Low Pos	Cglab-krus	143	31.79	0	0	0.35	1.1	0	0	0	0	0.37	1.2	1.35	4.2	1.44	4.5
C. glabrata, Mod Pos		144	29.75	0.54	1.8	0.22	0.8	0.34	1.1	0.47	1.6	0.07	0.2	0.90	3.0	1.22	4.1
TV, Low Pos	TV	136	38.41	0.21	0.6	0.22	0.6	0	0	0.33	0.9	0	0	1.23	3.2	1.30	3.4
TV, Mod Pos		144	35.97	0.15	0.4	0.09	0.3	0	0	0.07	0.2	0.23	0.6	0.50	1.4	0.58	1.6

Abbreviations: Atop gp, *Atopobium* group; Cglab-krus, *C. glabrata/C. krusei*; Cgroup, *Candida* spp.; CV%, coefficient of variance; Mega1; *Megasphaera*-1; Mod, moderate; Neg, negative; Pos, positive; SD, standard deviation; SPC; sample processing control

[a]Number of samples with Ct values out of 144.

Note: The variance estimate from some factors may be numerically negative, which can occur if the variability due to those factors is very small. When this occurs, the variability as measured with SD and component of variance (%) is set to 0.

Precision Study (Additional Evaluation for BV Targets)

Due to the diversity of BV organism compositions that may be present in vaginal specimens, a separate single-site study was conducted to establish precision of the Xpert Xpress MVP test for additional panel members prepared with unique combinations of BV target organisms at varying concentrations.

The precision study included a panel of nine panel members tested by two operators in duplicate on ten different days using one lot of Xpert Xpress MVP test cartridges. The total number of tests for each panel member was 80 (1 site × 1 lot × 10 days × 2 operators × 2 runs × 2 replicates). The panel included 1 negative panel member, a high negative level (<1× the near cut-off concentration), and two positive levels (low positives at ~1× the near cut-off concentration, and moderate positives at ~3× the near cut-off concentration) utilizing unique combinations of targeted BV organisms (*Atopobium vaginae*, *Megasphaera*-1, and BVAB2).

Results from the study are presented in Table 6.

Table 6: Summary of Precision Results for the BV

Panel Member	Agreement	95% CI
Negative	100% (80/80)	95.4% - 100%
A. vaginae, Low positive	97.5% (78/80)	91.3% - 99.3%
A. vaginae and BVAB2, High negative	66.3% (53/80)	55.4% - 75.7%
A. vaginae and BVAB2, Low positive	97.5% (78/80)	91.3% - 99.3%
A. vaginae and *Megasphaera*-1, High negative	23.8% (19/80)	15.8% - 34.1%
A. vaginae and *Megasphaera*-1, Low positive	95.0% (76/80)	87.8% - 98.0%
A. vaginae, BVAB2, and *Megasphaera*-1, High negative	53.8% (43/80)	42.9% - 64.3%
A. vaginae, BVAB2, and *Megasphaera*-1, Low positive	96.3% (77/80)	89.5% - 98.7%
A. vaginae, BVAB2, and *Megasphaera*-1, Moderate positive	100% (80/80)	95.4% - 100%

Abbreviations: *A. vaginae; Atopobium vaginae*

Precision for BV targets was evaluated in terms of the fluorescence signal expressed in Ct values for each of the Xpert Xpress MVP organism targets. The mean, standard deviation (SD), and coefficient of variation (CV) between-days, between-operators, between runs and within run for each panel member are presented in Table 7.

Table 7: Summary of Precision Study Data for BV

Panel member	Analyte	N[a]	Mean Ct	Day		Operator		Between-Run		Within-run		Total	
				SD	CV (%)	SD	CV (%)	SD	CV (%)	SD	CV (%)	SD	CV (%)
Negative	SPC	80	32.84	0.00	0.0	0.49	1.5	0.22	0.7	0.90	2.7	1.05	3.2
A. vaginae, Low Pos	Atop gp	80	24.98	0.00	0.0	0.00	0.0	0.03	0.1	0.32	1.3	0.32	1.3
A. vaginae and BVAB2, High Neg	SPC	80	32.64	0.17	0.5	0.17	0.5	0.12	0.4	0.37	1.1	0.46	1.4
	Atop gp	80	32.35	0.00	0.0	0.16	0.5	0.00	0.0	0.20	0.6	0.26	0.8
	Mega1-BVAB2[b]	75	41.30	0.37	0.9	0.00	0.0	0.26	0.6	1.15	2.8	1.24	3.0
A. vaginae and BVAB2, Low Pos	Atop gp	80	32.20	0.00	0.0	0.04	0.1	0.08	0.3	0.22	0.7	0.24	0.7
	Mega1-BVAB2[b]	80	40.03	0.00	0.0	0.00	0.0	0.30	0.7	0.90	2.2	0.94	2.4
	SPC	80	32.63	0.11	0.3	0.17	0.5	0.00	0.0	0.39	1.2	0.44	1.3

Panel member	Analyte	N[a]	Mean Ct	Day		Operator		Between-Run		Within-run		Total	
				SD	CV (%)	SD	CV (%)	SD	CV (%)	SD	CV (%)	SD	CV (%)
A. vaginae and Mega-1, High Neg	Atop gp	80	32.62	0.00	0.0	0.04	0.1	0.00	0.0	0.33	1.0	0.34	1.0
	Mega1-BVAB2[b]	28	38.98	0.00	0.0	1.01	2.6	0.21	0.6	0.84	2.2	1.33	3.4
A. vaginae and Mega-1, Low Pos	Atop gp	79	32.07	0.00	0.0	0.15	0.5	0.18	0.6	0.41	1.3	0.47	1.5
	Mega1-BVAB2[b]	80	35.48	0.00	0.0	0.29	0.8	0.00	0.0	0.71	2.0	0.77	2.2
A. vaginae, BVAB2, and Mega-1, High Neg	SPC	80	32.74	0.15	0.5	0.12	0.4	0.17	0.5	0.33	1.0	0.41	1.3
	Atop gp	80	32.53	0.00	0.0	0.15	0.5	0.00	0.0	0.22	0.7	0.27	0.8
	Mega1-BVAB2[b]	63	41.57	0.30	0.7	0.00	0.0	0.39	0.9	1.02	2.5	1.13	2.7
A. vaginae, BVAB2, and Mega-1, Low Pos	Atop gp	79	31.81	0.00	0.0	0.22	0.7	0.28	0.9	1.16	3.6	1.21	3.8
	Mega1-BVAB2[b]	80	36.25	0.15	0.4	0.00	0.0	0.10	0.3	0.69	1.9	0.71	2.0
A. vaginae, BVAB2, and Mega-1, Mod Pos	Atop gp	80	30.67	0.13	0.4	0.09	0.3	0.00	0.0	0.33	1.1	0.37	1.2
	Mega1-BVAB2[b]	80	35.64	0.00	0.0	0.26	0.7	0.00	0.0	0.48	1.3	0.54	1.5

Abbreviations: Atop gp, Atopobium group; CV%, coefficient of variance; Mega1, *Megasphaera*-1; Mod; moderate; Neg, negative; Pos, positive; SD, standard deviation; SPC, sample processing control

[a] Number of samples with non-zero Ct values out of 80.

[b] Samples with Mega1-BVAB2 that did not generate a Ct value were excluded from analysis.

Note: The variance estimate from some factors may be numerically negative, which can occur if the variability due to those factors is very small. When this occurs, the variability as measured with SD and CV is set to 0.

2. Linearity:

Not applicable. Device reports qualitative results.

3. Analytical Specificity/Interference:

Analytical Specificity Study (Cross-Reactivity)

The analytical specificity of the Xpert Xpress MVP test was evaluated by testing a panel of 115 potentially cross-reactive microorganisms that may be present in vaginal specimens. All strains were tested in triplicate in simulated vaginal swab matrix at a concentration of at least 10^6 CFU/mL for bacteria and yeast. For viruses, samples were prepared at a concentration of at least 10^5 $TCID_{50}$/mL or International Unit (IU)/mL with the exception of HIV-1 and Human papilloma virus which were evaluated at the highest stock concentrations available ($3x10^4$ IU/mL for HIV-1 and 4.3 x 10^5 cells/mL for a human cell line containing human papilloma virus).

Results from the study showed no cross-reactivity observed for 112 of the 115 microorganisms tested with the Xpert Xpress MVP test at the concentrations listed in Table 8. *Trichomonas tenax* and *Pentatrichomonas hominis* tested at 1×10^5 cells/mL generated positive results with the Xpert Xpress MVP test. *Candida orthopsilosis* tested at 1×10^6 CFU/mL generated positive results for Candida group. All three initially cross-reactive organisms were negative for all three replicates

when tested at lower concentrations. The results from cross-reactive organisms are presented in Table 9. A limitation is included in the instructions for use regarding the cross-reactivity of the Xpert Xpress MVP test with *Trichomonas tenax*, *Pentatrichomonas hominis* and *Candida orthopsilosis*.

Table 8. Organisms Tested for Analytical Specificity that Showed No Cross-reactivity

Organism	Concentration	Organism	Concentration
Bacteria		Bacteria	
Acinetobacter baumannii	1×10^6 CFU/mL	*Mycoplasma genitalium*	1×10^6 CFU/mL
Acinetobacter calcoaceticus	1×10^6 CFU/mL	*Mycoplasma hominis*	1×10^6 CFU/mL
Actinomyces israelii	1×10^6 CFU/mL	*Neisseria gonorrhoeae*	1×10^6 CFU/mL
Actinomyces pyogenes	1×10^6 CFU/mL	*Olsenella uli*	1×10^6 CFU/mL
Aerococcus viridans	1×10^6 CFU/mL	*Pantoea agglomerans*	1×10^6 CFU/mL
Alcaligenes faecalis	1×10^6 CFU/mL	*Peptoniphilus asaccharolyticus*	1×10^6 CFU/mL
Anaerococcus tetradius	1×10^6 CFU/mL	*Peptoniphilus anaerobius*	1×10^6 CFU/mL
Atopobium minutum	1×10^6 CFU/mL	*Peptostreptococcus anaerobius*	1×10^6 CFU/mL
Atopobium parvulum	1×10^6 CFU/mL	*Plesiomonas shigelloides*	1×10^6 CFU/mL
Atopobium rimae	1×10^6 CFU/mL	*Porphyromonas asaccharolytica*	1×10^6 CFU/mL
Bacillus subtilis	1×10^6 CFU/mL	*Prevotella bivia*	1×10^6 CFU/mL
Bacteroides caccae	1×10^6 CFU/mL	*Prevotella melaninogenica*	1×10^6 CFU/mL
Bacteroides fragilis	1×10^6 CFU/mL	*Prevotella oralis*	1×10^6 CFU/mL
Bacteroides stercoris	1×10^6 CFU/mL	*Propionibacterium acnes*	1×10^6 CFU/mL
Bacteroides ureolyticus	1×10^6 CFU/mL	*Proteus mirabilis*	1×10^6 CFU/mL
Bifidobacterium adolescentis	1×10^6 CFU/mL	*Providencia stuartii*	1×10^6 CFU/mL
Bifidobacterium breve	1×10^6 CFU/mL	*Pseudomonas aeruginosa*	1×10^6 CFU/mL
Bifidobacterium longum	1×10^6 CFU/mL	*Salmonella typhimurium*	1×10^6 CFU/mL
Brevibacterium linens	1×10^6 CFU/mL	*Serratia marcescens*	1×10^6 CFU/mL
Burkholderia cepacian	1×10^6 CFU/mL	*Shigella flexneri*	1×10^6 CFU/mL
BVAB1	1×10^6 copies/mL	*Sneathia amnii*	1×10^6 CFU/mL
Campylobacter jejuni	1×10^6 CFU/mL	*Sneathia sanguinegens*	1×10^6 CFU/mL
Chlamydia trachomatis	1×10^6 CFU/mL	*Staphylococcus aureus*	1×10^6 CFU/mL
Citrobacter freundii	1×10^6 CFU/mL	*Staphylococcus epidermidis*	1×10^6 CFU/mL
Clostridium perfringens	1×10^6 CFU/mL	*Streptococcus agalactiae*	1×10^6 CFU/mL
Corynebacterium genitalium	1×10^6 CFU/mL	*Streptococcus mitis*	1×10^6 CFU/mL
Dialister micraerophilus	1×10^6 CFU/mL	*Streptococcus mutans*	1×10^6 CFU/mL
Eikenella corrodens	1×10^6 CFU/mL	*Streptococcus salivarius*	1×10^6 CFU/mL
Enterobacter aerogenes	1×10^6 CFU/mL	*Treponema pallidum*	1×10^6 copies/mL
Enterococcus faecalis	1×10^6 CFU/mL	*Veillonella atypica*	1×10^6 CFU/mL
Enterococcus faecium	1×10^6 CFU/mL	*Veillonella parvula*	1×10^6 CFU/mL
Erysipelothrix rhusiopathiae	1×10^6 CFU/mL	*Vibrio parahaemolyticus*	1×10^6 CFU/mL
Escherichia coli	1×10^6 CFU/mL	*Yersinia enterocolitica*	1×10^6 CFU/mL
Finegoldia magna	1×10^6 CFU/mL	Yeasts	
Fusobacterium nucleatum	1×10^6 CFU/mL	*Candida catenulate*	1×10^6 CFU/mL
Gardnerella vaginalis	1×10^6 CFU/mL	*Candida famata*	1×10^6 CFU/mL
Gemella haemolysans	1×10^6 CFU/mL	*Candida haemulonii*	1×10^6 CFU/mL
Kingella denitrificans	1×10^6 CFU/mL	*Candida inconspicua*	1×10^6 CFU/mL
Klebsiella pneumoniae	1×10^6 CFU/mL	*Candida intermedia*	1×10^6 CFU/mL
Kocuria rhizophila	1×10^6 CFU/mL	*Candida kefyr*	1×10^6 CFU/mL
Lactobacillus acidophilus	1×10^6 CFU/mL	*Candida lusitaniae*	1×10^6 CFU/mL
Lactobacillus crispatus	1×10^6 CFU/mL	*Candida norvegica*	1×10^6 CFU/mL
Lactobacillus gasseri	1×10^6 CFU/mL	*Candida rugosa*	1×10^6 CFU/mL
Lactobacillus helveticus	1×10^6 CFU/mL	*Candida utilis*	1×10^6 CFU/mL
Lactobacillus iners	1×10^6 CFU/mL	*Kodamaea ohmeri*[b]	1×10^6 CFU/mL

Lactobacillus jensenii	1×10^6 CFU/mL	*Pichia fermentans*	1×10^6 CFU/mL
Lactobacillus johnsonii	1×10^6 CFU/mL	*Pichia norvegensis*[c]	1×10^6 CFU/mL
Lactobacillus vaginalis	1×10^6 CFU/mL	*Pichia occidentalis*[d]	1×10^6 CFU/mL
Legionella pneumophila	1×10^6 CFU/mL	*Saccharomyces cerevisiae*	1×10^6 CFU/mL
Mageeibacillus indolicus[a]	1×10^6 CFU/mL	Viruses	
Megasphaera-2	1×10^6 copies/mL	Hepatitis B virus	1×10^5 IU/mL
Megasphaera elsdenii	1×10^6 CFU/mL	Hepatitis C virus	1×10^5 IU/mL
Mobiluncus curtisii	1×10^6 CFU/mL	Herpes simplex virus I	1×10^5 $TCID_{50}$/mL
Mobiluncus mulieris	1×10^6 CFU/mL	HIV-1	3×10^4 IU/mL[e]
Moraxella catarrhalis	1×10^6 CFU/mL	Human herpesvirus 2	1×10^5 $TCID_{50}$/mL
Morganella morganii	1×10^6 CFU/mL	Human papilloma virus[f]	4.3×10^5 cells/mL
Mycobacterium smegmatis	1×10^6 CFU/mL	Varicella-zoster virus	1×10^5 copies/mL

[a]*Mageeibacillus indolicus* is formerly named BVAB3.
[b]*Kodamaea ohmeri* is also reported as *Pichia ohmeri* and *Candida guilliermondii.*
[c]*Pichia norvegensis* is also reported as *Candida norvegensis.*
[d]*Pichia occidentalis* is also reported as *Issatchenkia occidentalis* and *Candida sorbose.*
[e]Evaluated at highest concentration available
[f]Human cell line containing human papilloma virus

Table 9: Organisms Demonstrating Cross-Reactivity

Organism	Concentration	Replicates correctly reported as Not Detected/ Total replicates
Candida orthopsilosis	1×10^6 CFU/mL	0/3
	1×10^3 CFU/mL	0/3
	1×10^2 CFU/mL	3/3
Pentatrichomonas hominis	1×10^5 cells/mL	0/3
	5×10^4 cells/mL	3/3
Trichomonas tenax	1×10^5 cells/mL	0/3
	1×10^2 cells/mL	2/3
	10 cells/mL	3/3

Interfering Substances Study

A study was conducted to evaluate twenty potentially interfering substances that may be present in vaginal swab specimens. The substances evaluated included prescription and over-the-counter drugs, creams and/or gels, blood, hormones, semen and mucus. The substances and concentrations tested are presented in Table 10.

Potential interferents were tested in simulated vaginal swab matrix in the presence and absence of Xpert Xpress MVP test targets at 3× LoD or at 3× near cut-off concentrations (for BV analytes).

The study included two sets of positive samples prepared in simulated vaginal matrix. One set of positive samples (Positive Combination A) consisted of a mixture of *Atopobium vaginae* at 3× near cut-off concentration, BVAB2 at ~3× near cut-off concentration, *Candida albicans* at 3× LoD, *Candida glabrata* at 3× LoD, and *Trichomonas vaginalis* at 3× LoD. The second set of positive samples (Positive Combination B) consisted of a mixture of *Atopobium vaginae* at 3× near cut-off concentration, *Megasphaera*-1 at ~3× near cut-off concentration, *Candida albicans* at 3× LoD, *Candida glabrata* at 3× LoD, and *Trichomonas vaginalis* at 3× LoD. The positive samples without any potentially interfering substances served as positive controls. The positive samples in the presence of each potentially interfering substance were tested in replicates of eight

for each positive sample set and each substance. Negative samples comprised of simulated vaginal swab matrix were also evaluated for each potentially interfering substance.

For each interfering substance evaluated, all eight negative sample replicates generated the expected valid negative result for all Xpert Xpress MVP analytes. With the exception of mucin at 5.5% v/v, all eight Positive Combination A sample replicates and all eight Positive Combination B sample replicates generated the expected positive results for each applicable Xpert Xpress MVP test analyte. In the study, a total of six runs (1.0%) generated non-determinate GeneXpert results (3 ERROR and 3 NO RESULT). All six runs were successfully repeated.

An additional analysis was conducted to assess for any shifts in Ct values. For each interfering substances, with the exception of mucin, there was no clinically significant shift in mean Ct values (i.e., Mean Ct shifts were no greater than 2 Ct) as compared to the control for all Xpert Xpress MVP test analytes evaluated.

For samples containing mucin at a concentration of 5.5%, interference was observed for both Positive Combination A and Positive Combination B samples evaluated. Also observed was an increase in mean Ct values of >2 Ct for BV analytes, *Candida* spp. and *T. vaginalis*. The following unexpected results were observed:

- For Positive Combination A, 8/8 replicates generated BV NEGATIVE results and 2/8 replicates generated NOT DETECTED results for *Candida glabrata/Candida krusei*.

- For Positive Combination B, 1/8 sample replicates generated a BV NEGATIVE result and 1/8 replicates generated a NOT DETECTED results for Candida group.

When mucin was tested at a lower concentration of 4.0%, all sample replicates generated the expected positive results for all analytes. In addition, for this mucin concentration, there were no clinically significant changes in mean Ct values for Xpert Xpress MVP test analytes when compared to control samples that did not contain mucin.

A limitation is included in the instructions for use indicating that interference was observed in samples containing mucin (≥5.5% v/v).

Table 10: Potential Interfering Substances Tested

Substance/Class	Active Ingredient	Concentration Tested
Blood	Blood	5.0% v/v
Seminal Fluid	Semen	5.0% v/v
Mucus	Mucin (porcine stomach)	**5.5% v/v (Interference Observed)**
		4.0% v/v (No interference Observed)
Leukocytes	Leukocytes	10^5 cells/mL
Intravaginal Hormones	Estradiol; Progesterone	7mg/mL Progesterone + 0.07mg/mL Beta Estradiol
Over the counter (OTC) Vaginal Products; Contraceptives; Vaginal treatments	Benzocaine 5%; Resorcinol 2%	0.25% w/v
	Clotrimazole 2%	0.25% w/v
	Miconazole Nitrate 4%	0.25% w/v
	Tioconazole 6.5%	0.25% w/v
	5% w/w acyclovir	0.25% w/v

Substance/Class	Active Ingredient	Concentration Tested
	Glycerin, Propylene glycol	0.25% w/v
	Glycerin; carbomer	0.25% w/v
	Glycerin; sodium hydroxide; carbomer	0.25% w/v
	Glycerin, Hydroxyethyl cellulose	0.25% w/v
	Berberis Vulgaris 6X HPUS (Barberry), Borax 3X HPUS (Sodium Borate), Collinsonia Canadensis 3X HPUS (Stone Root), Hamamelis Virginiana 6X HPUS (Witch Hazel), *Bacillus coagulans* (Lactospore®)	0.25% w/v
	Povidone-iodine 10% (topical)	0.25% v/v
	Povidone-iodine 0.3% (douche)	0.25% v/v
	Nonoxynol-9 12.5%	0.25% w/v
	Metronidazole 0.75%	0.25% w/v
Hemorrhoidal Cream	Glycerin 14%; Pramoxine HCl 1%	0.25% w/v

Microbial Interference

An interfering microorganism study was performed to assess the potential inhibitory effects of 13 microorganisms (Table 11) that may be encountered in vaginal specimens on the performance of Xpert Xpress MVP test. Each potential interfering microorganism was evaluated at $\geq 10^6$ CFU/mL for bacteria and at $\geq 10^4$ International Unit/mL or cells/mL for viruses in both positive samples (samples inoculated with challenging concentration of MVP analytes) and negative samples (sample containing potentially interfering microorganisms alone).

Table 11. Potentially Interfering Microorganisms Tested

Microorganism
Dialister micraerophilus
Gardnerella vaginalis
Lactobacillus crispatus
Lactobacillus jensenii
Lactobacillus iners
Mageeibacillus indolicus
Mobiluncus curtisii
Porphyromonas asaccharolytica
Prevotella bivia
Sneathia amnii
Streptococcus agalactiae
HIV-1*
Human papilloma virus**

*Tested at 3.0 x 10^4 IU/mL

**Human Cell line containing Human Papilloma Virus, tested at 1.0 x 10^4 cells/mL

Positive sample replicates were prepared in simulated vaginal swab matrix inoculated with targeted organisms representing Xpert Xpress MVP targets (BV, *Candida* group, *Candida glabrata/krusei*, and *T. vaginalis*). The positive sample included a mixture of *Atopobium vaginae* at 3x near cut-off concentrations, *Megasphaera*-1 and BVAB2 each at ~1.5 near cut-off concentrations, *Candida albicans* at 3x LoD, *Candida glabrata* at 3x LoD and *T. vaginalis* at 3x LoD. A total of eight positive sample replicates were tested for each potentially interfering

microorganism. The positive sample without any potentially interfering microorganisms was tested in replicates of 8 and served as a positive control. In addition , eight negative sample replicates were tested for each potentially interfering microorganism.

For each of the potentially interfering microorganisms evaluated in the study, all positive sample replicates generated the expected positive results for MVP analytes and all negative sample replicates generated the expected negative result for each MVP analyte.

Out of the 238 runs performed in the study, 4 runs (1.7%) generated non-determinate GeneXpert results (3 errors, 1 NO RESULT). All four runs were repeated such that 8 valid replicates were tested per testing condition.

In summary, no microbial interference observed for the Xpert Xpress MVP test for the 13 non-targeted microorganisms and viruses evaluated.

Competitive Interference

The potential for competitive interference between Xpert Xpress MVP targets was evaluated by testing samples prepared with each organism at a low-positive concentration (<3x LoD) mixed with another target organism at a high concentration (≥1 x 10^6 CFU/mL or copies/mL for bacteria, 1 x 10^6 CFU/mL for *Candida* spp., 1 x 10^5 for *T. vaginalis*). Samples were prepared using simulated vaginal swab matrix.

For BV analytes, low positive BV samples were prepared using the following four representative BV POSITIVE compositions:

1) *Atopobium vaginae* and BVAB2 plasmid DNA each at < 3× near cut-off concentrations)
2) *Atopobium vaginae* and *Megasphaera*-1 plasmid DNA each at < 3× near cut-off concentrations)
3) *Atopobium vaginae* at < 3× near cut-off concentration and BVAB2 plasmid DNA and *Megasphaera*-1 plasmid DNA each at < 1.5× near cut-off concentrations
4) *Atopobium vaginae* at < 3× near cut-off concentration in the absence of *Megasphaera*-1 and BVAB2). Low positive samples of *Candida albicans*, *Candida glabrata* and *Trichomonas vaginalis* targets were prepared at ~2-3× LoD.

A total of 20 replicates were evaluated for each panel member evaluated. For all 20 replicates of each test panel, low-positive analytes (<3x LoD or near the cut-off) and high positive analytes were detected as expected; therefore, competitive inhibitory effects were not observed between Xpert Xpress MVP test analytes for the relevant co-infections evaluated in the study.

Of the 784 runs conducted in the study, 6 runs (0.8%) generated non-determinate GeneXpert results upon initial testing (4 ERROR, 1 NO RESULT, 1 INVALID). All replicates were repeated successfully.

The test panels evaluated for competitive interference between the Xpert Xpress MVP targets are presented in Table 12.

Table 12: Microbial Interference Study, Test Panel Organism Composition

	Testing Panel	Testing Target/Organisms (Low Positive)	Competitive Target/Organisms (High Positive)
Competitive Interference Evaluation between MVP Targets	1	*Atopobium vaginae* (< 3× near cut-off concentration) and BVAB2 (< 3× near cut-off concentration)	*Candida albicans* (1×10^6 CFU/mL)
	2		*Candida glabrata* (1×10^6 CFU/mL)
	3		*Trichomonas vaginalis* (1×10^5 cells/mL)
	4	*Atopobium vaginae* (< 3× near cut-off concentration) and *Megasphaera*-1 (< 3× near cut-off concentration)	*Candida albicans* (1×10^6 CFU/mL)
	5		*Candida glabrata* (1×10^6 CFU/mL)
	6		*Trichomonas vaginalis* (1×10^5 cells/mL)
	7	*Atopobium vaginae* (< 3× near cut-off concentration), BVAB2 (< 1.5× near cut-off concentration) and *Megasphaera*-1 (< 1.5× near cut-off concentration)	*Candida albicans* (1×10^6 CFU/mL)
	8		*Candida glabrata* (1×10^6 CFU/mL)
	9		*Trichomonas vaginalis* (1×10^5 cells/mL)
	10	*Atopobium vaginae* (< 3× near cut-off concentration) in the absence of BVAB2 and *Megasphaera*-1	*Candida albicans* (1×10^6 CFU/mL)
	11		*Candida glabrata* (1×10^6 CFU/mL)
	12		*Trichomonas vaginalis* (1×10^5 cells/mL)
	13	*Candida albicans* (< 3× LoD)	*Atopobium vaginae* (1×10^7 CFU/mL), BVAB2 (1×10^7 copies/mL) and *Megasphaera*-1 (1×10^7 copies/mL)
	14		*Atopobium vaginae* (1×10^7 CFU/mL) in the absence of BVAB2 and *Megasphaera*-1
	15		*Candida glabrata* (1×10^6 CFU/mL)
	16		*Trichomonas vaginalis* (1×10^5 cells/mL)
	17	*Candida glabrata* (< 3× LoD)	*Atopobium vaginae* (1×10^7 CFU/mL), BVAB2 (1×10^7 copies/mL) and *Megasphaera*-1 (1×10^7 copies/mL)
	18		*Atopobium vaginae* (1×10^7 CFU/mL) in the absence of BVAB2 and *Megasphaera*-1
	19		*Candida albicans* (1×10^6 CFU/mL)
	20		*Trichomonas vaginalis* (1×10^5 cells/mL)

	Testing Panel	Testing Target/Organisms (Low Positive)	Competitive Target/Organisms (High Positive)
	21	*Trichomonas vaginalis* (< 3× LoD)	*Atopobium vaginae* (1×10^7 CFU/mL), BVAB2 (1×10^7 copies/mL) and *Megasphaera*-1 (1×10^7 copies/mL)
	22		*Atopobium vaginae* (1×10^7 CFU/mL) in the absence of BVAB2 and *Megasphaera*-1
	23		*Candida albicans* (1×10^6 CFU/mL)
	24		*Candida glabrata* (1×10^6 CFU/mL)
Competitive Interference Evaluation between BV Organisms	25	*Atopobium vaginae* (< 3× near cut-off concentration)	BVAB2 (1×10^7 copies/mL) and *Megasphaera*-1 (1×10^7 copies/mL)
	26	BVAB2 (< 3× near cut-off concentration)	*Atopobium vaginae* (1×10^6 CFU/mL)
	27	*Megasphaera*-1 (< 3× near cut-off concentration)	*Atopobium vaginae* (1×10^6 CFU/mL)
	28	BVAB2 (< 1.5× near cut-off concentration) and *Megasphaera*-1 (< 1.5× near cut-off concentration)	*Atopobium vaginae* (1×10^6 CFU/mL)

4. Traceability, Stability, Expected Values (Controls, Calibrators, or Methods):

Specimen Stability:

A study was conducted to evaluate stability of vaginal swab specimens collected in Cepheid Swab Transport Reagent (STR), the media in Cepheid Xpert Swab Collection Kit collection tubes.

The study consisted of a negative panel member and a positive panel member evaluated at two temperatures (2°C and 30°C) at different time intervals up to 49 days of storage (T= 0, 7 days, 14 days, 21 days 28 days, 35 days, 42 days, and 49 days). At T=0, eight replicates of the negative panel member and 16 replicates of the positive panel member were evaluated. At all other time point, four replicates of both the positive and negative panel members were evaluated.

Negative samples were comprised of pooled natural clinical vaginal swab (VS) matrix in STR that had been pre-screened and determined to be negative for BV, Candida group, Candida glab-krus and TB. Positive samples were comprised of a mixture of *Atopobium vaginae* at 3x near cut-off concentration, BVAB-2 at 3x near cut-off concentration, *Candida albicans* at 3x LoD, *Candida glabrata* at 3x LoD and *Trichomonas vaginalis* at 3x LoD inoculated into a pooled negative vaginal swab matrix in STR.

For negative samples, all replicates stored at 2°C and 30°C at all time points generated the expected negative results for all Xpert Xpress MVP targets.

For positive samples, all replicates stored at 2°C and 30°C at all time points generated the expected positive results for al Xpert Xpress MVP targets.

Additional evaluation showed no significant shift in mean Ct values for Xpert Xpress MVP test analytes when comparing results between T=0 and 49 days for positive samples stored at 2°C or 30°C.

The study results support the claimed specimen storage conditions included in the Xpert Xpress MVP test instructions for use; storage at 2-28°C for up to 42 days.

Specimen Stability, Loaded Test Cartridge:

A study was conducted to evaluate the stability of vaginal swab specimens that have been inoculated to an Xpert Xpress MVP tested cartridge and are waiting for testing on an Xpert system. For the study, positive samples included Xpert MVP BV analytes at near cut-off concentrations and *Candida albicans*, *Candida glabrata*, and *Trichomonas vaginalis* at low-positive concentrations (<3x LoD). Samples were held up to 5.5 hours at either 25°C or 35°C prior to testing with the Xpert Xpress MVP test. A total of eight replicates each for positive and negative samples were tested at multiple time points for each storage condition.

Results from the study showed that all targeted analytes were correctly reported for all positive sample replicates at each time point and storage condition evaluated. All negative sample replicates generated the expected negative result. The study results support the claim in the package insert for manual loading of cartridges onto the Xpert system within one hour of adding the specimen. The study also supports a delay in testing of up to a 4.5 hours when using the GeneXpert Infinity System for which loaded cartridges are placed on conveyor belt prior to automatic loading.

Controls:

See Section B(5) above description of SPC and Probe Check Controls.

During the clinical study, external controls (one positive and one negative control that are not included with the Xpert Xpress MVP test) were tested at least daily at each testing site. The positive control sample included a mixture of targeted organisms including *A. vaginae* and BVAB2, *C. albicans*, *C. glabrata*, and *T. vaginalis*. The negative control sample included *Lactobacillus acidophilus*. Invalid results were obtained for 7.1% (13/182) of controls tested. Upon retesting of the 13 controls with initial non-determinate results, all 13 controls generated the expected results. For the controls with initially valid results, 167/169 (98.8%) generated expected results. The two discordant controls included one positive control that generated a false-negative BV result and one negative control that generated false positive results.

5. Limit of Detection (LoD)/Near the Cut-off:

The analytical sensitivity (Limit of Detection, LoD) of the Xpert Xpress MVP test was determined by preparing dilutions for each target organism detected by the Xpert Xpress MVP test. The LoD is defined as the lowest concentration of organism in a sample that is detected for ≥95% of sample replicates.

It is noted that results for individual BV organism targets are not reported by the Xpert Xpress MVP test. In addition, the Xpert Xpress MVP BV reporting algorithm includes Ct cutoffs that are lower (representing a higher target concentration) than Ct values generated at LoD for each target organism. Therefore, both the LoD and the near-cut concentration were established for each BV organism target. The near cut-off concentration for each BV organism target is defined as the lowest concentration that generates a BV POSITIVE test result for ≥95% of sample replicates. The near cut-off concentration was established for each of the BV analytes separately. Additionally, based on the BV reporting algorithm, the near cut-off concentration for *Atopobium* spp. was established using samples prepared with *Atopobium vaginae* alone as well as samples prepared with *Atopobium vaginae* combined with Megasphaera-1 and/or BVAB2.

Positive samples were prepared by inoculating simulated vaginal swab matrix with quantified whole organism preparations, with the exception of BVAB2 and Megasphaera-1 for which samples were inoculated with quantified stock of plasmid DNA containing the cloned genomic targets. Initial testing included replicates of 20 samples evaluated at a minimum of five concentrations for each of the target organisms. The LoD and/or near cut-off concentrations for the target organisms were estimated by probit analysis or by 95% hit rate. The estimated LoD and near cut-off concentrations were then confirmed with a minimum of 20 sample replicates for each target organism or organism combination (for BV), with a minimum of 19/20 sample replicates generating positive results.

The LoD for *Candida* spp. and *Trichomonas vaginalis* strains were then confirmed in natural clinical vaginal swab matrix and simulated vaginal swab matrix, with equivalent results obtained for each matrix type. Because BV organisms are present in clinical vaginal matrix as normal flora, the LoD and near cut-off concentrations for each BV organism were confirmed in simulated vaginal swab matrix only. The confirmed LoD for each Xpert Xpress MVP analyte is presented in Table 13. The confirmed near cut-off concentrations for BV analytes are presented in Table 14.

Table 13: Limit of Detection of BV, Candida group, Candida glab-krus, and TV targets

Target	Strain	LoD	Units
BV	*Atopobium vaginae* ATCC BAA-55	32	CFU/mL
	Megasphaera-1 plasmid DNA	338	copies/mL
	BVAB2 plasmid DNA	50	copies/mL
Candida group	*Candida albicans* ATCC 32032	30	CFU/mL
	Candida dubliniensis ATCC 44508	1,316	CFU/mL
	Candida tropicalis ATCC 13803	750	CFU/mL
	Candida parapsilosis ATCC 22019	1,339	CFU/mL
	Candida glabrata ATCC 28482	20	CFU/mL

Target	Strain	LoD	Units
Candida glab-krus	*Candida krusei* ATCC 34135	656	CFU/mL
TV	*Trichomonas vaginalis* ATCC 30001	5	cells/mL

Table 14. Near Cut-off Concentration for Xpert Xpress MVP BV Targets

Target	Strain	Near Cut-off concentration	Units
BV	*Atopobium vaginae* ATCC BAA-55 (in the absence of *Megasphaera*-1 and BVAB2)	320,000	CFU/mL
	Atopobium vaginae ATCC BAA-55 (in the presence of *Megasphaera*-1 and/or BVAB2)	2,750	CFU/mL
	Megasphaera-1 plasmid DNA	390	copies/mL
	BVAB2 plasmid DNA	50	copies/mL

6. Assay Cut-Off:

The Xpert Xpress MVP test cutoffs include defined Ct value cutoffs for each of the Xpert Xpress MVP organism targets as well as the SPC. The reporting algorithm for BV (see Table 2 above) includes assessment of Ct values generated for the BV-associated microorganism targets which are not individually reported (*Atopobium* spp., BVAB-2/*Megasphaera*).

7. Carry-Over/Cross-Contamination Study:

A Carry-Over/Cross-Contamination Study was conducted to assess the potential for specimen and/or amplicon carryover contamination from high positive to negative samples when tested in the same GeneXpert Module. The study included alternating high positive and negative samples tested in a single GeneXpert module. Negative samples consisted of simulated vaginal swab matrix. Replicates of three different high positive samples prepared in simulated vaginal swab matrix with the following target concentrations:

- BV high positive with *A. vaginae* at 2.8 x 10^7 CFU/mL and BVAB- 2 plasmid DNA at 5.0 x 10^8 copies/mL
- *C. albicans* high positive at 3.0 x 10^6 CFU/mL
- *T. vaginalis* high positive at 5.0 x 10^6 cells/mL.

A different GeneXpert module was used for testing replicates of each of the three high positive samples. The testing scheme was repeated 20 times in a single GeneXpert module for a total of 41 runs (20 high positive samples and 21 negative samples per module) across 3 GeneXpert modules. Study results included 63 negative samples correctly reported as negative and 60 positive samples correctly reported as positive for each applicable Xpert Xpress MVP test analyte.

B Comparison Studies:

1. Method Comparison with Predicate Device:

   Not applicable

2. Matrix Comparison:

   Simulated vaginal swab matrix (SVM) was used to prepare analytical study samples for certain studies. A study was conducted to assess if the Xpert Xpress MVP test performs equivalently with SVM as compared to natural clinical vaginal swab matrix.

   In this study, equivalency between SVM and natural clinical vaginal swab matrices was evaluated by testing samples inoculated individually with *C. albicans*, *C. glabrata*, or *T. vaginalis* in both matrices. The target strains were tested at three different concentrations relative to the assay LoD: below LoD (<1× LoD), at 1-2× LoD, and at 5× LoD, along with a negative sample. Since clinical vaginal swab matrix may contain BV analytes detectable by the Xpert Xpress MVP test, evaluation of *A. vaginae*, *Megasphaera-1* and BVAB2 was not included in the study.

   Negative samples were composed of non-seeded pooled negative natural clinical vaginal swab matrix or SVM. Replicates of 10 were tested for each matrix.

   Positive samples were prepared for both matrices with quantified stocks of *C. albicans*, *C. glabrata*, and *T. vaginalis* cells at concentrations shown in Table 15. The total number of replicates tested for matrix and organism concentration as well as expected results are presented in Table 16.

Table 15: Matrix Equivalency Study, Sample Concentrations

Organism	Verified LoD concentration	Testing concentration		
		<1× LoD	1-2× LoD	5× LoD
Candida albicans ATCC 32032	30 CFU/mL	10 CFU/mL	36 CFU/mL	150 CFU/mL
Candida glabrata ATCC 28482	20 CFU/mL	5 CFU/mL	25 CFU/mL	100 CFU/mL
Trichomonas vaginalis ATCC 30001	5 cells/mL	2 cells/mL	9 cells/mL	25 cells/mL

Table 16: Matrix Equivalency Study and Expected Results

Target Level (Multiple of LoD)	Number of Replicates per Analyte	Expected Result (% Positive)
5×	10	100%
1-2×	30	≥ 95%
<1×	30	10 – 90%
Negative	10	0%

Results from the study (Table 17) showed that the Xpert Xpress MVP test performed equivalently for samples prepared in SVM and pooled clinical vaginal swab matrix for negative samples as well as positive samples prepared at <1×, 1-2× and 5× LoD levels for three representative MVP organism targets (*C. albicans*, *C. glabrata* and *T. vaginalis*). Study results support the use of the simulated vaginal swab matrix as an alternative to natural clinical vaginal swab matrix in select analytical studies:

Table 17: Matrix Equivalency Study Results

Organism	Target Level (Multiple of LoD)	Vaginal Swab Matrix	No. Positive / Valid replicates	Results (% Positive)	Expected Results (% Positive)	Acceptance Criteria
Candida albicans	5×	VS	10/10	100%	100%	Met
		SVM	10/10	100%		Met
	1-2×	VS	30/30	100%	≥ 95%	Met
		SVM	30/30	100%		Met
	<1×	VS	9/30	30%	10 – 90%	Met
		SVM	11/30	36.7%		Met
Candida glabrata	5×	VS	10/10	100%	100%	Met
		SVM	10/10	100%		Met
	1-2×	VS	29/30	96.7%	≥ 95%	Met
		SVM	29/30	96.7%		Met
	<1×	VS	13/30	43.3%	10 – 90%	Met
		SVM	11/30	36.7%		Met
Trichomonas vaginalis	5×	VS	10/10	100%	100%	Met
		SVM	10/10	100%		Met
	1-2×	VS	30/30	100%	≥ 95%	Met
		SVM	30/30	100%		Met
	<1×	VS	22/30	73.3%	10 – 90%	Met
		SVM	21/30	70%		Met
Negative	0	VS	0/10	0%	0%	Met
		SVM	0/10	0%		Met

C Clinical Study:

A prospective blinded clinical study was conducted to evaluate the performance of the Xpert Xpress MVP test at 12 geographically diverse sites in the U.S. (12 specimen collection sites and 10 testing sites). Subjects included female patients who presented with signs and/or symptoms of vaginosis/vaginitis. For eligible subjects, one (1) self-collected (collected in a clinical setting, SVS) and five (5) clinician-collected vaginal swab (CVS) specimens were obtained for testing with the Xpert Xpress MVP test and reference/comparator testing. Patient management continued at the site per the standard practice, independent of investigational test results.

The Xpert Xpress MVP test performance was compared to the following reference/comparator methods: an FDA-cleared nucleic acid amplification test (NAAT) for the BV, yeast culture

followed by mass spectrometry identification for the Candida group and Candida glab-krus targets, a patient status (PIS) that included a composite result from two comparator methods for TV (an FDA-cleared NAAT and culture). For TV, a positive PIS was determined by a positive result from either NAAT or culture and a negative PIS was determined by a negative result from both NAAT and culture. When applicable, investigation of discrepant results was performed by testing specimens with another FDA-cleared NAAT.

The study population comprised of 1,476 female patients 18 to ≥ 50 years of age . Additionally, two individuals between 14-17 years of age were enrolled in the study. A total of 2,947 vaginal swabs were tested and were eligible for inclusion in the Xpert Xpress MVP study.

Clinical performance analytes reported by the Xpert Xpress MVP test are presented in Table 18.

Table 18: Clinical Performance of the Xpert Xpress MVP Test

	Clinician-collected (CVS)		Self-collected (SVS)	
	Sensitivity/PPA (95% CI)	**Specificity/NPA (95% CI)**	**Sensitivity/PPA (95% CI)**	**Specificity/NPA (95% CI)**
BV	93.8% 531/566 [a] (91.5% - 95.5%)	93.8% 808/861 [b] (92.0% - 95.3%)	94.0% 533/567 [c] (91.7% - 95.7%)	92.9% 794/855 [d] (90.9% - 94.4%)
Candida group*	98.0% 396/404 [e] (96.1% - 99.0%)	94.6% 984/1040 [f] (93.1% - 95.8%)	97.5% 393/403 [g] (95.5% - 98.7%)	92.1% 954/1036 [h] (90.3% - 93.6%)
Candida glab-krus Fresh Prospective	93.6% 44/47 [i] (82.8% - 97.8%)	99.6% 1392/1397 [j] (99.2% - 99.9%)	97.8% 45/46 [k] (88.7% - 99.6%)	99.3% 1384/1393 [l] (98.8% - 99.7%)
Candida glab-krus Contrived****	99.0% 98/99 (94.5% - 99.8%)	96.4% 27/28 (82.3% - 99.4%)	N/A	N/A
TV	97.3% 73/75 [m] (90.8% - 99.3%)	99.6% 1332/1337 [n] (99.1% - 99.8%)	97.3% 72/74 [o] (90.7% - 99.3%)	99.8% 1330/1333 [p] (99.3% - 99.9%)

Target includes *C. albicans*, *C. tropicalis*, *C. parapsilosis*, and *C. dubliniensis*

** Contrived specimens were prepared using individual negative clinical CVS and SVS specimens. See Table 14 below for stratified results for *Candida glabrata* and *Candida krusei.*

[a] Testing results with a second FDA-cleared NAAT: 14 were also negative and 21 were positive.

[b] Testing results with a second FDA-cleared NAAT: 25 were also positive and 28 were negative.

[c] Testing results with a second FDA-cleared NAAT: 12 were also negative and 22 were positive.

[d] Testing results with a second FDA-cleared NAAT: 23 were also positive and 38 were negative.

[e] Testing results with an FDA-cleared NAAT: 5 were also negative and 3 were positive.

[f] Testing results with an FDA-cleared NAAT: 31 were also positive, 24 were negative and 1 had no result.

[g] Testing results with an FDA-cleared NAAT: 5 were also negative and 5 were positive.

[h] Testing results with an FDA-cleared NAAT: 38 were also positive, 43 were negative and 1 had no result.

[i] Testing results with an FDA-cleared NAAT: 2 were also negative and 1 was positive.

[j]Testing results with an FDA-cleared NAAT: 5 were negative.

[k] Testing results with an FDA-cleared NAAT: 1 was also negative.

[l] Testing results with an FDA-cleared NAAT: 9 were negative.

[m] Testing results a second FDA-cleared NAAT: 1 was also negative and 1 was positive.

[n] Testing results a second FDA-cleared NAAT: 4 were also positive and 1 had no result.

[o] Testing results a second FDA-cleared NAAT: 1 was also negative and 1 was positive.

[p] Testing results a second FDA-cleared NAAT: 3 were also positive.

Clinical Study, BV Performance

Clinical performance for BV is presented in Tables 19, 20 and 21 stratified by age group, race and ethnicity, and clinical condition respectively.

Table 19: BV Performance by Age Group

Age Group	Clinician-collected (CVS)		Self-collected (SVS)	
	PPA (95% CI)	NPA (95% CI)	PPA (95% CI)	NPA (95% CI)
14-17	100% 1/1 (20.6% - 100%)	100% 1/1 (20.6% - 100%)	100% 1/1 (20.6% - 100%)	100% 1/1 (20.6% - 100%)
18-29	93.4% 228/244 (89.6% - 95.9%)	92.1% 279/303 (88.5% - 94.6%)	93.1% 228/245 (89.2% - 95.6%)	90.7% 273/301 (86.9% - 93.5%)
30-39	95.3% 164/172 (91.1% - 97.6%)	96.3% 206/214 (92.8% - 98.1%)	96.0% 167/174 (91.9% - 98.0%)	93.9% 201/214 (89.9% - 96.4%)
40-49	95.7% 89/93 (89.5% - 98.3%)	91.9% 125/136 (86.1% - 95.4%)	96.7% 89/92 (90.8% - 98.9%)	90.4% 122/135 (84.2% - 94.3%)
≥ 50	87.5% 49/56 (76.4% - 93.8%)	95.2% 197/207 (91.3% - 97.4%)	87.3% 48/55 (76.0% - 93.7%)	96.6% 197/204 (93.1% - 98.3%)

Table 20: BV Performance by Race and Ethnicity

Race/Ethnicity	Clinician-collected (CVS)		Self-collected (SVS)	
	PPA (95% CI)	NPA (95% CI)	PPA (95% CI)	NPA (95% CI)
White	88.9% 193/217 (84.1% - 92.4%)	94.9% 554/584 (92.8% - 96.4%)	90.0% 198/220 (85.3% - 93.3%)	93.8% 546/582 (91.6% - 95.5%)
Black or African American	97.2% 316/325 (94.8% - 98.5%)	91.7% 220/240 (87.5% - 94.5%)	96.9% 313/323 (94.4% - 98.3%)	91.2% 218/239 (86.9% - 94.2%)
Asian	80.0% 4/5 (37.5% - 96.4%)	93.8% 15/16 (71.7% - 98.9%)	80.0% 4/5 (37.5% - 96.4%)	86.7% 13/15 (62.1% - 96.3%)
American Indian or Alaska Native	83.3% 5/6 (43.6% - 97.0%)	80.0% 4/5 (37.5% - 96.4%)	83.3% 5/6 (43.6% - 97.0%)	80.0% 4/5 (37.5% - 96.4%)
Native Hawaiian or Other Pacific Islander	100% 2/2 (34.2% - 100%)	0% 0/1 (0% - 79.3%)	100% 2/2 (34.2% - 100%)	0% 0/1 (0% - 79.3%)
Mixed/Unknown	100% 11/11 (74.1% - 100%)	100% 15/15 (79.6% - 100%)	100% 11/11 (74.1% - 100%)	100% 13/13 (77.2% - 100%)
Hispanic or Latino	93.9% 77/82 (86.5% - 97.4%)	93.2% 123/132 (87.6% - 96.4%)	95.2% 79/83 (88.2% - 98.1%)	94.7% 124/131 (89.4% - 97.4%)

Table 21: BV Performance by Clinical Condition

Clinical Condition	Clinician-collected (CVS)		Self-collected (SVS)	
	PPA (95% CI)	NPA (95% CI)	PPA (95% CI)	NPA (95% CI)
Pregnant patients	93.3% 42/45 (82.1% - 97.7%)	89.5% 51/57 (78.9% - 95.1%)	95.6% 43/45 (85.2% - 98.8%)	91.1% 51/56 (80.7% - 96.1%)
Patients with menses at enrollment	97.2% 35/36 (85.8% - 99.5%)	92.6% 50/54 (82.4% - 97.1%)	94.1% 32/34 (80.9% - 98.4%)	85.2% 46/54 (73.4% - 92.3%)
Patients using anti-fungals ≤ 24 hours	93.3% 14/15 (70.2% - 98.8%)	100% 36/36 (90.4% - 100%)	87.5% 14/16 (64.0% - 96.5%)	100% 34/34 (89.8% - 100%)
Patients using antibiotics ≤ 24 hours	100% 8/8 (67.6% - 100%)	93.3% 14/15 (70.2% - 98.8%)	100% 8/8 (67.6% - 100%)	93.3% 14/15 (70.2% - 98.8%)
Patients using estrogen therapy ≤ 24 hours	66.7% 2/3 (20.8% - 93.8%)	100% 18/18 (82.4% - 100%)	66.7% 2/3 (20.8% - 93.8%)	100% 18/18 (82.4% - 100%)
Patients with recurrent symptoms	95.1% 328/345 (92.2% - 96.9%)	93.5% 343/367 (90.4% - 95.6%)	94.8% 327/345 (91.9% - 96.7%)	91.8% 334/364 (88.5% - 94.2%)
Patients with intercourse ≤ 24 hours	91.4% 32/35 (77.6% - 97.0%)	91.3% 42/46 (79.7% - 96.6%)	91.2% 31/34 (77.0% - 97.0%)	95.6% 44/46 (85.5% - 98.8%)

Clinical Study, Candida group Performance

Table 22 includes performance of the Xpert Xpress MVP test for the Candida group target stratified by each of the four *Candida* species that are detected by the target (*C. albicans*, *C. tropicalis*, *C. parapsilosis*, and *C. dubliniensis*). Performance is compared to the species identified by the reference method.

Table 22: Candida group Performance Stratified by Candida species

Species	Clinician-collected (CVS)	Self-collected (SVS)
	Sensitivity (95% CI)	
Candida albicans	98.4% 371/377 (96.6% - 99.3%)	97.9% 368/376 (95.9% - 98.9%)
Co-infection *Candida albicans* and *Candida glabrata*	100% 6/6 (61.0% - 100%)	100% 6/6 (61.0% - 100%)
Co-infection *Candida albicans* and *Candida krusei*	100% 1/1 (20.6% - 100%)	100% 1/1 (20.6% - 100%)

Co-infection *Candida albicans* and *Candida parapsilosis*	100% 1/1 (20.6% - 100%)	100.0% 1/1 (20.6% - 100%)
Co-infection *Candida albicans* and other yeast	80.0% 4/5 (37.5% - 96.4%)	60.0% 3/5 (23.1% - 88.2%)
Candida dubliniensis	100% 5/5 (56.5% - 100%)	100% 5/5 (56.5% - 100%)
Candida parapsilosis	80.0% 4/5 (37.5% - 96.4%)	100.0% 5/5 (56.5% - 100%)
Candida tropicalis	100% 4/4 (51.0% - 100%)	100% 4/4 (51.0% - 100%)
Overall	98.0% 396/404 (96.1% - 99.0%)	97.5% 393/403 (95.5% - 98.7%)

Clinical performance for Candida group is presented in Table 23, 24, and 25 stratified by age group, race and ethnicity, and clinical condition respectively.

Table 23. Candida group Performance by Age Group

Age Group	Clinician-collected (CVS) N=1377		Self-collected (SVS) N=1372	
	Sensitivity (95% CI)	**Specificity (95% CI)**	**Sensitivity (95% CI)**	**Specificity (95% CI)**
14-17	100% 2/2 (34.2% - 100%)	N/A	100% 2/2 (34.2% - 100%)	N/A
18-29	98.2% 225/229 (95.6% - 99.3%)	93.9% 308/328 (90.8% - 96.0%)	97.4% 222/228 (94.4% - 98.8%)	91.5% 300/328 (87.9% - 94.0%)
30-39	99.0% 100/101 (94.6% - 99.8%)	93.8% 273/291 (90.4% - 96.0%)	96.0% 97/101 (90.3% - 98.4%)	91.8% 269/293 (88.1% - 94.4%)
40-49	97.9% 47/48 (89.1% - 99.6%)	94.5% 172/182 (90.2% - 97.0%)	100% 48/48 (92.6% - 100%)	91.7% 165/180 (86.7% - 94.9%)
≥ 50	91.7% 22/24 (74.2% - 97.7%)	96.6% 231/239 (93.5% - 98.3%)	100% 24/24 (86.2% - 100%)	93.6% 220/235 (89.7% - 96.1%)

Table 24: Candida group Performance by Race and Ethnicity

Race/Ethnicity	Clinician-collected (CVS) N=1377		Self-collected (SVS) N=1372	
	Sensitivity (95% CI)	Specificity (95% CI)	Sensitivity (95% CI)	Specificity (95% CI)
White	97.2% 209/215 (94.0% - 98.7%)	95.6% 570/596 (93.7% - 97.0%)	98.2% 212/216 (95.3% - 99.3%)	92.8% 553/596 (90.4% - 94.6%)
Black or African American	98.8% 170/172 (95.9% - 99.7%)	93.2% 370/397 (90.3% - 95.3%)	97.1% 167/172 (93.4% - 98.8%)	91.1% 359/394 (87.9% - 93.5%)
Asian	100% 5/5 (56.5% - 100%)	88.2% 15/17 (65.7% - 96.7%)	80.0% 4/5 (37.5% - 96.4%)	87.5% 14/16 (64.0% - 96.5%)
American Indian or Alaska Native	100% 2/2 (34.2% - 100%)	88.9% 8/9 (56.5% - 98.0%)	100% 2/2 (34.2% - 100%)	88.9% 8/9 (56.5% - 98.0%)
Native Hawaiian or Other Pacific Islander	N/A	100% 3/3 (43.9% - 100%)	N/A	100% 3/3 (43.9% - 100%)
Mixed/Unknown	100% 10/10 (72.2% - 100%)	100% 18/18 (82.4% - 100%)	100% 8/8 (67.6% - 100%)	94.4% 17/18 (74.2% - 99.0%)
Hispanic or Latino	98.5% 66/67 (92.0% - 99.7%)	96.1% 146/152 (91.7% - 98.2%)	98.5% 65/66 (91.9% - 99.7%)	92.8% 142/153 (87.6% - 95.9%)

Table 25: Candida group Performance by Clinical Condition

Clinical Condition	Clinician-collected (CVS) N=1377		Self-collected (SVS) N=1372	
	Sensitivity (95% CI)	Specificity (95% CI)	Sensitivity (95% CI)	Specificity (95% CI)
Pregnant patients	98.0% 49/50 (89.5% - 99.7%)	92.5% 49/53 (82.1% - 97.0%)	95.9% 47/49 (86.3% - 98.9%)	94.3% 50/53 (84.6% - 98.1%)
Patients with menses at enrollment	100% 20/20 (83.9% - 100%)	97.2% 70/72 (90.4% - 99.2%)	100% 20/20 (83.9% - 100%)	92.9% 65/70 (84.3% - 96.9%)
Patients using anti-fungals ≤ 24 hours	100% 23/23 (85.7% - 100%)	82.1% 23/28 (64.4% - 92.1%)	95.5% 21/22 (78.2% - 99.2%)	82.1% 23/28 (64.4% - 92.1%)
Patients using antibiotics ≤ 24 hours	100% 9/9 (70.1% - 100%)	86.7% 13/15 (62.1% - 96.3%)	100% 9/9 (70.1% - 100%)	86.7% 13/15 (62.1% - 96.3%)
Patients using estrogen therapy ≤ 24 hours	83.3% 5/6 (43.6% - 97.0%)	100% 15/15 (79.6% - 100%)	100% 6/6 (61.0% - 100%)	100% 15/15 (79.6% - 100%)
Patient with recurrent symptoms	98.1% 210/214 (95.3% - 99.3%)	96.1% 491/511 (94.0% - 97.4%)	97.2% 205/211 (93.9% - 98.7%)	92.0% 470/511 (89.3% - 94.0%)

Clinical Condition	Clinician-collected (CVS) N=1377		Self-collected (SVS) N=1372	
	Sensitivity (95% CI)	Specificity (95% CI)	Sensitivity (95% CI)	Specificity (95% CI)
Patient with intercourse ≤ 24 hours	100% 24/24 (86.2% - 100%)	96.6% 57/59 (88.5% - 99.1%)	100% 25/25 (86.7% - 100%)	94.7% 54/57 (85.6% - 98.2%)

Clinical Study, *Candida glabrata*/*Candida krusei* Performance

Table 26 includes performance of the Xpert Xpress MVP test for *Candida glabrata*/*Candida krusei* stratified by each species as identified by the reference method. Table 26 includes stratified results for contrived clinical specimens.

Table 26: Candida glab-krus Performance Stratified by Species

Species	Clinician-collected (CVS)	Self-collected (SVS)
	Sensitivity (95% CI)	
Candida glabrata	95.5% 42/44 (84.9% - 98.7%)	97.7% 42/43 (87.9% - 99.6%)
Candida krusei	66.7% 2/3 (20.8% - 93.8%)	100% 3/3 (43.9% - 100%)

Clinical performance is presented in tables 27, 28 and 29 for the *Candida glabrata*/*Candida krusei* target stratified by age group, race and ethnicity, clinical condition respectively.

Table 27: Candida glab-krus Performance by Age Group

Age Group	Clinician-collected (CVS) N=1504		Self-collected (SVS) N=1499	
	Sensitivity (95% CI)	Specificity (95% CI)	Sensitivity (95% CI)	Specificity (95% CI)
14-17	N/A	100% 2/2 (34.2% - 100%)	N/A	100% 2/2 (34.2% - 100%)
18-29	81.8% 9/11 (52.3% - 94.9%)	99.6% 544/546 (98.7% - 99.9%)	100% 10/10 (72.2% - 100%)	100% 546/546 (99.3% - 100%)
30-39	90.9% 10/11 (62.3% - 98.4%)	100% 381/381 (99.0% - 100%)	90.9% 10/11 (62.3% - 98.4%)	99.0% 379/381 (97.4% - 99.6%)
40-49	100% 9/9 (70.1% - 100%)	99.6% 220/221 (97.5% - 99.9%)	100% 9/9 (70.1% - 100%)	98.6% 216/219 (96.0% - 99.5%)
≥ 50	100% 16/16 (80.6% - 100%)	99.2% 245/247 (97.1% - 99.8%)	100% 16/16 (80.6% - 100%)	99.2% 241/243 (97.0% - 99.8%)

Table 28: Candida glab-krus Performance by Race and Ethnicity

Race/Ethnicity	Clinician-collected (CVS) N=1504		Self-collected (SVS) N=1499	
	Sensitivity (95% CI)	Specificity (95% CI)	Sensitivity (95% CI)	Specificity (95% CI)
White	91.7% 22/24 (74.2% - 97.7%)	99.6% 784/787 (98.9% - 99.9%)	100% 24/24 (86.2% - 100%)	99.2% 782/788 (98.4% - 99.7%)
Black or African American	95.5% 21/22 (78.2% - 99.2%)	99.6% 545/547 (98.7% - 99.9%)	95.2% 20/21 (77.3% - 99.2%)	99.5% 542/545 (98.4% - 99.8%)
Asian	N/A	100% 22/22 (85.1% - 100%)	N/A	100% 21/21 (84.5% - 100%)
American Indian or Alaska Native	N/A	100% 11/11 (74.1% - 100%)	N/A	100% 11/11 (74.1% - 100%)
Native Hawaiian or Other Pacific Islander	N/A	100% 3/3 (43.9% - 100%)	N/A	100% 3/3 (43.9% - 100%)
Mixed/Unknown	100% 1/1 (20.6% - 100%)	100% 27/27 (87.5% - 100%)	100% 1/1 (20.6% - 100%)	100% 25/25 (86.7% - 100%)
Hispanic or Latino	100% 7/7 (64.6% - 100%)	100% 212/212 (98.2% - 100%)	100% 7/7 (64.6% - 100%)	100% 212/212 (98.2% - 100%)

Table 29: Candida glab-krus Performance by Clinical Condition

Clinical Condition	Clinician-collected (CVS) N=1504		Self-collected (SVS) N=1499	
	Sensitivity (95% CI)	Specificity (95% CI)	Sensitivity (95% CI)	Specificity (95% CI)
Pregnant patients	100% 1/1 (20.6% - 100%)	100% 102/102 (96.4% - 100%)	100% 1/1 (20.6% - 100%)	99.0% 100/101 (94.6% - 99.8%)
Patients with menses at enrollment	80.0% 4/5 (37.5% - 96.4%)	100% 87/87 (95.8% - 100%)	75.0% 3/4 (30.1% - 95.4%)	100% 86/86 (95.7% - 100%)
Patients using anti-fungals ≤ 24 hours	N/A	100% 51/51 (93.0% - 100%)	N/A	100% 50/50 (92.9% - 100%)
Patients using antibiotics ≤ 24 hours	100% 1/1 (20.6% - 100%)	100% 23/23 (85.7% - 100%)	100% 1/1 (20.6% - 100%)	100% 23/23 (85.7% - 100%)
Patients using estrogen therapy ≤ 24 hours	N/A	100% 21/21 (84.5% - 100%)	N/A	100% 21/21 (84.5% - 100%)
Patient with recurrent symptoms	100% 24/24 (86.2% - 100%)	99.4% 697/701 (98.5% - 99.8%)	100% 23/23 (85.7% - 100%)	99.1% 693/699 (98.1% - 99.6%)

Clinical Condition	Clinician-collected (CVS) N=1504		Self-collected (SVS) N=1499	
	Sensitivity (95% CI)	**Specificity (95% CI)**	**Sensitivity (95% CI)**	**Specificity (95% CI)**
Patient with intercourse ≤ 24 hours	100% 2/2 (34.2% - 100%)	97.5% 79/81 (91.4% - 99.3%)	100% 2/2 (34.2% - 100%)	98.8% 79/80 (93.2% - 99.8%)

Clinical Study, *Candida glabrata*/*krusei* Performance, Contrived Specimen Testing

To supplement the prospective clinical study for lower prevalence analytes, additional testing of contrived clinical specimens was performed for *Candida glabrata* and *Candida krusei*. Each individual contrived specimen was prepared using a unique negative clinical vaginal swab matrix inoculated with quantified preparations of *Candida glabrata* or *Candida krusei* at varying concentrations as shown in Table 30**.** Performance of the Xpert Xpress MVP test for contrived specimen testing is presented in Table 31 for *C. glabrata* and for *C krusei*.

Table 30: Composition of Contrived Samples

	Positive Samples		
	Low (< 2x LoD)	Moderate (<10x LoD)	High (< 20x LoD)
C. glabrata	25	20	5
C. krusei	25	20	5

Table 31: Performance for Contrived Specimens, *Candida glabrata*, *Candida krusei*

	PPA (95% CI)
Candida glabrata Contrived	98.0% 49*/50 (89.5% - 99.6%)
Candida krusei Contrived	100% 49/49 (20.8% - 93.9%)

*One false negative was a low positive specimen prepared at 1.8x LoD

Clinical Study, *Trichomonas vaginalis* Performance

Clinical performance for the Xpert Xpress MVP test *Trichomonas vaginalis* target is presented by age group, race and ethnicity, and clinical condition in tables 32, 33 and 34 respectively.

Table 32: TV Performance by Age Group

Age Group	Clinician-collected (CVS) N=1347		Self-collected (SVS) N=1342	
	PPA (95% CI)	NPA (95% CI)	PPA (95% CI)	NPA (95% CI)
14-17	N/A	100% 2/2 (34.2% - 100%)	N/A	100% 2/2 (34.2% - 100%)
18-29	96.2% 25/26 (81.1% - 99.3%)	99.8% 512/513 (98.9% - 100%)	96.2% 25/26 (81.1% - 99.3%)	100% 512/512 (99.3% - 100%)
30-39	100% 26/26 (87.1% - 100%)	99.4% 353/355 (98.0% - 99.9%)	100% 26/26 (87.1% - 100%)	99.4% 355/357 (98.0% - 99.9%)
40-49	94.1% 16/17 (73.0% - 99.0%)	99.5% 211/212 (97.4% - 99.9%)	93.8% 15/16 (71.7% - 98.9%)	100% 211/211 (98.2% - 100%)
≥ 50	100% 6/6 (61.0% - 100%)	99.6% 254/255 (97.8% - 99.9%)	100% 6/6 (61.0% - 100%)	99.6% 250/251 (97.8% - 99.9%)

Table 33: TV Performance by Race and Ethnicity

Race/Ethnicity	Clinician-collected (CVS) N=1347		Self-collected (SVS) N=1342	
	PPA (95% CI)	NPA (95% CI)	PPA (95% CI)	NPA (95% CI)
White	93.3% 14/15 (70.2% - 98.8%)	99.9% 775/776 (99.3% - 100%)	93.3% 14/15 (70.2% - 98.8%)	100% 777/777 (99.5% - 100%)
Black or African American	98.3% 58/59 (91.0% - 99.7%)	99.2% 497/501 (98.0% - 99.7%)	98.3% 57/58 (90.9% - 99.7%)	99.4% 496/499 (98.2% - 99.8%)
Asian	N/A	100% 21/21 (84.5% - 100%)	N/A	100% 20/20 (83.9% - 100%)
American Indian or Alaska Native	100% 1/1 (20.6% - 100%)	100% 10/10 (72.2% - 100%)	100% 1/1 (20.6% - 100%)	100% 10/10 (72.2% - 100%)
Native Hawaiian or Other Pacific Islander	N/A	100% 3/3 (43.9% - 100%)	N/A	100% 3/3 (43.9% - 100%)
Mixed/Unknown	N/A	100% 26/26 (87.1% - 100%)	N/A	100% 24/24 (86.2% - 100%)
Hispanic or Latino	83.3% 5/6 (43.6% - 97.0%)	100% 205/205 (98.2% - 100%)	83.3% 5/6 (43.6% - 97.0%)	100% 205/205 (98.2% - 100%)

Table 34: TV Performance by Clinical Condition

Clinical Condition	Clinician-collected (CVS) N=1347		Self-collected (SVS) N=1342	
	PPA (95% CI)	NPA (95% CI)	PPA (95% CI)	NPA (95% CI)
Pregnant patients	100% 3/3 (43.9% - 100%)	100% 94/94 (96.1% - 100%)	100% 3/3 (43.9% - 100%)	100% 93/93 (96.0% - 100%)
Patients with menses at enrollment	85.7% 6/7 (48.7% - 97.4%)	100% 81/81 (95.5% - 100%)	85.7% 6/7 (48.7% - 97.4%)	100% 79/79 (95.4% - 100%)
Patients using anti-fungals ≤ 24 hours	100% 2/2 (34.2% - 100%)	98.0% 48/49 (89.3% - 99.6%)	100% 2/2 (34.2% - 100%)	97.9% 47/48 (89.1% - 99.6%)
Patients using antibiotics ≤ 24 hours	0% 0/1 (0% - 79.3%)	100% 22/22 (85.1% - 100%)	0% 0/1 (0% - 79.3%)	100% 22/22 (85.1% - 100%)
Patients using estrogen therapy ≤ 24 hours	N/A	100% 21/21 (84.5% - 100%)	N/A	100% 21/21 (84.5% - 100%)
Patient with recurrent symptoms	97.8% 45/46 (88.7% - 99.6%)	99.4% 653/657 (98.4% - 99.8%)	97.8% 44/45 (88.4% - 99.6%)	99.5% 652/655 (98.7% - 99.8%)
Patient with intercourse ≤ 24 hours	100% 5/5 (56.5% - 100%)	100% 76/76 (95.2% - 100%)	100% 5/5 (56.5% - 100%)	100% 75/75 (95.1% - 100%)

Performance, Clinical Study, Multi-Target Detection

Rates of multi-target detection for the Xpert Xpress MVP test are presented in Table 35. A total of 17.4% of CVS specimens and 18.4% of SVS specimens resulted in positive results for more than one target in the Xpert Xpress MVP test. The most prevalent multi-target detection in both CVS and SVS specimens was a combination of BV and Candida group (11.2% and 11.8%, respectively), followed by a combination of BV and TV (3.6% and 3.6%, respectively).

Table 35: Rates of Multi-Target Detection by Xpert Xpress MVP

Analytes Detected	Clinician-collected (CVS)	Self-collected (SVS)
BV, Candida group	11.2% 161/1433	11.8% 169/1428
BV, TV	3.6% 52/1433	3.6% 52/1428
BV, Candida group, TV	0.9% 13/1433	0.8% 12/1428
BV, Candida glab-krus	0.5% 7/1433	0.5% 7/1428
Candida group, Candida glab-krus	0.3% 5/1433	0.6% 8/1428

Analytes Detected	Clinician-collected (CVS)	Self-collected (SVS)
BV, Candida group, Candida glab-krus	0.3% 5/1433	0.7% 10/1428
Candida group, TV	0.3% 4/1433	0.3% 4/1428
Candida glab-krus, TV	0.1% 1/1433	0.1% 1/1428
Candida group, Candida glab-krus, TV	0.1% 1/1433	N/A
Total	17.4% 249/1433	18.4% 263/1428

The number of fresh specimens with positive results for more than one target as determined by the Xpert Xpress MVP test or reference/comparator methods are summarized in Table 36. where bolded values indicate concordant results and non-bolded values indicate discordant results. Among 1,433 CVS specimens, 191 specimens yielded multi-target concordant results between Among 1,433 CVS specimens, 191 specimens yielded multi-target concordant results between Xpert Xpress MVP and reference methods. Of the 191 specimens, 66.0% (126/191) had concordant BV and Candida group co-infections, and 23.6% (45/191) had concordant BV and TV co-infections. Among 1,428 SVS specimens, 183 specimens yielded multi-target concordant results. Of the 173 specimens, 65.0% (119/183) had concordant BV and Candida group co-infections, and 24.0% (44/183) had concordant BV and TV co-infections.

Table 36: Multi-Target Detection by the Xpert Xpress MVP Test

	Total Number of Occurrences between the Xpert Xpress MVP Test vs. Reference/Comparator Method (CVS/SVS)													
	Infections	BV	BV, Candida group	BV, Candida glab-krus	BV, Candida group, Candida glab-krus	BV, TV	BV, Candida group, TV	Candida group	Candida group, Candida glab-krus	Candida group, TV	Candida glab-krus	Candida glab-krus, TV	TV	Negative
The Xpert Xpress MVP Test	BV		0/5	-	-	-	-	1/0	-	-	-	-	-	26/28
	BV, Candida group	16/26	**126/119**	-	1/0	-	-	16/22	1/0	-	-	-	-	1/2
	BV, Candida glab-krus	2/3	-	**3/1**	-	-	-	-	-	-	2/3	-	-	-
	BV, Candida group, Candida glab-krus	0/1	-	0/2	**4/5**	-	-	-	0/1	-	1/1	-	-	-
	BV, TV	2/2	-	-	-	**45/44**	1/1	-	-	-	-	-	4/5	-
	BV, Candida group, TV	-	-	-	-	3/3	**9/9**	-	-	1/0	-	-	-	-

Total Number of Occurrences between the Xpert Xpress MVP Test vs. Reference/Comparator Method (CVS/SVS)													
Infections	BV	BV, Candida group	BV, Candida glab-krus	BV, Candida group, Candida glab-krus	BV, TV	BV, Candida group, TV	Candida group	Candida group, Candida glab-krus	Candida group, TV	Candida glab-krus	Candida glab-krus, TV	TV	Negative
Candida group	1/2	14/15	-	-	-	-		-	1/1	1/1	-	-	27/36
Candida group, Candida glab-krus	-	-	1/1	-	-	-	-	**1/1**	-	3/6	-	-	-
Candida group, TV	-	-	-	-	-	-	1/0	-	**2/3**	-	-	-	1/1
Candida group, Candida glab-krus, TV	-	-	-	-	-	-	-	-	-	1/0	-	-	-
Candida glab-krus	-	-	1/0	-	-	-	-	-	-		-	-	3/5
Candida glab-krus, TV	-	-	-	-	-	-	-	-	-	-	**1/1**	-	-
TV	-	-	-	-	1/1	-	-	-	-	-	-		-
Negative	17/15	-	-	-	-	-	6/4	-	-	-	-	1/1	

Of the 2,947 Xpert Xpress MVP runs performed in the clinical study, 130 resulted in non-determinate ("Error", "Invalid" or "No Results") results on first attempt. Upon retest of these 130 specimens, 22 remained non-determinate. The initial non-determinate rate was 4.4% (130/2947) and the overall non-determinate rate was 0.7% (22/2947).

The initial non-determinate rate for CVS specimens was 3.9% (58/1473) and the overall non-determinate rate was 0.5% (8/1473). The initial non-determinate rate for SVS specimens was 4.9% (72/1474) and the overall non-determinate rate was 0.9% (14/1474).

D Clinical Cut-Off:

Not applicable

E Expected Values/Reference Range:

Positivity rates in the symptomatic patient population, as observed in the prospective clinical study determined by the Xpert Xpress MVP test, were calculated from clinician-collected vaginal swab (CVS) and self-collected vaginal swab (SVS) specimens and are presented by target and by race/ethnicity in Table 37.

Table 37: Positivity Rates in Symptomatic Patients

	Target	Overall	Black /African American		White		Asian	Others*
			Hispanic/ Latino	Not Hispanic/ Latino	Hispanic/ Latino	Not Hispanic/ Latino		
CVS	BV	40.9% (588/1436)	62.5% (10/16)	59.5% (327/550)	37.7% (72/191)	24.9% (154/618)	23.8% (5/21)	50.0% (20/40)
CVS	Candida group	31.2% (453/1450)	43.8% (7/16)	34.4% (191/555)	32.0% (62/194)	27.9% (173/621)	31.8% (7/22)	31.0% (13/42)
CVS	Candida glab-krus	3.4% (49/1450)	0% (0/16)	4.1% (23/555)	3.1% (6/194)	3.1% (19/621)	0% (0/22)	2.4% (1/42)
CVS	TV	5.5% (78/1423)	0% (0/16)	11.4% (62/545)	2.7% (5/188)	1.6% (10/613)	0% (0/21)	2.5% (1/40)
SVS	BV	41.8% (598/1431)	62.5% (10/16)	59.4% (325/547)	37.5% (72/192)	26.7% (165/618)	30.0% (6/20)	52.6% (20/38)
SVS	Candida group	32.9% (476/1445)	37.5% (6/16)	35.7% (197/552)	34.4% (67/195)	30.3% (188/621)	28.6% (6/21)	30.0% (12/40)
SVS	Candida glab-krus	3.7% (54/1445)	0% (0/16)	4.2% (23/552)	3.1% (6/195)	3.9% (24/621)	0% (0/21)	2.5% (1/40)
SVS	TV	5.3% (75/1418)	0% (0/16)	4.2% (23/542)	2.6% (5/189)	1.5% (9/613)	0% (0/20)	2.6% (1/38)

*Including: American Indian or Alaska Native, Native Hawaiian or Other Pacific Islander, Mixed/Unknown

Although the Xpert Xpress MVP test is not intended for use in an asymptomatic patient population, *Candida* species and BV associated organisms that are detected by the Xpert Xpress MVP test have been reported to be present as colonizing normal flora. Positivity rates were calculated from CVS and SVS specimens collected from asymptomatic patients to assess how often patients who, despite being asymptomatic, can have microbial flora associated with vaginosis and Candidiasis that could be detected by the Xpert Xpress MVP test. Positivity rates are presented by target and by race/ethnicity in Table 38.

Table 38. Positivity Rates in Asymptomatic Patients

	Target	Overall	Black /African American^	White		Others*
				Hispanic/Latino	Not Hispanic/Latino	
CVS	BV	32.9% (52/158)	51.0% (26/51)	25.5% (14/55)	19.5% (8/41)	36.4% (4/11)
CVS	Candida group	17.1% (27/158)	25.5% (13/51)	16.4% (9/55)	7.3% (3/41)	18.2% (2/11)
CVS	Candida glab-krus	4.4% (7/158)	2.0% (1/51)	5.5% (3/55)	4.9% (2/41)	9.1% (1/11)
SVS	BV	31.5% (51/162)	49.1% (26/53)	24.1% (13/54)	16.3% (7/43)	41.7% (5/12)
SVS	Candida group	19.1% (31/162)	28.3% (15/53)	18.5% (10/54)	7.0% (3/43)	25.0% (3/12)
SVS	Candida glab-krus	4.9% (8/162)	1.9% (1/53)	7.4% (4/54)	4.7% (2/43)	8.3% (1/12)

^Includes one Black/African American who was of Hispanic or Latino descent for CVS specimens; includes two Black/African Americans who were of Hispanic or Latino descent for SVS specimens.
*Including: American Indian or Alaska Native, Asian, Mixed/Unknown

VIII Proposed Labeling:

The labeling supports the finding of substantial equivalence for this device.

IX Conclusion:

The submitted information in this premarket notification is complete and supports a substantial equivalence decision.