

***Centers for Disease Control and Prevention
Model Performance Evaluation Program
T-Lymphocyte Immunophenotyping (TLI)***

*Figures and Tables Used for the Analysis of
Participant Laboratory Results for the
March 1996 Shipment*

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

Public Health Service

Centers for Disease Control and Prevention

Public Health Practice Program Office

Division of Laboratory Systems

Atlanta, Georgia 30333

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Figures and Tables Used for the Analysis of the March 1996 Specimen Shipment
Results Submitted by Laboratories Participating in the Model Performance
Evaluation Program for T-Lymphocyte Immunophenotyping

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Figure 1. Primary classification of laboratories participating in the March 1996 shipment.

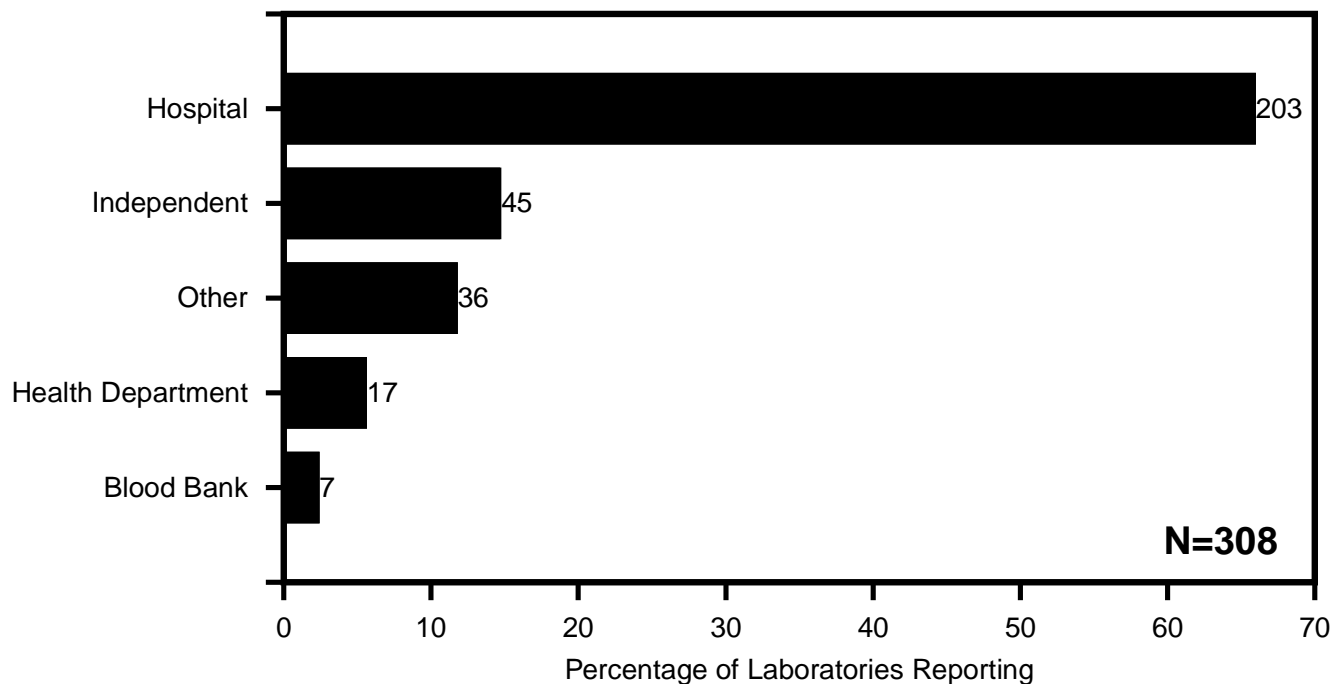


Figure 2. Methods used to prepare specimens for T-lymphocyte immunophenotyping, reported by participant laboratories to CDC for the March 1996 shipment.

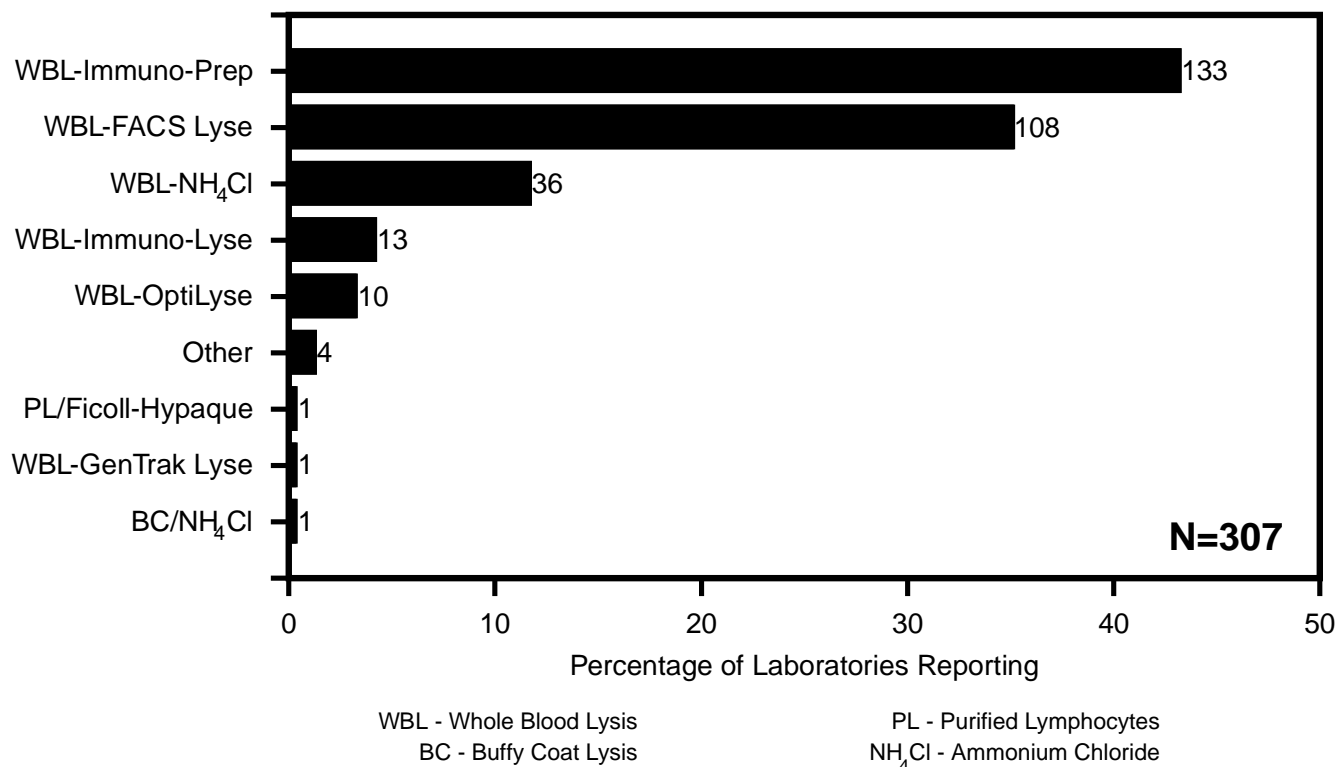


Figure 3. Methods used to fix specimens for T-lymphocyte immunophenotyping, reported by participant laboratories to CDC for the March 1996 shipment.

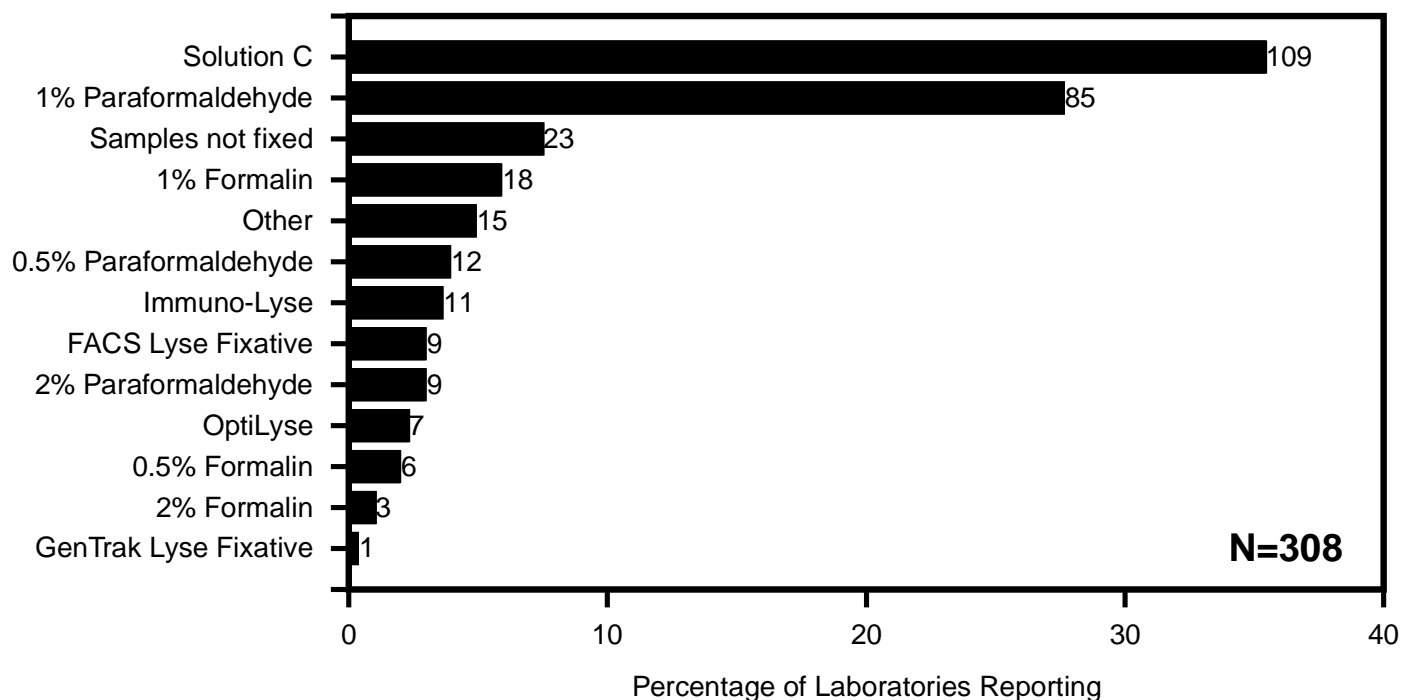
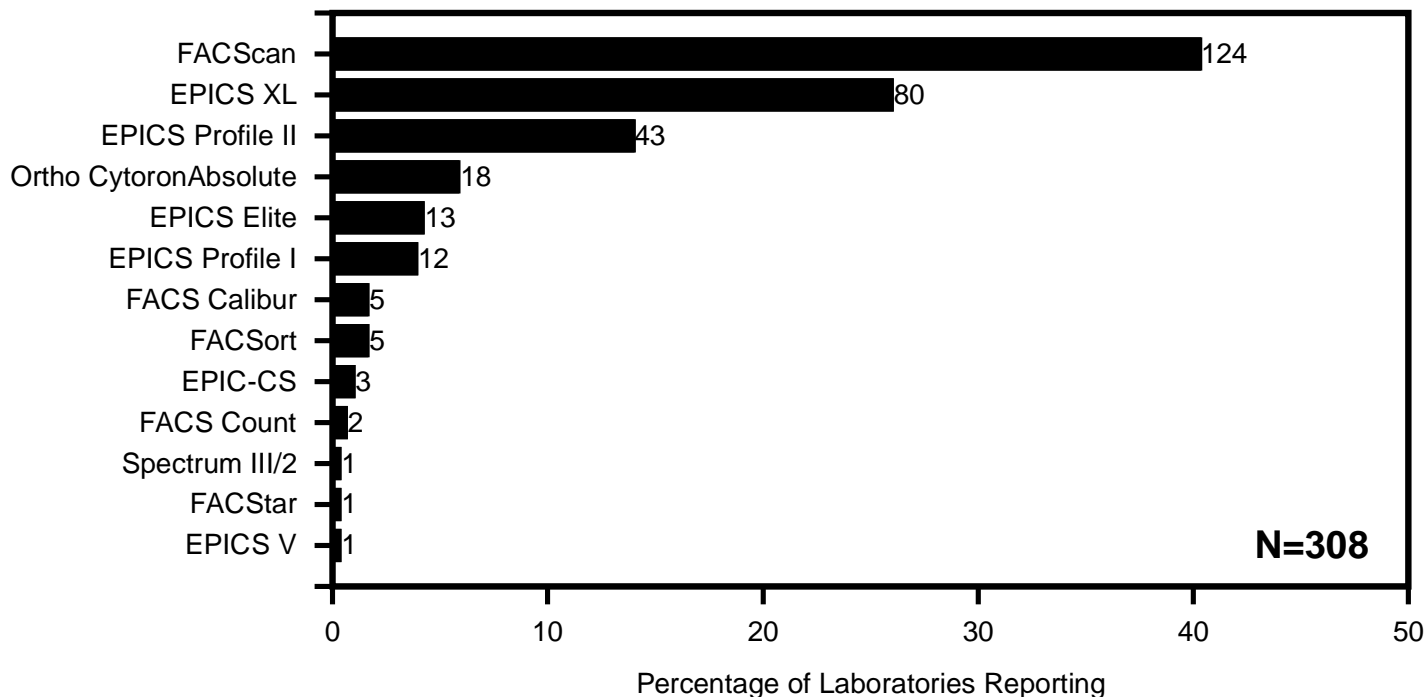


Figure 4. Types of flow cytometers used for T-lymphocyte immunophenotyping, reported by participant laboratories to CDC for the March 1996 shipment.



**Centers for Disease Control and Prevention (CDC) - Model Performance Evaluation Program
for T-Lymphocyte Immunophenotyping (TLI)
Donor Specimen Identification for March 5, 1996 TLI Shipment Specimens**

Panel Letter	Participant Lab Vial Label	CDC Donor Number	Donor Information (HIV-1^a status and CD4⁺ cell count)
A	A1, A5	01	HIV-1 Antibody-Positive, CD4 count \$ 500
	A2	08	HIV-1 Antibody-Positive, CD4 count # 200
	A3	12	HIV-1 Antibody-Negative
	A4	13	HIV-1 Antibody-Negative
B	B1	09	HIV-1 Antibody-Positive, CD4 count # 200
	B2	13	HIV-1 Antibody-Negative
	B3, B4	02	HIV-1 Antibody-Positive, CD4 count \$ 500
	B5	14	HIV-1 Antibody-Negative
C	C1, C2	03	HIV-1 Antibody-Positive, CD4 count \$ 500
	C3	15	HIV-1 Antibody-Negative
	C4	12	HIV-1 Antibody-Negative
	C5	10	HIV-1 Antibody-Positive, CD4 count # 200
D	D1	12	HIV-1 Antibody-Negative
	D2, D4	04	HIV-1 Antibody-Positive, CD4 count \$ 500
	D3	08	HIV-1 Antibody-Positive, CD4 count # 200
	D5	13	HIV-1 Antibody-Negative
E	E1	13	HIV-1 Antibody-Negative
	E2	15	HIV-1 Antibody-Negative
	E3	09	HIV-1 Antibody-Positive, CD4 count # 200
	E4, E5	05	HIV-1 Antibody-Positive, CD4 count \$ 500
F	F1	14	HIV-1 Antibody-Negative
	F2, F3	06	HIV-1 Antibody-Positive, CD4 count \$ 500
	F4	10	HIV-1 Antibody-Positive, CD4 count # 200
	F5	12	HIV-1 Antibody-Negative
G	G1	14	HIV-1 Antibody-Negative
	G2, G4	07	HIV-1 Antibody-Positive, CD4 count \$ 500
	G3	15	HIV-1 Antibody-Negative
	G5	11	HIV-1 Antibody-Positive, CD4 count > 200 but < 500

^aHuman immunodeficiency virus type 1

**Centers for Disease Control and Prevention (CDC) - Model Performance Evaluation Program
for T-Lymphocyte Immunophenotyping (TLI)
Donor Specimen Identification for March 12, 1996 TLI Shipment Specimens**

Panel Letter	Participant Lab Vial Label	CDC Donor Number	Donor Information (HIV-1^a status and CD4⁺ cell count)
H	H1	24	HIV-1 Antibody-Positive, CD4 count # 200
	H2	29	HIV-1 Antibody-Negative
	H3, H5	17	HIV-1 Antibody-Positive, CD4 count \$ 500
	H4	28	HIV-1 Antibody-Negative
I	I1, I4	18	HIV-1 Antibody-Positive, CD4 count \$ 500
	I2	27	HIV-1 Antibody-Negative
	I3	25	HIV-1 Antibody-Positive, CD4 count > 200 but < 500
	I5	30	HIV-1 Antibody-Negative
J	J1	23	HIV-1 Antibody-Positive, CD4 count # 200
	J2	28	HIV-1 Antibody-Negative
	J3, J5	19	HIV-1 Antibody-Positive, CD4 count \$ 500
	J4	27	HIV-1 Antibody-Negative
K	K1, K5	20	HIV-1 Antibody-Positive, CD4 count \$ 500
	K2	24	HIV-1 Antibody-Positive, CD4 count # 200
	K3	29	HIV-1 Antibody-Negative
	K4	28	HIV-1 Antibody-Negative
L	L1	25	HIV-1 Antibody-Positive, CD4 count > 200 but < 500
	L2, L5	21	HIV-1 Antibody-Positive, CD4 count \$ 500
	L3	27	HIV-1 Antibody-Negative
	L4	30	HIV-1 Antibody-Negative
M	M1	23	HIV-1 Antibody-Positive, CD4 count # 200
	M2	27	HIV-1 Antibody-Negative
	M3, M5	16	HIV-1 Antibody-Positive, CD4 count > 200 but < 500
	M4	28	HIV-1 Antibody-Negative
N	N1, N4	22	HIV-1 Antibody-Positive, CD4 count \$ 500
	N2	26	HIV-1 Antibody-Positive, CD4 count # 200
	N3	29	HIV-1 Antibody-Negative
	N5	30	HIV-1 Antibody-Negative

^aHuman immunodeficiency virus type 1

**Centers for Disease Control and Prevention (CDC) - Model Performance Evaluation Program
for T-Lymphocyte Immunophenotyping (TLI)
Donor Specimen Identification for March 19, 1996 TLI Shipment Specimens**

Panel Letter	Participant Lab Vial Label	CDC Donor Number	Donor Information (HIV-1^a status and CD4⁺ cell count)
O	O1	44	HIV-1 Antibody-Negative
	O2, O3	33	HIV-1 Antibody-Positive, CD4 count \$ 500
	O4	42	HIV-1 Antibody-Negative
	O5	40	HIV-1 Antibody-Positive, CD4 count > 200 but < 500
P	P1, P3	34	HIV-1 Antibody-Positive, CD4 count \$ 500
	P2	43	HIV-1 Antibody-Negative
	P4	38	HIV-1 Antibody-Positive, CD4 count # 200
	P5	42	HIV-1 Antibody-Negative
Q	Q1	39	HIV-1 Antibody-Positive, CD4 count # 200
	Q2, Q4	35	HIV-1 Antibody-Positive, CD4 count \$ 500
	Q3	45	HIV-1 Antibody-Negative
	Q5	43	HIV-1 Antibody-Negative
R	R1, R5	36	HIV-1 Antibody-Positive, CD4 count \$ 500
	R2	40	HIV-1 Antibody-Positive, CD4 count > 200 but < 500
	R3	42	HIV-1 Antibody-Negative
	R4	45	HIV-1 Antibody-Negative
S	S1, S5	31	HIV-1 Antibody-Positive, CD4 count \$ 500
	S2	42	HIV-1 Antibody-Negative
	S3	43	HIV-1 Antibody-Negative
	S4	38	HIV-1 Antibody-Positive, CD4 count # 200
T	T1	43	HIV-1 Antibody-Negative
	T2	39	HIV-1 Antibody-Positive, CD4 count # 200
	T3, T4	32	HIV-1 Antibody-Positive, CD4 count \$ 500
	T5	44	HIV-1 Antibody-Negative
U	U1	44	HIV-1 Antibody-Negative
	U2	41	HIV-1 Antibody-Positive, CD4 count > 200 but < 500
	U3	45	HIV-1 Antibody-Negative
	U4, U5	37	HIV-1 Antibody-Positive, CD4 count \$ 500

^aHuman immunodeficiency virus type 1

Table 1. Frequency of 2-color laboratory results for the March 1996 shipment, by cell marker, within, above, or below the 90% reference ranges*

CDC Donor Number -

Cell Marker HIV Status **

(Population)	1 - H		2 - H		3 - M		4 - M		5 - H		6 - H	
	Range	No. ^Δ	Range	No.	Range	No.	Range	No.	Range	No.	Range	No.
CD45+	> 99	5	> 100	0	> 99	2	> 100	0	> 99	5	> 100	0
	93 - 99	22	93 - 100	26	92 - 99	19	94 - 100	24	95 - 99	20	95 - 100	25
	< 93	0	< 93	0	< 92	1	< 94	0	< 95	1	< 95	1
CD14+	> 1	2	> 1	0	> 3	0	> 2	0	> 1	0	> 2	0
	1 - 1	11	0 - 1	24	0 - 3	22	0 - 2	22	0 - 1	26	0 - 2	24
	< 1	10	< 0	0	< 0	0	< 0	0	< 0	0	< 0	0
CD3+CD4+	> 37	5	> 59	2	> 32	0	> 31	0	> 36	1	> 34	0
	34 - 37	18	52 - 59	21	16 - 32	20	27 - 31	22	33 - 36	21	16 - 34	26
	< 34	2	< 52	3	< 16	0	< 27	2	< 33	4	< 16	0
CD3+CD8+	> 53	1	> 29	0	> 54	0	> 60	0	> 54	1	> 52	0
	44 - 53	16	21 - 29	25	28 - 54	20	46 - 60	23	49 - 54	17	38 - 52	26
	< 44	8	< 21	1	< 28	0	< 46	1	< 49	6	< 38	0
CD3-CD19+	> 12	0	> 17	0	> 14	0	> 12	0	> 12	0	> 11	0
	8 - 12	16	7 - 17	14	11 - 14	14	8 - 12	23	8 - 12	12	4 - 11	20
	< 8	1	< 7	0	< 11	2	< 8	1	< 8	0	< 4	0
CD3-(CD56 & CD16)+	> 7	0	> 5	0	> 5	0	> 5	0	> 12	0	> 17	0
	4 - 7	12	2 - 5	12	3 - 5	6	2 - 5	18	7 - 12	15	10 - 17	12
	< 4	0	< 2	0	< 3	0	< 2	0	< 7	1	< 10	0
CD3+ Average	> 87	1	> 88	2	> 88	0	> 89	0	> 83	1	> 77	1
	83 - 87	12	78 - 88	16	77 - 88	18	74 - 89	20	79 - 83	19	70 - 77	25
	< 83	7	< 78	2	< 77	0	< 74	0	< 79	0	< 70	0

*The 90% reference ranges were determined from results provided by participant laboratories which used the monoclonal antibody panel recommended in "1994 Revised Guidelines for the Performance of CD4+ T-Cell Determinations in Persons with Human Immunodeficiency Virus (HIV) Infection." MMWR 1994; 43(No.RR-3).

** HIV status: N=Negative; Positive --- L=Low CD4 ct (<200), M=Moderate CD4 ct (>200 but <500), H=High CD4 ct (>500)

^ΔNo. = frequency of laboratories

Table 1. Frequency of 2-color laboratory results for the March 1996 shipment, by cell marker, within, above, or below the 90% reference ranges*

Cell Marker (Population)	CDC Donor Number - HIV Status **											
	7 - M		8 - L		9 - L		10 - L		11 - L		12 - N	
	Range	No. ^Δ	Range	No.	Range	No.	Range	No.	Range	No.	Range	No.
CD45+	> 100	0	> 100	0	> 100	0	> 99	1	> 100	0	> 100	0
	94 - 100	20	81 - 100	26	95 - 100	26	88 - 99	22	92 - 100	11	92 - 100	50
	< 94	4	< 81	0	< 95	0	< 88	0	< 92	1	< 92	1
CD14+	> 3	0	> 1	1	> 3	0	> 2	0	> 1	0	> 1	3
	0 - 3	24	0 - 1	22	0 - 3	25	0 - 2	22	0 - 1	12	0 - 1	44
	< 0	0	< 0	0	< 0	0	< 0	0	< 0	0	< 0	0
CD3+CD4+	> 41	0	> 14	1	> 6	1	> 2	0	> 20	0	> 53	1
	26 - 41	16	5 - 14	21	2 - 6	25	1 - 2	23	13 - 20	8	47 - 53	44
	< 26	0	< 5	2	< 2	0	< 1	0	< 13	0	< 47	3
CD3+CD8+	> 45	0	> 69	2	> 61	0	> 72	0	> 78	0	> 27	3
	35 - 45	16	58 - 69	19	51 - 61	23	53 - 72	23	63 - 78	8	24 - 27	43
	< 35	0	< 58	3	< 51	2	< 53	0	< 63	0	< 24	2
CD3-CD19+	> 16	0	> 27	0	> 23	1	> 11	0	> 10	0	> 12	1
	8 - 16	18	12 - 27	19	16 - 23	12	7 - 11	18	3 - 10	10	8 - 12	38
	< 8	2	< 12	2	< 16	0	< 7	0	< 3	0	< 8	1
CD3-(CD56 & CD16)+	> 6	0	> 7	0	> 21	0	> 6	0	> 4	0	> 16	0
	3 - 6	16	4 - 7	15	13 - 21	14	2 - 6	9	1 - 4	8	12 - 16	23
	< 3	0	< 4	0	< 13	0	< 2	0	< 1	0	< 12	1
CD3+ Average	> 86	1	> 78	1	> 67	1	> 92	0	> 96	0	> 79	1
	76 - 86	23	68 - 78	16	57 - 67	19	70 - 92	21	86 - 96	12	71 - 79	40
	< 76	0	< 68	3	< 57	0	< 70	1	< 86	0	< 71	1

*The 90% reference ranges were determined from results provided by participant laboratories which used the monoclonal antibody panel recommended in "1994 Revised Guidelines for the Performance of CD4+ T-Cell Determinations in Persons with Human Immunodeficiency Virus (HIV) Infection." MMWR 1994: 43(No.RR-3).

** HIV status: N=Negative; Positive --- L=Low CD4 ct (<200), M=Moderate CD4 ct (>200 but <500), H=High CD4 ct (>500)

^ΔNo. = frequency of laboratories

Table 1. Frequency of 2-color laboratory results for the March 1996 shipment, by cell marker, within, above, or below the 90% reference ranges*

CDC Donor Number -		HIV Status **										
Cell Marker (Population)	13 - N		14 - N		15 - N		16 - M		17 - H		18 - H	
	Range	No. ^Δ	Range	No.	Range	No.	Range	No.	Range	No.	Range	No.
CD45+	> 100	0	> 100	0	> 100	0	> 100	0	> 99	1	> 100	0
	94 - 100	51	95 - 100	35	94 - 100	36	94 - 100	21	93 - 99	22	96 - 100	26
	< 94	1	< 95	3	< 94	0	< 94	0	< 93	1	< 96	0
CD14+	> 1	1	> 1	1	> 2	1	> 1	2	> 1	0	> 1	2
	0 - 1	47	0 - 1	35	0 - 2	34	0 - 1	19	0 - 1	24	0 - 1	23
	< 0	0	< 0	0	< 0	0	< 0	0	< 0	0	< 0	0
CD3+CD4+	> 43	5	> 38	3	> 49	1	> 41	2	> 39	1	> 35	2
	39 - 43	37	33 - 38	31	40 - 49	29	35 - 41	17	31 - 39	22	29 - 35	22
	< 39	7	< 33	0	< 40	1	< 35	0	< 31	1	< 29	0
CD3+CD8+	> 27	1	> 43	1	> 26	1	> 30	0	> 45	0	> 47	0
	20 - 27	43	36 - 43	32	18 - 26	26	26 - 30	19	36 - 45	24	38 - 47	24
	< 20	4	< 36	1	< 18	3	< 26	0	< 36	0	< 38	0
CD3-CD19+	> 19	1	> 10	1	> 20	1	> 11	0	> 16	1	> 21	0
	11 - 19	32	7 - 10	26	15 - 20	23	5 - 11	17	10 - 16	20	14 - 21	22
	< 11	1	< 7	0	< 15	0	< 5	0	< 10	1	< 14	0
CD3-(CD56 & CD16)+	> 19	1	> 14	0	> 16	0	> 21	0	> 9	0	> 7	0
	15 - 19	25	10 - 14	19	8 - 16	19	17 - 21	6	7 - 9	12	3 - 7	12
	< 15	1	< 10	1	< 8	0	< 17	2	< 7	2	< 3	0
CD3+ Average	> 70	0	> 81	2	> 70	0	> 74	1	> 85	1	> 82	0
	62 - 70	35	73 - 81	32	64 - 70	29	69 - 74	16	68 - 85	25	71 - 82	19
	< 62	4	< 73	1	< 64	2	< 69	0	< 68	0	< 71	0

*The 90% reference ranges were determined from results provided by participant laboratories which used the monoclonal antibody panel recommended in "1994 Revised Guidelines for the Performance of CD4+ T-Cell Determinations in Persons with Human Immunodeficiency Virus (HIV) Infection." MMWR 1994; 43(No.RR-3).

** HIV status: N=Negative; Positive --- L=Low CD4 ct (<200), M=Moderate CD4 ct (>200 but <500), H=High CD4 ct (>500)

^ΔNo. = frequency of laboratories

Table 1. Frequency of 2-color laboratory results for the March 1996 shipment, by cell marker, within, above, or below the 90% reference ranges*

Cell Marker (Population)	CDC Donor Number - HIV Status **											
	19 - H		20 - H		21 - H		22 - M		23 - L		24 - L	
	Range	No [^]	Range	No.	Range	No.	Range	No.	Range	No.	Range	No.
CD45+	> 100	0	> 100	0	> 100	0	> 100	0	> 100	0	> 100	0
	95 - 100	24	93 - 100	27	95 - 100	28	92 - 100	23	95 - 100	23	93 - 100	26
	< 95	2	< 93	1	< 95	2	< 92	0	< 95	1	< 93	0
CD14+	> 1	0	> 1	0	> 3	1	> 1	0	> 2	0	> 1	1
	0 - 1	24	0 - 1	28	0 - 3	29	0 - 1	21	0 - 2	23	0 - 1	25
	< 0	0	< 0	0	< 0	0	< 0	0	< 0	0	< 0	0
CD3+CD4+	> 46	0	> 38	1	> 40	0	> 35	0	> 10	0	> 2	1
	38 - 46	25	32 - 38	22	35 - 40	26	29 - 35	17	7 - 10	23	0 - 2	23
	< 38	1	< 32	1	< 35	0	< 29	0	< 7	0	< 0	0
CD3+CD8+	> 38	6	> 49	1	> 47	0	> 55	0	> 65	2	> 63	0
	33 - 38	18	38 - 49	23	36 - 47	26	49 - 55	17	54 - 65	21	51 - 63	23
	< 33	2	< 38	0	< 36	0	< 49	4	< 54	0	< 51	1
CD3-CD19+	> 16	0	> 13	1	> 16	0	> 6	0	> 29	0	> 34	0
	4 - 16	14	10 - 13	22	8 - 16	20	4 - 6	14	12 - 29	15	26 - 34	21
	< 4	0	< 10	1	< 8	0	< 4	1	< 12	1	< 26	2
CD3-(CD56 & CD16)+	> 10	0	> 8	0	> 5	0	> 8	1	> 12	0	> 7	0
	4 - 10	8	2 - 8	14	3 - 5	16	5 - 8	10	4 - 12	8	5 - 7	14
	< 4	2	< 2	0	< 3	0	< 5	2	< 4	1	< 5	0
CD3+ Average	> 84	0	> 85	1	> 83	1	> 89	2	> 73	1	> 69	1
	73 - 84	26	77 - 85	27	77 - 83	19	82 - 89	18	63 - 73	21	57 - 69	25
	< 73	0	< 77	0	< 77	2	< 82	3	< 63	0	< 57	1

*The 90% reference ranges were determined from results provided by participant laboratories which used the monoclonal antibody panel recommended in "1994 Revised Guidelines for the Performance of CD4+ T-Cell Determinations in Persons with Human Immunodeficiency Virus (HIV) Infection." MMWR 1994; 43(No.RR-3).

** HIV status: N=Negative; Positive --- L=Low CD4 ct (<200), M=Moderate CD4 ct (>200 but <500), H=High CD4 ct (>500)

[^]No. = frequency of laboratories

Table 1. Frequency of 2-color laboratory results for the March 1996 shipment, by cell marker, within, above, or below the 90% reference ranges*

Cell Marker (Population)	CDC Donor Number - HIV Status **											
	25 - L		26 - L		27 - N		28 - N		29 - N		30 - N	
	Range	No. [^]	Range	No.	Range	No.	Range	No.	Range	No.	Range	No.
CD45+	> 99	4	> 100	0	> 100	0	> 100	0	> 100	0	> 100	0
	94 - 99	24	95 - 100	12	94 - 100	50	90 - 100	49	91 - 100	37	95 - 100	38
	< 94	0	< 95	0	< 94	2	< 90	1	< 91	1	< 95	2
CD14+	> 1	2	> 0	1	> 1	1	> 1	2	> 1	2	> 2	2
	0 - 1	25	0 - 0	10	0 - 1	50	0 - 1	47	0 - 1	35	0 - 2	36
	< 0	0	< 0	0	< 0	0	< 0	0	< 0	0	< 0	0
CD3+CD4+	> 15	0	> 7	0	> 54	0	> 54	3	> 63	2	> 58	2
	9 - 15	25	5 - 7	9	47 - 54	44	46 - 54	45	53 - 63	30	52 - 58	31
	< 9	0	< 5	0	< 47	4	< 46	0	< 53	1	< 52	1
CD3+CD8+	> 67	0	> 66	0	> 21	2	> 28	1	> 26	1	> 22	0
	48 - 67	25	56 - 66	10	17 - 21	45	21 - 28	45	20 - 26	33	16 - 22	33
	< 48	0	< 56	1	< 17	1	< 21	2	< 20	1	< 16	3
CD3-CD19+	> 23	0	> 25	1	> 16	1	> 11	1	> 12	1	> 21	1
	5 - 23	21	13 - 25	7	11 - 16	35	7 - 11	37	9 - 12	28	14 - 21	28
	< 5	0	< 13	0	< 11	1	< 7	1	< 9	2	< 14	0
CD3-(CD56 & CD16)+	> 12	0	> 9	2	> 18	0	> 19	0	> 7	1	> 6	1
	8 - 12	13	7 - 9	5	11 - 18	22	11 - 19	22	4 - 7	20	4 - 6	20
	< 8	1	< 7	0	< 11	1	< 11	1	< 4	0	< 4	0
CD3+ Average	> 82	1	> 74	0	> 74	1	> 78	7	> 86	3	> 83	0
	64 - 82	18	65 - 74	10	67 - 74	39	71 - 78	40	77 - 86	34	72 - 83	30
	< 64	1	< 65	2	< 67	2	< 71	2	< 77	2	< 72	2

*The 90% reference ranges were determined from results provided by participant laboratories which used the monoclonal antibody panel recommended in "1994 Revised Guidelines for the Performance of CD4+ T-Cell Determinations in Persons with Human Immunodeficiency Virus (HIV) Infection." MMWR 1994; 43(No.RR-3).

** HIV status: N=Negative; Positive --- L=Low CD4 ct (<200), M=Moderate CD4 ct (>200 but <500), H=High CD4 ct (>500)

[^]No. = frequency of laboratories

Table 1. Frequency of 2-color laboratory results for the March 1996 shipment, by cell marker, within, above, or below the 90% reference ranges*

Cell Marker (Population)	CDC Donor Number - HIV Status **											
	31 - M		32 - M		33 - H		34 - M		35 - H		36 - H	
	Range	No. ^Δ	Range	No.	Range	No.	Range	No.	Range	No.	Range	No.
CD45+	> 100	0	> 99	4	> 100	0	> 99	1	> 100	0	> 99	2
	96 - 100	24	95 - 99	18	94 - 100	29	94 - 99	27	94 - 100	26	81 - 99	18
	< 96	0	< 95	0	< 94	1	< 94	0	< 94	0	< 81	0
CD14+	> 1	0	> 1	0	> 2	1	> 6	0	> 1	0	> 3	0
	0 - 1	22	0 - 1	22	0 - 2	29	0 - 6	28	0 - 1	26	0 - 3	21
	< 0	0	< 0	0	< 0	0	< 0	0	< 0	0	< 0	0
CD3+CD4+	> 39	2	> 31	0	> 40	1	> 33	0	> 45	0	> 50	2
	31 - 39	22	21 - 31	24	32 - 40	26	24 - 33	24	37 - 45	22	29 - 50	18
	< 31	0	< 21	0	< 32	1	< 24	0	< 37	0	< 29	0
CD3+CD8+	> 54	0	> 71	0	> 56	2	> 65	1	> 35	0	> 61	0
	42 - 54	22	52 - 71	26	42 - 56	25	54 - 65	23	30 - 35	22	40 - 61	20
	< 42	2	< 52	0	< 42	1	< 54	0	< 30	0	< 40	0
CD3-CD19+	> 10	1	> 9	0	> 12	1	> 5	0	> 13	0	> 9	0
	5 - 10	19	6 - 9	14	9 - 12	22	1 - 5	26	9 - 13	15	2 - 9	16
	< 5	0	< 6	0	< 9	1	< 1	0	< 9	1	< 2	0
CD3-(CD56 & CD16)+	> 9	0	> 4	0	> 4	0	> 4	0	> 17	0	> 4	0
	3 - 9	16	2 - 4	14	2 - 4	20	1 - 4	16	10 - 17	12	1 - 4	18
	< 3	0	< 2	0	< 2	0	< 1	0	< 10	0	< 1	0
CD3+ Average	> 88	0	> 92	0	> 88	2	> 95	0	> 77	0	> 96	0
	81 - 88	24	83 - 92	16	83 - 88	22	91 - 95	20	68 - 77	24	74 - 96	16
	< 81	0	< 83	0	< 83	0	< 91	6	< 68	0	< 74	0

*The 90% reference ranges were determined from results provided by participant laboratories which used the monoclonal antibody panel recommended in "1994 Revised Guidelines for the Performance of CD4+ T-Cell Determinations in Persons with Human Immunodeficiency Virus (HIV) Infection." MMWR 1994; 43(No.RR-3).

** HIV status: N=Negative; Positive --- L=Low CD4 ct (<200), M=Moderate CD4 ct (>200 but <500), H=High CD4 ct (>500)

^ΔNo. = frequency of laboratories

Table 1. Frequency of 2-color laboratory results for the March 1996 shipment, by cell marker, within, above, or below the 90% reference ranges*

CDC Donor Number -

Cell Marker HIV Status **

Cell Marker (Population)	37 - H		38 - L		39 - L		40 - L		41 - L	
	Range	No. ^A	Range	No.	Range	No.	Range	No.	Range	No.
CD45+	> 86	0	> 100	0	> 99	1	> 99	1	> 100	0
	86 - 100	21	92 - 100	25	89 - 99	23	89 - 99	24	85 - 100	12
	< 100	0	< 92	0	< 89	0	< 89	1	< 85	0
CD14+	> 1	1	> 6	0	> 1	0	> 3	0	> 1	0
	0 - 1	20	0 - 6	25	0 - 1	24	0 - 3	26	0 - 1	12
	< 0	0	< 0	0	< 0	0	< 0	0	< 0	0
CD3+CD4+	> 35	1	> 7	1	> 17	0	> 19	0	> 18	0
	25 - 35	19	3 - 7	22	9 - 17	23	15 - 19	23	12 - 18	12
	< 25	1	< 3	1	< 9	0	< 15	1	< 12	0
CD3+CD8+	> 43	0	> 80	0	> 60	0	> 60	0	> 59	0
	32 - 43	21	72 - 80	24	37 - 60	24	47 - 60	24	49 - 59	12
	< 32	0	< 72	0	< 37	0	< 47	0	< 49	0
CD3-CD19+	> 25	0	> 14	0	> 21	0	> 21	0	> 13	0
	9 - 25	15	6 - 14	22	10 - 21	15	11 - 21	20	7 - 13	9
	< 9	0	< 6	1	< 10	0	< 11	0	< 7	0
CD3-(CD56 & CD16)+	> 16	0	> 4	2	> 22	0	> 12	0	> 15	0
	1 - 16	12	1 - 4	14	8 - 22	13	1 - 12	19	7 - 15	7
	< 1	0	< 1	0	< 8	0	< 1	0	< 7	0
CD3+ Average	> 75	0	> 87	0	> 73	0	> 76	2	> 82	0
	61 - 75	14	80 - 87	24	53 - 73	20	65 - 76	18	70 - 82	9
	< 61	1	< 80	1	< 53	0	< 65	0	< 70	0

*The 90% reference ranges were determined from results provided by participant laboratories which used the monoclonal antibody panel recommended in "1994 Revised Guidelines for the Performance of CD4+ T-Cell Determinations in Persons with Human Immunodeficiency Virus (HIV) Infection," MMWR 1994; 43(No.RR-3).

** HIV status: N=Negative; Positive --- L=Low CD4 ct (<200), M=Moderate CD4 ct (>200 but <500), H=High CD4 ct (>500)

^ANo. = frequency of laboratories

Table 1. Frequency of 2-color laboratory results for the March 1996 shipment, by cell marker, within, above, or below the 90% reference ranges*

CDC Donor Number -

Cell Marker HIV Status **

Cell Marker (Population)	42 - N		43 - N		44 - N		45 - N	
	Range	No. [^]	Range	No.	Range	No.	Range	No.
CD45+	> 100	1	> 100	0	> 100	0	> 100	0
	92 - 100	49	91 - 100	49	94 - 100	39	92 - 100	35
	< 92	2	< 91	1	< 94	0	< 92	1
CD14+	> 3	1	> 2	1	> 2	0	> 1	1
	0 - 3	50	0 - 2	48	0 - 2	38	0 - 1	35
	< 0	0	< 0	0	< 0	0	< 0	0
CD3+CD4+	> 43	0	> 63	0	> 45	3	> 52	2
	35 - 43	46	53 - 63	46	40 - 45	35	41 - 52	30
	< 35	2	< 53	1	< 40	1	< 41	1
CD3+CD8+	> 32	1	> 22	2	> 30	0	> 27	1
	25 - 32	45	15 - 22	45	21 - 30	39	20 - 27	31
	< 25	2	< 15	1	< 21	1	< 20	1
CD3-CD19+	> 21	2	> 17	1	> 25	1	> 21	0
	13 - 21	40	13 - 17	36	18 - 25	26	14 - 21	23
	< 13	1	< 13	1	< 18	1	< 14	2
CD3-(CD56 & CD16)+	> 13	0	> 12	1	> 13	1	> 13	0
	4 - 13	34	4 - 12	28	6 - 13	23	2 - 13	22
	< 4	1	< 4	0	< 6	0	< 2	0
CD3+ Average	> 74	1	> 82	0	> 70	0	> 79	0
	65 - 74	42	71 - 82	43	64 - 70	29	68 - 79	29
	< 65	2	< 71	2	< 64	1	< 68	0

*The 90% reference ranges were determined from results provided by participant laboratories which used the monoclonal antibody panel recommended in "1994 Revised Guidelines for the Performance of CD4+ T-Cell Determinations in Persons with Human Immunodeficiency Virus (HIV) Infection," MMWR 1994; 43(No.RR-3).

** HIV status: N=Negative; Positive --- L=Low CD4 ct (<200), M=Moderate CD4 ct (>200 but <500), H=High CD4 ct (>500)

[^]No. = frequency of laboratories

Table 2. Range of all 2-color participant laboratory results for the March 1996 shipment for CD16 and CD56 cell markers. Insufficient data were reported by laboratories using the recommended monoclonal antibody panel to enable determination of 90% reference ranges. The ranges reported in this table are the maximum and minimum values reported by all laboratories using these cell markers.

Donor Report	HIV Status	CD3-/CD16+ Range			CD3-/CD56+ Range		
01	H	4	-	5	3	-	4
02	H		NA		2	-	5
03	M	3	-	4	2	-	4
04	M		NA		1	-	2
05	H		NA		6	-	9
06	H	10	-	11	0	-	15
07	M		NA		2	-	3
08	L	3	-	15	2	-	4
09	L		NA		6	-	12
10	L	2	-	11	1	-	6
11	L		NA		1	-	1
12	N	5	-	14	3	-	15
13	N	12	-	15	8	-	17
14	N	10	-	10	1	-	13
15	N	13	-	19	10	-	15
16	M	10	-	17	3	-	16
17	H	3	-	8	4	-	5
18	H	5	-	6	2	-	7
19	H		NA		5	-	6
20	H	1	-	6	1	-	3
21	H		NA		2	-	3
22	M	2	-	3	3	-	4
23	L	4	-	5	1	-	5
24	L	1	-	7	3	-	5
25	L	11	-	11	5	-	9
26	L	5	-	7	4	-	4
27	N	6	-	16	5	-	16
28	N	8	-	14	7	-	15
29	N	3	-	6	2	-	4
30	N	3	-	6	4	-	9
31	M		NA		2	-	5
32	M	1	-	2	1	-	3
33	H		NA		2	-	2
34	M		NA		1	-	4
35	H	10	-	13		NA	
36	H	1	-	1	1	-	2
37	H	7	-	9	5	-	5
38	L		NA		2	-	5
39	L	10	-	11	7	-	15
40	L	1	-	1	4	-	7
41	L	6	-	6	4	-	6
42	N	0	-	0	7	-	11
43	N	3	-	9	4	-	8
44	N	8	-	10	4	-	9
45	N	4	-	8	1	-	6

Table 3. Percentage of 2-color laboratory results for the March 1996 shipment, by monoclonal antibody manufacturer, that are within the 90% reference ranges*

		Becton-Dickinson (N=127)**																	
Cell Marker (Population)	CDC Donor Number																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
HIV Status***	H	H	M	M	H	H	M	L	L	L	L	N	N	N	N	M	H	H	
CD45+	83	100	100	100	100	100	86	100	100	100	100	96	96	94	100	100	92	100	
CD14+	75	100	100	100	100	100	100	100	100	100	100	96	100	100	100	100	100	100	
CD3+CD4+	86	63	100	100	75	100	100	94	100	100	100	92	92	94	92	100	92	86	
CD3+CD8+	79	100	100	94	100	100	100	88	100	100	100	88	96	94	100	100	100	100	
CD3-CD19+	100	100	100	94	100	100	100	100	100	100	100	96	89	100	100	100	92	100	
CD3-(CD56 & CD16)+	100	100	100	100	100	100	100	100	100	100	100	100	94	100	100	100	100	100	
CD3+ Average	50	75	100	100	100	100	100	92	86	100	100	100	95	88	100	100	92	100	

		Coulter (N=69)**																	
Cell Marker (Population)	CDC Donor Number																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
HIV Status***	H	H	M	M	H	H	M	L	L	L	L	N	N	N	N	M	H	H	
CD45+	0	100	100	100	88	83	100	100	100	100	100	100	100	100	100	100	NA	100	
CD14+	0	100	100	100	100	100	100	50	100	100	100	75	89	100	88	100	NA	100	
CD3+CD4+	0	75	100	50	75	100	100	100	88	100	100	100	64	100	89	67	NA	100	
CD3+CD8+	0	100	100	100	38	100	100	33	75	100	100	100	73	88	67	100	NA	100	
CD3-CD19+	NA	100	75	100	100	100	100	100	50	100	100	100	100	67	100	100	NA	100	
CD3-(CD56 & CD16)+	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
CD3+ Average	50	50	100	100	75	100	NA	33	100	80	NA	100	57	100	80	100	NA	100	

		Other Manufacturers (N=80)****																	
Cell Marker (Population)	CDC Donor Number																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
HIV Status***	H	H	M	M	H	H	M	L	L	L	L	N	N	N	N	M	H	H	
CD45+	92	100	63	100	58	100	75	100	100	88	75	100	100	86	100	100	92	100	
CD14+	22	100	100	100	100	100	100	100	100	100	100	100	100	92	100	85	100	50	
CD3+CD4+	67	100	100	100	90	100	100	60	100	100	100	85	57	80	100	100	92	100	
CD3+CD8+	56	90	100	100	80	100	100	80	100	100	100	85	93	100	89	100	100	100	
CD3-CD19+	86	100	83	100	100	100	67	60	100	100	100	92	100	100	88	100	90	100	
CD3-(CD56 & CD16)+	100	100	100	100	90	100	100	100	100	100	100	80	89	80	100	67	50	NA	
CD3+ Average	83	100	100	100	100	90	92	75	100	100	100	83	100	93	93	92	100	100	

*The 90% reference ranges were determined from results provided by participant laboratories which used the monoclonal antibody panel recommended in "1994 Revised Guidelines for the Performance of CD4+ T-Cell Determinations in Persons with Human Immunodeficiency Virus (HIV) Infection," MMWR 1994; 43(No.RR-3).

**Laboratories using Becton Dickinson or Coulter monoclonal antibodies exclusively for all tests.

*** HIV status: N=Negative; Positive --- L=Low CD4 ct (<200), M=Moderate CD4 ct (>200 but <500), H=High CD4 ct (>500)

****Results from laboratories using monoclonal antibodies from more than one manufacturer or from Dako, Caltag, GenTrak, Immunotech, In-house, Ortho, Pharmingen, or Sigma.

NA = no data returned by any laboratory for specified marker

Table 3. Percentage of 2-color laboratory results for the March 1996 shipment, by monoclonal antibody manufacturer, that are within the 90% reference ranges*

		Becton-Dickinson (N=127)**																	
Cell Marker (Population)	CDC Donor Number																		
	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	
HIV Status***	H	H	H	M	L	L	L	L	N	N	N	N	M	M	H	M	H	H	
CD45+	86	92	100	100	88	100	92	100	90	95	94	94	100	100	100	100	100	100	
CD14+	100	100	100	100	100	92	100	83	100	100	94	100	100	100	94	100	100	100	
CD3+CD4+	100	92	100	100	100	100	100	100	90	90	94	88	100	100	94	100	100	100	
CD3+CD8+	71	92	100	100	88	92	100	100	90	95	94	100	100	100	88	90	100	100	
CD3-CD19+	100	83	100	100	100	100	100	100	93	94	89	100	100	100	86	100	100	100	
CD3-(CD56 & CD16)+	75	100	100	82	80	100	100	67	93	93	94	94	100	100	100	100	100	100	
CD3+ Average	100	92	100	82	88	100	100	100	94	75	78	94	100	100	100	70	100	100	

		Coulter (N=69)**																	
Cell Marker (Population)	CDC Donor Number																		
	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	
HIV Status***	H	H	H	M	L	L	L	L	N	N	N	N	M	M	H	M	H	H	
CD45+	100	100	100	100	100	100	100	100	100	100	100	90	100	67	75	100	100	0	
CD14+	100	100	100	100	100	100	100	100	100	88	80	88	100	100	100	100	100	100	
CD3+CD4+	100	100	100	100	100	100	100	100	100	89	80	89	75	100	100	100	100	0	
CD3+CD8+	75	100	100	60	100	100	100	80	92	89	100	82	75	100	100	100	100	100	
CD3-CD19+	100	100	100	NA	75	100	100	NA	100	100	100	83	83	100	100	100	75	100	
CD3-(CD56 & CD16)+	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
CD3+ Average	100	100	100	75	100	100	100	75	100	83	100	100	100	100	50	50	100	NA	

		Other Manufacturers (N=80)****																	
Cell Marker (Population)	CDC Donor Number																		
	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	
HIV Status***	H	H	H	M	L	L	L	L	N	N	N	N	M	M	H	M	H	H	
CD45+	100	100	88	100	100	100	70	100	100	100	100	100	100	67	100	94	100	90	
CD14+	100	100	94	100	100	100	80	100	95	95	100	92	100	100	100	100	100	100	
CD3+CD4+	75	88	100	100	100	90	100	100	87	100	91	100	100	100	88	100	100	100	
CD3+CD8+	50	100	100	100	88	100	100	100	100	95	91	88	100	100	88	100	100	100	
CD3-CD19+	100	100	100	75	100	80	100	50	92	94	92	100	100	100	100	100	100	100	
CD3-(CD56 & CD16)+	100	100	100	50	100	100	75	100	100	100	100	100	100	100	100	100	100	100	
CD3+ Average	100	100	70	75	100	86	67	50	87	87	94	88	100	100	100	86	100	100	

*The 90% reference ranges were determined from results provided by participant laboratories which used the monoclonal antibody panel recommended in "1994 Revised Guidelines for the Performance of CD4+ T-Cell Determinations in Persons with Human Immunodeficiency Virus (HIV) Infection," MMWR 1994; 43(No.RR-3).

**Laboratories using Becton Dickinson or Coulter monoclonal antibodies exclusively for all tests.

*** HIV status: N=Negative; Positive --- L=Low CD4 ct (<200), M=Moderate CD4 ct (>200 but <500), H=High CD4 ct (>500)

****Results from laboratories using monoclonal antibodies from more than one manufacturer or from Dako, Caltag, GenTrak, Immunotech, In-house, Ortho, Pharmingen, or Sigma.

NA = no data returned by any laboratory for specified marker

Table 3. Percentage of 2-color laboratory results for the March 1996 shipment, by monoclonal antibody manufacturer, that are within the 90% reference ranges*

Becton-Dickinson (N=127)**

Cell Marker (Population)	CDC Donor Number									
	37	38	39	40	41	42	43	44	45	
	HIV Status***									
	H	L	L	L	L	N	N	N	N	
CD45+	100	100	100	100	100	87	100	100	94	
CD14+	91	100	100	100	100	100	100	100	94	
CD3+CD4+	91	91	100	100	100	92	100	95	94	
CD3+CD8+	100	100	100	100	100	88	90	100	94	
CD3-CD19+	100	90	100	100	100	86	94	94	93	
CD3-(CD56 & CD16)+	100	88	100	100	100	100	100	94	100	
CD3+ Average	89	91	100	100	100	91	89	100	100	

Coulter (N=69)**

Cell Marker (Population)	CDC Donor Number									
	37	38	39	40	41	42	43	44	45	
	HIV Status***									
	H	L	L	L	L	N	N	N	N	
CD45+	100	100	83	67	100	100	100	100	100	
CD14+	100	100	100	100	100	100	100	100	100	
CD3+CD4+	83	80	100	100	100	100	100	78	86	
CD3+CD8+	100	100	100	100	100	100	100	100	100	
CD3-CD19+	100	100	100	100	100	100	100	100	75	
CD3-(CD56 & CD16)+	100	NA	NA	NA	100	NA	NA	100	100	
CD3+ Average	100	100	100	50	100	100	100	100	100	

Other Manufacturers (N=80)****

Cell Marker (Population)	CDC Donor Number									
	37	38	39	40	41	42	43	44	45	
	HIV Status***									
	H	L	L	L	L	N	N	N	N	
CD45+	100	100	100	90	100	100	95	100	100	
CD14+	100	100	100	100	100	95	95	100	100	
CD3+CD4+	100	100	100	88	100	100	93	89	90	
CD3+CD8+	100	100	100	100	100	100	94	90	90	
CD3-CD19+	100	100	100	100	100	100	93	88	100	
CD3-(CD56 & CD16)+	NA	88	100	100	NA	93	93	100	100	
CD3+ Average	100	100	100	86	100	94	100	86	100	

*The 90% reference ranges were determined from results provided by participant laboratories which used the monoclonal antibody panel recommended in "1994 Revised Guidelines for the Performance of CD4+ T-Cell Determinations in Persons with Human Immunodeficiency Virus (HIV) Infection," MMWR 1994; 43(No.RR-3).

**Laboratories using Becton Dickinson or Coulter monoclonal antibodies exclusively for all tests.

*** HIV status: N=Negative; Positive --- L=Low CD4 ct (<200), M=Moderate CD4 ct (>200 but <500), H=High CD4 ct (>500)

****Results from laboratories using monoclonal antibodies from more than one manufacturer or from Dako, Caltag, GenTrak, Immunotech, In-house, Ortho, Pharmingen, or Sigma.

NA = no data returned by any laboratory for specified marker

Table 4. Percentage of 2-color laboratory results for the March 1996 shipment, by equipment manufacturer, that are within the 90% reference ranges*

Becton-Dickinson (N=122)

Cell Marker (Population)	CDC Donor Number																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
HIV Status**	H	H	M	M	H	H	M	L	L	L	L	N	N	N	N	M	H	H
CD45+	100	100	83	100	100	100	100	100	100	100	100	96	96	95	100	100	100	100
CD14+	71	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
CD3+CD4+	88	75	100	100	80	100	100	93	100	100	100	83	88	95	93	100	92	100
CD3+CD8+	88	100	100	93	88	100	100	80	100	100	100	87	92	95	100	100	100	100
CD3-CD19+	100	100	83	93	100	100	100	93	100	100	100	91	90	100	100	100	92	100
CD3-(CD56 & CD16)+	100	100	100	100	100	100	100	100	100	100	100	100	94	100	100	100	100	100
CD3+ Average	58	83	100	100	100	100	100	92	89	100	100	91	95	83	92	100	100	100

Coulter (N=137)

Cell Marker (Population)	CDC Donor Number																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
HIV Status**	H	H	M	M	H	H	M	L	L	L	L	N	N	N	N	M	H	H
CD45+	55	100	86	100	67	93	60	100	100	93	80	100	100	89	100	100	83	100
CD14+	11	100	100	100	100	100	100	88	100	100	100	86	96	94	95	85	100	85
CD3+CD4+	57	100	100	80	81	100	100	75	93	100	100	100	64	86	94	82	100	83
CD3+CD8+	14	92	100	100	63	100	100	75	86	100	100	91	91	93	75	100	100	100
CD3-CD19+	0	100	88	100	100	100	67	83	83	100	100	100	100	90	90	100	100	100
CD3-(CD56 & CD16)+	NA	100	100	100	90	100	100	100	100	100	100	100	89	83	100	67	0	100
CD3+ Average	50	100	100	100	93	93	92	50	100	92	100	100	87	100	94	89	100	100

Ortho (N=14)

Cell Marker (Population)	CDC Donor Number																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
HIV Status**	H	H	M	M	H	H	M	L	L	L	L	N	N	N	N	M	H	H
CD45+	100	NA	100	NA	NA	NA	NA	100	NA	100	NA	100	100	NA	100	100	83	100
CD14+	NA	NA	100	NA	NA	NA	NA	NA	NA	100	NA	100	NA	NA	100	100	100	100
CD3+CD4+	0	0	100	NA	NA	NA	NA	100	100	100	NA	100	50	100	100	100	83	100
CD3+CD8+	50	100	100	NA	NA	NA	NA	100	100	100	NA	100	50	100	100	100	100	100
CD3-CD19+	100	NA	100	NA	NA	NA	NA	100	NA	100	NA	100	100	NA	100	100	83	100
CD3-(CD56 & CD16)+	100	NA	100	NA	NA	NA	NA	100	NA	100	NA	50	100	NA	100	NA	100	NA
CD3+ Average	100	0	100	NA	NA	NA	NA	100	100	100	NA	100	50	100	100	100	88	100

*The 90% reference ranges were determined from results provided by participant laboratories which used the monoclonal antibody panel recommended in "1994 Revised Guidelines for the Performance of CD4+ T-Cell Determinations in Persons with Human Immunodeficiency Virus (HIV) Infection," MMWR 1994; 43(No.RR-3).

** HIV status: N=Negative; Positive --- L=Low CD4 ct (<200), M=Moderate CD4 ct (>200 but <500), H=High CD4 ct (>500)

NA = no data returned by any laboratory for specified marker

Table 4. Percentage of 2-color laboratory results for the March 1996 shipment, by equipment manufacturer, that are within the 90% reference ranges*

Becton-Dickinson (N=122)

Cell Marker (Population)	CDC Donor Number																	
	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
HIV Status**	H	H	H	M	L	L	L	L	N	N	N	N	M	M	H	M	H	H
CD45+	100	93	100	100	100	100	85	100	95	100	94	94	100	100	100	100	100	100
CD14+	100	100	94	100	100	92	92	75	100	100	94	100	100	100	93	100	100	100
CD3+CD4+	90	93	100	100	100	100	100	100	82	89	94	86	100	100	100	100	100	100
CD3+CD8+	40	93	100	100	67	92	100	100	88	95	94	100	100	100	83	90	100	100
CD3-CD19+	100	86	100	100	100	100	100	100	92	94	88	100	100	100	80	100	100	100
CD3-(CD56 & CD16)+	100	100	100	71	100	100	100	50	100	100	93	92	100	100	100	100	100	100
CD3+ Average	100	93	92	71	83	100	89	100	100	74	76	92	100	100	100	70	100	100

Coulter (N=137)

Cell Marker (Population)	CDC Donor Number																	
	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
HIV Status**	H	H	H	M	L	L	L	L	N	N	N	N	M	M	H	M	H	H
CD45+	86	100	86	100	93	100	86	100	96	96	100	95	100	67	93	95	100	60
CD14+	100	100	100	100	100	100	92	100	96	91	94	90	100	100	100	100	100	100
CD3+CD4+	100	100	100	100	100	100	100	100	96	95	85	95	83	100	86	100	100	67
CD3+CD8+	86	100	100	75	100	100	100	88	96	95	100	86	83	100	93	100	100	100
CD3-CD19+	100	100	100	88	90	67	100	75	100	100	90	93	88	100	100	100	88	100
CD3-(CD56 & CD16)+	50	100	100	83	80	100	80	100	90	88	100	100	100	100	100	100	100	100
CD3+ Average	100	100	80	81	100	89	90	75	91	86	94	94	100	100	83	81	100	100

Ortho (N=14)

Cell Marker (Population)	CDC Donor Number																	
	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
HIV Status**	H	H	H	M	L	L	L	L	N	N	N	N	M	M	H	M	H	H
CD45+	100	100	NA	NA	100	100	100	NA	100	100	100	100	NA	NA	100	NA	100	NA
CD14+	100	100	NA	NA	100	100	100	NA	100	100	100	100	NA	NA	100	NA	100	NA
CD3+CD4+	100	50	NA	NA	100	75	100	NA	100	100	100	100	NA	NA	100	NA	100	NA
CD3+CD8+	100	100	NA	NA	100	100	100	NA	100	88	75	100	NA	NA	100	NA	100	NA
CD3-CD19+	100	100	NA	NA	100	100	100	NA	75	86	100	100	NA	NA	100	NA	100	NA
CD3-(CD56 & CD16)+	100	NA	NA	NA	100	100	NA	NA	100	100	100	NA	NA	NA	100	NA	NA	NA
CD3+ Average	100	100	NA	NA	100	80	100	NA	80	89	100	100	NA	NA	100	NA	100	NA

*The 90% reference ranges were determined from results provided by participant laboratories which used the monoclonal antibody panel recommended in "1994 Revised Guidelines for the Performance of CD4+ T-Cell Determinations in Persons with Human Immunodeficiency Virus (HIV) Infection," MMWR 1994; 43(No.RR-3).

** HIV status: N=Negative; Positive --- L=Low CD4 ct (<200), M=Moderate CD4 ct (>200 but <500), H=High CD4 ct (>500)

NA = no data returned by any laboratory for specified marker

Table 4. Percentage of 2-color laboratory results for the March 1996 shipment, by equipment manufacturer, that are within the 90% reference ranges*

Becton-Dickinson (N=122)									
Cell Marker (Population)	CDC Donor Number								
	37	38	39	40	41	42	43	44	45
	HIV Status**			H	L	L	L	N	N
CD45+	100	100	100	93	100	88	100	100	95
CD14+	92	100	100	100	100	100	100	100	95
CD3+CD4+	92	91	100	92	100	92	95	95	95
CD3+CD8+	100	100	100	100	100	92	90	100	95
CD3-CD19+	100	90	100	100	100	95	94	100	94
CD3-(CD56 & CD16)+	100	88	100	100	100	100	93	93	100
CD3+ Average	91	91	100	92	100	91	90	100	100

Coulter (N=137)									
Cell Marker (Population)	CDC Donor Number								
	37	38	39	40	41	42	43	44	45
	HIV Status**			H	L	L	L	N	N
CD45+	100	100	93	90	100	100	100	100	100
CD14+	100	100	100	100	100	96	97	100	100
CD3+CD4+	88	92	100	100	100	100	100	83	85
CD3+CD8+	100	100	100	100	100	96	96	95	92
CD3-CD19+	100	100	100	100	100	90	95	82	88
CD3-(CD56 & CD16)+	100	88	100	100	100	93	100	100	100
CD3+ Average	100	100	100	86	100	95	100	92	100

Ortho (N=14)									
Cell Marker (Population)	CDC Donor Number								
	37	38	39	40	41	42	43	44	45
	HIV Status**			H	L	L	L	N	N
CD45+	NA	NA	100	100	NA	100	0	100	100
CD14+	NA	NA	100	100	NA	100	100	100	100
CD3+CD4+	NA	NA	100	100	NA	100	100	100	100
CD3+CD8+	NA	NA	100	100	NA	100	100	100	100
CD3-CD19+	NA	NA	100	100	NA	100	100	100	100
CD3-(CD56 & CD16)+	NA	NA	NA	100	NA	100	NA	100	NA
CD3+ Average	NA	NA	100	100	NA	100	100	100	100

*The 90% reference ranges were determined from results provided by participant laboratories which used the monoclonal antibody panel recommended in "1994 Revised Guidelines for the Performance of CD4+ T-Cell Determinations in Persons with Human Immunodeficiency Virus (HIV) Infection," MMWR 1994; 43(No.RR-3).

** HIV status: N=Negative; Positive --- L=Low CD4 ct (<200), M=Moderate CD4 ct (>200 but <500), H=High CD4 ct (>500)

NA = no data returned by any laboratory for specified marker

Table 5. Frequency of laboratory results for the March 1996 instrument performance control sample within, above, or below the 90% reference ranges*

Event Population

Green Unstained Orange/Red Unstained		Green Stained Orange/Red Unstained		Green Unstained Orange/Red Stained		Green Stained Orange/Red Stained	
Range	Frequency	Range	Frequency	Range	Frequency	Range	Frequency
<21	12	<20	8	<21	14	<13	8
21-33	250	20-31	259	21-31	264	13-27	268
>33	22	>31	17	>31	6	>27	7

*The 90% reference ranges were determined from results from the same laboratories whose results were used to determine the 90% reference ranges for Table 1.

Table 6. Frequency of 3-color laboratory results for the March 1996 shipment, by cell marker, within, above, or below the 90% reference ranges*

Cell Marker (Population)	CDC Donor Number - HIV Status **											
	1 - H		2 - H		3 - M		4 - M		5 - H		6 - H	
	Range	No. ^A	Range	No.	Range	No.	Range	No.	Range	No.	Range	No.
CD45+, CD3+, CD4+	NA		> 59 52 - 59 < 52	0 2 0	NA		> 31 27 - 31 < 27	0 2 0	NA		NA	
CD3+, CD4+, CD8-	> 37 34 - 37 < 34	2 0 0	> 59 52 - 59 < 52	0 2 0	> 32 16 - 32 < 16	1 3 0	NA		> 36 33 - 36 < 33	2 0 0	NA	
CD45+, CD3+, CD8+	NA		> 29 21 - 29 < 21	0 2 0	NA		> 60 46 - 60 < 46	0 2 0	NA		NA	
CD3+, CD4-, CD8+	> 53 44 - 53 < 44	0 0 2	> 29 21 - 29 < 21	0 2 0	> 54 28 - 54 < 28	0 4 0	NA		> 54 49 - 54 < 49	0 0 2	NA	
CD45+, CD3-, CD19+	NA		> 17 7 - 17 < 7	0 2 0	NA		> 12 8 - 12 < 8	0 0 2	NA		NA	
CD45+, CD3-, CD(56&16)+	NA		> 5 2 - 5 < 2	0 2 0	NA		NA		NA		NA	
	7 - M		8 - L		9 - L		10 - L		11 - L		12 - N	
	Range	No. ^A	Range	No.	Range	No.	Range	No.	Range	No.	Range	No.
CD45+, CD3+, CD4+	> 41 26 - 41 < 26	0 4 0	> 14 5 - 14 < 5	0 1 0	> 6 2 - 6 < 2	0 1 0	NA		> 20 13 - 20 < 13	1 1 0	> 53 47 - 53 < 47	0 1 0
CD3+, CD4+, CD8-	> 41 26 - 41 < 26	6 2 0	> 14 5 - 14 < 5	0 1 0	> 6 2 - 6 < 2	0 2 0	> 2 1 - 2 < 1	0 2 0	> 20 13 - 20 < 13	2 2 0	> 53 47 - 53 < 47	0 3 0
CD45+, CD3+, CD8+	> 45 35 - 45 < 35	0 4 0	> 69 58 - 69 < 58	0 1 0	> 61 51 - 61 < 51	0 1 0	NA		> 78 63 - 78 < 63	0 1 1	> 27 24 - 27 < 24	0 1 0
CD3+, CD4-, CD8+	> 45 35 - 45 < 35	0 4 4	> 69 58 - 69 < 58	0 0 1	> 61 51 - 61 < 51	0 1 1	> 72 53 - 72 < 53	0 2 0	> 78 63 - 78 < 63	0 3 1	> 27 24 - 27 < 24	0 3 0
CD45+, CD3-, CD19+	> 16 8 - 16 < 8	0 4 0	> 27 12 - 27 < 12	0 1 0	> 23 16 - 23 < 16	0 1 0	NA		> 10 3 - 10 < 3	0 2 0	> 12 8 - 12 < 8	0 1 0
CD45+, CD3-, CD(56&16)+	> 6 3 - 6 < 3	0 2 2	NA		> 21 13 - 21 < 13	0 1 0	NA		> 4 1 - 4 < 1	0 1 1	NA	

*The 90% reference ranges were determined from the 2-color results provided by participant laboratories which used the monoclonal antibody panel recommended in "1994 Revised Guidelines for the Performance of CD4+ T-Cell Determinations in Persons with Human Immunodeficiency Virus (HIV) Infection," MMWR 1994; 43(No.RR-3).

** HIV status: N=Negative; Positive --- L=Low CD4 ct (<200), M=Moderate CD4 ct (>200 but <500), H=High CD4 ct (>500)

^ANo. = frequency of laboratories

NA = no data returned by any laboratory for specified marker

Table 6. Frequency of 3-color laboratory results for the March 1996 shipment, by cell marker, within, above, or below the 90% reference ranges*

Cell Marker (Population)	CDC Donor Number - HIV Status **											
	13 - N		14 - N		15 - N		16 - M		17 - H		18 - H	
	Range	No. ^A	Range	No.	Range	No.	Range	No.	Range	No.	Range	No.
CD45+, CD3+, CD4+	> 43	0	> 38	0	> 49	0	> 41	0	NA		> 35	2
	39 - 43	2	33 - 38	3	40 - 49	2	35 - 41	4			29 - 35	2
	< 39	0	< 33	0	< 40	0	< 35	0			< 29	0
CD3+, CD4+, CD8-	> 43	1	> 38	1	> 49	0	> 41	0	> 39	2	NA	
	39 - 43	2	33 - 38	4	40 - 49	7	35 - 41	4	31 - 39	2		
	< 39	0	< 33	0	< 40	0	< 35	0	< 31	0		
CD45+, CD3+, CD8+	> 27	0	> 43	0	> 26	0	> 30	2	NA		> 47	0
	20 - 27	2	36 - 43	3	18 - 26	2	26 - 30	2			38 - 47	2
	< 20	0	< 36	0	< 18	0	< 26	0			< 38	2
CD3+, CD4-, CD8+	> 27	0	> 43	0	> 26	0	> 30	2	> 45	0	NA	
	20 - 27	3	36 - 43	5	18 - 26	7	26 - 30	2	36 - 45	3		
	< 20	0	< 36	0	< 18	0	< 26	0	< 36	1		
CD45+, CD3-, CD19+	> 19	0	> 10	3	> 20	0	> 11	0	NA		> 21	0
	11 - 19	2	7 - 10	0	15 - 20	2	5 - 11	4			14 - 21	4
	< 11	0	< 7	0	< 15	0	< 5	0			< 14	0
CD45+, CD3-, CD(56&16)+	> 19	0	> 14	0	> 16	0	> 21	0	NA		> 7	0
	15 - 19	1	10 - 14	2	8 - 16	1	17 - 21	1			3 - 7	3
	< 15	0	< 10	1	< 8	1	< 17	3			< 3	1
CD45+, CD3+, CD4+	> 46	0	> 38	0	> 40	3	> 35	1	> 10	0	> 2	0
	38 - 46	4	32 - 38	2	35 - 40	1	29 - 35	5	7 - 10	4	0 - 2	1
	< 38	0	< 32	0	< 35	0	< 29	0	< 7	0	< 0	0
CD3+, CD4+, CD8-	NA		> 38	1	> 40	0	> 35	2	> 10	0	> 2	0
			32 - 38	3	35 - 40	2	29 - 35	2	7 - 10	1	0 - 2	4
			< 32	0	< 35	0	< 29	0	< 7	1	< 0	0
CD45+, CD3+, CD8+	> 38	0	> 49	0	> 47	0	> 55	1	> 65	0	> 63	0
	33 - 38	2	38 - 49	2	36 - 47	4	49 - 55	1	54 - 65	4	51 - 63	1
	< 33	2	< 38	0	< 36	0	< 49	0	< 54	0	< 51	0
CD3+, CD4-, CD8+	NA		> 49	0	> 47	0	> 55	2	> 65	0	> 63	0
			38 - 49	0	36 - 47	2	49 - 55	0	54 - 65	2	51 - 63	4
			< 38	4	< 36	0	< 49	2	< 54	0	< 51	0
CD45+, CD3-, CD19+	> 16	0	> 13	0	> 16	0	> 6	0	> 29	0	> 34	0
	4 - 16	2	10 - 13	2	8 - 16	2	4 - 6	1	12 - 29	3	26 - 34	1
	< 4	0	< 10	0	< 8	0	< 4	1	< 12	0	< 26	0
CD45+, CD3-, CD(56&16)+	> 10	0	> 8	0	> 5	0	NA		> 12	0	> 7	0
	4 - 10	4	2 - 8	0	3 - 5	2			4 - 12	2	5 - 7	0
	< 4	0	< 2	2	< 3	0			< 4	2	< 5	1

*The 90% reference ranges were determined from the 2-color results provided by participant laboratories which used the monoclonal antibody panel recommended in "1994 Revised Guidelines for the Performance of CD4+ T-Cell Determinations in Persons with Human Immunodeficiency Virus (HIV) Infection," MMWR 1994; 43(No.RR-3).

** HIV status: N=Negative; Positive --- L=Low CD4 ct (<200), M=Moderate CD4 ct (>200 but <500), H=High CD4 ct (>500)

^ANo. = frequency of laboratories

NA = no data returned by any laboratory for specified marker

Table 6. Frequency of 3-color laboratory results for the March 1996 shipment, by cell marker, within, above, or below the 90% reference ranges*

Cell Marker (Population)	CDC Donor Number - HIV Status **											
	25 - L		26 - L		27 - N		28 - N		29 - N		30 - N	
	Range	No. ^A	Range	No.	Range	No.	Range	No.	Range	No.	Range	No.
CD45+, CD3+, CD4+	> 15	1	> 7	0	> 54	2	> 54	1	> 63	0	> 58	2
	9 - 15	3	5 - 7	3	47 - 54	6	46 - 54	4	53 - 63	4	52 - 58	5
	< 9	0	< 5	0	< 47	0	< 46	0	< 53	0	< 52	0
CD3+, CD4+, CD8-	> 15	0	> 7	0	> 54	0	> 54	0	> 63	2	> 58	1
	9 - 15	1	5 - 7	2	47 - 54	3	46 - 54	5	53 - 63	4	52 - 58	1
	< 9	0	< 5	0	< 47	0	< 46	0	< 53	0	< 52	0
CD45+, CD3+, CD8+	> 67	0	> 66	0	> 21	1	> 28	0	> 26	0	> 22	0
	48 - 67	4	56 - 66	1	17 - 21	6	21 - 28	3	20 - 26	2	16 - 22	5
	< 48	0	< 56	0	< 17	1	< 21	2	< 20	0	< 16	0
CD3+, CD4-, CD8+	> 67	0	> 66	0	> 21	0	> 28	0	> 26	0	> 22	0
	48 - 67	1	56 - 66	1	17 - 21	3	21 - 28	4	20 - 26	4	16 - 22	1
	< 48	0	< 56	1	< 17	0	< 21	1	< 20	2	< 16	1
CD45+, CD3-, CD19+	> 23	0	> 25	0	> 16	0	> 11	0	> 12	0	> 21	0
	5 - 23	3	13 - 25	1	11 - 16	6	7 - 11	4	9 - 12	2	14 - 21	4
	< 5	0	< 13	0	< 11	0	< 7	0	< 9	0	< 14	0
CD45+, CD3-, CD(56&16)+	> 12	0	NA		> 18	0	> 19	0	> 7	0	> 6	0
	8 - 12	2			11 - 18	5	11 - 19	5	4 - 7	0	4 - 6	2
	< 8	1			< 11	2	< 11	0	< 4	1	< 4	1
CD45+, CD3+, CD4+	NA		NA		> 40	0	NA		> 45	0	> 50	0
					32 - 40	2			37 - 45	4	29 - 50	4
					< 32	0			< 37	0	< 29	0
CD3+, CD4+, CD8-	> 39	0	> 31	0	NA		> 33	2	> 45	0	> 50	0
	31 - 39	4	21 - 31	2			24 - 33	4	37 - 45	4	29 - 50	4
	< 31	0	< 21	0			< 24	0	< 37	0	< 29	0
CD45+, CD3+, CD8+	NA		NA		> 56	0	NA		> 35	0	> 61	0
					42 - 56	2			30 - 35	4	40 - 61	4
					< 42	0			< 30	0	< 40	0
CD3+, CD4-, CD8+	> 54	0	> 71	0	NA		> 65	0	> 35	0	> 61	0
	42 - 54	4	52 - 71	2			54 - 65	6	30 - 35	2	40 - 61	4
	< 42	0	< 52	0			< 54	0	< 30	2	< 40	0
CD45+, CD3-, CD19+	NA		NA		> 12	0	NA		> 13	0	> 9	0
					9 - 12	2			9 - 13	4	2 - 9	3
					< 9	0			< 9	0	< 2	1
CD45+, CD3-, CD(56&16)+	NA		NA		> 4	0	NA		> 17	0	> 4	0
					2 - 4	2			10 - 17	4	1 - 4	4
					< 2	0			< 10	0	< 1	0

*The 90% reference ranges were determined from the 2-color results provided by participant laboratories which used the monoclonal antibody panel recommended in "1994 Revised Guidelines for the Performance of CD4+ T-Cell Determinations in Persons with Human Immunodeficiency Virus (HIV) Infection," MMWR 1994; 43(No.RR-3).

** HIV status: N=Negative; Positive --- L=Low CD4 ct (<200), M=Moderate CD4 ct (>200 but <500), H=High CD4 ct (>500)

^ANo. = frequency of laboratories

NA = no data returned by any laboratory for specified marker

Table 6. Frequency of 3-color laboratory results for the March 1996 shipment, by cell marker, within, above, or below the 90% reference ranges*

Cell Marker (Population)	CDC Donor Number - HIV Status **									
	37 - H		38 - L		39 - L		40 - L		41 - L	
	Range	No. ^A	Range	No.	Range	No.	Range	No.	Range	No.
CD45+, CD3+, CD4+	> 35	4	NA		> 17	0	> 19	0	> 18	0
	25 - 35	2			9 - 17	2	15 - 19	3	12 - 18	3
	< 25	0			< 9	0	< 15	0	< 12	0
CD3+, CD4+, CD8-	NA		> 7	0	> 17	0	> 19	0	NA	
			3 - 7	5	9 - 17	3	15 - 19	2		
			< 3	0	< 9	0	< 15	0		
CD45+, CD3+, CD8+	> 43	2	NA		> 60	0	> 60	2	> 59	0
	32 - 43	4			37 - 60	2	47 - 60	1	49 - 59	3
	< 32	0			< 37	0	< 47	0	< 49	0
CD3+, CD4-, CD8+	NA		> 80	0	> 60	0	> 60	0	NA	
			72 - 80	4	37 - 60	3	47 - 60	2		
			< 72	1	< 37	0	< 47	0		
CD45+, CD3-, CD19+	> 25	0	NA		> 21	0	> 21	0	> 13	0
	9 - 25	6			10 - 21	2	11 - 21	2	7 - 13	3
	< 9	0			< 10	0	< 11	1	< 7	0
CD45+, CD3-, CD(56&16)+	> 16	1	NA		> 22	0	> 12	0	> 15	0
	1 - 16	3			8 - 22	2	1 - 12	3	7 - 15	2
	< 1	0			< 8	0	< 1	0	< 7	0

	42 - N		43 - N		44 - N		45 - N	
	Range	No. ^A	Range	No.	Range	No.	Range	No.
	CD45+, CD3+, CD4+	> 43	0	> 63	0	> 45	1	> 52
35 - 43		2	53 - 63	2	40 - 45	3	41 - 52	7
< 35		1	< 53	0	< 40	0	< 41	0
CD3+, CD4+, CD8-	> 43	1	> 63	1	> 45	1	> 52	0
	35 - 43	6	53 - 63	7	40 - 45	0	41 - 52	4
	< 35	0	< 53	0	< 40	0	< 41	0
CD45+, CD3+, CD8+	> 32	0	> 22	0	> 30	1	> 27	1
	25 - 32	3	15 - 22	2	21 - 30	3	20 - 27	6
	< 25	0	< 15	0	< 21	0	< 20	0
CD3+, CD4-, CD8+	> 32	0	> 22	0	> 30	0	> 27	0
	25 - 32	7	15 - 22	7	21 - 30	1	20 - 27	3
	< 25	0	< 15	1	< 21	0	< 20	1
CD45+, CD3-, CD19+	> 21	0	> 17	0	> 25	0	> 21	0
	13 - 21	3	13 - 17	2	18 - 25	3	14 - 21	7
	< 13	0	< 13	0	< 18	1	< 14	0
CD45+, CD3-, CD(56&16)+	> 13	1	> 12	0	> 13	0	> 13	0
	4 - 13	2	4 - 12	2	6 - 13	3	2 - 13	6
	< 4	0	< 4	0	< 6	0	< 2	0

*The 90% reference ranges were determined from the 2-color results provided by participant laboratories which used the monoclonal antibody panel recommended in "1994 Revised Guidelines for the Performance of CD4+ T-Cell Determinations in Persons with Human Immunodeficiency Virus (HIV) Infection," MMWR 1994; 43(No.RR-3).

** HIV status: N=Negative; Positive --- L=Low CD4 ct (<200), M=Moderate CD4 ct (>200 but <500), H=High CD4 ct (>500)

^ANo. = frequency of laboratories

NA = no data returned by any laboratory for specified marker