

Section 12. Laboratory Considerations

12.1 Overview and General Guidance

This section contains information on the laboratory procedures performed in MTN-016, which are limited to testing on HIV-exposed and/or HIV-infected infants. The tests to be conducted on these infants include: HIV-1 DNA PCR, HIV-1 RNA PCR (confirmatory testing) and standard genotypic resistance testing; plasma will be processed for storage and later testing.

As transmission of HIV and other infectious agents can occur through contact with contaminated needles, blood, blood products, and vaginal secretions, all study staff must take appropriate precautions when collecting and handling biological specimens. Sites must have appropriate written safety procedures in place before study initiation. Guidance on universal precautions available from the US Centers for Disease Control and Prevention can be found at the following website:

- http://www.cdc.gov/ncidod/dhqp/bp_universal_precautions.html

Some laboratory procedures will be performed in the study site clinic or laboratory and others in the MTN Network Laboratory (NL).

Table 12-1 lists for each test the testing location, specimen type, specimen container and kit/method (if specified). Table 12-2 specifies blood collection by visit type and suggested volumes.

Regardless of whether tests are performed in clinic or laboratory settings, study staff that performs the tests must be trained in proper QC procedures prior to performing the tests for study purposes; training documentation should be available for inspection at any time.

Questions related to MTN-016 laboratory procedures may be referred to:

<p>Pam Kunjara Magee-Womens Research Institute 204 Craft Ave, Room A540 Pittsburgh, PA 15213 rsipk@mwri.magee.edu Phone # 412-641-6393 Pager # 412-917-9343 Fax # 412-641-6170</p>	<p>Urvi Parikh University of Pittsburgh 3550 Terrace Street Scaife Hall, Suite 817-A Pittsburgh, PA 15261 ump3@pitt.edu Phone # 412-648-3103 Fax # 412-648-8521</p>
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Table 12-1
Overview of Laboratory Testing Locations, Specimens, and Methods for MTN-016

Test	Testing Location	Specimen Type	Tube/Container	Kit/Method
HIV-1 DNA	Local, Regional, or Network Lab	Whole Blood cell pellet or Dried Blood Spots	EDTA tube	Roche Amplicor HIV-1 DNA Test or Network approved method
HIV-1 RNA	Local, Regional, or Network Lab	Plasma	EDTA tube	Roche Amplicor HIV-1 Monitor Test or Network approved method
Genotypic Resistance testing	MTN NL	Plasma	EDTA tube	ViroSeq

Table 12-2
Suggested Volumes for Infant Blood Collection

Visit Type	Total Blood Volume (ml)*	Purpose
Initial HIV testing with confirmation	EDTA tube: 1.5-2 ml	HIV DNA, HIV RNA
Resistance Testing	EDTA tube: 2.5-3ml**	Resistance testing
Interim Visit	Varies	As clinically indicated

* Sites are responsible for ensuring that specimen volumes do not exceed what is described in the informed consent process. The MTN NL may request details of collection containers and volumes for this purpose.

**A minimum of 1 ml plasma must be available for resistance testing to be done.

Ideally, one method, one type of test kit, and/or a combination of test kits will be used for each protocol specified test throughout the duration of the study. If for any reason a new or alternative method or test kit must be used after study initiation, site laboratory staff must perform a validation study of the new method or test prior to implementing a change in methods. The MTN NL must be notified before implementing the change and the MTN NL can provide further guidance on validation requirements.

Adherence to the specifications of this section is essential to ensure that primary and secondary endpoint data derived from laboratory testing will be considered acceptable to all regulatory authorities.

This section of the MTN-016 SSP manual gives basic guidance to the sites but is not an exhaustive procedure manual for all laboratory testing. This section must be supplemented with Standard Operating Procedures. The MTN NL will assist in the creation of any SOPs upon request. Essential SOPs to be created by the site for MTN-016 include but are not limited to:

- Specimen Collection and transport
- Chain of Custody (Must be approved by the MTN NL for study activation)
- HIV testing

12.2 Specimen Labeling

All containers into which specimens are initially collected (e.g. blood collection tubes) will be labeled with SCHARP-provided Participant ID (PTID) labels. The date of specimen collection should also be included on the label. If the date is handwritten, it should be in indelible ink (such as a Sharpie pen).

When specimens are tested at the local lab, any additional labeling required for on-site specimen management and chain of custody will be performed in accordance with site SOPs. The following specimens will be entered into LDMS and labeled with LDMS-generated labels: HIV DNA PCR, HIV RNA PCR, HIV Resistance testing.

12.3 Procedures for Specimens that cannot be evaluated

When possible, specimens will be redrawn or recollected if it is found that they cannot be evaluated per site SOPs. The site will monitor specimen management problems as part of ongoing Quality Assurance. In cases where additional specimens need to be recollected due to a laboratory error (lost or broken specimen or clerical error) or a clinic error (clerical error), a protocol event form provided by the NL may be required.

12.4 Use of LDMS

The Laboratory Data and Management System (LDMS) is a program used for the storage and shipping of laboratory specimens. It is supported by the Frontier Science Foundation (FSTRF). LDMS must be used to track the collection, storage, and shipment of all specimens collected for MTN-016.

Detailed instructions for use of LDMS are provided at: <https://www.fstrf.org/ldms> (may require a password).

The site will be required to maintain the current version of LDMS and monitor updates relating to use of the LDMS. It is crucial to be aware of proper label formats to ensure that specimens are correctly labeled. The site will be responsible to back up their LDMS data (frequency determined by site) locally and to export their data to FSTRF (at least weekly).

Questions related to use of LDMS in MTN-016 may be directed to Pam Kunjara or Urvi Parikh at the NL or LDMS Technical (User) Support. Usual business hours for LDMS User Support are 12:00 am - 6:00 pm (U.S. ET) on Monday through Friday. This will allow international laboratories to receive immediate support via phone or email for any LDMS issues or questions. LDMS use support will also be available via pagers from 6:00 pm to 12:00 am Monday through Friday and on weekends if the site is locked out of the LDMS or experiencing errors that prevent the completion of LDMS work. Please contact LDMS User Support as follows:

Email: ldmshelp@fstrf.org

Phone: +716-834-0900, ext 7311

Fax: +716-898-7711

LDMS User Support can be paged during off business hours if you are locked out of LDMS or experience errors that prevent you from completing LDMS lab work. To page LDMS User Support, email LDMS pager 1 (address shown in table below) and include the following information in the body of your email:

- LDMS lab number (this is a three-digit number that is different from your network assigned clinical site number)
- The full telephone number at which you can be reached, including the country code and city code if you are outside the United States
- A short description of the problem

If a response is not received within 15 minutes after emailing LDMS 1, try emailing LDMS 2, then finally, LDMS 3.

Table 12-3
LDMS User Support Paging Details

Pager	Email Address
LDMS 1	ldmspager1@fstrf.org
LDMS 2	ldmspager2@fstrf.org
LDMS 3	ldmspager3@fstrf.org

The site must export its LDMS data to Frontier Science (FSTRF) on a weekly basis.

Exported data are used by the MTN SDMC to generate a monthly specimen repository report and to reconcile data entered in LDMS with data entered on study case report forms. Any discrepancies identified during the reconciliation are included in a monthly discrepancy report for the site. Sites are expected to resolve all discrepancies within two weeks of receipt of the report. The MTN NL is responsible for reminding sites to adhere to the two week timeframe and for following up with sites that do not resolve discrepancies within two weeks. The MTN SDMC reviews the discrepancy reports for critical samples (e.g., blood needed for confirmatory HIV testing) that appear to be missing, and works with the NL and site staff to undertake appropriate corrective action. All corrective action should be documented in paper-based clinic and/or laboratory records as appropriate, and entered in the details section of LDMS. The NL and SDMC will discuss and document any items that, although resolved, appear ‘irresolvable’ in LDMS.

**Table 12-4
LDMS Specimen Management Guide to Logging in 016 Specimens**

The table below should be used as a guide when logging in MTN 016 specimens. Please use the LDMS codes listed below when logging in specimens for each test listed. Tests that are listed as local do not require that a sample be logged into the LDMS. See Appendix 12-1 for a copy of the LDMS tracking sheet.

Test	Primary	Additive	Derivative	Primary Volume	Aliquot Volume	Units
*Blood for HIV DNA and RNA PCR testing	BLD	EDT	PL1/2	1 ml	Minimum of 0.5	ML
		EDT	PER	1 ml	5 x 10 ⁶	CEL
		EDT	DBS	1 ml	100	UL
**Blood for HIV resistance testing	BLD	EDT	PL1/2	Variable	1	ML

* For determination of infant HIV status DNA and RNA PCR are performed from same specimen. RNA PCR is performed only when DNA PCR is positive.

** RNA PCR may be performed for resistance analysis if viral load is not already available

**Table 12-5
Specimen Shipping Summary**

Specimen	Use LDMS?	Ship to:	Shipping schedule
Blood for DNA/RNA PCR	Yes	If not performed locally –Regional or MTN Network Lab - Pittsburgh	Within 1 week of processing
Plasma for resistance testing	Yes	MTN Core Virology – Pittsburgh	Contact MTN Core Virology for shipping schedule

12.5 HIV Testing for Infants

If the woman is known to be HIV positive, she has the option to test her infant for HIV status and possible resistance, for up to 6 weeks from cessation of breast feeding. Maternal diagnosis will ideally be based upon documented HIV testing through the parent protocol. However, because some women may be diagnosed outside of any related clinical trial, MTN-016 staff may presume that an infant is HIV-exposed based on maternal report alone.

At least 1.5ml of whole blood (EDTA) will be needed to perform HIV-1 testing in infants by DNA PCR and RNA PCR for confirmation. All tests, and associated procedures, must be documented on local laboratory log sheets or other laboratory source documents. At all sites, HIV infection status will be assessed or confirmed per the MTN-016 HIV testing algorithm (see appendix 12-2 and 12-3 in this section of the MTN-016 SSP).

12.5.1 Specimen Collection and Initial Processing

Label all required tubes with a SCHARP-provided PTID label at the time of collection.

After collection, lavender top tubes (additive = EDTA) should be gently inverted at least eight times to prevent clotting. EDTA tubes are used for all HIV-1 testing in infants and must be processed within 6 hours of collection.

Note: If locally available tube top colors do not correspond with the tube additives specified above, use appropriate tubes based on the additives, not the listed tube top colors.

12.5.2 HIV-I DNA PCR and RNA PCR Testing

These tests can be performed locally, regionally, or at the Network Lab.

For local and regional testing, please follow site SOPs and standard of care. Before site activation, the MTN NL will review and approve testing platforms to be used at the site level. Sites that perform testing locally for MTN-016 will participate in the Virology Quality Assurance (VQA) External Quality Assurance program. Any changes to testing platforms such as using Dried Blood Spots (DBS) instead of cell pellets for DNA PCR, must be approved by the MTN NL in accordance with VQA validation standards. All tests, and associated QC procedures must be documented on local laboratory log sheets or other laboratory source documents.

The MTN Core Virology Lab will use the Roche Amplicor HIV-1 DNA Test and the Roche Amplicor HIV-1 Monitor Standard Test according to the algorithm for infant HIV testing. The HIV-1 DNA PCR test is a qualitative assay. If the DNA PCR test is negative, the infant is considered HIV-1 uninfected and may need to be retested at a later date if there is continued exposure to HIV-1 through breast feeding. If the DNA PCR test is positive, the quantitative standard RNA PCR assay which determines viral load will be performed. If the viral load is ≥ 400 copies/ml a second sample must be obtained for a repeat RNA PCR. If the viral load is < 400 copies/ml, please contact the NL for further analysis and instructions. The infant is only considered HIV-1 infected after 2 specimens are confirmed to have viral loads ≥ 400 copies/ml. Infants with viral loads ≥ 400 copies/ml can be referred for resistance testing.

Kit inventories should be monitored closely and re-supply orders placed at least 8-12 weeks in advance of actual need (or longer if needed per site procurement policies and procedures). Notify the NL immediately if any kit inventory or quality control problems are identified, so that appropriate action can be taken.

At all sites, all test results must be documented on local laboratory log sheets or other laboratory source documents. In addition to initialing or signing the testing logs to document review and verification of the results, the second staff member must also record the time at which the results were reviewed and verified.

For specimens being shipped to the MTN Core Virology Lab for HIV-1 DNA PCR and/or RNA PCR testing, please adhere to the following specimen processing procedure.

Specimen Processing Instructions

**Note: If your site uses Dried Blood Spots (DBS), process plasma and DBS according to local lab guidelines and SOP.*

1. Collect a minimum of 1.5ml of whole blood into an EDTA microtainer by heel stick or venipuncture.

2. Specimen must be stored at 2-25°C and processed within 6 hours from collection.
3. Mark level of whole blood with indelible ink on the outside of microtainer tube.
4. Spin whole blood at 800-1600 ×g for 20 minutes at room temperature.
5. Separate plasma and store a minimum of 0.5 ml per cryovial at -70°C. This plasma will be used for confirmatory RNA PCR testing if needed.
6. To continue processing sample for DNA PCR cell pellets, use the remaining portion of whole blood. Bring specimen back up to original marked volume using HBSS or PBS. Invert microtainer 10-15 times to mix.
7. Using an aerosol barrier tip, pipet 0.5ml whole blood solution into each 2.0ml cryovials.
8. Add 1.0ml BLD WS to each cryovial. Invert 10-15 times.
9. Incubate tubes for 5 minutes at room temperature.
10. Invert tubes 10-15 times to mix.
11. Incubate for an additional 5 minutes at room temperature.
12. Microcentrifuge the tubes for 3 minutes at maximum speed.
13. Using a fine-tip transfer pipet, aspirate the supernatant, being careful to avoid disturbing the pellet.
14. Repeat wash steps 8-13.
15. The dry pellet may be extracted immediately for DNA PCR or stored at -70°C until ready to extract or ship.
16. LDMS will be used to label and track the specimens

12.5.3 HIV Resistance Testing

Once an infant is diagnosed as being HIV-1 infected, resistance testing may be offered. This test will be performed by the MTN Core Virology Lab using the ViroSeq assay. Based on the viral load results from the RNA PCR the volume of plasma required may vary. A minimum of 1ml plasma must be available. Therefore, we require at least 2-3ml whole blood (EDTA) to yield a minimum 1ml plasma volume.

Specimen Processing Instructions

1. Collect at least 3ml of whole blood into an EDTA microtainer by heel stick or venipuncture.
2. Specimen must be stored at 2-25°C and processed within 2 hours from collection.
3. Spin whole blood at 800-1600 ×g for 20 minutes at room temperature.
4. Separate plasma and aliquot into 1.0ml volumes per cryovial. All remaining volumes should be stored and noted in LDMS.
5. Store plasma at -70°C until ready to ship to MTN NL.
6. LDMS will be used to label and track the specimens.

12.5.4 Shipping to the MTN Core Virology Lab

HIV Infant testing (DNA PCR and RNA PCR) not being performed locally must be shipped to the regional or MTN Core Virology Lab. For DNA PCR and RNA PCR specimens going to the MTN Core Virology Lab, please ship them to Urvi Parikh (Pittsburgh). All resistance testing must be performed by the MTN Core Virology Lab and will be shipped to Urvi Parikh (Pittsburgh).

- When the site is ready to ship to the MTN Core Virology Lab please follow all local and IATA regulations for shipping diagnostic specimens.
- Use LDMS to create a shipping batch under the shipping module. Please refer to the LDMS Manual for instructions.
- Notify the MTN Core Virology Lab via e-mail with the shipment airway bill, expected shipping dates, and the attached LDMS batch file.

- Ship batch to LDMS site 470 – MTN Core Virology Lab University of Pittsburgh:
Urvi Parikh/Krista Eskay
University of Pittsburgh
3550 Terrace Street
S804 Scaife Hall
Pittsburgh, PA 15261
ump3@pitt.edu
Phone # 412-648-3103
Fax # 412-648-8521

Appendix 12-1 LDMS Tracking Sheet

MTN-016 Non-DataFax LDMS Specimen Tracking Sheet

For login of MTN-016 Infant stored specimens into LDMS

Participant ID <input type="text"/> - <input type="text"/> <input type="text"/> <input type="text"/> - <input type="text"/> - <input type="text"/> <small>Site Number Participant Number <i>Gen</i> Cohort</small>		Visit Code <input type="text"/> . <input type="text"/>		Specimen Collection Date <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <small><i>dd</i> <i>MMM</i> <i>YY</i></small>	
# of TUBES or SPECIMENS	PRIMARY SPECIMEN	PRIMARY ADDITIVE	# of ALIQUOT TUBES or SPECIMENS	ALIQUOT DERIVATIVE	NOTES FOR LAB
<input type="checkbox"/>	Blood (BLD) for DNA/RNA Collection Time: ____:____ hour : min	EDT (purple top)	<input type="checkbox"/>	Plasma (PL 1/2)	Store in aliquots of at least 0.5 ml. Plasma must be frozen within 6 hours of collection.
			<input type="checkbox"/>	Cell Pellet (PER)	Store at -70C until testing
			<input type="checkbox"/>	Dried Blood Spot (DBS)	Store at RT
<input type="checkbox"/>	Blood (BLD) for resistance Collection Time: ____:____ hour : min	EDT (purple top)	<input type="checkbox"/>	Plasma (PL 1/2)	Store in aliquots of at least 1.0 ml. Plasma must be frozen within 2 hours of collection.

Comments: _____

Initials: _____ **LDMS Data Entry Date:** / / _____
Sending Staff Receiving Staff *dd* *MMM* *YY* LDMS Staff

Version 3.0, 08-DEC-11

MTN-016 Non-DataFax LDMS Specimen Tracking Sheet

For login of MTN-016 Infant stored specimens into LDMS

LDMS Specimen Tracking Sheet (nonDataFax)

Purpose: This non-DataFax form is used to document collection and entry of MTN 016 specimens into the Laboratory Data Management System (LDMS).

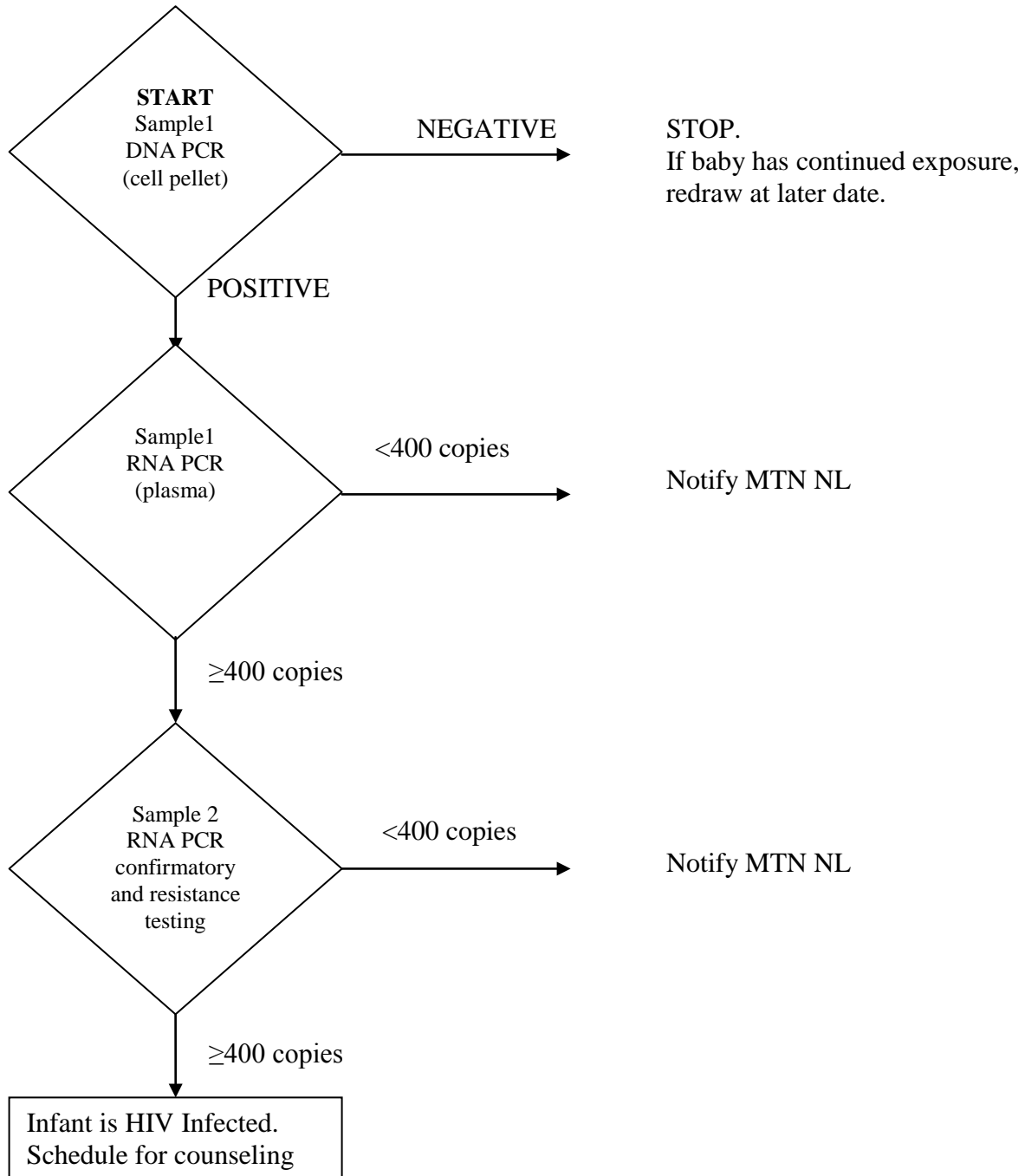
General Information/Instructions: A copy of this form accompanies LDMS specimens in their original specimen collection containers to each LDMS entry laboratory. Once the specimens have been entered into LDMS, this form is kept on file at the LDMS entry laboratory. If the site chooses, a copy of this completed form may be made once the specimens have been entered into LDMS and the copy kept in the participant's study notebook. This is not required, however. Because this form is a non-DataFax form, this form should NOT be faxed to SCHARP DataFax.

Item-specific Instructions:

- **Visit Code:** Record the visit code of the visit at which the LDMS specimens were collected.
- **# of TUBES or SPECIMENS:** Record the total number of collected tubes or specimens of the listed primary specimen type that will be entered into LDMS. If no LDMS specimens of the primary specimen type were collected, record "0."
- **Collection Time:** When collection time is present, record the time the specimen was collected using a 24-hour clock. For example, a specimen collected at 2:36pm would have "14:36" recorded as the collection time.
- **Initials – Sending Staff:** The clinic staff person who completed the form and/or who is sending the LDMS form and specimens to the LDMS entry lab, records his/her initials here.
- **Initials - Receiving Staff:** The laboratory staff person who received this form (and the LDMS specimens accompanying the form), records his/her initials here.
- **LDMS Data Entry Date:** Record the date the LDMS specimens listed on this form were entered into LDMS.
- **LDMS Data Entry Date - LDMS Staff:** The LDMS laboratory staff person who entered the specimens into LDMS, records his/her initials here.

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Appendix 12-2 Algorithm for Infant HIV Testing



Appendix 12-3

Flow Chart for Testing HIV Exposed Infant within MTN-016

