DEPARTMENT OF HEALTH AND HUMAN SERVICES

Centers for Disease Control and Prevention Model Performance Evaluation Program

Human Immunodeficiency Virus Type 1 Ribonucleic Acid (RNA) Determinations

Report of Results for the Performance Evaluation Survey Conducted in August 2005

CENTERS FOR DISEASE™
CONTROL AND PREVENTION

COORDINATING CENTER FOR HEALTH INFORMATION AND SERVICE
DIVISION OF LABORATORY SERVICES
ATLANTA, GEORGIA

Report of the August 2005 Human Immunodeficiency Virus Type 1 (HIV-1) Ribonucleic Acid (RNA) Determinations

Report of the August 2005 Human Immunodeficiency Virus Type I (HIV-1) Ribonucleic Acid (RNA) Performance Evaluation Sample Testing Results Provided by Participant Laboratories in the Model Performance Evaluation Program (MPEP), Centers for Disease Control and Prevention (CDC).

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Overview

Introduction

This report is an analysis of testing results reported by laboratories participating in the Centers for Disease Control and Prevention (CDC) Model Performance Evaluation Program (MPEP) for human immunodeficiency virus type 1 (HIV-1) ribonucleic acid (RNA) determinations performed using specimens sent on August 9, 2005.

Specimen panels

Each laboratory received a total of seven specimens. Five were plasma MPEP specimens obtained from individual donors (not pooled or diluted with plasma from other donors) and two were simulated samples. Overall, the shipment contained five HIV-1 antibody-positive and two HIV-1 antibody-negative samples.

- Before shipment, the CDC tested each donor with three viral RNA test kits approved by the Food and Drug Administration (FDA).

- One of the HIV-1 antibody-positive plasma specimens, Donor 2, was sent to the participant laboratories in duplicate. For the samples designated Donor 2 and Donor 2 Duplicate, the material came from the same plasma but was sent to the laboratories as separate samples under different sample vial designations. The vial designations for this shipment were A3, A7, B2 and B5.

- Two simulated samples, Donor 5 and Donor 6 (vial designations A2, A5, B6, & B3) were included as a pilot test in this shipment to investigate their comparability with plasma MPEP specimens and their overall suitability as performance evaluation materials. These samples were prepared from highly purified infectious viruses, isolated from the plasma of infected individuals and rendered non-infectious while maintaining the integrity of the RNA. Donor 5 had a target value of 1,000 copies/ml and Donor 6 had a target value of 3,000 copies/ml.

- Not all laboratories received the same panel of samples. Each laboratory received either Panel A or B.

Laboratory response

Of the 194 laboratories receiving sample panels, 163 (84.0%) reported testing results.

- The percentage of the laboratories reporting results has declined slightly from the February 2005 shipment from 89% to 84%.

- The majority of the laboratories (109/163, 67%) reported their testing results using the online data entry system.

Note: We continue to encourage laboratories to use the online option as a method of streamlining the reporting process.

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Overview: Significant Findings

Table 1a: The following table summarizes the results grouped by test type for the **Plasma MPEP samples, donors 1, 2, 3, & 4.**

Results summary: Plasma MPEP samples

			Positive Donors		Negative Donors		Overall Performance
Method	**Total # of labs**	**Total # of results**	**Positive**	**False-negative**	**Negative**	**False-positive**	**(TP+TN/ total # results)[3]**
Quantitative[1]	156	828	478	18	320	12	96.4%
Qualitative[2]	7	35	21	0	14	0	100%
Total	163	863	499	18	334	12	96.5%

[1] Roche Amplicor HIV-1 Monitor, Bayer Versant HIV-1 RNA 3.0 Assay (bDNA), bioMérieux NucliSens® HIV-1 QT, bioMérieux NucliSens® EasyQ HIV-1 and In-house methods.
[2] Chiron Procleix method
[3] TP, true positives; TN, true negatives.

Table 1b: The following table summarizes the results grouped by test type for **Simulated samples, donors 5 and 6.**

Results summary, continued: Simulated Samples

			Positive Donors		Overall Performance
Method	**Total # of labs**	**Total # of results**	**Positive**	**False-negative**	**(TP+TN/ total # results)[3]**
Quantitative[1]	156	329	323	6	98.2%
Qualitative[2]	7	14	14	0	100%
Total	163	343	337	6	98.3%

[1] Roche Amplicor HIV-1 Monitor, Bayer Versant HIV-1 RNA 3.0 Assay (bDNA), bioMérieux NucliSens® HIV-1 QT, bioMérieux NucliSens® EasyQ HIV-1 and In-house methods.
[2] Chiron Procleix method
[3] TP, true positives; TN, true negatives.

False-negative results

The overall quality of testing performance for the Plasma MPEP samples as measured in this survey has decreased compared to the previous shipment.

Plasma MPEP Samples

There were 3.5% (18/517) false-negative interpretations reported for Plasma MPEP samples for this shipment, compared to 0.6% (3/518) reported from the previous shipment.

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False-negative results (continued)

- Of the 18 false-negatives reported for Plasma MPEP samples, thirteen were obtained using Roche's Amplicor HIV-1 Monitor® test, three using Roche's Amplicor HIV-1 Monitor® UltraSensative test, one using Bayer Versant® HIV-1 RNA 3.0 Assay (bDNA), and one using an "Other" test.

Simulated Samples

There were 1.7% (6/343) false-negative interpretations reported for simulated donors 5 and 6 (containing 1,000 and 3,000 copies/ml, respectively) for this shipment. This is a decrease from the February 2005 shipment for which 4.3% (15/345) false-negative interpretations were reported for the simulated samples.

- Four of the false-negatives reported for simulated donors were associated with Donor 5 (1,000 copies/ml target).

- Of the six false-negatives reported for simulated donors, four were obtained using Roche's Amplicor HIV-1 Monitor® test, one was obtained using Roche's Amplicor HIV-1 Monitor® UltraSensitive test, and one reported by an "Other" test.

False-positive results

The percentage of false-positive results, 3.5% (12/346), reported in this survey for Plasma MPEP samples, was the same as the previous survey false-positive rate of 3.5% (12/346).

- Of the 12 false-positives reported, seven were associated with Donor 3 and five with Donor 4.

- Four of the 12 false-positives were reported by laboratories using Roche's Amplicor Monitor® test with a reported lower limit sensitivity (LLS) of 400 copies/ml.

- Three of the 12 false-positives were reported by laboratories using Bayer Versant HIV-1 RNA 3.0 Assay (bDNA).
  - Of these three, two had a LLS of 75 copies/ml, and one had a LLS of 50 copies/ml.

- Two of the false-positives were reported by laboratories using Roche's Amplicor Monitor® UltraSensitive test (LLS 50 copies/ml), one using bioMerieux NucliSens HIV-1 QT Easy Q test (LLS 25 copies/ml), and two using an "Other" test manufacturer using a LLS of 50 copies/ml.

Quality control

A total of 54.0% (88/163) of respondents indicated that they used external quality control materials.

Donor Report

Overview The Donor Report contains the specimen numbers and donor information for each performance evaluation specimen. Table 2, below, is provided for the participant laboratories to record and compare their results with CDC MPEP results for each performance evaluation specimen.

Table 2 Donor Identification for August 2005 Shipment Specimens

Panel Letter	Vial Label	CDC Donor Number	CDC Test Result[1]	Donor HIV Status	Laboratory Interpretation[2] and/or Results	
					Test Result	Interpretation
A	A1	3	Negative	Uninfected	_____	_____
	*A2	5	Positive	Infected	_____	_____
	A3	2	Positive	Infected	_____	_____
	A4	1	Positive	Infected	_____	_____
	*A5	6	Positive	Infected	_____	_____
	A6	4	Negative	Uninfected	_____	_____
	A7	2	Positive	Infected	_____	_____
B	B1	4	Negative	Uninfected	_____	_____
	B2	2	Positive	Infected	_____	_____
	*B3	6	Positive	Infected	_____	_____
	B4	3	Negative	Uninfected	_____	_____
	B5	2	Positive	Infected	_____	_____
	*B6	5	Positive	Infected	_____	_____
	B7	1	Positive	Infected	_____	_____

[1] The CDC result was obtained after pre-shipment testing with three manufactured kits for determining the presence of HIV-1 RNA. These kits are licensed by the Food and Drug Administration (FDA). The CDC result is consistent with the manufacturer's criteria for interpretation of results.

[2] Laboratory Interpretation space (to be completed by participant laboratory) provided to facilitate comparison of participant laboratory result with CDC result.

* Samples A2, A5, B3 and B6 were the simulated infected samples.

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Donor Report: CDC HIV-1 RNA Testing Results

Table 3 CDC HIV-1 RNA Testing Results for the August 9, 2005, Participant Laboratory Panel Samples

Panel Letter	Vial Label	CDC Donor Number	CDC Test Results[1]	Test Kit Manufacturer	Test Kit	CDC Interpretation[2]
A	A1	3	No HIV RNA detected	Roche	Amplicor HIV-1 Monitor®	Negative
			No HIV RNA detected	bioMérieux	NucliSens® HIV-1 QT	Negative
			No HIV RNA detected	Bayer	Versant® HIV-1 RNA 3.0 Assay (bDNA)	Negative
	A2	5	HIV RNA detected	Roche	Amplicor HIV-1 Monitor®	Positive
			HIV RNA detected	bioMérieux	NucliSens® HIV-1 QT	Positive
			HIV RNA detected	Bayer	Versant® HIV-1 RNA 3.0 Assay (bDNA)	Positive
	A3, A7	2	HIV RNA detected	Roche	Amplicor HIV-1 Monitor®	Positive
			HIV RNA detected	bioMérieux	NucliSens® HIV-1 QT	Positive
			HIV RNA detected	Bayer	Versant® HIV-1 RNA 3.0 Assay (bDNA)	Positive
	A4	1	HIV RNA detected	Roche	Amplicor HIV-1 Monitor®	Positive
			HIV RNA detected	bioMérieux	NucliSens® HIV-1 QT	Positive
			HIV RNA detected	Bayer	Versant® HIV-1 RNA 3.0 Assay (bDNA)	Positive
	A5	6	HIV RNA detected	Roche	Amplicor HIV-1 Monitor®	Positive
			HIV RNA detected	bioMérieux	NucliSens® HIV-1 QT	Positive
			HIV RNA detected	Bayer	Versant® HIV-1 RNA 3.0 Assay (bDNA)	Positive
	A6	4	No HIV RNA detected	Roche	Amplicor HIV-1 Monitor®	Negative
			No HIV RNA detected	bioMérieux	NucliSens® HIV-1 QT	Negative
			No HIV RNA detected	Bayer	Versant® HIV-1 RNA 3.0 Assay (bDNA)	Negative
B	B1	4	No HIV RNA detected	Roche	Amplicor HIV-1 Monitor®	Negative
			No HIV RNA detected	bioMérieux	NucliSens® HIV-1 QT	Negative
			No HIV RNA detected	Bayer	Versant® HIV-1 RNA 3.0 Assay (bDNA)	Negative
	B2, B5	2	HIV RNA detected	Roche	Amplicor HIV-1 Monitor®	Positive
			HIV RNA detected	bioMérieux	NucliSens® HIV-1 QT	Positive
			HIV RNA detected	Bayer	Versant® HIV-1 RNA 3.0 Assay (bDNA)	Positive
	B3	6	HIV RNA detected	Roche	Amplicor HIV-1 Monitor®	Positive
			HIV RNA detected	bioMérieux	NucliSens® HIV-1 QT	Positive
			HIV RNA detected	Bayer	Versant® HIV-1 RNA 3.0 Assay (bDNA)	Positive
	B4	3	No HIV RNA detected	Roche	Amplicor HIV-1 Monitor®	Negative
			No HIV RNA detected	bioMérieux	NucliSens® HIV-1 QT	Negative
			No HIV RNA detected	Bayer	Versant® HIV-1 RNA 3.0 Assay (bDNA)	Negative
	B6	5	HIV RNA detected	Roche	Amplicor HIV-1 Monitor®	Positive
			HIV RNA detected	bioMérieux	NucliSens® HIV-1 QT	Positive
			HIV RNA detected	Bayer	Versant® HIV-1 RNA 3.0 Assay (bDNA)	Positive
	B7	1	HIV RNA detected	Roche	Amplicor HIV-1 Monitor®	Positive
			HIV RNA detected	bioMérieux	NucliSens® HIV-1 QT	Positive
			HIV RNA detected	Bayer	Versant® HIV-1 RNA 3.0 Assay (bDNA)	Positive

[1]**The CDC test results were obtained after pre-shipment testing with three manufactured kits for determining the presence of HIV-1 RNA. These kits are licensed by the Food and Drug Administration (FDA).**

[2]**The CDC interpretation is consistent with the manufacturer's criteria for interpretation of results. Positive = HIV-1 RNA detected; Negative = HIV-1 RNA not detected (based on lower limit of test kit sensitivity)**

Laboratory Demographics and Methods

Overview

A total of 163 different laboratories submitted results. Of these:

- the 154 United States and U.S. associated laboratories are depicted in ***Figure 1.***
- 9 testing sites were Canadian laboratories.
- ***Figure 2*** shows the primary classification of laboratories reporting quantitative or qualitative HIV-1 RNA results.
    - Hospital laboratories predominated.

Figure 1

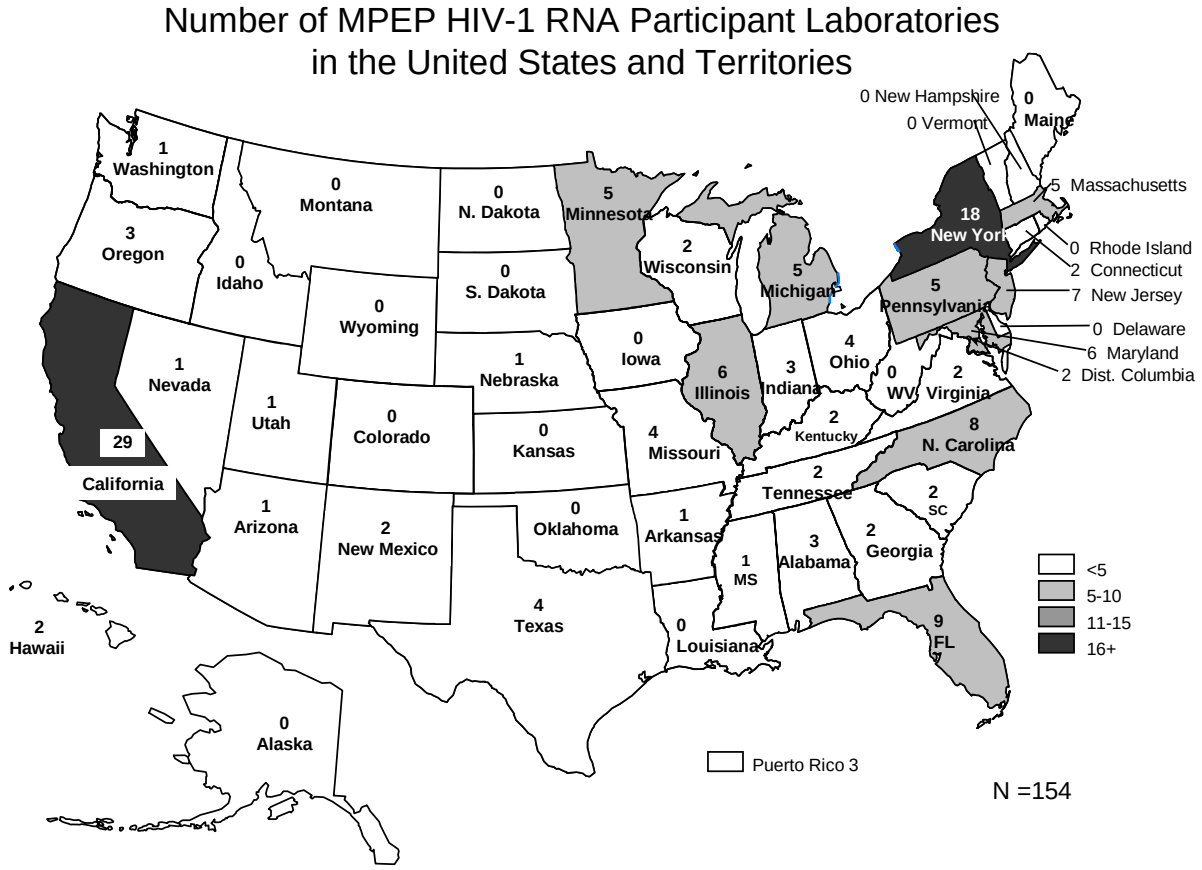

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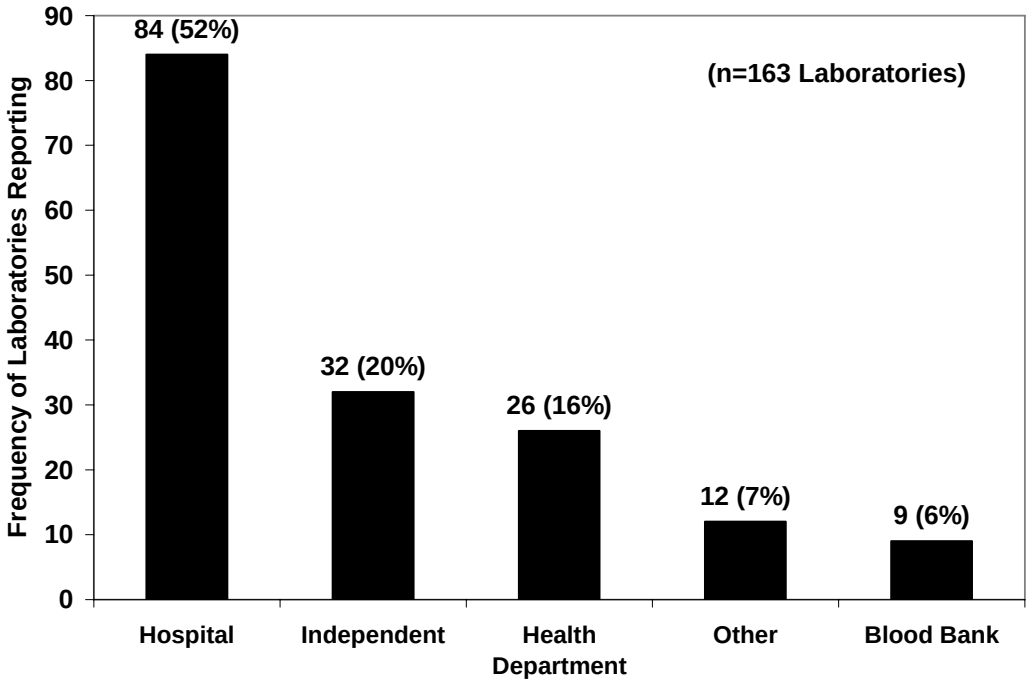
Figure 2:

Types of Participant Laboratories



Kit Types Used by Participants

Overview

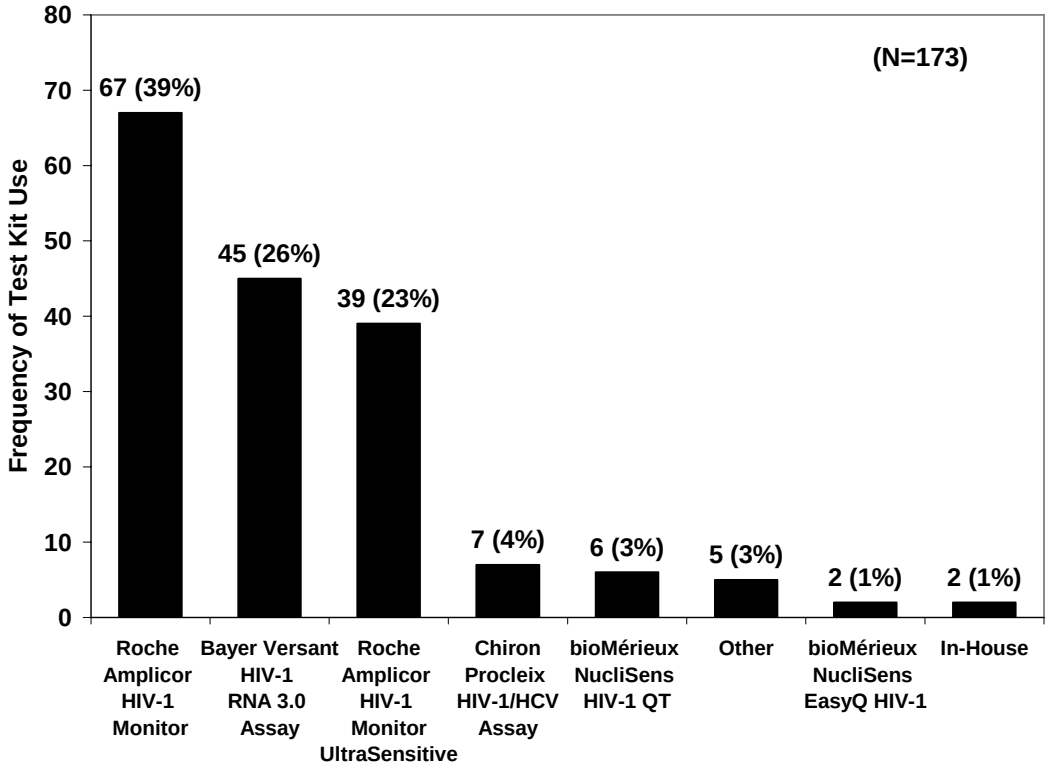
This section describes the types of test kits used by laboratories performing viral RNA quantitative and qualitative determinations in this survey.

- Roche's Amplicor HIV-1 Monitor® test kit was used most frequently (67/173, 38.7%) in reporting results.

- All of the participating laboratories that reported using qualitative RNA testing procedures used the HIV-1/HCV assay, which was developed by Gen-Probe and is marketed by Chiron under the name Procleix™ HIV-1/HCV Assay.

Note: The "N=" on Figure 3 represents the number of reported results. For this graph, some laboratories used more than one test kit, therefore, the number of results reported (N =173) exceeds the number of laboratories reporting results (n =163).

Figure 3 Types of Test Kits Used to Perform HIV-1 RNA Determinations



Summary of Results: Plasma MPEP Samples

Overview

There were 12 false-positives (12/346, 3.5%) reported in the current survey, same as the 12 false-positive (12/346, 3.5%) results reported in the previous performance survey (February 2005). The percentage of false-negative results (3.5%, 18/517) reported for plasma MPEP donors 1, 2, 3 and 4 in this survey was more than that of the previous survey (0.6%, 3/518).

Summary of participant results

Table 4 contains the cumulative frequencies of quantitative and qualitative test results for all donor samples reported by participants. This table describes the final test interpretations (positive or negative for HIV-1 RNA) with respect to the donors' status (infected or uninfected) and includes the data for all test kits used.

Table 4:

Cumulative frequencies of test results

	Number of Results	Percent Correct	Percent False Negative	Percent False Positive
Infected Donor Samples	517	96.5% (499/517)	3.5% (18/517)	n/a
Uninfected Donor Samples	346	96.5% (334/346)	n/a	3.5% (12/346)
TOTAL RESULTS	863	96.5% (833/863)	***	***

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Test kit lower limit sensitivities

Table 5 shows the false-positive and false-negative results categorized by kit type and lower limit sensitivities.

Table 6 shows the variability in the lower limit sensitivities reported by the laboratories using commercially manufactured quantitative HIV-1 RNA test kits. The lower limit sensitivities of the reported quantitative kits ranged from 0 RNA copies/ml to 400 copies/ml. For each test kit, the percentage of the total reported results for each specified lower limit sensitivity is shown, and "n" is the number of sample results reported using that test kit.

False Negative Results

Eighteen false-negative results were reported using the following test kits and LLS:

- Fifteen of the 18 false-negative results were reported for Donor 1, the low-positive donor.
- Thirteen reported using Roche's Amplicor HIV-1 Monitor® test; the reported LLS associated with this result was 400 copies/ml, and
- Three reported using Roche's Amplicor HIV-1 Monitor® UltraSensitive test; the reported LLS associated with this result was 50 copies/ml, and
- One reported using Bayer Versant HIV-1 RNA 3.0 Assay; the reported LLS associated with this result was 75 copies/ml, and
- One reported using an "Other" kit manufacturer; the reported LLS associated with this result was 50 copies/ml.

False Positive Results

Twelve false-positives results were reported using the following test kits and LLS:

- Three of the twelve false positive results were obtained using Bayer Versant HIV-1 RNA 3.0 Assay; the reported LLS associated with two results was 75 copies/ml, and one reported LLS associated with this results 50 copies/ml, and
- Four false positive results were reported using Roche's Amplicor HIV-1 Monitor® test; the reported LLS associated with these results was 400 copies/ml, and
- Two false positive results were reported using Roche's Amplicor HIV-1 Monitor® UltraSensitive test; the reported LLS associated with these results was 50 copies/ml, and
- Two false positive results were reported using "Other" testing methods; the reported LLS associated with these results was 50 copies/ml, and
- One false positive result was reported using bioMerieux NucliSens HIV-1 QT EasyQ test; the reported LLS associated with this result was 25 copies/ml.

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Table 5:

LLS Results by Kit Manufacturer (Plasma MPEP samples)

			LLS[‡] for FP			LLS for FN	
Manufacturer	**Total # of Results**	**FP[*]**	**# of Results**	**LLS**	**FN[†]**	**# of Results**	**LLS**
Roche Amplicor HIV-1 Monitor	335	4 (1.2%)	4	400	13 (3.9%)	13	400
Roche Amplicor HIV-1 Monitor UltraSensitive	194	2 (1.0%)	2	50	3 (1.5%)	3	50
Bayer Versant HIV-1 RNA 3.0 Assay (bDNA)	225	3 (1.3%)	1 2	50 75	1 (0.4%)	1	75
bioMérieux NucliSens HIV-1 QT	29	0			0		
bioMérieux NucliSens® EasyQ HIV-1	10	1 (10.0%)	1	25	0		
In House	10	0			0		
Other	25	2 (8.0%)	2	50	1 (4.0%)	1	50
Total	828	12 (1.4%)			18 (2.2%)		

[*]FP, False-positives [†]FN, False-negatives [‡]LLS, Lower Limit Sensitivity Used (copies/ml)

Table 6:
Test Kit Lower Limit Sensitivities (Donors 1, 2, 3 & 4)

Manufacturer Test Kit (n = number of reports)	**Lower Limit Sensitivity Used (copies/ml)**	**Percent of Reports (n) for each kit type**
Roche Amplicor HIV-1 Monitor® (n = 335)	0	2% (5)
	50	10% (35)
	400	85% (285)
	not indicated	3% (10)
Bayer Versant® HIV-1 RNA 3.0 Assay (bDNA) (n= 225)	50	9% (20)
	75	84% (190)
	not indicated	7% (15)
bioMérieux NucliSens® HIV-1 QT (n= 29)	25	17% (5)
	80	17% (5)
	160	31% (9)
	200	17%(5)
	250	17%(5)
bioMérieux NucliSens® EasyQ HIV-1 (n= 10)	25	100% (10)
Roche Amplicor HIV-1 Monitor® UltraSensitive (n= 194)	40	3% (5)
	50	95% (184)
	400	3% (5)
In-House (n= 10)	30	100% (5)
	100	100% (5)
Other (n= 25)	50	60% (15)
	400	20% (5)
	not indicated	20% (5)

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Summary of Results: Plasma MPEP Samples, Continued

Results by donor

Of the 12 false-positive quantitative results reported (12/332, 3.6%), seven were associated with Donor 3 and five with Donor 4. Out of the 18 false-negatives reported for donors 1 and 2, 15 were associated with Donor 1, one was associated with Donor 2 and two were associated with Donor 2 duplicate.

Donor 1 (HIV-1 infected, low-positive)	15 false-negative
Donor 2 (HIV-1 infected, high-positive)	1 false-negative
Donor 2 Duplicate (HIV-1 infected, high-positive)	2 false-negative
Donor 3 (HIV-1 negative)	7 false-positives
Donor 4 (HIV-1 negative)	5 false-positives

Summary of Results: Simulated MPEP Samples

Overview

The percentage of false-negative results for Simulated donors 5 and 6 was 1.7% (6/343). Of the 6 false-negative results reported (6/343, 1.7%), four were associated with Donor 5 and two with Donor 6. Simulated Donor 5 had a target value of approximately 1,000 RNA copies/ml, whereas Simulated Donor 6 had a target value of approximately 3,000 RNA copies/ml.

Table 7:

Cumulative frequencies of test results: donors 5 & 6

Table 7 contains the cumulative frequencies of quantitative and qualitative test results for Simulated donor samples reported by laboratories.

	Number of Results	Percent Correct	Percent False Negative	Percent False Positive
Infected Donor Samples	343	98.3% (337/343)	1.7% (6/343)	n/a
Uninfected Donor Samples	n/a	n/a	n/a	n/a
TOTAL RESULTS	343	98.3% (337/343)	***	***

LLS results by kit manufacturer

Table 8 shows the variability in the lower limit sensitivities reported by the laboratories using commercially manufactured quantitative HIV-1 RNA test kits for the Simulated Donors 5 and 6.

Table 8:

LLS results by kit manufacturer simulated donors 5 & 6

			LLS for FN	
Manufacturer	**Total # of Results**	**FN[†]**	**# of Results**	**LLS**
Roche Amplicor HIV-1 Monitor	134	4 (3.0%)	4	400
Bayer Versant HIV-1 RNA 3.0 Assay (bDNA)	90	0		
bioMérieux NucliSens HIV-1 QT	11	0		
bioMérieux NucliSens® EasyQ HIV-1	4	0		
Roche Amplicor HIV-1 Monitor UltraSensitive	76	1 (1.3%)	1	50
In House	4	0		
Other	10	1 (10%)	1	50
Total	329	6 (1.8%)		

[*]FP, False-positives [†]FN, False-negatives [‡]LLS, Lower Limit Sensitivity Used (copies/ml)

Quantitative and Qualitative Test Aggregate Results

Aggregate test results

Tables 9 through 12 show the aggregate participant laboratories' testing results for each Plasma MPEP donor sample by test kit manufacturer.

Tables 13 and 14 show the aggregate participant laboratories' testing results for each simulated donor sample by test kit manufacturer.

Description: Tables 9-14

Result columns provide the totals for the number of results reported detecting HIV-1 RNA and not detecting HIV-1 RNA.

For the quantitative results:

- The absolute minimum and maximum reported values of RNA copies/ml are given irrespective of the different kits' lower limit sensitivities.
- Also included for the quantitative results are the 25%, 50% (median) and 75% quartiles for those samples that had detectable RNA levels.

Description: Table 10A and 10B, Duplicate sample

Table 10A shows the laboratory test results reported for Donor 2 and table 10B shows results for the duplicated specimen, Donor 2 Duplicate.

- For this performance survey shipment, Donor 2, an HIV-1 infected donor, was duplicated in each panel to provide the participant laboratories an opportunity to evaluate their intra-shipment reproducibility.
- For the samples designated Donor 2 and Donor 2 Duplicate, the material came from the same plasma but was sent to the laboratories as separate samples under different sample vial designations.

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Table 9 Results of the HIV-1 RNA Determinations Reported by Participant Laboratories for Donor #1
Donor Status: HIV-1 Infected and HIV-1 RNA Detected
Panel Vial Labels: A4, B7

Test Kit	No. of Results Detecting RNA	No. of Results Not Detecting RNA	Range of Quantitative Results Reported (RNA copies/ml)				
			minimum	maximum	25% Quartile	Median (50%)	75% Quartile
Bayer Versant HIV-1 RNA 3.0 Assay	44	1	190	903	355	**406**	509
bioMérieux NucliSens HIV-1 QT	5		300	2500	360	**630**	950
bioMérieux NucliSens HIV-1 QT EasyQ	2		1700	4300	1700	**3000**	4300
Roche Amplicor HIV-1 Monitor	55	12	270	6820	556	**830**	1174
Roche Amplicor HIV-1 Monitor UltraSensitive	37	2	257	2030	441	**553**	752
In House	2		800	935	800	**868**	935
Other	5		85	739	217	**464**	659

Table 10A Results of the HIV-1 RNA Determinations Reported by Participant Laboratories for Donor #2
Donor Status: HIV-1 Infected and HIV-1 RNA Detected
Panel Vial Labels: A3, B2

Test Kit	No. of Results Detecting RNA	No. of Results Not Detecting RNA	Range of Quantitative Results Reported (RNA copies/ml)				
			minimum	maximum	25% Quartile	Median (50%)	75% Quartile
Bayer Versant HIV-1 RNA 3.0 Assay	45		1746	11894	6855	**8659**	9720
bioMérieux NucliSens HIV-1 QT	6		15000	27000	18000	**19000**	19000
bioMérieux NucliSens HIV-1 QT EasyQ	2		56000	89000	56000	**72500**	89000
Roche Amplicor HIV-1 Monitor	66	1	5100	291000	8626	**12650**	16825
Roche Amplicor HIV-1 Monitor UltraSensitive	39		239	28200	8470	**10400**	12748
In House	2		12000	17833	12000	**14917**	17833
Other	5		837	10400	6138	**7920**	7950

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Table 10B Results of the HIV-1 RNA Determinations Reported by Participant Laboratories for Donor #2 Duplicate
Donor Status: HIV-1 Infected and HIV-1 RNA Detected
Panel Vial Labels: A7, B5

Test Kit	No. of Results Detecting RNA	No. of Results Not Detecting RNA	Range of Quantitative Results Reported (RNA copies/ml)				
			minimum	maximum	25% Quartile	Median (50%)	75% Quartile
Bayer Versant HIV-1 RNA 3.0 Assay	45		126	12056	6984	**8293**	9547
bioMérieux NucliSens HIV-1 QT	6		9010	22000	13000	**14500**	17500
bioMérieux NucliSens HIV-1 QT EasyQ	2		31000	34000	31000	**32500**	34000
Roche Amplicor HIV-1 Monitor	67		5590	49600	9000	**12649**	15918
Roche Amplicor HIV-1 Monitor UltraSensitive	37	1	232	39012	7910	**10400**	12800
In House	2		11000	17648	11000	**14324**	17648
Other	4	1	7294	15200	7567	**8655**	15200

Table 11 Results of the HIV-1 RNA Determinations Reported by Participant Laboratories for Donor #3
Donor Status: HIV-1 Uninfected and HIV-1 RNA Not Detected
Panel Vial Labels: A1, B4

Test Kit	No. of Results Detecting RNA	No. of Results Not Detecting RNA	Range of Quantitative Results Reported (RNA copies/ml)				
			minimum	maximum	25% Quartile	Median (50%)	75% Quartile
Bayer Versant HIV-1 RNA 3.0 Assay	2	43	190	1150	190	**670**	1150
bioMérieux NucliSens HIV-1 QT		6	n/a	n/a	n/a	**n/a**	n/a
bioMérieux NucliSens HIV-1 QT EasyQ	1	1	580	580	580	**580**	580
Roche Amplicor HIV-1 Monitor	2	65	n/a	n/a	n/a	**n/a**	n/a
Roche Amplicor HIV-1 Monitor UltraSensitive	1	38	n/a	n/a	n/a	**n/a**	n/a
In House		2	n/a	n/a	n/a	**n/a**	n/a
Other	1	4	5728	5728	5728	**5728**	5728

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Table 12 Results of the HIV-1 RNA Determinations Reported by Participant Laboratories for Donor #4
Donor Status: HIV-1 Uninfected and HIV-1 RNA Not Detected
Panel Vial Labels: A6, B1

Test Kit	No. of Results Detecting RNA	No. of Results Not Detecting RNA	Range of Quantitative Results Reported (RNA copies/ml)				
			minimum	maximum	25% Quartile	Median (50%)	75% Quartile
Bayer Versant HIV-1 RNA 3.0 Assay	1	44	308	308	308	**308**	308
bioMérieux NucliSens HIV-1 QT		6	n/a	n/a	n/a	**n/a**	n/a
bioMérieux NucliSens HIV-1 QT EasyQ		2	n/a	n/a	n/a	**n/a**	n/a
Roche Amplicor HIV-1 Monitor	2	65	718	718	718	**718**	718
Roche Amplicor HIV-1 Monitor UltraSensitive	1	38	n/a	n/a	n/a	**n/a**	n/a
In House		2	n/a	n/a	n/a	**n/a**	n/a
Other	1	4	1712	1712	1712	**1712**	1712

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Table 13: Simulated samples

Results of the HIV-1 RNA Determinations Reported by Participant Laboratories for Donor #5 (Target value ~ 1,000 copies/ml)
Donor Status: HIV-1 Infected and HIV-1 RNA Detected
Panel Vial Labels: A2, B6

Test Kit	No. of Results Detecting RNA	No. of Results Not Detecting RNA	Range of Quantitative Results Reported (RNA copies/ml)				
			minimum	maximum	25% Quartile	Median (50%)	75% Quartile
Bayer Versant HIV-1 RNA 3.0 Assay	45		138	1973	777	**920**	1211
bioMérieux NucliSens HIV-1 QT	5		270	4888	1300	**1900**	2900
bioMérieux NucliSens HIV-1 QT EasyQ	2		900	2300	900	**1600**	2300
Roche Amplicor HIV-1 Monitor	64	3	268	3820	723	**1027**	1390
Roche Amplicor HIV-1 Monitor UltraSensitive	38	1	104	2440	663	**914**	1260
In House	2		200	489	200	**345**	489
Other	5		386	1188	474	**623**	936

Table 14: Simulated samples

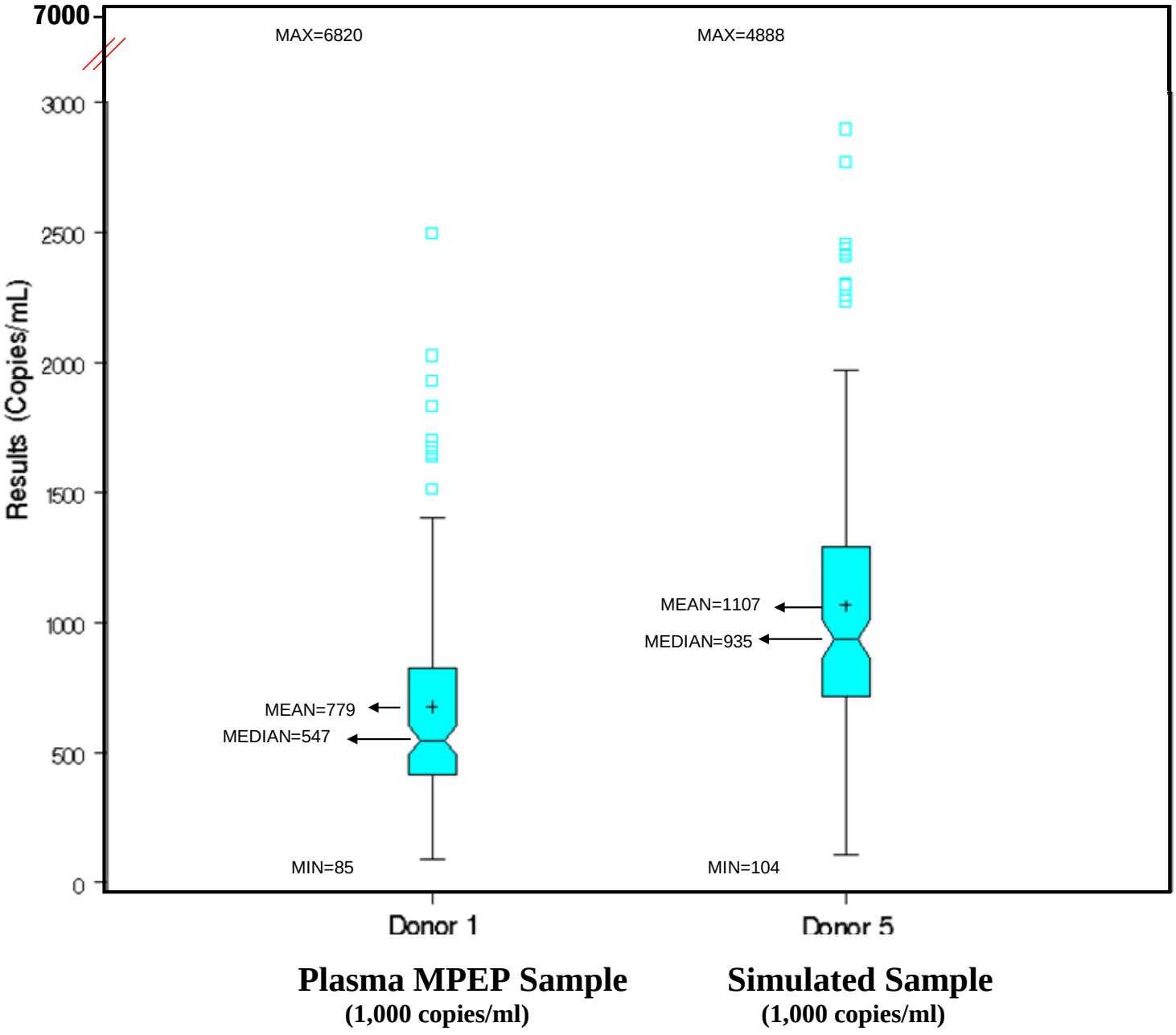
Results of the HIV-1 RNA Determinations Reported by Participant Laboratories for Donor #6 (Target value ~ 3,000 copies/ml)
Donor Status: HIV-1 Infected and HIV-1 RNA Detected
Panel Vial Labels: A5, B3

Test Kit	No. of Results Detecting RNA	No. of Results Not Detecting RNA	Range of Quantitative Results Reported (RNA copies/ml)				
			minimum	maximum	25% Quartile	Median (50%)	75% Quartile
Bayer Versant HIV-1 RNA 3.0 Assay	45		709	5127	2242	**2525**	3113
bioMérieux NucliSens HIV-1 QT	6		2900	9100	3000	**4400**	5350
bioMérieux NucliSens HIV-1 QT EasyQ	2		3300	5100	3300	**4200**	5100
Roche Amplicor HIV-1 Monitor	66	1	893	7570	2120	**2762**	3560
Roche Amplicor HIV-1 Monitor UltraSensitive	37		339	12000	2041	**2610**	3000
In House	2		200	2913	200	**1557**	2913
Other	4	1	1510	2080	1540	**1870**	2625

Distribution of Qualitative Results by Sample

Figure 4: Box Plot – Donor 1 and 5

In this box plot, Donor 1 was a plasma sample and Donor 5 was the simulated sample; both had target values of 1,000 copies/ml.



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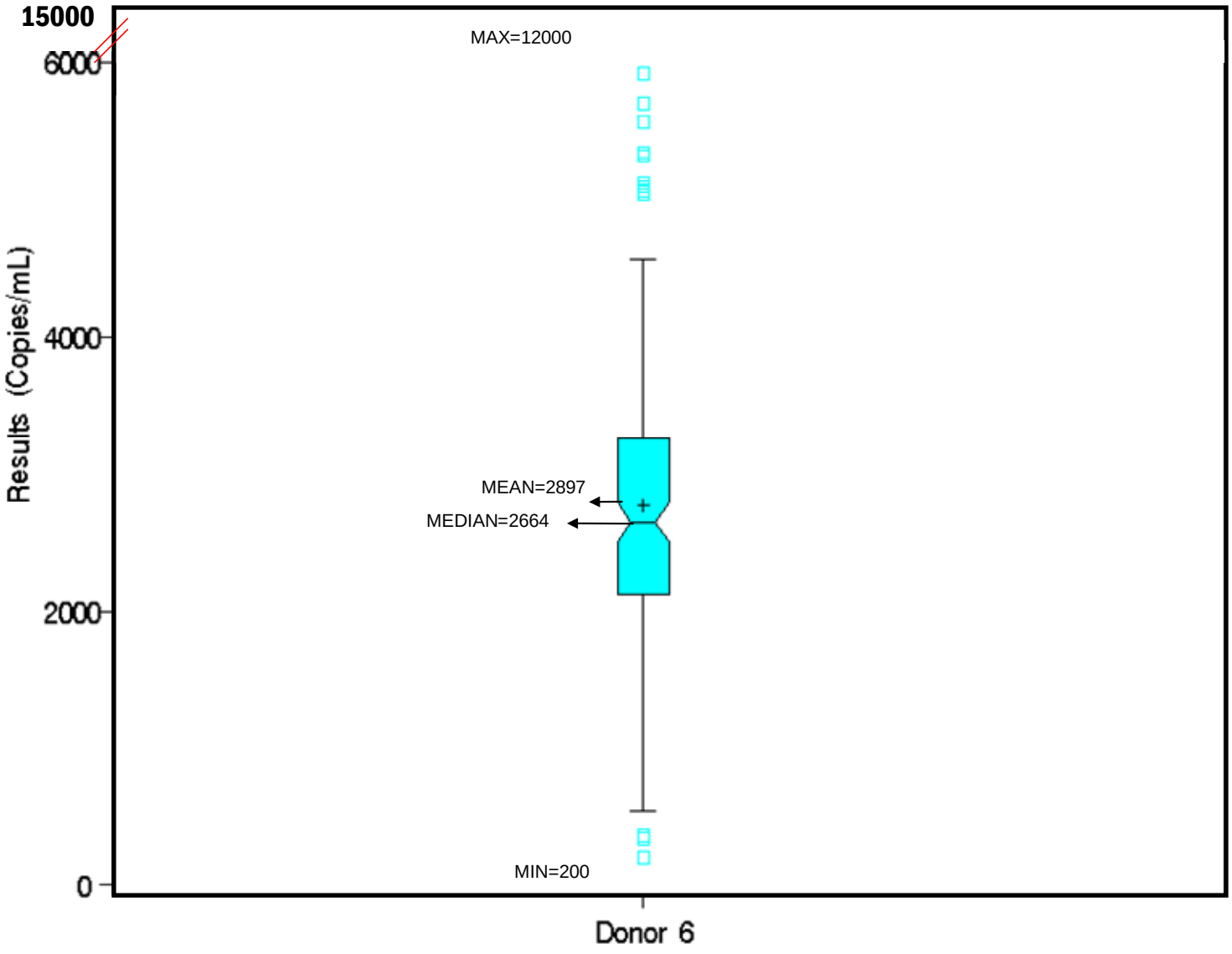
Distribution of Qualitative Results by Sample, Continued

Figure 5: Box Plot – Donor 6

In this box plot, Donor 6 (simulated sample) had a target value of 3,000 copies/ml.



Simulated Sample
(3,000 copies/ml)

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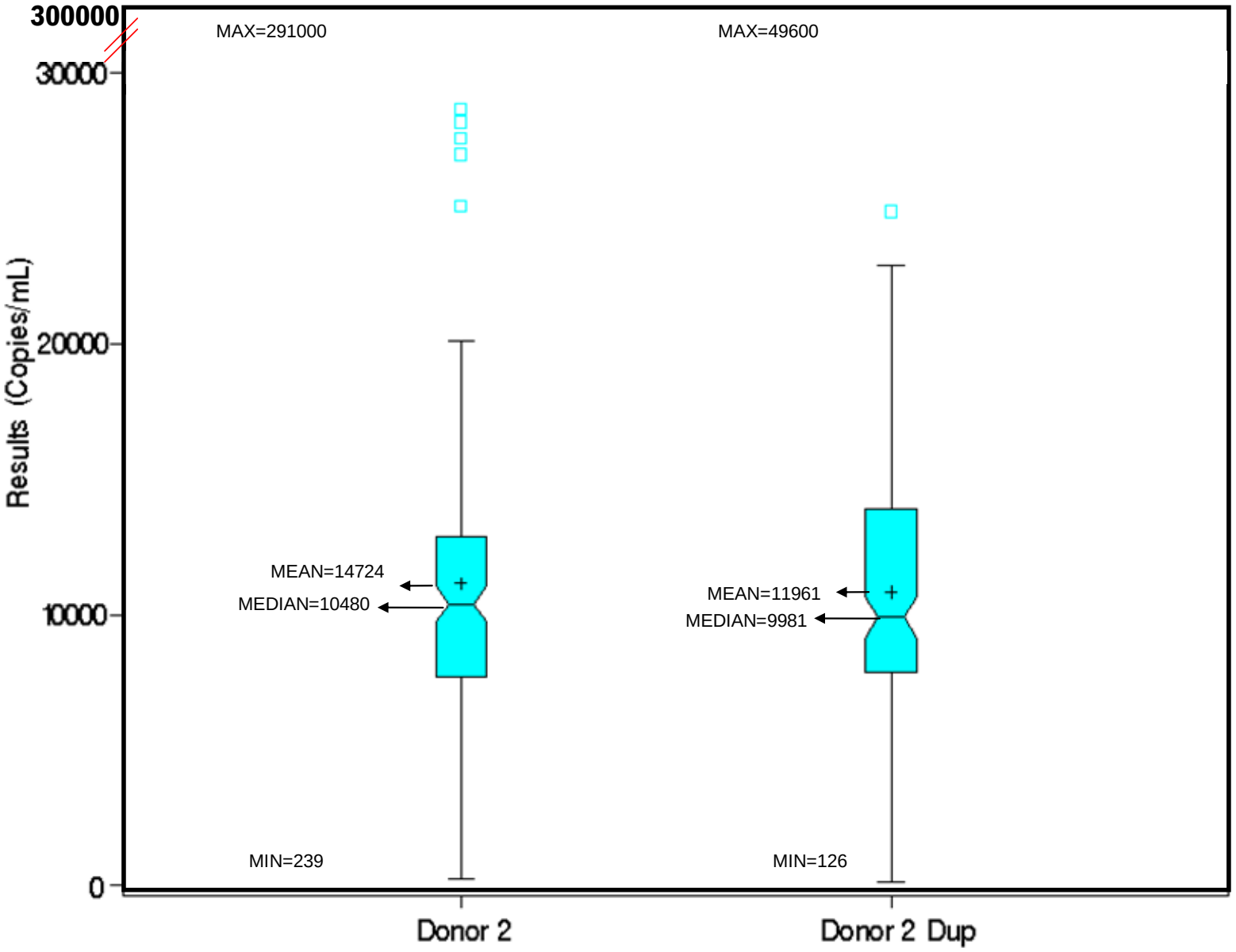
Distribution of Qualitative Results by Sample, Continued

Figure 6: Box plot – Donor 2 and 2 duplicate

In this box plot, Donor 2 and Donor 2 Duplicate were the plasma samples having target values of 10,000 copies/ml.



Plasma MPEP Samples
(10,000 copeis/ml)

Discussion

Overall performance for plasma MPEP samples

The overall performance in this survey was 96.5% for the Plasma MPEP samples, donors 1, 2, 3 & 4, representing an overall decline compared with the last shipment February 2005 (98.3%).

There were a total of 18 false-negative interpretations reported for HIV-1 RNA positive samples Donor 1, Donor 2, and Donor 2 duplicate in this shipment.

- Fourteen unique laboratories reported 15 false-negative interpretations for Donor 1 (1,000 copies/ml). Laboratories could report multiple results if they used more than one method.

- Three laboratories reported false-negative interpretations for Donor 2 and Donor 2 duplicate (identical "high-positive" samples with a target value of 10,000 copies/ml).

There were a total of 12 false-positive interpretations reported for HIV-1 RNA negative samples Donor 3 and Donor 4 in this shipment.

- There were 7 reported false-positives results on negative Donor 3 and 5 false-positive results on Donor 4.

- Nine laboratories reported false-positive interpretations for either Donor 3 or Donor 4.

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Simulated samples performance

Simulated samples, Donor 5 and Donor 6 (vial designations A2, A5, B6, & B3) were included in this shipment to investigate their comparability with Plasma MPEP donor samples. The simulated plasma samples appeared to perform well compared with plasma samples. Overall performance was 98.3% compared to 96.5% for plasma MPEP donor samples. Distributions for the simulated samples were similar to those typically observed for plasma MPEP donor samples with low and midrange copy numbers. Overall performance was higher for this shipment (98.3%) than in February 2005 (95.7%) for the simulated samples.

- There were 4 false-negative results reported for the simulated sample, donor 5 (4/165, 2.4%) compared with 15 false-negative results reported for the plasma MPEP sample, donor 1 (15/165, 9.1%) of equivalent copy number (1,000 copies/ml).

- Two false-negative interpretations (1.2%) were reported for the simulated sample, Donor 6 (target value 3,000 copies/ml).

External Quality Control (QC)

Of the 163 laboratories reporting results in this survey:

- 98.2% (160/163) provided information on external QC materials*

  - 45% (72/160) reported they did not use external QC samples

  - 55% (88/160) indicated that they used external QC materials. The source of their external QC materials are as follows:

Commercial Material	62.5% (55/88)
In-House material	34.1% (30/88)
Both Commercial and In-House Material	3.4% (3/88)

* External QC materials are quality control materials in which laboratories use IN ADDITION to controls, standards or calibrators that are included in their manufacturer's kit.