EVALUATION OF AUTOMATIC CLASS III DESIGNATION FOR
PrimeStore MTM
DECISION SUMMARY

A. DEN Number:

DEN170029

B. Purpose for Submission:

De Novo request for evaluation of automatic class III designation for the PrimeStore MTM

C. Measurands:

Storage and stability of nucleic acids from *Mycobacterium Tuberculosis* and Influenza A virus.

D. Type of Device:

Transport device for the stabilization of microbial nucleic acids

E. Applicant:

Longhorn Vaccines and Diagnostics, LLC

F. Proprietary and Established Names:

PrimeStore MTM

G. Regulatory Information:

1. Regulation section:

   21 CFR 866.2950

2. Classification:

   Class II (Special Controls)

3. Product code(s):

   QBD

4. Panel:

   83- Microbiology

H. Indications for Use:

1. Indications for use:

   PrimeStore MTM is intended for the stabilization, transportation and inactivation of infectious unprocessed nasal washes suspected of containing Influenza A virus RNA. PrimeStore MTM is also intended for the stabilization, transportation and inactivation of infectious unprocessed sputum samples suspected of containing *Mycobacterium tuberculosis* DNA from human samples.

2. Special conditions for use statement(s):

   For *in vitro* diagnostic use only
   For prescription use only

3. Special instrument requirements:

   None

I. Device Description:

The PrimeStore MTM device consists of a storage tube with an O-ring and lip seal containing 1.5 mL of the stabilization solution. These components are intended to inactivate Influenza A and *Mycoplasma tuberculosis*, lyse cells, disrupt/lyse lipid membranes, denatures proteins, inactivates enzymes, and stabilize Influenza A RNA and *M. tuberculosis* DNA. The transport device is designed for storage of specimens between 36-77 °F (2-25 °C).

The media contains the following reagents:

- Guanidine thiocyanate
- TCEP
- Sodium Citrate
- N-Lauroylsarcosine sodium (NLS)
- Antifoam A, TRIS
- EDTA
- Ethanol (molecular grade)
- HCl
- Nuclease-free water

J. Standard/Guidance Document Referenced (if applicable):

Not applicable

K. Test Principle:

Not applicable

L. Performance Characteristics:

1. Analytical performance:

a. Limit of detection

LoD testing was conducted to determine the lowest concentration of organisms that contains measurable nucleic acids that can be repeatedly recovered from the transport media with a greater than 95% accuracy. The LoD studies for *M. tuberculosis* and Influenza A were designed using a specific extraction platforms and amplification instrument to establish a concentration of organisms which will form the basis of additional testing. Testing near the LoD for the additional studies will challenge PrimeStore MTM ability to preserver nucleic acids from degradation under a variety of test conditions.

***Mycobacterium Tuberculosis* Limit of Detection:**

LoD testing was initially performed by spiking seven concentrations of MTB diluted 1:10 into pooled sputum which was known to be negative for MTB. The spiked sputum was then added at a concentration of 1:3 into the PrimeStore MTM for recovery using the PrimeXtract extraction kit and amplification using the ABI 7500 realtime PCR instrument. The study was conducted in quadruplicate to determine a recoverable concentration of MTB after being spiked into sputum and subsequently added to PrimeStore MTM. No detection (C_t = 40) was observed for one of the replicates at the 10^0 CFU/mL concentration. All other concentrations demonstrated recovery of MTB DNA from all the replicates. Table 1 shows the results of MTB organisms diluted 1:10 at multiple concentrations, extraction of DNA and amplification at each concentration. Additional LoD testing was provided at a concentration of 10^1 CFU/mL with 25 replicates. An acceptance criteria with a range of 3 C_t was used to determine the concentration that yielded at least a 95% of the replicates were recoverable within this range. At a concentration of 10^1 CFU/mL 25 of 25 replicates had recoverable concentrations and all replicates fell within the range of 3 C_t values, Table 2. The MTB DNA extracted from PrimeStore MTM had an average CT = 34.0; S.D. = 0.98 at a concentration of 10^1 CFU/mL.

The *M. tuberculosis* strain used for LoD studies was strain HN878 (BEI Resources, Catalog No. NR-13647)

Table 1. MTB preliminary Limit of Detection

MTB Concentration (CFU/mL)	Rep 1 (Ct)	Rep 2 (Ct)	Rep 3 (Ct)	Rep 4 (Ct)	Average (Ct)	SD (Ct)
10^6	17.8	17.7	17.6	17.6	17.7	0.1
10^5	22.1	22.6	21.9	22.1	22.2	0.4
10^4	23.5	23.4	23.2	23.5	23.4	0.2
10^3	26.3	26.7	26.6	26.8	26.6	0.2
10^2	29.4	29.3	29.6	28.7	29.3	0.2
10^1	32.8	32.6	33.4	32.2	32.8	0.4
10	34.4	40.0	34.6	35.6	36.2	3.2

Table 2. MTB LoD

10^1 CFU/mL	
Replicates	Ct Value
1	33.3
2	33.2
3	33.0
4	32.7
5	33.0
6	34.1
7	33.6
8	33.4
9	35.4
10	35.1
11	35.3
12	35.4
13	36.0
14	35.1
15	34.1
16	33.4
17	33.2
18	32.3
19	34.3
20	34.3
21	33.3
22	33.1
23	33.9
24	34.0
25	34.6
AVG:	34.0
SD:	1.0

LoD testing at both 10^1 CFU/mL and 10^2 CFU/mL resulted in all 25 replicates for each concentration to meet the pre-defined acceptance criteria.

Influenza A Limit of Detection:

LoD testing was initially performed by spiking multiple concentrations of influenza A diluted 1:10 into pooled, clinically negative, nasal washes. The final concentration of each spiked nasal wash was then added to achieve a final ratio of 1:3 specimen to PrimeStore MTM for recovery using the PrimeXtract extraction kit and amplification in conjunction with the ABI 7500 realtime PCR instrument. The study objective was to determine the detectable concentration of influenza A (A/Texas/78209/2008 (H3N2)) after spiking into nasal wash and added to PrimeStore MTM. No detection (C_t = 40) was observed at the 10^1 $TCID_{50}$/mL concentration. All other concentrations demonstrated recovery of Influenza A. Table 3 shows the results of the 1:10 dilutions of Influenza A. Additional LoD testing was provided at a concentration of 10^2 $TCID_{50}$/mL. 10^2 $TCID_{50}$/mL was replicated 25 times. An acceptance criteria with a range of 3 C_t was used to determine the concentration that yielded at least a 95% of the replicates were recoverable within this range. At a concentration of 10^2 $TCID_{50}$/mL 25 of 25 replicates had recoverable concentrations; however, one replicate had a high C_t value and fell outside the range of 3 C_t values, Table 4. The Influenza A RNA extracted from PrimeStore MTM had the following performance average CT = 34.5; S.D. = 0.88 at a concentration of 10^2 $TCID_{50}$/mL.

Table 3. Influenza A Preliminary Limit of Detection

FLUA Concentration ($TCID_{50}$/mL)	Rep 1 (Ct)	Rep 2 (Ct)	Rep 3 (Ct)	Average (Ct)	SD (Ct)
10^5	25.5	25	25.1	25.2	0.26
10^4	28.1	28	27.9	28	0.10
10^3	31.4	31.3	32.1	31.6	0.44
10^2	35.3	35.5	34.9	35.2	0.31
10^1	40	40	40	40	0

Table 4. Influenza A LoD

10^2 $TCID_{50}$/mL	
Replicates	C_T Value
1	35.8
2	33.7
3	34.6
4	33.3
5	34.2
6	33.9
7	34.1
8	36.3
9	34.9
10	33.9
11	34.6
12	34
13	34.2
14	33.8
15	34.7
16	34.4
17	33.6
18	34.4
19	34.5
20	34.4
21	34.9
22	36.1
23	35.5
24	32.6
25	35.6
AVG:	34.5
SD:	0.88

LoD testing at 10^2 $TCID_{50}$ resulted in all 25 replicates for the concentration to meet the pre-defined acceptance criteria.

b. Stability

***Mycobacterium Tuberculosis* stability:**

Stability studies evaluated the stability of DNA from whole organism *Mycobacterium tuberculosis* (MTB; $1x10^3$ CFU/mL) spiked into clinically negative sputum samples incubated in PrimeStore MTM at: refrigerated temperature (4°C, 39.2°F) for 36 days, Table 5, and ambient temperature (27°C, 80.6°F) for 36 days, Table 6. DNA from MTB (Strain HN878) in PrimeStore MTM was extracted using PrimeXtract spin columns. Nucleic acid stability was measured and analyzed by real-time PCR using the ABI 7500 (Thermo Fisher Scientific) instrument. The study analyzed 25 replicates extracted at each time point and at each temperature range. An initial time point designated as Day 0 for each temperature was included as the initial C_T average from

which all other time points were compared to. Time points for sample extractions were performed at Day 0, 1, 8, 15, 22, 29, 36, with an embedded Internal Negative Control (INC) included at both temperatures. The INC consisted of a test that used negative clinical samples in PrimeStore MTM, i.e., sputum without MTB. Additionally, a control that contained clinical specimen plus target, i.e., sputum plus MTB, was incubated in PBS, without PrimeStore MTM ((POS-(PS)), and included in the evaluation. A pre-defined acceptance criteria of (+/-) 3.0 C_t from time zero was used to establish stability and preservation of nucleic acids (DNA from MTB) as determined by real-time PCR, for 4 and 27°C without loss of detection signal using statistical analysis.

Table 5. MTB (1 x 10^3 CFU/mL) stability at 4°C

Day (4°C)	0	1	8	15	22	29	36
AVG (Ct):	29.8	29.5	29.4	29.3	30.8	29.5	29.3
SD (Ct):	0.8	0.4	0.4	0.3	0.3	0.5	0.7
INC:	NEG	NEG	NEG	NEG	NEG	NEG	NEG
POS (-PS) (Ct):	28.9	29.7	29.8	29.9	32.4	32.2	30.8

Table 6. MTB (1 x 10^3 CFU/mL) stability at 27°C

Day (27°C)	0	1	8	15	22	29	36
AVG (Ct):	29.4	29.4	29.4	29.4	31.0	29.8	29.4
SD (Ct):	0.2	0.2	0.3	0.3	0.3	0.4	0.3
INC:	NEG	NEG	NEG	NEG	NEG	NEG	NEG
POS (-PS) (Ct):	29.3	34.6	34.9	34.7	34.3	34.8	34.7

Stability testing of DNA from *M. tuberculosis* whole organism spiked into sputum and stored in PrimeStore MTM resulted in a variation of 1.6 C_t or less over 36 days at both 4°C and 27°C. The Positive samples not stored in Primestore MTM demonstrated degraded DNA as time and temperature increased.

Influenza A stability:

Stability studies evaluated the stability of Influenza A virus (Flu A; 1 x 10^3 $TCID_{50}$/mL) RNA from clinical samples incubated in PrimeStore MTM at: refrigerated temperature (4°C, 39.2°F) for 29 days, Table 7, and ambient temperature (27°C, 80.6°F) for 8 days, Table 8. The clinical matrix for the flu A stability study was nasal washes. The RNA was stabilized under the predefined conditions and was then extracted using PrimeXtract spin columns. Nucleic acid stability was measured and analyzed with the ABI 7500 (Thermo Fisher Scientific) instrument. The experiment analyzed 25 replicates extracted at each time point and for each temperature range. An initial time point designated as Day 0 and was included as the initial Ct average for each of the two temperature ranges tested. Time points for sample extractions were performed at Day 0, 1, 8, 15, 22 and 29 for refrigerated temperature (4°C, 39.2°F) and Day 0, 1 and 8 for ambient temperature (27°C, 80.6°F). An embedded Internal Negative Control (INC) was included in the study at both temperatures. The INC consisted of a test using negative clinical sample in PrimeStore MTM, i.e., nasal washing without Flu A virus. Additionally, a control that contained clinical specimen plus target, i.e., nasal washing plus Flu A was incubated

in PBS (POS (-PS)) and included in the evaluation. Pre-defined acceptance criteria of (+/-) 3.0 C_t from time zero was used to establish stability and preservation of nucleic acids (RNA from Flu A virus) as determined by real-time PCR, for 4°C and 27°C without loss of detection signal using statistical analysis.

Table 7. Flu A (1 x 10^3 $TCID_{50}$ / mL) stability at 4°C

Day (4°C)	0	1	8	15	22	29
AVG (Ct):	31.9	32.3	34.4	34.3	34.1	34.6
SD (Ct):	0.6	0.8	1.3	0.9	0.8	0.8
INC:	NEG	NEG	NEG	NEG	NEG	NEG
POS (-PS) (Ct):	34.4	33.6	35.8	NEG	36.5	NEG

Table 8. Flu A (1 x 10^3 $TCID_{50}$ / mL) stability at 27°C

Day (27°C)	0	1	8
AVG (Ct):	32.3	33.0	34.3
SD (Ct):	0.4	0.9	1.6
INC:	NEG	NEG	NEG
POS (-PS) (Ct):	34.4	34.9	37.6

Stability testing of RNA from Influenza A whole virus spiked into nasal wash and stored in PrimeStore MTM resulted in a variation of 2.7 C_t over 29 days at 4°C and a variation of 2.0 C_t over 8 days at 27°C. The Positive samples not stored in Primestore MTM demonstrated degraded RNA as time and temperature increased.

c. Inactivation

***Mycobacterium tuberculosis* inactivation:**

Sputum samples not submitted for MTB investigation were obtained from the diagnostic laboratory at the University of Pretoria (Pretoria, South Africa) and assessed for the presence of acid-fast bacilli by smear microscopy, cultured by MGIT 960 system to confirm the absence of MTB followed by quality assessment using the Bartlett Scoring System. Good quality purulent sputum specimens (Bartlett test score of 2+) were included for use in the spiking matrix experiments. These sputa were split and spiked with MTB H37Rv strain with concentrations of 1.5 x10^6 and 1.5 x 10^8 CFU/mL followed by inoculation into PrimeStore MTM (without decontamination or other pre-culture steps). A matrix assessment to determine effect of concentration was performed by adding to 1 mL of spiked sputum to 3, 2, and 1 mL of PrimeStore MTM. Samples were incubated in triplicate at ambient temperature for 1, 5, 10, 30, 60 and 180 minutes, including two positive and negative controls, and analyzed using the MGIT 960 system. Effective inactivation at each concentration and time point is defined as no growth in all samples after 42 days.

Transport media inactivation results:
No growth of MTB was observed when the concertation of MTB in sputum was 1.5 x 10^6 CFU/mL and incubated for a time of greater than 5 minutes with PrimeStore

MTM. Intermittent growth was observed at each time point when MTB concentration was1.5 x 10^8 CFU/ml and added at a ratio of 1:1, 1:2 and 1:3 sample to PrimeStore MTM. Growth was determined after 42 days of incubation (Table 9. below).

Table 9. MTB Growth at 42 days after exposure to PrimeStore MTM at different concentrations and ratios

Concentration of *M. tuberculosis* spiked in sputum	Ratio of Sputum to PrimeStore MTM	Exposure to PrimeStore MTM Time (Minutes)						
		1	5	10	15	30	60	180
		Number of replicates which exhibited growth after 42 days						
1.5 x 10^6 CFU/mL	1-3	0/3	0/3	0/3	0/3	0/3	0/3	0/3
	1-2	1/3	0/3	0/3	0/3	0/3	0/3	0/3
	1-1	0/3	0/3	0/3	0/3	0/3	0/3	0/3
1.5 x 10^8 CFU/mL	1-3	0/3	1/3	0/3	1/3	0/3	0/3	0/3
	1-2	3/3	0/3	0/3	0/3	2/3	0/3	0/3
	1-1	3/3	1/3	2/3	0/3	0/3	1/3	2/3

The data shows that PrimeStore MTM must be used at a ratio of at least 1:3 sputum to PrimeStore MTM and a minimum of 60 minutes exposure time to demonstrate MTB inactivation.

Influenza A inactivation:

Influenza/A/Wuhan/359/95 (10^8 $TCID_{50}$/ml) were incubated with PrimeStore MTM for 10, 30 and 60 seconds. Influenza only and PrimeStore MTM only were also incubated accordingly to serve as internal controls. Four days after inoculation, the cells were fixed and stained with 0.06% crystal violet in 1% glutaraldehyde. Wells that were not stained demonstrated the cytopathic effect (CPE) of the virus. The titer of the virus was recorded as the $TCID_{50}$.

Inactivation rate:

PrimeStore MTM showed cytotoxicity on MDCK cells when diluted 1:100 but not cytotoxicity at 1:1,000. The mixture of PrimeStore MTM and Influenza had similar profiles as PrimeStore MTM alone with 10, 30 and 60 second incubations, while Influenza only samples had viral loads of 1 x $10^{7.75}$, 1 x $10^{7.5}$ and 1 x $10^{7.75}$ $TCID_{50}$ respectively.

Transport media inactivation:

PrimeStore MTM rapidly inactivated Influenza virus with a >4.0 log reduction in concentration at 10 seconds. Viral CPE could not be observed at < 3.0 logs due to cellular destruction by PrimeStore MTM, Table 10 below.

Table 10 MTB inactivation in PrimeStore MTM

	10s incubation $1 X 10^x TCID_{50}$	30s incubation $1 X 10^x TCID_{50}$	60s incubation $1 X 10^x TCID_{50}$
Flu A only	7.75	7.5	7.75
Flu A and PrimeStore MTM	< 3.0	< 3.0	< 3.0
PrimeStore MTM only*	< 3.0	< 3.0	< 3.0

*PrimeStore shows cytotoxicity on MDCK cells when diluted to 1:1,000.

The PrimeStore MTM must be used at a ratio of at least 1:3 nasal to PrimeStore MTM and a minimum of 10 seconds exposure time to demonstrate inactivation of Influenza A. Measuring Influenza inactivation below $1 X 10^3$ was not possible because of the cytotoxic affects PrimeStore MTM has on the cell culture based testing.

2. Comparison Studies:

a. Clinical Comparison:

Method comparison is not applicable for a nucleic acid transport device. The device itself does not provide a result that can be used in making a clinical decision. Bench testing studies were done to determine the ability of PrimeStore MTM to stabilize the nucleic acids from MTB and Flu A samples. Nucleic Acid stability was performed using clinically negative matrix pooled and a minimum of 50 distinct matrices were used for each analyte for the stability study.

b. Extraction platform and amplification instrument compatibility

Mycobacterium Tuberculosis:

A study to establish that the PrimeStore MTM media is compatible with commercially available nucleic acid isolation reagents was performed using MTB spiked into sputum with final concentrations ranging from 3 to 250,000 CFU/mL. Aliquots of sputum in PrimeStore MTM were prepared and processed using the following nucleic acid extraction systems as per manufacturers' instructions:

- The QIAamp DNA mini kit (Qiagen, Hilden, Germany)
- MagNA Pure 96 System (Roche Diagnostics, Mannheim, Germany) using the DNA Bacterial/Viral small volume kit
- NucliSENS easyMAG (bioMerieux, Marcy I'Etoile, France) and using the generic protocol.
- An FDA cleared assay was performed as a control.

An aliquot of a sputum sample was tested using the control assay prior to inoculating in PrimeStore MTM, as instructed by the manufacturer. An input volume of 200 µL PrimeStore MTM sample was used along with the manufacturer recommended output volume of 50 µL (QIAamp and NucliSENS) and 100 µL (MagNA Pure 96) for further analysis. Real-time PCR targeting the MTB specific insertion sequence element 6110 (IS6110) was performed on the LightCycler 480II platform (Roche Diagnostics, Mannheim, Germany) to identify MTB in the DNA extracts. For each extraction method, the limit of detection for MTB DNA in PrimeStore MTM was similar to the PBS control as noted in Table 11.

Table 11. MTB extraction comparison

	MagNA Pure (PrimeStore MTM)[1,2]	EasyMAG (PrimeStore MTM)[1,3]	QIAamp (PrimeStore MTM)[1,4]	FDA Cleared control (PBS Control)
MTB Concentration (CFU/mL)	Number of positive replicates out of 20 samples			
2.5×10^5	20	20	20	20
2.5×10^4	20	20	20	20
2.5×10^3	20	20	16	13
2.5×10^2	20	20	18	5
2.5×10^1	13	10	7	3

[1] LightCycler 480II platform (Roche Diagnostics, Mannheim, Germany).
[2] MagNA Pure LoD, 2.5×10^2 CFU/mL
[3] EasyMAG LoD, 2.5×10^2 CFU/mL
[4] QIAamp LoD, 2.5×10^4 CFU/mL

A study was performed to establish the performance of PrimeStore MTM with the same amplification assay performed using two PCR amplification instruments. The study evaluated the detection of three 10-fold concentrations (1×10^5, 1×10^4, and 1×10^3 CFU/mL) of MTB (Strain HN878, 1×10^8 CFU/mL) extracted from sputum stored in PrimeStore MTM. Amplification was performed using two commercial real-time PCR platforms: 1) The ABI 7500 (Thermo Fisher Scientific) and 2) LightCycler 2.0 (Roche Diagnostics). The results using the two platforms are similar as shown in Table 12.

Table 12: Amplification comparison for two amplification instruments

ABI 7500 Instrument	C_T Value Rep 1	C_T Value Rep 2	Average C_T Value (High Concentration)
10^5 Extraction 1	19.2	18.8	19.0
10^5 Extraction 2	19.4	18.9	19.1
10^4 Extraction 1	22.0	22.1	22
10^4 Extraction 2	21.6	22.0	21.8
10^3 Extraction 1	24.4	24.7	24.5
10^3 Extraction 2	24.8	24.7	24.7
NTC	NEG	NEG	
NTC	NEG	NEG	
Positive Control	POS	POS	
Roche LightCycler	C_T Value Rep 1	C_T Value Rep 2	Average C_T Value (Low Concentration)
10^5 Extraction 1	19.9	20.3	20.1
10^5 Extraction 2	20.3	20.0	20.1
10^4 Extraction 1	23.4	22.8	23.1
10^4 Extraction 2	22.6	23.1	22.8
10^3 Extraction 1	25.6	25.9	25.7
10^3 Extraction 2	26.9	26.7	26.8
NTC	NEG	NEG	
NTC	NEG	NEG	
Positive Control	POS	POS	

The test results indicate that the extraction method used may affect the LoD of the downstream assay. The extraction methods listed above all indicate they are compatible with PrimeStore MTM but the QIAamp increases the LoD by two logs. A similar result is observed when the ABI 7500 and Roche LightCycler are compared to each other. The variation within each instrument is on average within 1 C_t. The variation between instruments is between 1 to 1.7 C_t depending on the concentration of *M. tuberculosis* used for testing. The results indicate that the extraction platform and amplification instrument may need additional validation to ensure robust results are provided.

c. Matrix Equivalence Study

Not applicable

3. Clinical Studies:

Not applicable

4. Clinical cut-off**:**

Not applicable

5. Expected values/Reference range:

   Not applicable.

M. Instrument Name

Not applicable

N. System Descriptions:

1. Modes of Operation:
   Does the applicant's device contain the ability to transmit data to a computer, webserver, or mobile device?

   Yes _____ or No _____X___

   Does the applicant's device transmit data to a computer, webserver, or mobile device using wireless transmission?

   Yes _____ or No ____X____

2. Software:
   FDA has reviewed applicant's Hazard Analysis and software development processes for this line of product types:

   Yes _____ or No ____X____

   Hazard Analysis and software development are not applicable to this class of device:

3. Specimen Identification:
   Transport device are not intended to identify specimens. The device itself does not provide a result that can be used in making a clinical decision. Transport devices are intended to preserve and stabilize nucleic acids.

4. Specimen Sampling and Handling:
   See section L.1.b regarding specimen stability.

5. Calibration:
   Not applicable.

6. Quality Control:
   Not applicable.

O. Other Supportive Instrument Performance Characteristics Data Not Covered in the "Performance Characteristics" Section above:

Not applicable

P. Proposed Labeling:

The labeling is sufficient and satisfies the requirements of 21 CFR parts 801 and 809 as well as the Special Controls for this type of device.

Q. Identified Risks to Health and Mitigation Measures:

Identified Risks to Health	Mitigation Measures
Failure to stabilize pathogen nucleic acid resulting in a false negative result	General Controls and Special Controls (1), (2), and (3)
Failure to inactivate the specimen	General Controls and Special Controls (1), (2)(i), (2)(ii), (3)(i), (3)(ii) and (3)(iv)

R. Benefit/Risk Analysis:

Summary	
Summary of the Benefit(s)	• PrimeStore MTM is a transport media that inactivates and stabilizes sputum specimens from patients suspected of influenza A or *M. tuberculosis* infection. • PrimeStore MTM facilitates downstream diagnostic testing by stabilizing pathogen nucleic acids to allow storage and transport of specimens between facilities or from patient care areas to the laboratory. • PrimeStore MTM may help prevent occupational transmission of infection to laboratory personnel by inactivating infectious agents.
Summary of the Risk(s)	• False negative results or failure to inactivate infectious pathogens are the primary risks associated with use of the PrimeStore MTM transport media. • If PrimeStore MTM does not stabilize pathogen nucleic acids, a false negative result could occur and may result in a delay of antimicrobial therapy, with subsequent worsening of infection and associated increase in morbidity or mortality. • Failure to inactivate pathogen nucleic acids may increase risk of transmission to laboratory personnel.
Summary of Other Factors	None
Conclusions Do the probable benefits outweigh the probable risks?	The probable benefits of the PrimeStore MTM device outweigh the potential risks in light of the listed special controls and applicable general controls. The PrimeStore MTM inactivates and stabilizes influenza A and *M. tuberculosis* nucleic acids, which may protect laboratory workers from occupational exposures and assist downstream molecular assays to detect Influenza A and *M. tuberculosis*. The proposed special controls will ensure that errors will be uncommon, and potential errors are further mitigated by current laboratory practices, which include universal precautions to protect laboratory technicians. The PrimeStore MTM performance characteristics suggest that the device will be safe and effective, if used as directed by the package insert, and could provide potential benefits to patients and laboratory personnel by facilitating the safe transport of clinical specimens.

S. Patient Perspectives

This submission did not include specific information on patient perspectives for this device.

T. Conclusion:

The information provided in this *de novo* submission is sufficient to classify this device into class II under regulation 21 CFR 866.2950. FDA believes that the stated special controls, and applicable general controls provide reasonable assurance of the safety and effectiveness of the device type. The device is classified under the following:

Product Code: QBD

Device Type: Microbial nucleic acid storage and stabilization device

Class: II (special controls)

Regulation: 21 CFR 866.2950

(a) Identification. A microbial nucleic acid storage and stabilization device is a device that consists of a container and reagents intended to stabilize microbial nucleic acids in human specimens for subsequent isolation and purification of nucleic acids for further molecular testing. The device in not intended for preserving morphology or viability of microorganisms.

(b) Classification. Class II (special controls). the special controls for this device are:

(1) The intended use for the 21 CFR 809.10 labeling must include a detailed description of microorganisms and types of human specimens intended to be preserved.

(2) The 21 CFR 809.10(b) labeling must include:

(i) A detailed device description, including all device components.

(ii) Performance characteristics from applicable analytical studies, including but not limited to, nucleic acid stability and microorganism inactivation.

(iii) A limiting statement that erroneous results may occur when the transport device is not compatible with molecular testing.

(iv) A limiting statement that the device has only been validated to preserve the representative microorganisms used in the analytical studies.

(3) Design verification and validation must include the following:

(i) Overall device design including all device components and all control elements incorporated into the analytical validation procedures.

(ii) Thorough description of the microorganisms and methodology used in the

validation of the device including, but not limited to, extraction platforms and assays used for the detection of preserved nucleic acids.

(iii) The limit of detection (LoD) of the molecular test used to establish microorganism nucleic acid stability.