GeneXpert
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Xpert® Xpress MVP

REF **XPRSMVP-10**

REF **XPRSMVP-120**

Instructions for Use

CLIA Complexity: Waived

IVD

Cepheid

In Vitro Diagnostic Medical Device

302-6886, Rev. A
11-2023

Trademark, Patents, and Copyright Statements

See Section 28 for a description of changes.

Xpert® Xpress MVP

℞only

In Vitro Diagnostic Use

CLIA Complexity: Waived

A Certificate of Waiver is required to perform this test in a CLIA Waived setting. To obtain CLIA waiver information and a Certificate of Waiver, please contact your state health department. Additional CLIA waiver information is available at the Centers for Medicare and Medicaid website at www.cms.hhs.gov/CLIA.

Failure to follow the instructions or modification to the test system instructions will result in the test no longer meeting the requirements for waived classification.

1 Proprietary Name

Xpert® Xpress MVP

2 Common or Usual Name

Xpert Xpress MVP

3 Intended Use

The Xpert® Xpress MVP test, performed on the GeneXpert® Xpress System, 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.

4 Summary and Explanation

The most common causes of vaginosis and vaginitis are: 1) proliferation of one or more anaerobic bacterial species in the vaginal tract leading to vaginal discharge without inflammation (22–50% of symptomatic women), known as bacterial vaginosis; 2) vulvovaginal candidiasis (17–39%); and 3) trichomoniasis (4–35%).[1] Symptoms in undiagnosed women may be caused by a broad array of non-infectious conditions, including atrophic vaginitis, aerobic vaginitis, various vulvar dermatologic conditions, and vulvodynia. Abnormal vaginal discharge has a broad differential diagnosis, and successful treatment typically requires an accurate diagnosis.

5 Principle of the Procedure

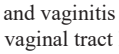
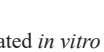
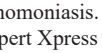
The Xpert Xpress MVP test is an automated *in vitro* diagnostic test for qualitative detection of DNA targets from anaerobic bacteria associated with bacterial vaginosis, *Candida* species associated with vulvovaginal candidiasis, and *Trichomonas vaginalis*, the agent of trichomoniasis. The Xpert Xpress MVP test is performed on the Cepheid GeneXpert Xpress System. With this platform, an operator can run the test by performing three simple steps: 1) transfer liquid sample to the cartridge with a transfer pipette, 2) run the test on the GeneXpert Xpress System, and 3) read the results.

The GeneXpert Xpress System automates and integrates sample preparation, nucleic acid extraction and amplification, and detection of the target sequences from clinical specimens using real-time PCR tests. The system consists of an instrument, computer, and preloaded software for running tests and viewing the results. The system requires the use of single-use disposable cartridges that hold the sample processing and PCR reagents and host the PCR process. Because the cartridges are self-contained, cross-contamination between samples is minimized. For a full description of the system, see the *GeneXpert Xpress System User's Guide*.

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 Xpress System. 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. The SPC also ensures that the PCR 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 designed for use with 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 testing site 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 Xpress System, which performs hands-off, automated sample processing, and real-time PCR for the detection of DNA. The results are interpreted by the GeneXpert Xpress software from measured fluorescent signals

Symbol	Meaning
	Batch code
	Consult instructions for use
	Manufacturer
	Country of manufacture
	Contains sufficient for *n* tests
	Expiration date
	Temperature limitation
	For prescription use only

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IVD

28 Revision History

Description of Changes: 302-6886, Rev. A

Purpose: Initial release.

25 Cepheid Headquarters Locations

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26 Technical Assistance

Before Contacting Us

Collect the following information before contacting Cepheid Technical Support:

- Product name
- Lot number
- Serial number of the instrument
- Error messages (if any)
- Software version and, if applicable, Computer Service Tag Number

United States Technical Support

Telephone: + 1 888 838 3222
Email: techsupport@cepheid.com

France Technical Support

Telephone: + 33 563 825 319
Email: support@cepheideurope.com

Contact information for all Cepheid Technical Support offices is available on our website: www.cepheid.com/en/support/contact-us.

27 Table of Symbols

Symbol	Meaning
REF	Catalog number
IVD	*In vitro* diagnostic medical device
	Do not reuse

and embedded calculation algorithms and are shown in the **RESULTS** screen. The Xpert Xpress MVP provides test results for BV, Candida group, Candida glab-krus and TV.

6 Materials Provided

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

Each kit contains the following:

Xpert Xpress MVP cartridges with integrated reaction tubes	**10 per kit**	**120 per kit**
• Bead 1, Bead 2, Bead 3 and Bead 4	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	0.44 mL per cartridge	0.44 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**
Instructions for Use CLIA Complexity: Waived (For use with the GeneXpert Xpress System only)	**1 per kit**	**1 per kit**
Quick Reference Instructions CLIA Complexity: Waived (For use with the GeneXpert Xpress System only)	**1 per kit**	**1 per kit**
CD • Assay Definition File (ADF) • Instructions to import ADF into GeneXpert software • Instructions for Use	**1 per kit**	**1 per kit**

Note Safety Data Sheets (SDS) are available at www.cepheid.com or www.cepheidinternational.com under the **SUPPORT** tab.

Note The bovine serum albumin (BSA) in the beads within this product was produced and manufactured exclusively from bovine plasma sourced in the United States. No ruminant protein or other animal protein was fed to the animals; the animals passed ante- and post-mortem testing. During processing, there was no mixing of the material with other animal materials.

7 Storage and Handling

- Store the Xpert Xpress MVP cartridges at 2–28°C until the expiration date provided on the label.
- Do not use expired cartridges.
- Do not open a cartridge lid until you are ready to perform testing.
- Do not use a cartridge that is wet or has leaked.
- Do not open or alter any part of the used cartridge for disposal.

8 Materials Required but not Provided

- Samples must be collected and transported with the Xpert Swab Specimen Collection kit (catalog number SWAB/G-50-US).
- GeneXpert Xpress System (catalog number: GXIV-2-CLIA or GXIV-4-CLIA): GeneXpert Xpress IV instrument, GeneXpert Hub with integrated computer running proprietary GeneXpert Xpress software version 6.2 or higher, touchscreen monitor and barcode scanner, external CD drive, *Getting Started Guide*, and *GeneXpert Xpress System User's Guide*.

9 Materials Available but not Provided

- NATtrol™ Vaginal Negative Control, ZeptoMetrix Corporation catalog number NATVNEG-6C
- NATtrol™ Vaginal Positive Control, ZeptoMetrix Corporation catalog number NATVPOS-6C

10 Warnings and Precautions

10.1 General

- For *in vitro* diagnostic use.
- For prescription use only.
- Treat all biological samples, including used cartridges, as if capable of transmitting infectious agents. Because it is often impossible to know which might be infectious, all biological samples should be handled using standard precautions. Guidelines for sample handling are available from the U.S. Centers for Disease Control and Prevention[2] and the Clinical and Laboratory Standards Institute.[3]
- Follow safety procedures set by your institution for working with chemicals and handling biological samples.
- Consult your institution's environmental waste personnel on proper disposal of used cartridges, which may contain amplified material. This material may exhibit characteristics of Federal EPA Resource Conservation and Recovery Act (RCRA) hazardous waste requiring specific disposal requirements. Check state and local regulations as they may differ from federal disposal regulations.

24 Bibliography

1. Hainer BL, Gibson MV. Vaginitis. Am Fam Physician. 2011;83(7): 807-815.
2. Centers for Disease Control and Prevention. *Biosafety in Microbiological and Biomedical laboratories* (refer to latest edition). http://www.cdc.gov/biosafety/publications/
3. Clinical and Laboratory Standards Institute. *Protection of Laboratory Workers from Occupationally Acquired Infections; Approved Guideline*. Document M29 (refer to latest edition).
4. Chemical hazards determined under REGULATION (EC) No 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2008 (on classification, labeling and packaging of substances and mixtures amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006) and the Occupational Safety and Health Standards, Hazard Communication, Toxic and Hazard Substances (March 26, 2012) (29 C.F.R., pt. 1910, subpt. Z), can be referenced on the Safety Data Sheet available at www.cepheid.com and www.cepheidinternational.com under the **SUPPORT** tab.

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

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.

The BV-associated organisms targeted by the Xpert Xpress MVP test demonstrated acceptable precision.

23 CLIA Waiver Studies

The accuracy of the Xpert Xpress MVP test was evaluated when it was used by untrained operators who had no CLIA Moderate/High Complexity laboratory experience and were representative of operators from CLIA-waived environment in a multi-site, prospective, observational, method comparison clinical study. The clinical study was conducted at 9 CLIA waived sites from geographically diverse locations with 22 untrained operators participating. No training on the use of the test was provided to the operators. A total of 2,544 vaginal swabs were tested and were eligible for inclusion in the Xpert Xpress MVP clinical study. Of the 2,544 vaginal swabs tested with the Xpert Xpress MVP test, 1,269 were clinician-collected vaginal swab specimens (CVS) and 1,275 were self-collected vaginal swab specimens (SVS). The performance of Xpert Xpress MVP was established relative to the comparators and the results are shown in Section 20.2, Table 5. The data represents a re-analysis of the original data using the GeneXpert Xpress software version 6.4a. There were no changes to the clinical data associated with the re-analysis.

Near the Cutoff Study

A study was conducted to evaluate the performance of Xpert Xpress MVP with weakly reactive samples when tested by untrained operators. This blinded study was performed at three external sites representative of a CLIA-waived environment and utilized a multi-factor nested design consisting of contrived panel members spanning the relevant limit of detection (LoD) spectrum (or, in the case of BV, the near cut-off concentration spectrum) for the four intended target types. The panel testing was conducted over a minimum of five days at each site. The performance of Xpert Xpress MVP with samples near the assay cutoff was acceptable when tested by untrained operators and are shown in Section 22, Table 33.

Flex Studies

Using risk analysis as a guide, flex studies were conducted on Xpert Xpress MVP for use with the GeneXpert Xpress System. The testing evaluated numerous sources of potential human errors that could affect the accuracy of results, including those related to sample handling, reagent handling, and the operation of the GeneXpert Xpress System. Flex study data were previously generated using older GeneXpert Xpress System software versions. Data were re-analyzed with the GeneXpert Xpress software version 6.4a. There were no changes in the data associated with the re-analysis. The studies demonstrated that the Xpert Xpress MVP test and the GeneXpert Xpress System are robust to the usage variation that may be encountered.

Institutions should check the hazardous waste disposal requirements within their respective countries.

- Do not open or alter any part of the used cartridge for disposal.

10.2 Specimen

- For collection and transport of vaginal swab samples, use only the Xpert Swab Specimen Collection Kit.
- Vaginal swab samples must be collected and tested before the expiration date printed on the Xpert Swab Specimen Collection Kit.
- Maintain proper storage conditions during sample transport to ensure the integrity of the sample (see Section 12, Specimen Collection, Transport, and Storage). Samples placed in transport medium following collection can be stored for up to 42 days at 2–28°C. Sample stability under shipping/storage conditions other than those recommended has not been evaluated.

10.3 Assay/Reagent

- Do not open the Xpert Xpress MVP cartridge lid except when adding specimen.
- Do not use a cartridge that has been dropped after removing it from the packaging.
- Do not shake the cartridge. Shaking or dropping the cartridge after opening the cartridge may yield non-determinate results.
- Do not place the sample ID label on the cartridge lid or on the barcode label.
- Do not use a cartridge with a damaged or missing barcode label.
- Do not use a cartridge that has a damaged or missing reaction tube.
- Each single-use Xpert Xpress MVP cartridge is used to process one test. Do not reuse processed cartridges.
- Each single-use disposable pipette is used to transfer one specimen. Do not reuse disposable pipettes.
- Do not use a cartridge if it appears wet or if the lid seal appears to have been broken.
- Wear clean lab coats and gloves. Change gloves between the handling of each specimen.
- In the event of a spill of specimens or controls, wear gloves and absorb the spill with paper towels. Then, thoroughly clean the contaminated area with a 1:10 dilution of freshly prepared household chlorine bleach. Final active chlorine concentration should be 0.5% regardless of the household bleach concentration in your country. Allow a minimum of two minutes of contact time. Ensure the work area is dry before using 70% denatured ethanol to remove bleach residue. Allow surface to dry completely before proceeding. Or, follow your institution's standard procedures for a contamination or spill event. For equipment, follow the manufacturer's recommendations for decontamination of equipment.
- Biological specimens, transfer devices, and used cartridges should be considered capable of transmitting infectious agents requiring standard precautions. Follow your institution's environmental waste procedures for proper disposal of used cartridges and unused reagents. These materials may exhibit characteristics of chemical hazardous waste requiring specific disposal. If country or regional regulations do not provide clear direction on proper disposal, biological specimens and used cartridges should be disposed per

WHO [World Health Organization] medical waste handling and disposal guidelines.

11 Chemical Hazards[4]

- **UN GHS Signal Word: Warning**
- **UN GHS Hazard Statements:**
  - May be harmful if swallowed.
  - May be harmful in contact with skin.
  - Causes eye irritation.
- **UN GHS Hazard Statements:**
  - **Prevention**
    - Wash thoroughly after handling.
  - **Response**
    - Call a POISON CENTER or doctor/physician if you feel unwell.
    - If skin irritation occurs: Get medical advice/attention.
    - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
    - If eye irritation persists: Get medical advice/attention.

12 Specimen Collection, Transport, and Storage

- Proper sample collection, storage, and transport are critical to the performance of this test. Inadequate sample collection, improper sample handling and/or transport may yield a false result. Samples should be transported at 2–28°C.
- Samples placed in transport medium following collection can be stored for up to 42 days at 2–28°C prior to testing with the Xpert Xpress MVP test.
- Refer to the Xpert Swab Specimen Collection Kit Instructions for Use for collection and transport instructions.

13 Starting the GeneXpert Xpress System

Note Before you start the test, make sure that the system is running GeneXpert Xpress software version 6.2 or higher and that the Xpert Xpress MVP Assay Definition File is imported into the software.

This section lists the basic steps to operate the test. For detailed instructions, see the *GeneXpert Xpress System User's Guide*.

1. Turn on the GeneXpert Xpress instrument.
2. Turn on the Hub computer. The Windows Lock screen appears.
3. Swipe up to continue. The Windows Password screen appears.
4. Touch **Password** to display the keyboard, then type your Windows password.
5. Touch the arrow button at the right of the password entry area. The GeneXpert Xpress software starts and a login screen appears.
6. If enabled, you may log in by scanning a barcode on your institutional ID, using the barcode scanner (located behind the right side of the touchscreen). Then proceed to Step 9. Otherwise, follow the steps below to login manually.
7. Enter your User Name and Password. The virtual keyboard appears once you touch the entry fields.

Sample Type	Overall Agreement	95% CI
A. vaginae, BVAB2, and *Megasphaera*-1, Moderate positive	100% (80/80)	95.4% - 100%

Precision for BV targets was 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-days, between-operators, between-runs and within-run for each panel member are presented in Table 36.

Table 36. Results of Precision for the BV Target

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
A. vaginae and Mega-1, High Neg	SPC	80	32.63	0.11	0.3	0.17	0.5	0.00	0.0	0.39	1.2	0.44	1.3
	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

[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.

The Xpert Xpress MVP test demonstrated acceptable reproducibility across sites (sites 02-04), operators, and panel members when testing was performed in a CLIA-waived environment.

22.1 Precision of the BV Target

Due to the diversity of organisms associated with the detection of BV, a separate single-site study was conducted to establish precision of the BV target. To establish the test precision for the BV targets in the Xpert Xpress MVP test, a single-center, blinded precision study was conducted utilizing samples with unique combinations of contrived BV organisms.

A panel of nine panel members were 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 the BV organisms (*Atopobium vaginae*, *Megasphaera*-1, and BVAB2). Testing was performed on the GeneXpert Infinity System using GeneXpert Xpertise software version 6.4b and were re-analyzed using the GeneXpert Xpress software version 6.4a. The re-analyzed data generated acceptable results.

As shown in Table 35, agreement for each panel member was calculated, as well as the Wilson Score 95% confidence interval for each proportion of concordance.

Table 35. Summary of Precision Results for the BV Target

Sample Type	Overall 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%

8. Touch the **X** in the upper right of the virtual keyboard. The keyboard disappears and the **LOGIN** button appears at the bottom of the screen. Touch the **LOGIN** button to continue.
9. The Database Maintenance Reminder screen and the Archive Tests Reminder dialog boxes may appear, depending on your system configuration. For more information, see the *GeneXpert Xpress System User's Guide*.

14 Procedure

14.1 Starting a Test

The following instructions showing how to prepare the sample and the cartridge are shown on-screen in a video and are also described in the *Quick Reference Instructions* (QRI).

Important **Start the test within 30 minutes of adding the sample to the cartridge.**

1. Put on a new pair of gloves if performing a test.
2. Touch the **NEW TEST** button on the Home screen (see Figure 1).

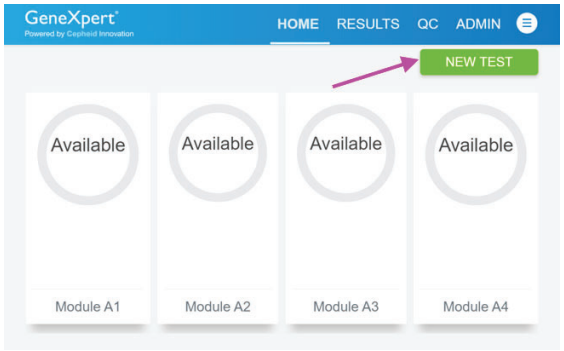

Figure 1. The Home Screen

If Patient Information is configured by an administrator, then the Patient Information screen appears (see Figure 2). If Patient Information is not configured, the Sample ID screen appears. Skip to Section 14.2 if the Sample ID screen appears.

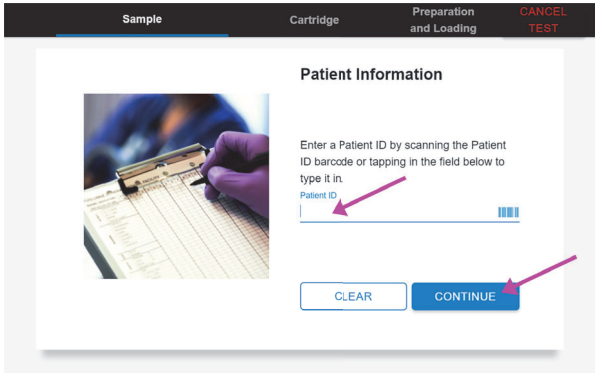

Figure 2. The Patient Information Screen

3. Scan the patient ID barcode or manually enter the Patient ID.
4. Touch **CONTINUE**. The Confirm Patient Information screen appears.
5. Verify the Patient ID and touch **CONFIRM**. The Sample ID screen appears.

14.2 Preparing the Specimen and Cartridge

1. Obtain a new Xpert Xpress MVP cartridge and a new transfer pipette provided in the Xpert Xpress MVP test kit.
2. Scan Sample ID barcode or manually enter the Sample ID for patient specimen.
3. Touch **CONTINUE**. The Confirm Sample ID screen appears.
4. Verify the Sample ID and touch **CONFIRM**. The Scan Cartridge Barcode screen appears (see Figure 3).

Important **In the following steps, keep the cartridges upright when handling or scanning. Do not rotate or tip the cartridge, because damage to the contents or injury to personnel may occur.**

Note If the barcode on the Xpert Xpress MVP test cartridge does not scan or scanning the barcode results in an error message stating that the cartridge is expired, then repeat the test with a new cartridge.

Note If you have scanned the cartridge barcode in the Xpress software and the assay definition file is not available, a screen will appear indicating the assay definition file is not loaded on the system. If this screen appears, upload the ADF included in the CD with this kit, or contact Cepheid Technical Support.

Table 34. Results of Reproducibility for the Xpert Xpress MVP Test

Panel Member	Analyte	N[a]	Mean Ct	Variance Source									
				Site		Day		Operator		Within-run		Total	
				SD	CV (%)	SD	CV (%)	SD	CV (%)	SD	CV (%)	SD	CV (%)
Negative	SPC	270	32.4	0.25	0.8	0	0	0.26	0.8	1.02	3.2	1.08	3.3
BV, High Neg	Atop gp	88	32.2	0.04	0.1	0.12	0.4	0.16	0.5	0.26	0.8	0.33	1.0
BV, Low Pos		90	31.4	0	0	0.09	0.3	0.31	1.0	0.43	1.4	0.54	1.7
BV, Mod Pos		89	30.1	0.01	0	0	0	0.22	0.7	0.33	1.1	0.39	1.3
BV, High Neg	Mega1-BVAB2	76[b]	40.4	0	0	0.08	0.2	0.44	1.1	1.23	3.1	1.31	3.3
BV, Low Pos		90	36.3	0.10	0.3	0	0	0.41	1.1	0.71	2.0	0.83	2.3
BV, Mod Pos		89	34.5	0.33	1	0.28	0.8	0	0	0.84	2.4	0.95	2.7
C. albicans, Low Pos	Cgroup	86	36.1	0.18	0.5	0	0	0.20	0.6	0.93	2.6	0.96	2.7
C. albicans, Mod Pos		90	34.2	0.55	1.6	0	0	0.74	2.2	0.74	2.2	1.18	3.5
C. glabrata, Low Pos	Cglab-krus	88	30.5	0.55	1.8	0	0	1.18	3.9	1.33	4.4	1.86	6.1
C. glabrata, Mod Pos		90	28.5	0.22	0.8	0	0	0.51	1.8	0.78	2.7	0.96	3.4
TV, Low Pos	TV	90	37.4	0	0	0	0	0.55	1.5	0.92	2.5	1.08	2.9
TV, Mod Pos		90	35.0	0.05	0.1	0.14	0.4	0	0	0.42	1.2	0.45	1.3

[a] Number of samples with non-zero Ct values out of 90.

[b] Twelve (12) out of 88 samples with Mega1-BVAB2 Ct = 0 were excluded from ANOVA analysis.

Abbreviations: CV, coefficient of variance; Mod, moderate; Neg, negative; Pos, positive, SD, standard deviation; SPC; sample processing control

Table 33. Summary of Reproducibility and Precision Results

Panel member	Phase I								Phase II				Overall Agreement and 95% CI
	Site 02				Site 03				Site 04				
	Op 1	Op 2	Op 3	Subtotal	Op 1	Op 2	Op 3	Subtotal	Op 1	Op 2	Op 3	Subtotal	
Negative	100% (30/30)	100% (30/30)	100% (30/30)	100% (90/90)	100% (30/30)	100% (30/30)	100% (30/30)	100% (90/90)	96.7% (29/30)	100% (30/30)	100% (30/30)	98.9% (89/90)	99.6% (269/270) 97.9% - 99.9%
BV, High Neg	90.0% (9/10)	70.0% (7/10)	80.0% (8/10)	80.0% (24/30)	60.0% (6/10)	70.0% (7/10)	40.0% (4/10)	56.7% (17/30)	80.0% (8/10)	87.5% (7/8)	60.0% (6/10)	75.0% (21/28)	70.5% (62/88) 60.2% - 79.0%
BV, Low Pos	100% (10/10)	90.0% (9/10)	100% (10/10)	96.7% (29/30)	80.0% (8/10)	100% (10/10)	100% (10/10)	93.3% (28/30)	100% (10/10)	100% (10/10)	100% (10/10)	100% (30/30)	96.7% (87/90) 90.7% - 98.9%
BV, Mod Pos	100% (10/10)	100% (10/10)	100% (10/10)	100% (30/30)	100% (10/10)	100% (10/10)	100% (10/10)	100% (30/30)	100% (10/10)	100% (9/9)	100% (10/10)	100% (29/29)	100% (89/89) 95.9% - 100%
C. albicans, Low Pos	100% (10/10)	100% (10/10)	90% (9/10)	96.7% (29/30)	100% (9/9)	100% (9/9)	100% (9/9)	100% (27/27)	100% (10/10)	100% (10/10)	100% (10/10)	100% (30/30)	98.9% (86/87) 93.8% - 99.8%
C. albicans, Mod Pos	100% (10/10)	100% (10/10)	100% (10/10)	100% (30/30)	100% (10/10)	100% (10/10)	100% (10/10)	100% (30/30)	100% (10/10)	100% (10/10)	100% (10/10)	100% (30/30)	100% (90/90) 95.9% - 100%
C. glabrata, Low Pos	100% (10/10)	100% (10/10)	90% (9/10)	96.7% (29/30)	100% (10/10)	100% (9/9)	100% (10/10)	100% (29/29)	100% (10/10)	100% (9/9)	100% (10/10)	100% (29/29)	98.9% (87/88) 93.8% - 99.8%
C. glabrata, Mod Pos	100% (10/10)	100% (10/10)	100% (10/10)	100% (30/30)	100% (10/10)	100% (10/10)	100% (10/10)	100% (30/30)	100% (10/10)	100% (10/10)	100% (10/10)	100% (30/30)	100% (90/90) 95.9% - 100%
TV, Low Pos	100% (10/10)	100% (10/10)	100% (10/10)	100% (30/30)	100% (10/10)	100% (10/10)	100% (10/10)	100% (30/30)	100% (10/10)	100% (10/10)	100% (10/10)	100% (30/30)	100% (90/90) 95.9% - 100%
TV, Mod Pos	100% (10/10)	100% (10/10)	100% (10/10)	100% (30/30)	100% (10/10)	100% (10/10)	100% (10/10)	100% (30/30)	100% (10/10)	100% (10/10)	100% (10/10)	100% (30/30)	100% (90/90) 95.9% - 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-days, between-operators, between-runs and within-run for each panel member are presented in Table 34.

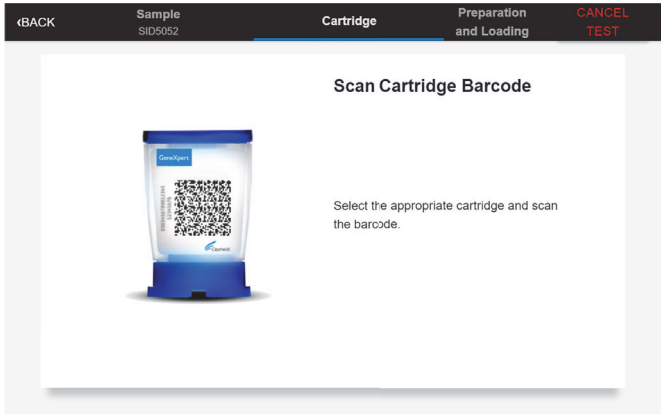

Figure 3. Scan Cartridge Barcode Screen

5. Confirm the appropriate cartridge is selected and scan the cartridge barcode. After scanning, the Confirm Test Information screen appears.
6. Verify that the correct cartridge has been scanned and that the Assay Name matches the name of the test on the cartridge (see Figure 4).

Figure 4. Confirm Test Information Screen

7. Touch **CONFIRM** if the displayed information is correct.
8. Depending on your configuration, the Enter Credentials to Continue screen may appear (see Figure 5). If enabled, you may log in by scanning your institutional ID. Otherwise, manually enter your User Name and Password and touch **LOGIN** to continue.

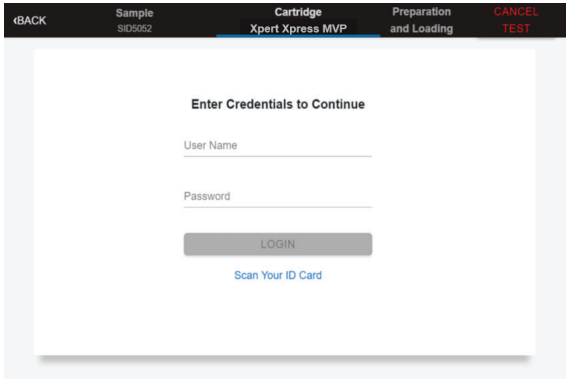

Figure 5. Enter Credentials to Continue Screen

The Cartridge Preparation screen appears (see Figure 6).

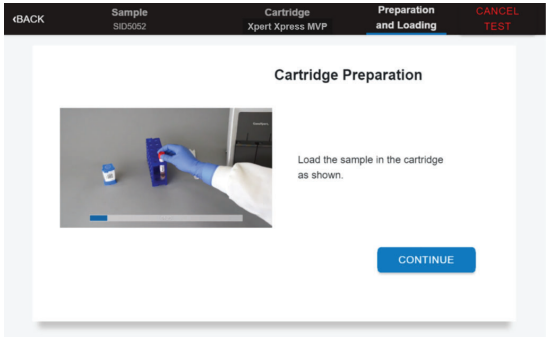

Figure 6. Cartridge Preparation Screen

9. A video clip shows the cartridge preparation steps. Watch the video before continuing. Once complete, the video starts from the beginning automatically. Touch the **CONTINUE** button to exit video. Prepare the cartridge according to the directions below, which are also shown in the video.
10. Open the cartridge by lifting the front of the cartridge lid.
11. Check that the specimen transport tube cap is closed. Vigorously shake the specimen transport tube 3 to 4 times. Open the cap on the specimen transport tube.

Note Not shaking or inadequate shaking of the specimen transport tube may generate false negative results.

12. Remove the transfer pipette from the wrapper.

Note Do not place the unwrapped pipette on the workbench.

13. Squeeze the top bulb of the transfer pipette **completely until the top bulb is fully flat**. While continuing to hold the bulb fully flat, place the pipette tip in the specimen transport tube (see Figure 7).

22 Reproducibility

Reproducibility and precision of the Xpert Xpress MVP test was established through a multicenter (3 sites) representative of a CLIA-waived environment, blinded study utilizing a multi-factor nested design consisting of contrived panel members spanning the relevant limit of detection (LoD) spectrum (or, in the case of BV, the near cut-off concentration) for the 4 intended target types.

A panel of ten panel members with varying concentrations of the intended target types were tested by three operators in duplicate on five different days at three sites using one lot of Xpert Xpress MVP test cartridges. The total number of tests for each panel member was 90 (3 sites × 5 days × 3 operators × 1 run × 2 replicates). The three concentrations for each intended target type included two positive levels (moderate positives at ~3× LoD/near cut-off concentration, low positives at ~1× LoD/near cut-off concentration) and one negative. For the BV target, a high negative level (<1× near the cut-off concentration) was also included.

Percent agreement for each panel member was analyzed across each of the 9 operators and across each of the 3 sites. Overall percent agreement for each panel member was calculated, as well as the Wilson Score 95% confidence interval for each proportion of concordance (Table 33). Of the 1080 samples tested, 1037 yielded valid results on the initial test (96.0%, 1037/1080); therefore, the initial non-determinate rate was 4.0% (43/1080). The non-determinate cases included 26 **NO RESULT-REPEAT TEST** results, and 17 **INSTRUMENT ERROR** results. Of the 43 initial non-determinate specimens, 40 were retested (per the assay instruction) of which 35 generated valid results for a final non-determinate rate of 0.7% (8/1080). Three specimens were not retested due to insufficient sample volume. All final non-determinate results were removed from analyses.

It should be noted that during phase I of the study, site 01 had low percent agreement for three specific panel members. Low positive *C. albicans*, low positive *C. glabrata*, and moderate positive *C. albicans* had a percent agreement of 40% (12/30), 80% (24/30), and 86.7% (26/30), respectively. An investigation revealed that the operators at site 01 failed to follow certain sample transfer steps of the Quick Reference Instructions, by not vigorously shaking the sample tube and/or adding an excessive amount of sample to the cartridge, which could generate false negative results as demonstrated by flex studies, leading to low percent agreement.

Consequently, all reproducibility data from site 01 in phase I were excluded and phase II was conducted on all panel members at an additional fourth site (site 04) with three new untrained operators.

Reproducibility results from sites 02-04 are shown in detail in Table 33.

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

21.7 Carry-over Contamination

A study was conducted to demonstrate that single-use, self-contained GeneXpert cartridges prevent specimen and amplicon carry-over contamination from very high titer positive samples into successively run negative samples when processed in the same GeneXpert module. The study consisted of a negative sample processed in the same GeneXpert module immediately after processing a very high BV positive sample (an *A. vaginae* strain at 2.8×10^7 CFU/mL and BVAB2 plasmid DNA at 5.0×10^8 copies/mL), a very high Candida group sample (a *C. albicans* strain at 3.0×10^6 CFU/mL), or a very high TV sample (a *T. vaginalis* strain at 5.0×10^6 cells/mL) in simulated vaginal swab matrix. 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. There was no evidence of any carry-over contamination. All 63 negative samples were correctly reported as negative/not detected. All 60 positive samples were correctly reported as positive/detected.

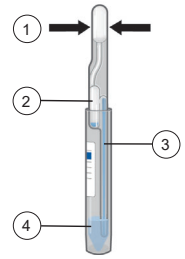

Figure 7. Transfer Pipette

Number	Description
1	Top Bulb (Squeeze here until fully flat)
2	Overflow Reservior Bulb (Do Not Squeeze)
3	Pipette
4	Sample

14. Keeping the pipette below the surface of the liquid, release the top bulb of the pipette **slowly until the pipette is completely filled with sample** before removing it from the tube. After filling pipette, excess sample may be seen in the overflow reservoir bulb of the pipette (see Figure 7). It is okay if liquid goes into the overflow reservoir. Check that the pipette does not contain bubbles.
15. To transfer the sample to the cartridge, put the pipette into the large opening on the lower right corner of the cartridge (Sample Chamber) shown in Figure 8. Squeeze the top bulb of the transfer pipette **completely until it is fully flat** to empty the contents.

Figure 8. Xpert Xpress MVP Cartridge (Top View)

Note Dispense the entire volume of liquid from the transfer pipette into the sample chamber. Non-determinate results may occur if insufficient sample is added to the cartridge.

16. Continue **to hold the top bulb fully flat and do not release** until the pipette is removed from the cartridge. **Do not reuse a pipette**. Dispose of the used pipette in an appropriate waste container after use.
17. Close the cartridge lid.

14.3 Loading the Cartridge

1. Touch the **CONTINUE** button on the Cartridge Preparation screen. The Load Cartridge into Module screen appears (see Figure 9).
2. Open the module door with the flashing green light.

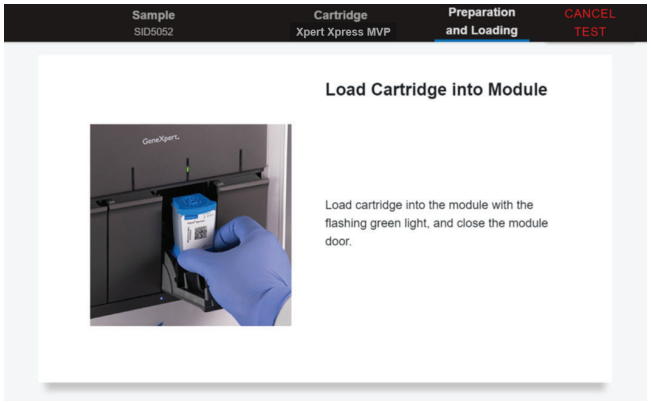

Figure 9. Load Cartridge into Module Screen

3. Load the cartridge with the barcode facing the operator on the cartridge bay platform. Do not try to insert the cartridge past the cartridge bay platform.
4. Close the door until it clicks. The green light will stop blinking and the test starts.
5. When the cartridge is loaded, the Test Loading screen appears, followed by the Test Running screen showing that the test is running (see Figure 10).

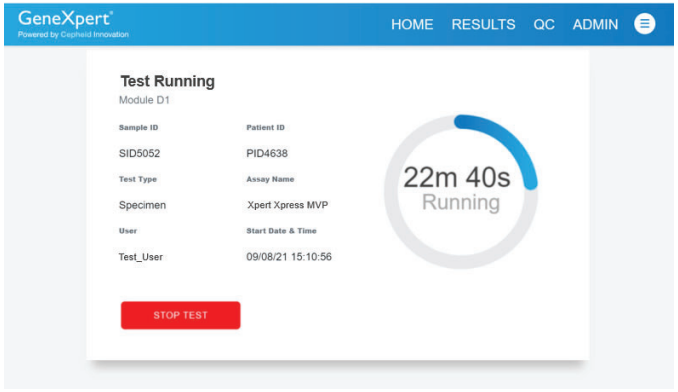

Figure 10. Test Running Screen showing Test Time Remaining

A circular graphic indicator at the right indicates the progress of the test and the time remaining until a test result is available.

Note Time to result is within 60 minutes.

Note While a test is running, you can start another test. See Section 14.4, Start a New Test While a Test is Running.

	Testing Panel	Testing Target/Organisms (Low Positive)	Competitive Target/Organisms (High Positive)
	28	BVAB2 (< 1.5× near cut-off concentration) and *Megasphaera*-1 (< 1.5× near cut-off concentration)	*Atopobium vaginae* (1×10^6 CFU/mL)

21.6 Potentially Interfering Substances

Twenty substances that may be present in the vaginal swab specimens with the potential to interfere with the performance of Xpert Xpress MVP were evaluated. The potentially interfering substances included prescription and over-the-counter drugs, creams and/or gels, blood, hormones, semen and mucus. The substances, active ingredients, and concentrations tested are listed in Table 32. Potential interferents were tested in simulated vaginal swab matrix in the presence and absence of Xpert Xpress MVP targets at 3× LoD/3× near cut-off concentrations. With the exception of the 5.5% concentration of mucin (from porcine stomach), no clinically significant inhibitory effects from substances that may be encountered in vaginal specimens were observed on the performance of the Xpert Xpress MVP test. When mucin was tested at a concentration of 4.0%, no clinically significant inhibitory effect was observed on the performance of the Xpert Xpress MVP test. This is addressed in Section 18, Limitations.

Table 32. 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 (Interference not 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

	Testing Panel	Testing Target/Organisms (Low Positive)	Competitive Target/Organisms (High Positive)
	19		*Candida albicans* (1×10^6 CFU/mL)
	20		*Trichomonas vaginalis* (1×10^5 cells/mL)
	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)

Note Do not turn off or unplug the instrument while a test is in progress. Turning off or unplugging the GeneXpert Xpress instrument stops the test. If necessary, touch the **STOP TEST** button to cancel a test while it is loading or running.

6. When the test is done, the green light goes out and the door automatically unlocks. The screen text changes to Test Completed. The Test Completed screen provides the results for the test just completed.
7. Open the module door, remove the used cartridge, and properly dispose of the cartridge according to your institution's hazardous waste disposal policies.
8. Touch **REPORT** to view the result of the test that has just completed. Touch **HOME** to go back to the Home screen.
9. To log out, touch the **User Menu** icon ( ), then select **Logout**.

14.4 Start a New Test While a Test is Running

You can start a new test while another test is in progress.

1. Touch the **HOME** button on the Test Running screen (see Figure 10).
2. For a new user log in, touch the **User Menu** icon ( ) to log in.
3. Repeat the steps in Section 14.1, Starting a Test through Section 14.3, Loading the Cartridge.
4. After a second test has started, touch the **HOME** button. The status of both tests appears. The Home screen displays the module(s) in use with a circular graphic indicator around each test, and Patient Identification below the module graphic (see Figure 11).

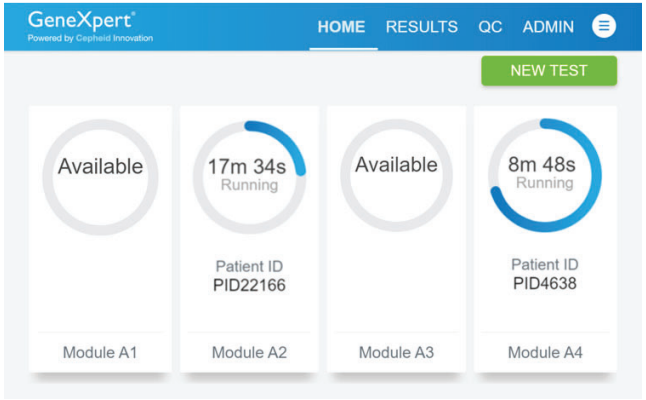

Figure 11. Home Screen showing Two Tests Running

5. After a test has completed, the module icon text changes to **Complete** (see Figure 12). Touch **Complete View Result** to view test results.

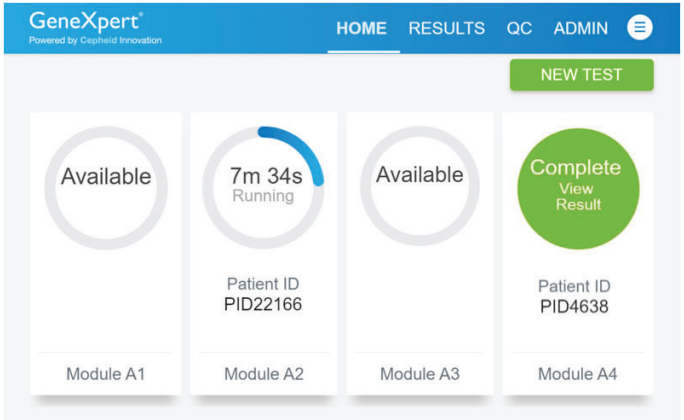

Figure 12. Home Screen with One of Two Tests Completed

14.5 Viewing Test Results

For detailed instructions on how to view and print the results, see the *GeneXpert Xpress System User's Guide*.

1. Touch the **RESULTS** button located on the panel at the top of the screen. The Results screen appears (see Figure 13). Test results are, by default, in order of the date and time that the test was run. Navigate through the test result pages by touching the numbered buttons or arrows at the bottom of the screen.

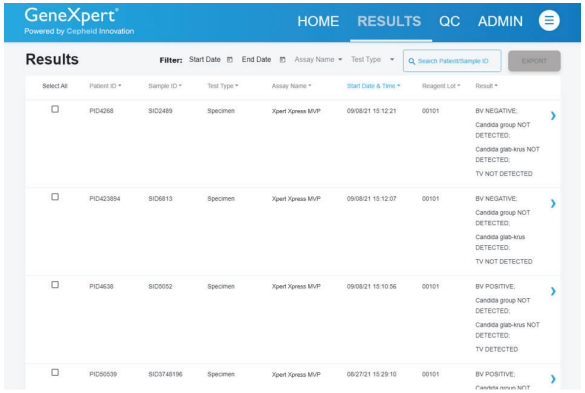

Figure 13. Results Screen

2. Touch the desired result to open the Test Result screen (see Figure 14).

	Testing Panel	Testing Target/Organisms (Low Positive)	Competitive Target/Organisms (High Positive)
	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

21.5 Competitive Interference

Competitive interference between targets (BV, Candida group, Candida glab-krus and TV) of the Xpert Xpress MVP test caused by co-infections was evaluated by testing each target at low positive concentration in the presence of another target at high concentration in simulated vaginal swab matrix. Competitive inhibitory effects between the BV analytes (Atop gp and Mega1-BVAB2) were also evaluated in simulated vaginal swab matrix. The conditions simulating co-infections were presented in Table 31. Under the conditions of this study, competitive inhibitory effects were not observed between MVP targets or BV analytes with the Xpert Xpress MVP test.

Table 31. Competitive Interference Testing Conditions

	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)

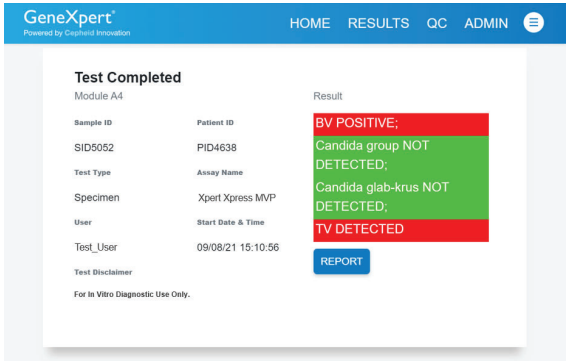

Figure 14. Test Result Screen (Example)

15 Quality Control

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

Sample Processing Control (SPC) – Ensures that the sample is processed correctly. The SPC verifies that sample processing is adequate. Additionally, this control detects sample-associated inhibition of the real-time PCR test, ensures that the PCR conditions (temperature and time) are appropriate for the amplification reaction, and that the PCR reagents are functional. 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.

If the sample is negative for BV, Candida group, Candida glab-krus and TV and the SPC fails, the result will be NO RESULT – REPEAT TEST. See Section 17, Retests.

Probe Check Control (PCC) – Before the start of the PCR, the GeneXpert Xpress 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.

If PCC fails, the result will be NO RESULT – REPEAT TEST. See Section 17, Retests.

15.1 Testing Quality Control Samples (External Controls)

External controls described in Section 9 are available but not provided and must be used in accordance with local, state, and/or federal regulations or accreditation requirements, as applicable.

Note If the QC Lockout feature is enabled, follow the QC Lockout instructions detailed in the *GeneXpert Xpress System User's Guide*.

Note

Cepheid recommends that external controls be tested at the frequency noted below:

- Each time a new lot of Xpert Xpress MVP kits is received.
- Each time a new shipment of Xpert Xpress MVP kits is received even if it is the same lot previously received.
- Each time a new operator is performing the test (i.e., operator who has not performed the test recently).
- When problems (storage, operator, instrument, or other) are suspected or identified.
- If otherwise required by your institution's standard Quality Control (QC) procedures.

To run an external control using the Xpert Xpress MVP test:

1. Put on a clean pair of gloves.
2. Have a new Xpert Xpress MVP test cartridge, a transfer pipette provided in the Xpert Xpress MVP test kit, and a quality control tube ready.
3. On the Home screen or the Test Running screen, touch **QC** (see Figure 15).

21.4 Microbial Interference

An interfering microorganism study was performed to assess the inhibitory effects of microorganisms that may be encountered in vaginal specimens on the performance of Xpert Xpress MVP. Thirteen microorganisms were tested for potential interference at $\geq 10^6$ CFU/mL for bacteria and at $\geq 10^4$ International Unit/mL or cells/mL for viruses (Table 30). Each of the microorganisms was tested in simulated vaginal swab matrix in the presence and absence of *Atopobium vaginae* at 3× near cut-off concentrations, *Megasphaera*-1 and BVAB2 targets each at ~1.5× near cut-off concentrations, and *Candida albicans*, *C. glabrata* and *Trichomonas vaginalis* targets each at 3× LoD. The results showed that the presence of the tested microorganisms did not interfere with the performance of the Xpert Xpress MVP test.

Table 30. 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[a]
Human papilloma virus[b]

[a] Evaluated at highest concentration available (3×10^4 IU/mL)

[b] Evaluated at 1×10^4 cells/mL

Organism	Concentration	Organism	Concentration
Mycobacterium smegmatis	1×10^6 CFU/mL	Varicella-zoster virus	1×10^5 copies/mL

[a] *Kodamaea ohmeri* is also reported as *Pichia ohmeri* and *Candida guilliermondii.*

[b] *Pichia norvegensis* is also reported as *Candida norvegensis.*

[c] *Pichia occidentalis* is also reported as *Issatchenkia occidentalis* and *Candida sorbose.*

[d] *Mageeibacillus indolicus* is formerly named BVAB3.

[e] Evaluated at highest concentration available

Table 29. Organisms Tested that Showed Cross-Reactivity

Organism	Concentration	Replicates correctly reported results/ 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**

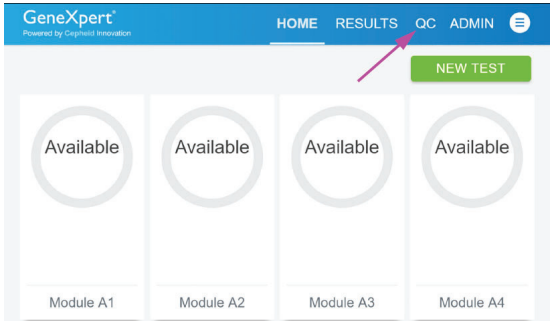

Figure 15. Home Screen

4. The Quality Control screen appears. Touch **Run QC Positive Test** or **Run QC Negative Test** (see Figure 16) based on the test being performed.

Figure 16. Quality Control Screen

5. The Sample ID screen appears.
6. Manually enter **Negative Control** for the Negative Control or **Positive Control** for the Positive Control, or scan the sample ID barcode, if enabled.
7. Touch **CONTINUE**.
8. The Confirm Sample ID screen appears. Verify the Sample ID entered is accurate by touching the **CONFIRM** button.
9. Scan the cartridge barcode, and touch **CONFIRM** to verify the test information displayed is correct.
10. Touch **CONTINUE** after confirming the information is correct.

If the barcode on the Xpert Xpress MVP test cartridge does not scan or scanning the barcode results in an error message stating that the cartridge is expired, then repeat the test with a new cartridge.

Note If you have scanned the cartridge barcode in the Xpress software and the assay definition file is not available, a screen will appear indicating the assay definition file is not loaded on the system. If this screen appears, upload the ADF file included in the CD with this kit, or contact Cepheid Technical Support.

11. If applicable, enter your User Name and Password.
12. The Cartridge Preparation screen appears (see Figure 6).

13. A video clip shows the cartridge preparation steps. Watch the video before continuing. Once complete, the video starts from the beginning automatically. Touch the **CONTINUE** button to exit video. Prepare the cartridge according to the directions below, which are also shown in the video.
14. Open the cartridge lid by lifting the front of the cartridge lid.
15. Check that the external control sample tube cap is closed. Vigorously shake the external control sample 3 to 4 times. Open the cap on the external control tube.
16. Remove the transfer pipette from the wrapper.
17. Squeeze the top bulb of the transfer pipette **completely until the top bulb is fully flat**. While continuing to hold the bulb fully flat, place the pipette tip in the external control tube (see Figure 7).
18. Keeping the pipette below the surface of the liquid, release the top bulb of the pipette **slowly until the pipette is completely filled with sample** before removing it from the tube. After filling the pipette, excess sample may be seen in the overflow reservoir bulb of the pipette (see Figure 7). It is okay if liquid goes into the overflow reservoir. Check that the pipette does not contain bubbles.
19. To transfer the sample to the cartridge, put the pipette into the large opening on the lower right corner of the cartridge (Sample Chamber) shown in Figure 8. Squeeze the top bulb of the transfer pipette **completely until it is fully flat** to empty the contents.
20. Continue to **hold the top bulb fully flat and do not release** until the pipette is removed from the cartridge. Do not reuse a pipette. Dispose of the used quality control tube and pipette in an appropriate waste container according to your institution's standard practices.
21. Close the cartridge lid.
22. Touch the **CONTINUE** button on the Cartridge Preparation screen. The Load Cartridge into Module screen appears (see Figure 9).
23. Open the module door with the flashing green light.
24. Load the cartridge with the barcode facing the operator onto the cartridge bay platform. Do not try to insert the cartridge past the cartridge bay platform.
25. Close the door until it clicks. The green light will stop blinking. The Test Running screen appears.
26. When the test is done, the green light goes out and the door automatically unlocks. The QC Test Result screen appears and shows the result for the completed QC test.
27. Open the module door, remove the used cartridge, and properly dispose of the cartridge according to your institution's hazardous waste disposal policies.
28. Repeat the above steps with the second control tube before testing patient samples.

Note If an unexpected result occurs (e.g., Negative Quality Control result is positive or Positive Quality Control result is negative), test a new Quality Control sample using a new cartridge and a new transfer pipette provided in the Xpert Xpress MVP test kit. If an unexpected result occurs upon retest, contact Cepheid Technical Support.

Organism	Concentration	Organism	Concentration
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*[a]	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*[b]	1×10^6 CFU/mL
Lactobacillus vaginalis	1×10^6 CFU/mL	*Pichia occidentalis*[c]	1×10^6 CFU/mL
Legionella pneumophila	1×10^6 CFU/mL	*Saccharomyces cerevisiae*	1×10^6 CFU/mL
Mageeibacillus indolicus[d]	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	4.3×10^5 cells/mL

Organism	Concentration	Organism	Concentration
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

16 Interpretation of Results

The results are interpreted automatically by the GeneXpert Xpress System and are clearly shown in the **Results** screen. The possible results and interpretations are shown in Table 1.

Table 1. Xpert Xpress MVP Results and Interpretations

Result	Interpretation
BV NEGATIVE	Negative test for bacterial vaginosis (BV).
Candida group NOT DETECTED	Candida group (*C. albicans* and/or *C. tropicalis* and/or *C. parapsilosis* and/or *C. dubliniensis*) target DNA is not detected.
Candida glab-krus NOT DETECTED	*Candida glabrata* and/or *Candida krusei* target DNA is not detected.
TV NOT DETECTED	*Trichomonas vaginalis* (TV) target DNA is not detected.
BV POSITIVE	Positive test for bacterial vaginosis (BV). Indicator DNA target(s) related to BV organisms is/are detected in one of the four BV Positive algorithms as shown in Table 2.
Candida group DETECTED	Candida group (*C. albicans* and/or *C. tropicalis* and/or *C. parapsilosis* and/or *C. dubliniensis*) target DNA is detected.
Candida glab-krus DETECTED	*Candida glabrata* and/or *Candida krusei* target DNA is detected.
TV DETECTED	*Trichomonas vaginalis* (TV) target DNA is detected.
NO RESULT - REPEAT TEST	If the result is **NO RESULT - REPEAT TEST**, then retest with a new cartridge using a new transfer pipette.
INSTRUMENT ERROR	Result is an instrument error. Touch **CLEAR ERROR** and follow the on-screen instructions. When the Home screen appears, repeat the test using a new cartridge and a new transfer pipette.

Table 2 presents the BV algorithm and the expected results.

Table 2. BV Results Algorithm[a]

BV Organisms			BV Result
***Atopobium* spp.** [b]	***Megasphaera*-1**	**BVAB2**	
+	+	-	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.

17 Retests

17.1 Reasons to Repeat the Test

If any of the test results mentioned below occur, repeat the test once according to instructions in Section 17.2, Retest Procedure.

- An **INSTRUMENT ERROR** result could be due to, but not limited to, the maximum pressure limits were exceeded or a power failure occurred.
- A **NO RESULT - REPEAT TEST** indicates that insufficient data were collected. For example, Probe Check Control failed.

17.2 Retest Procedure

To retest an **INSTRUMENT ERROR** or **NO RESULT - REPEAT TEST** result (non-determinate result), use a new cartridge (do not re-use the original cartridge). Use the leftover sample from the original specimen transport tube.

1. Put on a clean pair of gloves. Obtain a new Xpert Xpress MVP cartridge and a new transfer pipette provided in the Xpert Xpress MVP test kit.
2. Repeat the steps in Section 14.1, Starting a Test through Section 14.3, Loading the Cartridge.

18 Limitations

- The Xpert Xpress MVP test has been validated using only the procedures provided in this Instructions for Use. Modification to these procedures may alter the performance of the test.
- The Xpert Xpress MVP test has been validated with vaginal swabs collected with the Xpert Swab Specimen Collection Kit.
- Testing of vaginal swab specimens with the Xpert Xpress MVP test is not intended to replace an exam by a clinician. Vaginal infections may result from other causes or concurrent infections may occur.

21.3 Analytical Specificity (Cross-reactivity)

The analytical specificity of the Xpert Xpress MVP test was evaluated by testing a panel of 115 potentially cross-reactive microorganisms that are likely to be found in the vaginal flora/female genital tract. All strains were tested in triplicates in simulated vaginal swab matrix at a concentration of at least 10^6 CFU/mL, 10^5 cells/mL, 10^5 $TCID_{50}$/mL, or 10^4 International Unit (IU)/mL. No cross-reactivity was observed for 112 of the 115 microorganisms tested with the Xpert Xpress MVP test at the concentrations listed in Table 28. *Trichomonas tenax* and *Pentatrichomonas hominis* tested at 1×10^5 cells/mL reported **TV DETECTED** with the Xpert Xpress MVP test. *Candida orthopsilosis* tested at 1×10^6 CFU/mL reported Candida group **DETECTED** with the Xpert Xpress MVP test. All three initially cross-reactive organisms were negative on retest at lower concentrations. The results are presented in Table 29. This is addressed in Section 18, Limitations.

Table 28. 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

Organism	Strain	Concentration	Result			
			BV	Candida group	Candida glab-krus	TV
	ATCC 50139	15 cells/mL	Negative	Not Detected	Not Detected	Detected
	ATCC 50141	15 cells/mL	Negative	Not Detected	Not Detected	Detected
	ATCC 50167	15 cells/mL	Negative	Not Detected	Not Detected	Detected
	ATCC 50183	15 cells/mL	Negative	Not Detected	Not Detected	Detected
	ATCC PRA-95	15 cells/mL	Negative	Not Detected	Not Detected	Detected

[a] The LoD for *Atopobium vaginae* is for information only. All *Atopobium* spp. strains tested at ~3× LoD level reported BV NEGATIVE result calls as expected, as the concentration of *Atopobium* spp. strains tested was below the near cut-off concentration either in the presence or absence of Mega1-BVAB2 target. Replicates reporting Atop gp Ct values of ≤ 40.0 was treated as positive (pos) when *Atopobium* spp. strains were tested at ~ 3× LoD.

[b] *Atopobium vaginae* CCUG 44125 was tested at ~ 4× LoD (120 CFU/mL) to obtain 3 of 3 Atop gp Ct values of ≤ 40.0 results.

[c] *Atopobium vaginae* CCUG 48515 was tested at ~ 12× LoD (400 CFU/mL) to obtain 3 of 3 Atop gp Ct values of ≤ 40.0 results.

[d] *Atopobium vaginae* CCUG 44125 was tested at ~ 4× near cut-off concentration (1.2×10^6 CFU/mL) in the absence of BVAB2 and *Megasphaera*-1 to obtain 3 of 3 BV POSITIVE result calls.

[e] *Atopobium vaginae* CCUG 44156 was tested at ~ 6× near cut-off concentration (2.0×10^6 CFU/mL) in the absence of BVAB2 and *Megasphaera*-1 to obtain 3 of 3 BV POSITIVE result calls.

[f] *Atopobium vaginae* CCUG 48515 was tested at ~ 12× near cut-off concentration (4.0×10^6 CFU/mL) in the absence of BVAB2 and *Megasphaera*-1 to obtain 3 of 3 BV POSITIVE result calls.

[g] *Atopobium* novel species CCUG 55226 was tested at ~ 6× near cut-off concentration (2.0×10^6 CFU/mL) in the absence of BVAB2 and *Megasphaera*-1 to obtain 3 of 3 BV POSITIVE result calls.

[h] *Atopobium vaginae* CCUG 44125 was tested at ~ 4× near cut-off concentration (10,000 CFU/mL) in the presence of BVAB2 and/or *Megasphaera*-1 to obtain 3 of 3 BV POSITIVE result calls.

[i] *Atopobium vaginae* CCUG 44156 was tested at ~ 6× near cut-off concentration (17,000 CFU/mL) in the presence of BVAB2 and/or *Megasphaera*-1 to obtain 3 of 3 BV POSITIVE result calls.

[j] *Atopobium vaginae* CCUG 48515 was tested at ~ 6× (17,000 CFU/mL) to ~ 7× (20,000 CFU/mL) near cut-off concentration in the presence of BVAB2 and/or *Megasphaera*-1 to obtain 3 of 3 BV POSITIVE result calls.

[k] *Atopobium* novel species CCUG 55226 was tested at ~ 4× near cut-off concentration (10,000 CFU/mL) in the presence of BVAB2 and/or *Megasphaera*-1 to obtain 3 of 3 BV POSITIVE result calls.

[l] *Candida albicans* ATCC 38289 was tested at ~ 4× LoD (120 CFU/mL) to obtain 3 of 3 Candida group DETECTED result calls.

[m] *Candida albicans* ATCC 62376 was tested at ~ 20× LoD (600 CFU/mL) to obtain 3 of 3 Candida group DETECTED result calls.

[n] *Candida albicans* ATCC 753 was tested at ~ 20× LoD (600 CFU/mL) to obtain 3 of 3 Candida group DETECTED result calls.

[o] metronidazole-resistant strain

- As with many diagnostic tests, results from the Xpert Xpress MVP test should be interpreted in conjunction with other laboratory and clinical data available to the clinician.
- Public health recommendations should be consulted regarding testing for additional sexually transmitted diseases for patients with a positive result for bacterial vaginosis (BV) or *T. vaginalis* with the Xpert Xpress MVP test.
- The Xpert Xpress MVP test targets three anaerobic microorganisms that are associated with BV. Other organisms that are not detected by the Xpert Xpress MVP test have also been reported to be associated with BV and aerobic vaginitis.
- A Candida group positive result can be due to one or multiple *Candida* species.
- *Candida* species can be present as commensal organisms in women; the Xpert Xpress MVP positive results for *Candida* should be considered in conjunction with other clinical and patient information to determine the disease status.
- The BV organism targets of the Xpert Xpress MVP test can be commensal in women; Xpert Xpress MVP positive results for bacterial vaginosis should be considered in conjunction with other clinical and patient information to determine the disease status.
- Erroneous test results might occur from improper specimen collection, technical error, sample mix-up, or because the number of organisms in the specimen is not detected by the test. Careful compliance with the instructions in this Instructions for Use and the Xpert Swab Specimen Collection Kit instruction documents are necessary to avoid erroneous results.
- A negative test result does not exclude the possibility of infection because test results may be affected by improper specimen collection, technical error, specimen mix-up, concurrent antibiotic therapy, or the number of organisms in the specimen that may be below the sensitivity of the tests.
- False negative results may occur if the organism(s) is present at levels below the analytical limit of detection, below the cut-off concentration or outside the BV algorithm parameters for a positive result.
- Mutations or other changes within the regions of the microbial genomes covered by the primers and/or probes in the Xpert Xpress MVP test may result in failure to detect the target organisms.
- The effects of other potential variables such as vaginal discharge, use of tampons, douching, and specimen collection variables have not been determined.
- The Xpert Xpress MVP test provides qualitative results. No correlation can be drawn between the magnitude of the Ct value and the number of cells in an infected sample.
- The Xpert Xpress MVP test performance has been evaluated in patients 14 years of age and older (including pregnant women).
- The Xpert Xpress MVP test has not been validated for use with vaginal swab specimens collected by patients at home. The self-collected vaginal swab specimen application is limited to healthcare facilities where support/counseling is available to explain procedures and precautions.
- Five strains of *Candida albicans* evaluated in the Inclusivity Study were detected by the Xpert Xpress MVP test. Three of the strains were only detected at concentrations higher than 3× LoD (one strain at 4× LoD and two strains at 20× LoD).
- Eleven strains of *Atopobium* spp. evaluated in the Inclusivity Study were detected by the Xpert Xpress MVP test. Four of the strains were only detected

at concentrations higher than 3× near cut-off concentration (ranging from 4× and 12×).

- *Candida orthopsilosis*, a recently described species that has been grouped previously with *C. parapsilosis*, was found to cross-react with the Xpert Xpress MVP test at levels above 1×10^2 CFU/mL. *Pentatrichomonas hominis* (a commensal of the large intestine) was found to cross-react with the Xpert Xpress MVP test at levels above 5×10^4 cells/mL. *Trichomonas tenax* (a commensal of the oral cavity) was found to cross-react with the Xpert Xpress MVP test at levels above 10 cells/mL. See Section 21.3 for details.
- Interference with the Xpert Xpress MVP test was observed in the presence of mucin (from porcine stomach) (≥5.5% v/v). See Section 21.6 for details.
- The analyte target may persist *in vivo*, independent of pathogen viability. Detection of the analyte target does not imply that the corresponding pathogen is infectious, or is the causative agent of the clinical symptoms.
- The Xpert Xpress MVP test cannot be used to assess therapeutic success or failure since target nucleic acids may persist following antimicrobial therapy.

Organism	Strain	Concentration	Result			
			BV	Candida group	Candida glab-krus	TV
	ATCC 90874	2,250 CFU/mL	Negative	Detected	Not Detected	Not Detected
	ATCC 204318	2,250 CFU/mL	Negative	Detected	Not Detected	Not Detected
	ATCC MYA-2733	2,250 CFU/mL	Negative	Detected	Not Detected	Not Detected
	ATCC MYA-277	2,250 CFU/mL	Negative	Detected	Not Detected	Not Detected
Candida parapsilosis	ATCC 7330	4,017 CFU/mL	Negative	Detected	Not Detected	Not Detected
	ATCC 60548	4,017 CFU/mL	Negative	Detected	Not Detected	Not Detected
	ATCC 90875	4,017 CFU/mL	Negative	Detected	Not Detected	Not Detected
	ATCC 96139	4,017 CFU/mL	Negative	Detected	Not Detected	Not Detected
	ATCC 96140	4,017 CFU/mL	Negative	Detected	Not Detected	Not Detected
Candida glabrata	ATCC 32312	60 CFU/mL	Negative	Not Detected	Detected	Not Detected
	ATCC 32554	60 CFU/mL	Negative	Not Detected	Detected	Not Detected
	ATCC 15126	60 CFU/mL	Negative	Not Detected	Detected	Not Detected
	ATCC 2001	60 CFU/mL	Negative	Not Detected	Detected	Not Detected
	ATCC MYA-276	60 CFU/mL	Negative	Not Detected	Detected	Not Detected
Candida krusei	ATCC 28870	1,968 CFU/mL	Negative	Not Detected	Detected	Not Detected
	ATCC 32672	1,968 CFU/mL	Negative	Not Detected	Detected	Not Detected
	ATCC 90878	1,968 CFU/mL	Negative	Not Detected	Detected	Not Detected
	ATCC 200917	1,968 CFU/mL	Negative	Not Detected	Detected	Not Detected
	ATCC 201748	1,968 CFU/mL	Negative	Not Detected	Detected	Not Detected
Trichomonas vaginalis	ATCC 30184	15 cells/mL	Negative	Not Detected	Not Detected	Detected
	ATCC 30187	15 cells/mL	Negative	Not Detected	Not Detected	Detected
	ATCC 30238[O]	15 cells/mL	Negative	Not Detected	Not Detected	Detected
	ATCC 30240	15 cells/mL	Negative	Not Detected	Not Detected	Detected
	ATCC 30245	15 cells/mL	Negative	Not Detected	Not Detected	Detected

Organism	Strain	Concentration	Result			
			BV	Candida group	Candida glab-krus	TV
	CCUG 55227	8,250 CFU/mL	Positive	Not Detected	Not Detected	Not Detected
	CCUG 55226	10,000 CFU/mL[k]	Positive	Not Detected	Not Detected	Not Detected
Atopobium spp. In the **presence** of *Megasphaera*-1 and BVAB2	CCUG 39382	8,250 CFU/mL	Positive	Not Detected	Not Detected	Not Detected
	CCUG 42099	8,250 CFU/mL	Positive	Not Detected	Not Detected	Not Detected
	CCUG 43049	8,250 CFU/mL	Positive	Not Detected	Not Detected	Not Detected
	CCUG 44061	8,250 CFU/mL	Positive	Not Detected	Not Detected	Not Detected
	CCUG 44116	8,250 CFU/mL	Positive	Not Detected	Not Detected	Not Detected
	CCUG 44125	10,000 CFU/mL[h]	Positive	Not Detected	Not Detected	Not Detected
	CCUG 44156	17,000 CFU/mL[i]	Positive	Not Detected	Not Detected	Not Detected
	CCUG 44258	8,250 CFU/mL	Positive	Not Detected	Not Detected	Not Detected
	CCUG 48515	17,000 CFU/mL[j]	Positive	Not Detected	Not Detected	Not Detected
	CCUG 55227	8,250 CFU/mL	Positive	Not Detected	Not Detected	Not Detected
	CCUG 55226	10,000 CFU/mL[k]	Positive	Not Detected	Not Detected	Not Detected
Candida albicans	ATCC 38289	120 CFU/mL[l]	Negative	Detected	Not Detected	Not Detected
	ATCC 62376	600 CFU/mL[m]	Negative	Detected	Not Detected	Not Detected
	ATCC 96113	90 CFU/mL	Negative	Detected	Not Detected	Not Detected
	ATCC 60193	90 CFU/mL	Negative	Detected	Not Detected	Not Detected
	ATCC 753	600 CFU/mL[n]	Negative	Detected	Not Detected	Not Detected
Candida dubliniensis	ATCC MYA-179	3,948 CFU/mL	Negative	Detected	Not Detected	Not Detected
	ATCC MYA-577	3,948 CFU/mL	Negative	Detected	Not Detected	Not Detected
	ATCC MYA-646	3,948 CFU/mL	Negative	Detected	Not Detected	Not Detected
	ATCC MYA-580	3,948 CFU/mL	Negative	Detected	Not Detected	Not Detected
	ATCC MYA-581	3,948 CFU/mL	Negative	Detected	Not Detected	Not Detected
Candida tropicalis	ATCC 34139	2,250 CFU/mL	Negative	Detected	Not Detected	Not Detected

19 Expected Values

Positivity rates in the symptomatic patient population, as observed in the 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 3.

Table 3. Positivity Rates in Symptomatic Patients

	Target	Overall	Black /African American		White		Asian	Other[a]
			Hispanic/ Latino	Not Hispanic/ Latino	Hispanic/ Latino	Not Hispanic/ Latino		
CVS	BV	38.6% (476/1232)	55.6% (5/9)	58.6% (253/432)	35.1% (46/131)	24.8% (150/605)	33.3% (6/18)	43.2% (16/37)
CVS	Candida group	32.7% (407/1246)	33.3% (3/9)	37.4% (164/438)	34.6% (46/133)	28.8% (175/608)	42.1% (8/19)	28.2% (11/39)
CVS	Candida glab-krus	2.7% (34/1246)	0% (0/9)	3.0% (13/438)	3.0% (4/133)	2.6% (16/608)	0% (0/19)	2.6% (1/39)
CVS	TV	4.4% (53/1220)	0% (0/9)	8.9% (38/427)	3.9% (5/129)	1.5% (9/600)	0% (0/18)	2.7% (1/37)
SVS	BV	39.5% (488/1234)	55.6% (5/9)	58.5% (252/431)	36.1% (48/133)	26.1% (158/605)	38.9% (7/18)	47.4% (18/38)
SVS	Candida group	33.9% (423/1247)	33.3% (3/9)	38.9% (170/437)	35.1% (47/134)	30.4% (185/608)	36.8% (7/19)	27.5% (11/40)
SVS	Candida glab-krus	3.0% (37/1247)	0% (0/9)	2.7% (12/437)	3.0% (4/134)	3.3% (20/608)	0% (0/19)	2.5% (1/40)
SVS	TV	4.1% (50/1221)	0% (0/9)	8.5% (36/426)	3.8% (5/130)	1.3% (8/600)	0% (0/18)	2.6% (1/38)

[a] 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, positivity rates were calculated from CVS and SVS specimens collected from asymptomatic patients to assess how often patients who, despite being asymptomatic, harbored 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 4.

Table 4. Positivity Rates in Asymptomatic Patients

	Target	Overall	Black / African American[a]	White		Other[b]
				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)

[a] 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.
[b] Including: American Indian or Alaska Native, Asian, Mixed/Unknown

20 Performance Characteristics

20.1 Clinical Performance

A blinded clinical study was conducted to evaluate the performance of the Xpert Xpress MVP test at 9 geographically diverse sites in the U.S. Subjects included female patients ≥ 14 years of age 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 target, yeast culture followed by mass spectrometry identification for the Candida group and Candida glab-krus targets, a patient infected status (PIS)

Organism	Strain	Concentration	Result			
			BV	Candida group	Candida glab-krus	TV
	CCUG 48515	4.0×10^6 CFU/mL[f]	Positive	Not Detected	Not Detected	Not Detected
	CCUG 55227	9.6×10^5 CFU/mL	Positive	Not Detected	Not Detected	Not Detected
	CCUG 55226	2.0×10^6 CFU/mL[g]	Positive	Not Detected	Not Detected	Not Detected
Atopobium spp. In the **presence** of BVAB2	CCUG 39382	8,250 CFU/mL	Positive	Not Detected	Not Detected	Not Detected
	CCUG 42099	8,250 CFU/mL	Positive	Not Detected	Not Detected	Not Detected
	CCUG 43049	8,250 CFU/mL	Positive	Not Detected	Not Detected	Not Detected
	CCUG 44061	8,250 CFU/mL	Positive	Not Detected	Not Detected	Not Detected
	CCUG 44116	8,250 CFU/mL	Positive	Not Detected	Not Detected	Not Detected
	CCUG 44125	10,000 CFU/mL[h]	Positive	Not Detected	Not Detected	Not Detected
	CCUG 44156	17,000 CFU/mL[i]	Positive	Not Detected	Not Detected	Not Detected
	CCUG 44258	8,250 CFU/mL	Positive	Not Detected	Not Detected	Not Detected
	CCUG 48515	17,000 CFU/mL[j]	Positive	Not Detected	Not Detected	Not Detected
	CCUG 55227	8,250 CFU/mL	Positive	Not Detected	Not Detected	Not Detected
	CCUG 55226	10,000 CFU/mL[k]	Positive	Not Detected	Not Detected	Not Detected
Atopobium spp. In the **presence** of *Megasphaera*-1	CCUG 39382	8,250 CFU/mL	Positive	Not Detected	Not Detected	Not Detected
	CCUG 42099	8,250 CFU/mL	Positive	Not Detected	Not Detected	Not Detected
	CCUG 43049	8,250 CFU/mL	Positive	Not Detected	Not Detected	Not Detected
	CCUG 44061	8,250 CFU/mL	Positive	Not Detected	Not Detected	Not Detected
	CCUG 44116	8,250 CFU/mL	Positive	Not Detected	Not Detected	Not Detected
	CCUG 44125	10,000 CFU/mL[h]	Positive	Not Detected	Not Detected	Not Detected
	CCUG 44156	17,000 CFU/mL[i]	Positive	Not Detected	Not Detected	Not Detected
	CCUG 44258	8,250 CFU/mL	Positive	Not Detected	Not Detected	Not Detected
	CCUG 48515	20,000 CFU/mL[j]	Positive	Not Detected	Not Detected	Not Detected

BV POSITIVE test result. Two *Atopobium* spp. strains reported **BV POSITIVE** at ~4×, one strain at ~6×, and one strain at ~7× near cut-off concentration. The inclusivity result summary is presented in Table 27.

Table 27. Analytical Reactivity (Inclusivity) of the Xpert Xpress MVP test

Organism	Strain	Concentration	Result			
			BV	Candida group	Candida glab-krus	TV
Negative Control			Negative	Not Detected	Not Detected	Not Detected
Atopobium spp. LoD (Below the near cut-off concentrations and not generating BV POSITIVE result)[a]	CCUG 39382	96 CFU/mL	pos [a]	Not Detected	Not Detected	Not Detected
	CCUG 42099	96 CFU/mL	pos[a]	Not Detected	Not Detected	Not Detected
	CCUG 43049	96 CFU/mL	pos[a]	Not Detected	Not Detected	Not Detected
	CCUG 44061	96 CFU/mL	pos[a]	Not Detected	Not Detected	Not Detected
	CCUG 44116	96 CFU/mL	pos[a]	Not Detected	Not Detected	Not Detected
	CCUG 44125	120 CFU/mL[b]	pos[a]	Not Detected	Not Detected	Not Detected
	CCUG 44156	96 CFU/mL	pos[a]	Not Detected	Not Detected	Not Detected
	CCUG 44258	96 CFU/mL	pos[a]	Not Detected	Not Detected	Not Detected
	CCUG 48515	400 CFU/mL[c]	pos[a]	Not Detected	Not Detected	Not Detected
	CCUG 55227	96 CFU/mL	pos[a]	Not Detected	Not Detected	Not Detected
	CCUG 55226	96 CFU/mL	pos[a]	Not Detected	Not Detected	Not Detected
Atopobium spp. In the **absence** of *Megasphaera*-1 and BVAB2	CCUG 39382	9.6×10^5 CFU/mL	Positive	Not Detected	Not Detected	Not Detected
	CCUG 42099	9.6×10^5 CFU/mL	Positive	Not Detected	Not Detected	Not Detected
	CCUG 43049	9.6×10^5 CFU/mL	Positive	Not Detected	Not Detected	Not Detected
	CCUG 44061	9.6×10^5 CFU/mL	Positive	Not Detected	Not Detected	Not Detected
	CCUG 44116	9.6×10^5 CFU/mL	Positive	Not Detected	Not Detected	Not Detected
	CCUG 44125	1.2×10^6 CFU/mL[d]	Positive	Not Detected	Not Detected	Not Detected
	CCUG 44156	2.0×10^6 CFU/mL[e]	Positive	Not Detected	Not Detected	Not Detected
	CCUG 44258	9.6×10^5 CFU/mL	Positive	Not Detected	Not Detected	Not Detected

algorithm that included a combination of NAAT and culture results for the TV target. When applicable, investigation of discrepant results was performed by testing specimens with another FDA-cleared NAAT.

20.2 Results

The study population comprised of 1,275 female patients 18 to ≥ 50 years of age. Additionally, two patients between 14–17 years of age were enrolled in the study. A total of 2,554 vaginal swabs (1,269 CVS and 1,275 SVS specimens) were tested and were eligible for inclusion in the Xpert Xpress MVP study.

Performance of the Xpert Xpress MVP test is presented in Table 5. The Xpert Xpress MVP test demonstrated positive percent agreement (PPA) and negative percent agreement (NPA) of 92.9% and 94.5% for BV detection in CVS specimens, respectively, and 93.5% and 93.6% in SVS specimens, respectively. For Candida group detection, the Xpert Xpress MVP test demonstrated sensitivity and specificity of 98.1% and 94.9% in CVS specimens, respectively, and 97.8% and 92.9% in SVS specimens, respectively. The Xpert Xpress MVP test demonstrated sensitivity and specificity of 94.1% and 99.8% for Candida glab-krus detection in CVS specimens, respectively, and 100% and 99.7% in SVS specimens, respectively. For *Trichomonas vaginalis* (TV) detection, the Xpert Xpress MVP test demonstrated PPA and NPA of 98.0% and 99.6% in CVS specimens, respectively, and 97.9% and 99.7% in SVS specimens, respectively.

Table 5. 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	92.9% 429/462[a] (90.1% - 94.9%)	94.5% 719/761[b] (92.6% - 95.9%)	93.5% 434/464[c] (90.9% - 95.4%)	93.6% 711/760[d] (91.6% - 95.1%)
Candida group[e]	98.1% 360/367[f] (96.1% - 99.1%)	94.9% 820/864[g] (93.2% - 96.2%)	97.8% 359/367[h] (95.8% - 98.9%)	92.9% 804/865[i] (91.0% - 94.5%)
Candida glab-krus Fresh Prospective	94.1% 32/34[j] (80.9% - 98.4%)	99.8% 1195/1197[k] (99.4% - 99.9%)	100% 33/33 (89.6% - 100%)	99.7% 1195/1199[l] (98.8% - 99.7%)
Candida glab-krus Contrived[m]	99.0% 98/99 (94.5% - 99.8%)	96.4% 27/28 (82.3% - 99.4%)	N/A	N/A

	Clinician-collected (CVS)		Self-collected (SVS)	
	Sensitivity/ PPA (95% CI)	Specificity/ NPA (95% CI)	Sensitivity/ PPA (95% CI)	Specificity/ NPA (95% CI)
TV Fresh Prospective	98.0% 48/49[n] (89.3% - 99.6%)	99.6% 1155/1160[o] (99.1% - 99.8%)	97.9% 47/48[p] (89.1% - 99.6%)	99.7% 1159/1162[q] (99.2% - 99.9%)
TV Contrived[m]	94.4% 84/89 (87.5% - 97.6%	100% 29/29 (88.3% - 100%)	N/A	N/A

a Testing results with a second FDA-cleared NAAT: 15 were also negative and 18 were positive.
b Testing results with a second FDA-cleared NAAT: 21 were also positive and 21 were negative.
c Testing results with a second FDA-cleared NAAT: 9 were also negative and 21 were positive.
d Testing results with a second FDA-cleared NAAT: 20 were also positive and 29 were negative.
e Target includes *C. albicans*, *C. tropicalis*, *C. parapsilosis*, and *C. dubliniensis*
f Testing results with an FDA-cleared NAAT: 5 were also negative and 2 were positive.
g Testing results with an FDA-cleared NAAT: 25 were also positive and 19 were negative.
h Testing results with an FDA-cleared NAAT: 4 were also negative and 4 were positive.
i Testing results with an FDA-cleared NAAT: 30 were also positive and 31 were negative.
j Testing results with an FDA-cleared NAAT: 1 was also negative and 1 was positive.
k Testing results with an FDA-cleared NAAT: 2 were negative.
l Testing results with an FDA-cleared NAAT: 4 were negative.
m Contrived specimens were prepared using individual negative clinical CVS and SVS specimens. See Table 14 for stratified results for *Candida glabrata* and *Candida krusei*.
n Testing results a second FDA-cleared NAAT: 1 was positive.
o Testing results a second FDA-cleared NAAT: 4 were also positive and 1 had no result.
p Testing results a second FDA-cleared NAAT: 1 was positive.
q Testing results a second FDA-cleared NAAT: 3 were also positive.

Table 26. Near Cut-off Concentration of BV Target for Xpert Xpress MVP

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 BVAB2)	2,750	CFU/mL
	Megasphaera-1 plasmid DNA	390	copies/mL
	BVAB2 plasmid DNA	50	copies/mL

21.2 Analytical Reactivity (Inclusivity)

The analytical reactivity (inclusivity) of the Xpert Xpress MVP test was determined with 5 strains of *Candida albicans*, 5 strains of *C. dubliniensis*, 5 strains of *C.tropicalis*, 5 strains of *C. parapsilosis*, 5 strains of *C. glabrata*, 5 strains of *C. krusei,* 11 strains of *Atopobium* spp. (*Atopobium vaginae* and/or *Atopobium* novel species CCUG 55226), and 10 strains of *Trichomonas vaginalis* that were diluted in simulated vaginal swab matrix at 3× LoD. Each *Atopobium* spp. strain was also evaluated at 3× near cut-off concentrations diluted in simulated vaginal swab matrix in the absence or presence of BVAB2 and/or *Megasphaera*-1 DNA to confirm the correct **BV POSITIVE** test results were reported. Three replicates were tested for each strain.

The Xpert Xpress MVP test correctly identified 46 of 51 strains upon initial testing at 3× LoD. Two strains of *Atopobium vaginae* tested at 3× LoD and three strains of *Candida albicans* tested at 3× LoD were not detected and were tested at higher concentrations to determine the minimum concentration sufficient for detection. One *A. vaginae* strain was detected at ~4× LoD and the other strain was detected at ~12× LoD. One *C. albicans* strain was detected at ~4× LoD and the other two *C. albicans* strains were detected at ~20× LoD. For near cut-off concentration of *Atopobium* spp. in the absence of *Megasphaera*-1 and BVAB2, the Xpert Xpress MVP test correctly reported **BV POSITIVE** test result for 7 of the 11 strains upon initial testing at 3× near cut-off concentration. Four strains did not meet acceptance criteria and were further tested to determine the minimum concentration sufficient for reporting **BV POSITIVE** test result. One *Atopobium* spp. strain reported **BV POSITIVE** at ~4×, two strains at ~6×, and one strain at ~12× near cut-off concentration. For the near cut-off concentration of *Atopobium* spp. in the presence of *Megasphaera*-1 and/or BVAB2, the Xpert Xpress MVP test correctly reported **BV POSITIVE** test result for 7 of the 11 strains upon initial testing at 3× near cut-off concentration. Four strains did not meet acceptance criteria and were further tested to determine the minimum concentration sufficient for reporting

of detection (LoD) and near cut-off concentrations for the target organisms were estimated by probit analysis. The LoD is defined as the lowest concentration of organism sample that can be reproducibly distinguished from negative samples with 95% confidence. The near cut-off concentration for the BV organisms is defined as the lowest concentrations of *Atopobium vaginae* and *Megasphaera*-1, or *A. vaginae* and BVAB2, or *A. vaginae* and *Megasphaera*-1 and BVAB2, or *A. vaginae* in the absence of *Megasphaera*-1 and BVAB2 that result in **BV POSITIVE** test results and can be reproducibly distinguished from negative samples with a 95% confidence level. The LoD for each *Candida* spp. and *Trichomonas vaginalis* strain was confirmed in natural clinical vaginal swab matrix and simulated vaginal swab matrix (Table 25). The LoD and near cut-off concentrations for each BV organism were confirmed in simulated vaginal swab matrix (Table 25 and Table 26).

Table 25. Limit of Detection of BV, Candida group, Candida glab-krus, and TV Targets for Xpert Xpress MVP

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 glab-krus	*Candida glabrata* ATCC 28482	20	CFU/mL
	Candida krusei ATCC 34135	656	CFU/mL
TV	*Trichomonas vaginalis* ATCC 30001	5	cells/mL

20.3 BV Performance Results

Table 6 presents BV performance stratified by age groups in clinician-collected and self-collected swab specimens. The PPA was greater than 93.0% in all age groups except for patients aged 50 and over, in whom the PPA was 74.1% and 76.9% in CVS and SVS specimen collection types, respectively. The NPA of > 90% was observed across all age groups and specimen collection types.

Table 6. 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 (20.7% - 100%)	100% 1/1 (20.7% - 100%)	100% 1/1 (20.7% - 100%)	100% 1/1 (20.7% - 100%)
18–29	94.4% 219/232 (90.7% - 96.7%)	92.0% 263/286 (88.2% - 94.6%)	94.4% 220/233 (90.7% - 96.7%)	91.3% 261/286 (87.4% - 94.0%)
30–39	93.9% 123/131 (88.4% - 96.9%)	96.0% 170/177 (92.1% - 98.1%)	94.7% 126/133 (89.5% - 97.4%)	93.8% 166/177 (89.2% - 96.5%)
40–49	93.0% 66/71 (84.6% - 97.0%)	93.7% 118/126 (88.0% - 96.7%)	94.4% 67/71 (86.4% - 97.8%)	92.9% 118/127 (87.1% - 96.2%)
≥ 50	74.1% 20/27 (55.3% - 86.8%)	97.7% 167/171 (94.1% - 99.1%)	76.9% 20/26 (58.0% - 89.0%)	97.6% 165/169 (94.1% - 99.1%)

Performance of the BV target stratified by race and ethnicity subgroups showed PPA and NPA ranging from 83.3% to 100% in most subgroups in CVS and SVS specimens (Table 7).

Table 7. 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	87.2% 170/195 (81.8% - 91.2%)	95.7% 511/534 (93.6% - 97.1%)	83.3% 174/197 (83.1% - 92.1%)	94.6% 504/533 (92.3% - 96.2%)
Black or African American	97.2% 239/246 (94.2% - 98.6%)	91.2% 176/193 (86.3% - 94.4%)	97.5% 238/244 (94.7% - 98.9%)	91.2% 177/194 (86.4% - 94.5%)
Asian	83.3% 5/6 (43.6% - 97.0%)	91.7% 11/12 (64.6% - 98.5%)	83.3% 5/6 (43.6% - 97.0%)	83.3% 10/12 (55.2% - 95.3%)
American Indian or Alaska Native	100% 3/3 (43.9% - 100%)	83.3% 5/6 (43.6% - 97.0%)	100% 3/3 (43.9% - 100%)	83.3% 5/6 (43.6% - 97.0%)
Native Hawaiian or Other Pacific Islander	100% 1/1 (20.7% - 100%%)	100% 1/1 (20.7% - 100%%)	100% 1/1 (20.7% - 100%%)	100% 1/1 (20.7% - 100%%)
Mixed/Unknown	100% 11/11 (74.1% - 100%)	100% 15/15 (79.6% - 100%)	100% 13/13 (77.2% - 100%)	100% 14/14 (78.5% - 100%)
Hispanic or Latino	92.5% 49/53 (82.1% - 97.0%)	95.7% 88/92 (89.3% - 98.3%)	94.4% 51/54 (84.9% - 98.1%)	95.6% 87/91 (89.2% - 98.3%)

	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	TV	Negative
Candida group, Candida glab-krus, TV	-	-	-	-	-	-	-	-	-	1/0	-	-
Candida glab-krus	-	-		-	-	-	-	-	-		-	1/3
TV	-	-	-	-	-	-	-	-	-	-		-
Negative	20/15	-	-	-	-	-	3/4	-	-	-	1/1	

20.8 Non-Determinate Rate

Of the 2,544 Xpert Xpress MVP runs performed in the clinical study, 126 resulted in non-determinate (**INSTRUMENT ERROR** or **NO RESULT - REPEAT TEST**) results on first attempt. Upon retest of these 126 specimens, 21 remained non-determinate. The initial non-determinate rate was 5.0% (126/2544) and the overall non-determinate rate was 0.8% (21/2544).

The initial non-determinate rate for CVS specimens was 4.6% (59/1269) and the overall non-determinate rate was 0.6% (8/1269). The initial non-determinate rate for SVS specimens was 5.3% (67/1275) and the overall non-determinate rate was 1.0% (13/1275).

21 Analytical Performance

Analytical study data were generated using the GeneXpert Instrument Systems (GeneXpert Dx running GeneXpert Dx software version 4.7b or higher or GeneXpert Infinity-80 running Xpertise software version 6.4b or higher). The data were re-analyzed with GeneXpert Xpress software version 6.4a and demonstrated acceptable results.

21.1 Analytical Sensitivity (Limit of Detection)

The analytical sensitivity of the Xpert Xpress MVP test was determined by preparing dilutions for each of the target organisms detected by the test. The near cut-off concentrations for the BV organisms were also determined. Positive samples were prepared by inoculating simulated vaginal swab matrix with each representative strain or quantified stocks of plasmid DNA containing the cloned genomic targets of BVAB2 or *Megasphaera*-1. Replicates of 20 were evaluated at a minimum of five concentrations for each of the target organisms. The limit

(22/147) had concordant BV and TV co-infections. Among 1,182 SVS specimens, 143 specimens yielded multi-target concordant results. Of the 143 specimens, 71.3% (102/143) had concordant BV and Candida group co-infections, and 14.7% (21/143) had concordant BV and TV co-infections.

Table 24. 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	TV	Negative
The Xpert Xpress MVP Test	BV		2/3	-	-	-	-	1/0	-	-	-	-	19/22
	BV, Candida group	10/18	**106/102**	-	1/0	-	-	14/17	1/0	-	-	-	1/2
	BV, Candida glab-krus	1/1	-	**3/2**	-	-	-	-	-	-	2/3	-	-
	BV, Candida group, Candida glab-krus	-	-	1/2	**3/4**	-	-	-	0/1	-	-	-	-
	BV, TV	2/2	-	-	-	**22/21**	1/1	-	-	-	-	3/3	-
	BV, Candida group, TV	-	-	-	-	2/2	**7/7**	-	-	1/0	-	-	-
	Candida group	1/3	11/12	-	-	-	-		-	-	-	-	22/28
	Candida group, Candida glab-krus	-	-	1/0	-	-	-	-	**3/3**	-	2/2	-	-
	Candida group, TV	-	-	-	-	-	-	1/0	-	**3/4**	-	-	1/1

Performance of BV target in subgroups based on clinical conditions at the time of specimen collection is presented in Table 8. Results showed PPA of ≥ 82.4% except in subgroup of patients using estrogen therapy and NPA of ≥ 87.0% in all subgroups across in CVS and SVS specimen collection types.

Table 8. 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	95.5% 42/44 (84.9% - 98.7%)	87.0% 47/54 (75.6% - 93.6%)	97.7% 43/44 (88.2% - 99.6%)	88.9% 48/54 (77.8% - 94.8%)
Patients with menses at enrollment	97.1% 33/34 (85.1% - 99.5%)	92.7% 38/41 (80.6% - 97.5%)	93.8% 30/32 (79.9% - 98.3%)	88.1% 37/42 (75.0% - 94.8%)
Patients using anti-fungals ≤ 24 hours[a]	87.5% 14/16 (64.0% - 96.5%)	100% 33/33 (89.6% - 100%)	82.4% 14/17 (59.0% - 93.8%)	100% 33/33 (89.6% - 100%)
Patients using antibiotics ≤ 24 hours[a]	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	75.0% 3/4 (30.1% - 95.4%)	100% 21/21 (84.5% - 100%)	66.7% 2/3 (20.8% - 93.8%)	100% 21/21 (84.5% - 100%)
Patients with recurrent symptoms	94.1% 255/271 (90.6% - 96.3%)	93.7% 253/270 (90.1% - 96.0%)	94.5% 257/272 (91.1% - 96.6%)	92.2% 249/270 (88.4% - 94.9%)
Patients with intercourse ≤ 24 hours	89.7% 26/29 (73.6% - 96.4%)	91.1% 41/45 (79.3% - 96.5%)	92.9% 26/28 (77.4% - 98.0%)	95.6% 43/45 (85.2% - 98.8%)

[a] Two (2) patients reported both anti-fungal and antibiotic use 24 hours prior to specimen collection

20.4 Candida group Performance Results

As presented in Table 9, sensitivity of the Candida group target is stratified by each of the four species that are detected in the Candida group target (*C. albicans*, *C. tropicalis*, *C. parapsilosis*, and *C. dubliniensis*) as identified by the reference method.

Table 9. Candida group Sensitivity by Species

Species	Clinician-collected (CVS)	Self-collected (SVS)
	Sensitivity (95% CI)	
Candida albicans	98.5% 337/342 (96.6% - 99.4%)	98.0% 335/342 (95.8% - 99.0%)
Co-infection *Candida albicans* and *Candida glabrata*	100% 7/7 (64.6% - 100%)	100% 7/7 (64.6% - 100%)
Co-infection *Candida albicans* and *Candida krusei*	100% 1/1 (20.7% - 100%)	100% 1/1 (20.7% - 100%)
Co-infection *Candida albicans* and other yeast	75.0% 3/4 (30.1% - 95.4%)	75.0% 3/4 (30.1% - 95.4%)
Candida dubliniensis	100% 5/5 (56.6% - 100%)	100% 5/5 (56.5% - 100%)
Candida parapsilosis	80.0% 4/5 (37.6% - 96.4%)	100.0% 5/5 (56.6% - 100%)
Candida tropicalis	100% 3/3 (43.9% - 100%)	100% 3/3 (43.9% - 100%)
Overall	98.1% 360/367 (96.1% - 99.1%)	97.8% 359/367 (95.8% - 98.9%)

20.7 Multi-Target Detection

Rates of multi-target detection for the Xpert Xpress MVP test are presented in Table 23, which includes specimens with valid results in all four targets of the Xpert Xpress MVP test and by the reference/comparator method (1,181 of 1,269 total CVS specimens, and 1,182 of 1,275 total SVS specimens). Overall, 16.3% of CVS specimens and 16.8% 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 (11.3% and 11.8%, respectively), followed by a combination of BV and TV (2.4% and 2.3%, respectively).

Table 23. Rates of Multi-Target Detection by Xpert Xpress MVP

Analytes Detected	Clinician-collected (CVS)	Self-collected (SVS)
BV, Candida group	11.3% 133/1181	11.8% 139/1182
BV, TV	2.4% 28/1181	2.3% 27/1182
BV, Candida group, TV	0.8% 10/1181	0.8% 9/1182
BV, Candida glab-krus	0.5% 6/1181	0.5% 6/1182
Candida group, Candida glab-krus	0.5% 6/1181	0.4% 5/1182
BV, Candida group, Candida glab-krus	0.3% 4/1181	0.7% 7/1182
Candida group, TV	0.4% 5/1181	0.4% 5/1182
Candida group, Candida glab-krus, TV	0.1% 1/1181	N/A
Total	16.3% 193/1181	16.8% 198/1182

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 24, where bolded values indicate concordant results and non-bolded values indicate discordant results.

Among 1,181 CVS specimens, 147 specimens yielded multi-target concordant results between Xpert Xpress MVP and reference methods. Of the 147 specimens, 72.1% (106/147) had concordant BV and Candida group co-infections, and 15%

Performance of the TV target in subgroups based on clinical conditions at the time of specimen collection is presented in Table 22. Results showed PPA ranging from 80.0% to 100% and NPA ranging from 97.9% to 100% in most subgroups in CVS and SVS specimen collection types.

Table 22. TV 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	100% 4/4 (51.0% - 100%)	100% 89/89 (95.9% - 100%)	100% 4/4 (51.0% - 100%)	100% 89/89 (95.9% - 100%)
Patients with menses at enrollment	80.0% 4/5 (37.6% - 96.4%)	100% 68/68 (94.7% - 100%)	80.0% 4/5 (37.6% - 96.4%)	100% 67/67 (94.6% - 100%)
Patients using anti-fungals ≤ 24 hours[a]	100% 2/2 (34.2% - 100%)	97.9% 46/47 (88.9% - 99.6%)	100% 2/2 (34.2% - 100%)	97.9% 47/48 (89.1% - 99.6%)
Patients using antibiotics ≤ 24 hours[a]	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	100% 1/1 (20.7% - 100%)	100% 24/24 (86.2% - 100%)	100% 1/1 (20.7% - 100%)	100% 23/23 (85.7% - 100%)
Patient with recurrent symptoms	96.4% 27/28 (82.3% - 99.4%)	99.2% 500/504 (98.0% - 99.7%)	96.3% 26/27 (81.7% - 99.3%)	99.4% 503/506 (98.3% - 99.8%)
Patient with intercourse ≤ 24 hours	100% 3/3 (43.9% - 100%)	100% 71/71 (94.9% - 100%)	100% 3/3 (43.9% - 100%)	100% 70/70 (94.8% - 100%)

[a] Two (2) patients reported both anti-fungal and antibiotic use 24 hours prior to specimen collection

As presented in Table 10, performance of the Candida group target stratified by age groups showed sensitivity and specificity of 91.7% or higher across all age groups and specimen collection types.

Table 10. Candida group Performance by Age Group

Age Group	Clinician-collected (CVS)		Self-collected (SVS)	
	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	98.1% 208/212 (95.2% - 99.3%)	94.6% 296/313 (91.5% - 96.6%)	97.2% 207/213 (94.0% - 98.7%)	91.7% 287/313 (88.1% - 94.2%)
30–39	97.8% 88/90 (92.3% - 99.4%)	93.7% 207/221 (89.6% - 96.2%)	97.8% 88/90 (92.3% - 99.4%)	92.8% 207/223 (88.7% - 95.5%)
40–49	100% 42/42 (91.6% - 100%)	95.5% 148/155 (91.0% - 97.8%)	100% 42/42 (91.6% - 100%)	93.6% 146/156 (88.6% - 96.5%)
≥ 50	95.2% 20/21 (77.3% - 97.2%)	96.6% 169/175 (92.7% - 98.4%)	100% 20/20 (83.9% - 100%)	94.8% 164/173 (90.4% - 97.2%)

Performance of the Candida group target stratified by race and ethnicity subgroups showed sensitivity of > 97.0% and specificity of > 87.5% in all subgroups except in Asian patients in CVS and SVS specimen collection types (Table 11).

Table 11. Candida group Performance by Race and Ethnicity

Race/Ethnicity	Clinician-collected (CVS)		Self-collected (SVS)	
	Sensitivity (95% CI)	Specificity (95% CI)	Sensitivity (95% CI)	Specificity (95% CI)
White	98.5% 199/202 (95.7% - 99.5%)	96.0% 509/530 (94.0% - 97.4%)	98.0% 198/202 (95.0% - 99.2%)	93.8% 498/531 (91.4% - 95.5%)
Black or African American	97.3% 145/149 (93.3% - 99.0%)	93.2% 272/292 (89.7% - 95.5%)	98.0% 147/150 (94.3% - 99.3%)	91.7% 266/290 (88.0% - 94.4%)
Asian	100% 6/6 (61.0% - 100%)	84.6% 11/13 (57.8% - 95.7%)	83.3% 5/6 (43.6% - 97.0%)	84.6% 11/13 (57.8% - 95.7%)
American Indian or Alaska Native	100% 1/1 (20.7% - 100%)	87.5% 7/8 (52.9% - 97.8%)	100% 1/1 (20.7% - 100%)	87.5% 7/8 (52.9% - 97.8%)
Native Hawaiian or Other Pacific Islander	N/A	100% 2/2 (34.2% - 100%)	N/A	100% 2/2 (34.2% - 100%)
Mixed/Unknown	100% 9/9 (70.1% - 100%)	100% 19/19 (83.2% - 100%)	100% 8/8 (67.6% - 100%)	95.2% 20/21 (77.3% - 99.2%)
Hispanic or Latino	100% 46/46 (92.3% - 100%)	95.1% 97/102 (89.0% - 97.9%)	100% 45/45 (92.1% - 100%)	93.2% 96/103 (86.6% - 96.7%)

Performance of the TV target stratified by race and ethnicity subgroups showed PPA ranging from 97.1% to 100% and NPA ranging from 99.0% to 100% in CVS and SVS specimen collection types (Table 21).

Table 21. TV 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	100% 13/13 (77.2% - 100%)	99.9% 706/707 (99.2% - 99.9%)	100% 13/13 (77.2% - 100%)	100% 708/708 (99.5% - 100%)
Black or African American	97.1% 34/35 (85.5% - 99.5%)	99.0% 395/399 (97.5% - 99.6%)	97.1% 33/34 (85.1% - 99.5%)	99.2% 396/399 (97.8% - 99.7%)
Asian	N/A	100% 18/18 (82.4% - 100%)	N/A	100% 18/18 (82.4% - 100%)
American Indian or Alaska Native	100% 1/1 (20.7% - 100%)	100% 8/8 (67.6% - 100%)	100% 1/1 (20.7% - 100%)	100% 8/8 (67.6% - 100%)
Native Hawaiian or Other Pacific Islander	N/A	100% 2/2 (34.2% - 100%)	N/A	100% 2/2 (34.2% - 100%)
Mixed/Unknown	N/A	100% 26/26 (87.1% - 100%)	N/A	100% 27/27 (87.5% - 100%)
Hispanic or Latino	100% 5/5 (56.6% - 100%)	100% 138/138 (97.3% - 100%)	100% 5/5 (56.6% - 100%)	100% 138/138 (97.3% - 100%)

[b] Two false negatives were moderate positive specimens prepared at 8× LoD. These samples may have contained clinical background with more inhibition.
[c] A total of nine specimens were tested. Eight specimens gave valid results and were included in the calculation. One specimen was not included in the calculation due to a final non-determinate result.
[d] A total of 30 specimens were tested. 29 specimens gave valid results and were included in the calculation. One specimen was not included in the calculation due to a final non-determinate result.
[e] Of the 120 contrived specimens that were tested, four gave initial non-determinate results. Two of the four (2/4) specimens gave valid retest results, and two of the four (2/4) specimens generated non-determinate retest results. The initial non-determinate rate was 3.3% (4/120), and the final non-determinate rate was 1.7% (2/120).

As presented in Table 20, performance of the TV target stratified by age groups showed PPA and NPA of 90.0% or higher across all age groups and specimen collection types.

Table 20. TV 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	N/A	100% 2/2 (34.2% - 100%)	N/A	100% 2/2 (34.2% - 100%)
18–29	100% 21/21 (84.5% - 100%)	99.8% 488/489 (98.8% - 99.9%)	100% 21/21 (84.5% - 100%)	100% 490/490 (99.2% - 100%)
30–39	100% 15/15 (79.6% - 100%)	99.3% 286/288 (97.5% - 99.8%)	100% 15/15 (79.6% - 100%)	99.3% 288/290 (97.5% - 99.8%)
40–49	90.9% 10/11 (62.3% - 98.4%)	99.5% 185/186 (97.0% - 99.9%)	90.0% 9/10 (59.6% - 98.2%)	100% 188/188 (98.0% - 100%)
≥ 50	100% 2/2 (34.2% - 100%)	99.5% 194/195 (97.2% - 99.9%)	100% 2/2 (34.2% - 100%)	99.5% 191/192 (97.1% - 99.9%)

Performance of the Candida group target in subgroups based on clinical conditions at the time of specimen collection is presented in Table 12. Results showed sensitivity and specificity ranging from 83.9% to 100% in CVS and SVS specimen collection types.

Table 12. Candida group Performance by Clinical Condition

Clinical Condition	Clinician-collected (CVS)		Self-collected (SVS)	
	Sensitivity (95% CI)	Specificity (95% CI)	Sensitivity (95% CI)	Specificity (95% CI)
Pregnant patients	100% 48/48 (92.6% - 100%)	96.0% 48/50 (86.5% - 98.9%)	95.8% 46/48 (86.0% - 98.9%)	96.0% 48/50 (86.5% - 98.9%)
Patients with menses at enrollment	94.4% 17/18 (74.2% - 99.0%)	98.3% 57/58 (90.9% - 99.7%)	100% 18/18 (82.4% - 100%)	98.2% 56/57 (90.7% - 99.7%)
Patients using anti-fungals ≤ 24 hours[a]	100% 17/17 (81.6% - 100%)	83.9% 26/31 (67.4% - 92.9%)	94.1% 16/17 (73.0% - 99.0%)	84.4% 27/32 (68.2% - 93.1%)
Patients using antibiotics ≤ 24 hours[a]	100% 7/7 (64.6% - 100%)	86.7% 13/15 (62.1% - 96.3%)	100% 7/7 (64.6% - 100%)	86.7% 13/15 (62.1% - 96.3%)
Patients using estrogen therapy ≤ 24 hours	85.7% 6/7 (48.7% - 97.4%)	100% 18/18 (82.4% - 100%)	100% 6/6 (61.0% - 100%)	100% 18/18 (82.4% - 100%)
Patient with recurrent symptoms	97.8% 179/183 (94.5% - 99.1%)	96.7% 357/369 (94.4% - 98.1%)	97.2% 176/181 (93.7% - 98.8%)	93.3% 347/372 (90.3% - 95.4%)
Patient with intercourse ≤ 24 hours	100% 24/24 (86.2% - 100%)	100% 53/53 (93.2% - 100%)	100% 25/25 (86.7% - 100%)	98.0% 50/51 (89.7% - 99.7%)

[a] Two (2) patients reported both anti-fungal and antibiotic use 24 hours prior to specimen collection

20.5 Candida glab-krus Performance Results

Performance of the Candida glab-krus target was evaluated in fresh and contrived specimens. Table 13 presents sensitivity of the Candida glab-krus target from fresh perspective specimens stratified by *C. glabrata* and *C. krusei*.

Table 13. Candida glab-krus Sensitivity in Fresh Specimens by Species

Species	Clinician-collected (CVS)	Self-collected (SVS)
	Sensitivity (95% CI)	
Candida glabrata	96.7% 29/30 (83.3% - 99.4%)	100% 29/29 (88.3% - 100%)
Candida krusei	75.0% 3/4 (30.1% - 95.4%)	100% 4/4 (51.0% - 100%)
Overall	94.1% 32/34[a] (80.9% - 98.4%)	100% 33/33 (89.6% - 100%)

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

Table 14 presents a summary of performance of the Candida glab-krus target in contrived specimens, including the concentrations that were tested as well as the number of replicates tested at each concentration.

Table 14. Performance of Candida glab-krus in Contrived Specimens

Contrived Specimen	Load (× LoD)	Concentration (CFU/mL)	N of Replicates Tested	Evaluable Results N = 127	
				PPA (95% CI)	NPA (95% CI)
Candida glabrata	Low (1.8×)	36	25	96.0% 24/25[a] (80.5% - 99.3%)	N/A
	Moderate (9.5×)	190	20	100% 20/20 (83.9% - 100%)	N/A
	High (19×)	380	5	100% 5/5 (56.5% - 100%)	N/A

20.6 TV Performance Results

Performance of the TV target was evaluated in fresh and contrived specimens. Table 18 presents a summary of performance of the TV target in fresh prospective specimens.

Table 18. Performance of TV in Fresh Specimens

Organism	Clinician-collected (CVS)		Self-collected (SVS)	
	PPA (95% CI)	NPA (95% CI)	PPA (95% CI)	NPA (95% CI)
Trichomonas vaginalis	98.0% 48/49 (89.3% - 99.6%)	99.6% 1155/1160 (99.0% - 99.8%)	97.9% 47/48 (89.1% - 99.6%)	99.7% 1159/1162 (99.2% - 99.9%)

Table 19 presents a summary of performance of the TV target in contrived specimens, including the concentrations that were tested as well as the number of replicates tested at each concentration.

Table 19. Performance of TV in Contrived Specimens

Contrived Specimen	Load (× LoD)	Concentration (cells/mL)	N of Replicates Tested	Evaluable Results N = 118	
				PPA (95% CI)	NPA (95% CI)
Trichomonas vaginalis	Low (1.7×)	8.7	45	93.3% 42/45[a] (82.1% - 97.7%)	N/A
	Moderate (8.0×)	40	36	94.4% 34/36[b] (83.9% - 100%)	N/A
	High (19.2×)	96	9[c]	100% 8/8 (67.6% - 100%)	N/A
Negative	N/A	N/A	30[d]	N/A	100% 29/29 (88.3% - 100%)
Total			120[e]	94.4% 84/89 (87.5% - 97.6%)	100% 29/29 (88.3% - 100%)

[a] Three false negatives were low positive specimens prepared at 1.7× LoD.

Performance of the Candida glab-krus target in subgroups based on clinical conditions at the time of specimen collection is presented in Table 17. Results showed sensitivity and specificity ranging from 98.7% to 100% in CVS and SVS specimen collection types.

Table 17. Candida glab-krus Performance by Clinical Condition

Clinical Condition	Clinician-collected (CVS)		Self-collected (SVS)	
	Sensitivity (95% CI)	Specificity (95% CI)	Sensitivity (95% CI)	Specificity (95% CI)
Pregnant patients	100% 1/1 (20.7% - 100%)	100% 97/97 (96.2% - 100%)	100% 1/1 (20.7% - 100%)	99.0% 96/97 (94.4% - 99.8%)
Patients with menses at enrollment	100% 3/3 (43.9% - 100%)	100% 73/73 (95.0% - 100%)	100% 2/2 (34.2% - 100%)	100% 73/73 (95.0% - 100%)
Patients using anti-fungals ≤ 24 hours[a]	N/A	100% 48/48 (92.6% - 100%)	N/A	100% 49/49 (92.7% - 100%)
Patients using antibiotics ≤ 24 hours[a]	100% 1/1 (20.7% - 100%)	100% 21/21 (84.5% - 100%)	100% 1/1 (20.7% - 100%)	100% 21/21 (84.5% - 100%)
Patients using estrogen therapy ≤ 24 hours	N/A	100% 25/25 (86.7% - 100%)	N/A	100% 24/24 (86.2% - 100%)
Patient with recurrent symptoms	100% 14/14 (78.5% - 100%)	99.6% 536/538 (98.7% - 99.9%)	100% 13/13 (77.2% - 100%)	99.8% 539/540 (99.0% - 99.9%)
Patient with intercourse ≤ 24 hours	100% 2/2 (34.2% - 100%)	98.7% 74/75 (92.8% - 99.8%)	100% 2/2 (34.2% - 100%)	100% 74/74 (95.1% - 100%)

[a] Two (2) patients reported both anti-fungal and antibiotic use 24 hours prior to specimen collection

Contrived Specimen	Load (× LoD)	Concentration (CFU/mL)	N of Replicates Tested	Evaluable Results N = 127	
				PPA (95% CI)	NPA (95% CI)
Candida krusei	Low (1.8×)	1,181	25	100.0% 25/25 (86.7% - 100.0%)	N/A
	Moderate (8.5×)	5,576	20	100.0% 20/20 (83.9% - 100%)	N/A
	High (19×)	12,464	5[b]	100% 4/4 (51.0% - 100%)	N/A
Negative	N/A	N/A	30[c]	N/A	96.4% 27/28[d] (82.3% - 99.4%)
Total			130[e]	99.0% 98/99 (89.5% - 99.6%)	96.4% 27/28 (82.3% - 99.4%)

[a] One false negative was a low positive specimen prepared at 1.8× LoD.

[b] A total of five specimens were tested. Four specimens gave valid results and were included in the calculation. One specimen was not included in the calculation due to a final non-determinate result.

[c] A total of 30 specimens were tested. 28 specimens gave valid results and were included in the calculation. Two specimens were not included in the calculation due to final non-determinate results.

[d] One false positive was detected at a Ct value of 39.3.

[e] Of the 130 tested contrived specimens, three gave initial non-determinate results. Two of the three (2/3) specimens were retested and generated final non-determinate results. One of the three (1/3) specimens was not retested. Both the initial and final non-determinate rates were 2.3% (3/130).

As presented in Table 15, performance of the Candida glab-krus target stratified by age groups showed sensitivity of 75.0% or higher and specificity of 99.0% or higher across all age groups and specimen collection types.

Table 15. Candida glab-krus Performance by Age Group

Age Group	Clinician-collected (CVS)		Self-collected (SVS)	
	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	75.0% 6/8 (40.9% - 92.9%)	99.6% 512/514 (98.6% - 99.9%)	100% 7/7 (64.6% - 100%)	100% 519/519 (99.3% - 100%)
30–39	100% 10/10 (72.2% - 100%)	100% 301/301 (98.7% - 100%)	100% 10/10 (72.2% - 100%)	99.0% 300/303 (97.1% - 99.7%)
40–49	100% 7/7 (64.6% - 100%)	100% 190/190 (98.0% - 100%)	100% 7/7 (64.6% - 100%)	99.5% 190/191 (97.1% - 99.9%)
≥ 50	100% 9/9 (70.1% - 100%)	100% 187/187 (98.0% - 100%)	100% 9/9 (70.1% - 100%)	100% 184/184 (98.0% - 100%)

Performance of the Candida glab-krus target stratified by race and ethnicity subgroups showed sensitivity ranging from 90.0% to 100% and specificity ranging from 99.4% to 100% in CVS and SVS specimen collection types (Table 16).

Table 16. Candida glab-krus Performance by Race and Ethnicity

Race/Ethnicity	Clinician-collected (CVS)		Self-collected (SVS)	
	Sensitivity (95% CI)	Specificity (95% CI)	Sensitivity (95% CI)	Specificity (95% CI)
White	90.0% 18/20 (69.9% - 97.2%)	99.7% 710/712 (99.0% - 99.9%)	100% 20/20 (83.9% - 100%)	99.4% 709/713 (98.6% - 99.8%)
Black or African American	100% 13/13 (77.2% - 100%)	100% 428/428 (99.1% - 100%)	100% 12/12 (75.8% - 100%)	100% 428/428 (99.1% - 100%)
Asian	N/A	100% 19/19 (83.2% - 100%)	N/A	100% 19/19 (83.2% - 100%)
American Indian or Alaska Native	N/A	100% 9/9 (70.1% - 100%)	N/A	100% 9/9 (70.1% - 100%)
Native Hawaiian or Other Pacific Islander	N/A	100% 2/2 (34.2% - 100%)	N/A	100% 2/2 (34.2% - 100%)
Mixed/Unknown	100% 1/1 (20.7% - 100%)	100% 27/27 (87.5% - 100%)	100% 1/1 (20.7% - 100%)	100% 28/28 (87.9% - 100%)
Hispanic or Latino	100% 5/5 (56.6% - 100%)	100% 143/143 (97.4% - 100%)	100% 5/5 (56.6% - 100%)	100% 143/143 (97.4% - 100%)