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Hematology Proficiency Test Program

Statistical Summary – June 2016 (Event 16-2)

This statistical report summarizes participant data for the Hematology proficiency survey shipped 6 June 2016.

Five test samples were distributed to participants for each test category:

Routine Blood Counts (B26, B27, B28, B29, B30)
Routine Coagulation (C26, C27, C28, C29, C30)
Cell Identification (426, 427, 428, 429, 430)

Results for individual instrument and reagent systems where the number of laboratories using those systems is three or greater are provided. Mean and Standard Deviation (± 1 SD) values are calculated by a robust statistical technique that does not assume a Gaussian distribution.

Disclaimer:
Note: The use of brand and/or trade names in this report does not constitute an endorsement of the products on the part of the Wadsworth Center or the New York State Department of Health.

Should you have any questions regarding this report, please contact the Hematology Section at (518) 474-9878.

White Cell Count   (x 10^9/L)

Specimen: B26	Specimen: B27	Specimen: B28	Specimen: B29	Specimen: B30	Number	[Code] Instrument or Reagent System
16.43 ± 0.68	24.54 ± 0.95	9.30 ± 0.41	4.93 ± 0.21	11.75 ± 0.56	n = 216	[---] All Methods & Instruments
						\<Instruments\>
16.99 ± 0.56	26.07 ± 0.23	9.77 ± 0.60	5.35 ± 0.19	12.65 ± 0.36	n = 3	[ABG] Abbott Cell Dyn 1700
16.43 ± 0.31	24.68 ± 0.56	9.31 ± 0.25	4.96 ± 0.12	11.64 ± 0.10	n = 8	[ABM] Abbott Cell Dyn 3700
16.53 ± 0.39	24.25 ± 0.73	8.99 ± 0.23	4.87 ± 0.16	11.75 ± 0.54	n = 4	[ABS] Abbott Cell Dyn Sapphire
16.89 ± 0.49	24.93 ± 0.85	9.45 ± 0.27	5.02 ± 0.15	12.04 ± 0.31	n = 8	[ABT] Abbott Cell Dyn Ruby
15.22 ± 0.41	21.96 ± 0.56	8.65 ± 0.19	4.84 ± 0.10	10.84 ± 0.26	n = 3	[ABU] Abbott Cell Dyn Emerald
15.88 ± 0.61	22.79 ± 0.11	8.82 ± 0.09	4.56 ± 0.10	10.88 ± 0.15	n = 3	[BTD] Siemens Advia 120
16.28 ± 0.46	23.80 ± 0.57	8.93 ± 0.28	4.60 ± 0.19	11.11 ± 0.29	n = 10	[BTE] Siemens Advia 2120
16.52 ± 0.34	24.48 ± 0.46	9.42 ± 0.22	5.01 ± 0.11	11.88 ± 0.29	n = 33	[CUL] Coulter UniCel DxH 600,800
16.44 ± 0.26	24.92 ± 0.60	9.26 ± 0.16	4.75 ± 0.12	11.75 ± 0.23	n = 4	[CUS] Coulter ACT 5 diff
16.87 ± 0.32	25.02 ± 0.46	9.68 ± 0.23	5.21 ± 0.17	12.13 ± 0.32	n = 14	[CUT] Coulter ACT series,not ACT5 diff
16.49 ± 0.40	24.92 ± 0.68	9.53 ± 0.33	5.01 ± 0.15	12.09 ± 0.35	n = 11	[CUX] Coulter LH750,755
16.45 ± 0.24	25.00 ± 0.37	9.62 ± 0.10	5.07 ± 0.09	12.11 ± 0.23	n = 8	[CUY] Coulter LH 780
17.28 ± 0.39	25.51 ± 0.59	9.60 ± 0.32	5.33 ± 0.12	12.20 ± 0.23	n = 6	[CUZ] Coulter LH500
16.56 ± 0.10	24.76 ± 0.10	9.23 ± 0.05	4.93 ± 0.05	11.93 ± 0.05	n = 3	[MEB] Medonic M-series
15.85 ± 0.63	24.02 ± 0.96	9.01 ± 0.37	4.83 ± 0.14	11.40 ± 0.27	n = 3	[ROB] ABX Pentra series
16.35 ± 0.36	24.33 ± 0.14	9.20 ± 0.18	4.93 ± 0.05	11.85 ± 0.46	n = 3	[ROC] ABX Micro
15.57 ± 1.06	23.32 ± 1.02	8.82 ± 0.52	4.85 ± 0.21	11.26 ± 0.59	n = 8	[SYA] Sysmex XE 5000
15.11 ± 1.23	22.49 ± 2.00	8.87 ± 0.51	4.80 ± 0.10	9.84 ± 1.17	n = 20	[SYC] Sysmex XN-series
14.27 ± 0.86	22.10 ± 0.73	8.22 ± 0.32	4.45 ± 0.19	10.72 ± 0.50	n = 3	[SYG] Sysmex POCHi
16.18 ± 0.55	24.62 ± 0.58	9.26 ± 0.21	4.80 ± 0.16	11.64 ± 0.26	n = 18	[SYI] Sysmex XT-2000i,XT-1800i
16.47 ± 0.87	25.05 ± 1.14	9.43 ± 0.53	5.07 ± 0.12	11.89 ± 0.55	n = 3	[SYO] Sysmex XE2100
16.98 ± 0.56	25.01 ± 0.64	9.46 ± 0.22	4.97 ± 0.10	12.07 ± 0.26	n = 19	[SYP] Sysmex XS-1000i,XS-1000iAL
15.11 ± 0.29	23.09 ± 0.89	8.79 ± 0.31	4.79 ± 0.12	10.88 ± 0.28	n = 4	[SYQ] Sysmex XE 2100D(Blood Center)
16.10 ± 0.46	24.29 ± 0.60	9.03 ± 0.32	4.78 ± 0.11	11.51 ± 0.33	n = 12	[SYV] Sysmex XT 4000i

Summary of Participant Responses
Mean ± One Standard Deviation

Red Cell Count   (x 10^{12}/L)

Specimen: B26	Specimen: B27	Specimen: B28	Specimen: B29	Specimen: B30	Number	[Code] Instrument or Reagent System
5.521 ± 0.103	4.568 ± 0.080	4.715 ± 0.081	2.570 ± 0.059	5.157 ± 0.095	n = 216	[---] All Methods & Instruments
						<Instruments>
5.548 ± 0.158	4.705 ± 0.108	4.677 ± 0.285	2.611 ± 0.085	5.300 ± 0.144	n = 3	[ABG] Abbott Cell Dyn 1700
5.457 ± 0.077	4.583 ± 0.018	4.705 ± 0.070	2.609 ± 0.022	5.119 ± 0.071	n = 7	[ABM] Abbott Cell Dyn 3700
5.622 ± 0.073	4.650 ± 0.062	4.780 ± 0.099	2.593 ± 0.052	5.224 ± 0.107	n = 4	[ABS] Abbott Cell Dyn Sapphire
5.685 ± 0.117	4.595 ± 0.100	4.749 ± 0.080	2.547 ± 0.061	5.167 ± 0.088	n = 8	[ABT] Abbott Cell Dyn Ruby
5.179 ± 0.120	4.320 ± 0.091	4.479 ± 0.081	2.453 ± 0.034	4.964 ± 0.091	n = 3	[ABU] Abbott Cell Dyn Emerald
5.470 ± 0.145	4.552 ± 0.087	4.674 ± 0.079	2.577 ± 0.041	5.115 ± 0.036	n = 3	[BTD] Siemens Advia 120
5.498 ± 0.114	4.546 ± 0.049	4.638 ± 0.076	2.581 ± 0.016	5.038 ± 0.072	n = 10	[BTE] Siemens Advia 2120
5.541 ± 0.069	4.565 ± 0.048	4.728 ± 0.064	2.586 ± 0.040	5.183 ± 0.063	n = 33	[CUL] Coulter UniCel DxH 600,800
5.414 ± 0.039	4.512 ± 0.054	4.622 ± 0.038	2.543 ± 0.025	5.094 ± 0.052	n = 4	[CUS] Coulter ACT 5 diff
5.636 ± 0.088	4.681 ± 0.096	4.807 ± 0.093	2.606 ± 0.058	5.259 ± 0.096	n = 14	[CUT] Coulter ACT series,not ACT5 diff
5.577 ± 0.059	4.644 ± 0.049	4.772 ± 0.051	2.594 ± 0.027	5.235 ± 0.044	n = 11	[CUX] Coulter LH750,755
5.576 ± 0.071	4.658 ± 0.032	4.786 ± 0.046	2.609 ± 0.051	5.254 ± 0.065	n = 8	[CUY] Coulter LH 780
5.615 ± 0.162	4.697 ± 0.081	4.760 ± 0.031	2.644 ± 0.058	5.288 ± 0.035	n = 6	[CUZ] Coulter LH500
5.405 ± 0.083	4.492 ± 0.103	4.603 ± 0.014	2.519 ± 0.037	5.033 ± 0.014	n = 3	[MEB] Medonic M-series
5.519 ± 0.057	4.530 ± 0.018	4.673 ± 0.034	2.499 ± 0.029	5.134 ± 0.071	n = 3	[ROB] ABX Pentra series
5.484 ± 0.065	4.566 ± 0.056	4.673 ± 0.005	2.483 ± 0.014	5.180 ± 0.118	n = 3	[ROC] ABX Micro
5.449 ± 0.071	4.556 ± 0.045	4.757 ± 0.081	2.598 ± 0.029	5.153 ± 0.050	n = 8	[SYA] Sysmex XE 5000
5.556 ± 0.076	4.558 ± 0.059	4.698 ± 0.054	2.510 ± 0.034	5.148 ± 0.063	n = 20	[SYC] Sysmex XN-series
5.528 ± 0.086	4.506 ± 0.065	4.681 ± 0.052	2.570 ± 0.009	5.030 ± 0.055	n = 3	[SYG] Sysmex POCHi
5.472 ± 0.062	4.532 ± 0.047	4.701 ± 0.051	2.565 ± 0.032	5.146 ± 0.058	n = 18	[SYI] Sysmex XT-2000i,XT-1800i
5.501 ± 0.044	4.605 ± 0.027	4.754 ± 0.065	2.588 ± 0.024	5.203 ± 0.014	n = 3	[SYO] Sysmex XE2100
5.479 ± 0.056	4.511 ± 0.043	4.663 ± 0.051	2.494 ± 0.024	5.067 ± 0.054	n = 19	[SYP] Sysmex XS-1000i,XS-1000iAL
5.402 ± 0.045	4.584 ± 0.043	4.735 ± 0.053	2.623 ± 0.020	5.160 ± 0.051	n = 4	[SYQ] Sysmex XE 2100D(Blood Center)
5.464 ± 0.076	4.553 ± 0.082	4.718 ± 0.080	2.597 ± 0.050	5.158 ± 0.075	n = 12	[SYV] Sysmex XT 4000i

Summary of Participant Responses
Mean ± One Standard Deviation

Hemoglobin   (g/dL)

Specimen: B26	Specimen: B27	Specimen: B28	Specimen: B29	Specimen: B30	Number	[Code] Instrument or Reagent System
15.61 ± 0.29	13.95 ± 0.26	13.60 ± 0.17	6.49 ± 0.15	12.77 ± 0.21	n = 218	[---] All Methods & Instruments
						<Instruments>
15.56 ± 0.26	14.05 ± 0.19	13.20 ± 0.55	6.63 ± 0.14	12.82 ± 0.24	n = 3	[ABG] Abbott Cell Dyn 1700
15.80 ± 0.22	14.35 ± 0.07	13.73 ± 0.10	6.71 ± 0.07	12.98 ± 0.10	n = 8	[ABM] Abbott Cell Dyn 3700
15.82 ± 0.20	14.16 ± 0.19	13.76 ± 0.19	6.68 ± 0.04	12.89 ± 0.11	n = 4	[ABS] Abbott Cell Dyn Sapphire
16.32 ± 0.36	14.54 ± 0.29	13.97 ± 0.28	6.70 ± 0.16	13.15 ± 0.35	n = 8	[ABT] Abbott Cell Dyn Ruby
15.77 ± 0.05	14.02 ± 0.15	13.57 ± 0.23	6.53 ± 0.05	12.90 ± 0.18	n = 3	[ABU] Abbott Cell Dyn Emerald
15.70 ± 0.27	14.10 ± 0.09	13.67 ± 0.14	6.67 ± 0.05	12.80 ± 0.18	n = 3	[BTD] Siemens Advia 120
15.87 ± 0.29	14.19 ± 0.24	13.68 ± 0.33	6.69 ± 0.10	12.85 ± 0.20	n = 10	[BTE] Siemens Advia 2120
15.31 ± 0.16	13.71 ± 0.16	13.50 ± 0.12	6.46 ± 0.08	12.52 ± 0.14	n = 33	[CUL] Coulter UniCel DxH 600,800
15.73 ± 0.24	14.15 ± 0.23	13.70 ± 0.17	6.57 ± 0.09	12.90 ± 0.17	n = 4	[CUS] Coulter ACT 5 diff
15.68 ± 0.20	14.01 ± 0.26	13.60 ± 0.20	6.48 ± 0.13	12.75 ± 0.23	n = 14	[CUT] Coulter ACT series,not ACT5 diff
15.43 ± 0.08	13.86 ± 0.07	13.50 ± 0.08	6.45 ± 0.07	12.74 ± 0.08	n = 11	[CUX] Coulter LH750,755
15.50 ± 0.10	13.97 ± 0.12	13.62 ± 0.15	6.55 ± 0.10	12.76 ± 0.07	n = 8	[CUY] Coulter LH 780
15.82 ± 0.25	14.28 ± 0.23	13.71 ± 0.14	6.68 ± 0.07	12.97 ± 0.19	n = 6	[CUZ] Coulter LH500
15.88 ± 0.15	14.30 ± 0.09	13.67 ± 0.05	6.77 ± 0.05	13.14 ± 0.10	n = 3	[MEB] Medonic M-series
15.88 ± 0.32	14.08 ± 0.24	13.68 ± 0.24	6.33 ± 0.05	12.80 ± 0.09	n = 3	[ROB] ABX Pentra series
15.87 ± 0.14	14.30 ± 0.09	13.80 ± 0.09	6.56 ± 0.10	13.05 ± 0.19	n = 3	[ROC] ABX Micro
15.61 ± 0.20	13.75 ± 0.19	13.55 ± 0.12	6.48 ± 0.04	12.69 ± 0.15	n = 8	[SYA] Sysmex XE 5000
15.68 ± 0.18	13.90 ± 0.14	13.53 ± 0.13	6.33 ± 0.08	12.70 ± 0.14	n = 20	[SYC] Sysmex XN-series
15.47 ± 0.14	13.77 ± 0.05	13.43 ± 0.05	6.47 ± 0.05	12.57 ± 0.05	n = 3	[SYG] Sysmex POCHi
15.45 ± 0.20	13.87 ± 0.12	13.60 ± 0.12	6.46 ± 0.09	12.79 ± 0.11	n = 18	[SYI] Sysmex XT-2000i,XT-1800i
15.77 ± 0.23	14.00 ± 0.09	13.67 ± 0.05	6.50 ± 0.00	12.90 ± 0.09	n = 3	[SYO] Sysmex XE2100
15.83 ± 0.14	14.07 ± 0.14	13.71 ± 0.13	6.41 ± 0.08	12.84 ± 0.13	n = 19	[SYP] Sysmex XS-1000i,XS-1000iAL
15.60 ± 0.17	13.90 ± 0.00	13.62 ± 0.04	6.55 ± 0.06	12.80 ± 0.08	n = 4	[SYQ] Sysmex XE 2100D(Blood Center)
15.32 ± 0.13	13.75 ± 0.13	13.55 ± 0.07	6.37 ± 0.07	12.76 ± 0.08	n = 12	[SYV] Sysmex XT 4000i

Hematocrit   (%)

Specimen: B26	Specimen: B27	Specimen: B28	Specimen: B29	Specimen: B30	Number	[Code] Instrument or Reagent System
44.96 ± 1.89	40.04 ± 1.64	39.54 ± 1.45	20.88 ± 1.10	38.46 ± 1.09	n = 219	[---] All Methods & Instruments
						<Instruments>
46.19 ± 1.70	41.87 ± 1.30	39.72 ± 2.75	20.95 ± 1.10	39.81 ± 1.45	n = 3	[ABG] Abbott Cell Dyn 1700
47.13 ± 0.87	41.84 ± 0.49	41.19 ± 0.60	21.42 ± 0.28	39.15 ± 0.57	n = 8	[ABM] Abbott Cell Dyn 3700
43.50 ± 0.89	38.08 ± 0.73	37.69 ± 0.89	19.00 ± 0.43	35.77 ± 0.91	n = 4	[ABS] Abbott Cell Dyn Sapphire
41.61 ± 1.26	35.01 ± 1.11	35.43 ± 0.92	17.85 ± 0.48	34.48 ± 0.84	n = 8	[ABT] Abbott Cell Dyn Ruby
45.40 ± 0.80	40.32 ± 1.18	39.86 ± 0.80	20.95 ± 0.30	38.73 ± 0.66	n = 4	[ABU] Abbott Cell Dyn Emerald
40.43 ± 0.59	35.57 ± 0.41	35.21 ± 0.52	17.84 ± 0.10	33.19 ± 0.20	n = 3	[BTD] Siemens Advia 120
40.91 ± 1.52	35.54 ± 0.87	35.15 ± 1.37	17.81 ± 0.46	32.67 ± 0.79	n = 10	[BTE] Siemens Advia 2120
46.64 ± 0.75	41.25 ± 0.55	40.59 ± 0.61	20.90 ± 0.42	39.10 ± 0.54	n = 33	[CUL] Coulter UniCel DxH 600,800
42.72 ± 0.52	38.19 ± 0.37	36.89 ± 0.34	18.69 ± 0.11	35.68 ± 0.27	n = 4	[CUS] Coulter ACT 5 diff
46.48 ± 0.72	41.20 ± 0.83	40.31 ± 0.87	20.69 ± 0.49	38.85 ± 0.78	n = 14	[CUT] Coulter ACT series,not ACT5 diff
46.53 ± 0.23	41.44 ± 0.44	40.50 ± 0.42	20.56 ± 0.20	39.16 ± 0.24	n = 11	[CUX] Coulter LH750,755
46.22 ± 0.73	41.16 ± 0.63	40.16 ± 0.57	20.59 ± 0.46	39.06 ± 0.63	n = 8	[CUY] Coulter LH 780
46.37 ± 1.58	41.42 ± 0.83	40.25 ± 0.38	21.01 ± 0.46	39.10 ± 0.58	n = 6	[CUZ] Coulter LH500
43.08 ± 0.78	38.41 ± 1.10	37.60 ± 0.27	19.75 ± 0.45	36.82 ± 0.15	n = 3	[MEB] Medonic M-series
43.59 ± 0.83	38.93 ± 0.34	37.85 ± 0.36	19.40 ± 0.09	36.49 ± 0.29	n = 3	[ROB] ABX Pentra series
45.76 ± 0.88	40.53 ± 0.76	39.82 ± 0.41	19.92 ± 0.32	39.04 ± 1.11	n = 3	[ROC] ABX Micro
44.48 ± 0.82	39.96 ± 0.40	39.96 ± 0.68	21.67 ± 0.27	38.54 ± 0.48	n = 8	[SYA] Sysmex XE 5000
45.01 ± 0.84	39.23 ± 0.70	38.95 ± 0.76	20.42 ± 0.46	38.26 ± 0.75	n = 20	[SYC] Sysmex XN-series
45.26 ± 0.79	39.76 ± 0.74	39.70 ± 0.45	22.51 ± 0.20	38.45 ± 0.54	n = 3	[SYG] Sysmex POCHi
43.63 ± 0.73	39.18 ± 0.50	38.99 ± 0.59	21.82 ± 0.38	37.98 ± 0.59	n = 18	[SYI] Sysmex XT-2000i,XT-1800i
44.92 ± 0.41	40.33 ± 0.34	40.04 ± 0.39	21.50 ± 0.46	39.03 ± 0.23	n = 3	[SYO] Sysmex XE2100
44.30 ± 0.53	39.48 ± 0.52	39.20 ± 0.50	21.46 ± 0.23	37.81 ± 0.52	n = 19	[SYP] Sysmex XS-1000i,XS-1000iAL
43.71 ± 0.99	39.71 ± 0.88	39.42 ± 0.75	21.66 ± 0.65	38.35 ± 0.75	n = 4	[SYQ] Sysmex XE 2100D(Blood Center)
43.62 ± 0.57	39.42 ± 0.71	39.27 ± 0.67	22.01 ± 0.45	38.22 ± 0.64	n = 12	[SYV] Sysmex XT 4000i

Summary of Participant Responses
Mean ± One Standard Deviation

Platelet Count (x 10^9/L)

Specimen: B26	Specimen: B27	Specimen: B28	Specimen: B29	Specimen: B30	Number	[Code] Instrument or Reagent System
373.4 ± 17.29	419.4 ± 18.46	238.5 ± 11.00	91.2 ± 6.32	248.4 ± 13.36	n = 217	[---] All Methods & Instruments
						<Instruments>
423.6 ± 29.78	457.2 ± 30.32	248.4 ± 16.53	95.1 ± 6.58	280.2 ± 5.90	n = 3	[ABG] Abbott Cell Dyn 1700
376.1 ± 11.93	432.6 ± 23.16	252.2 ± 7.70	98.0 ± 2.96	257.9 ± 11.68	n = 8	[ABM] Abbott Cell Dyn 3700
381.0 ± 25.70	423.6 ± 22.04	234.6 ± 7.94	108.9 ± 5.64	263.7 ± 12.77	n = 4	[ABS] Abbott Cell Dyn Sapphire
399.0 ± 17.06	436.7 ± 25.10	254.2 ± 10.90	128.5 ± 9.93	291.9 ± 16.95	n = 8	[ABT] Abbott Cell Dyn Ruby
344.1 ± 27.64	399.7 ± 31.09	235.2 ± 20.33	99.8 ± 6.93	244.5 ± 14.93	n = 4	[ABU] Abbott Cell Dyn Emerald
374.5 ± 15.38	429.9 ± 24.84	243.3 ± 14.87	94.0 ± 5.48	252.4 ± 17.17	n = 3	[BTD] Siemens Advia 120
370.4 ± 15.46	423.4 ± 21.32	234.5 ± 10.87	90.6 ± 5.43	243.2 ± 13.47	n = 10	[BTE] Siemens Advia 2120
362.6 ± 7.69	406.8 ± 7.75	233.8 ± 4.36	89.2 ± 3.29	241.9 ± 6.35	n = 33	[CUL] Coulter UniCel DxH 600,800
364.5 ± 13.91	416.8 ± 10.09	240.8 ± 10.54	98.4 ± 4.26	256.4 ± 15.37	n = 4	[CUS] Coulter ACT 5 diff
372.9 ± 23.11	416.8 ± 23.95	233.3 ± 13.57	89.8 ± 7.67	245.0 ± 13.25	n = 14	[CUT] Coulter ACT series,not ACT5 diff
368.3 ± 11.04	414.3 ± 16.48	235.1 ± 8.79	94.3 ± 3.38	246.3 ± 7.83	n = 11	[CUX] Coulter LH750,755
364.7 ± 10.95	412.3 ± 13.98	236.9 ± 5.38	93.1 ± 2.86	250.6 ± 8.45	n = 8	[CUY] Coulter LH 780
373.7 ± 16.02	426.5 ± 24.08	237.0 ± 16.11	90.6 ± 1.98	254.6 ± 14.57	n = 6	[CUZ] Coulter LH500
333.0 ± 2.70	396.9 ± 9.80	214.0 ± 3.58	81.4 ± 1.02	223.9 ± 6.08	n = 3	[MEB] Medonic M-series
389.5 ± 22.54	433.6 ± 9.30	246.8 ± 8.71	94.3 ± 2.26	263.1 ± 9.19	n = 3	[ROB] ABX Pentra series
375.7 ± 4.06	431.0 ± 12.85	247.2 ± 9.43	99.0 ± 4.60	254.0 ± 21.61	n = 3	[ROC] ABX Micro
338.8 ± 13.00	394.7 ± 13.37	223.8 ± 10.97	84.7 ± 5.96	223.1 ± 7.90	n = 8	[SYA] Sysmex XE 5000
379.0 ± 10.33	416.9 ± 9.29	235.8 ± 5.02	83.5 ± 3.92	245.9 ± 8.17	n = 20	[SYC] Sysmex XN-series
386.2 ± 14.15	427.3 ± 9.73	240.4 ± 6.45	90.0 ± 1.80	249.1 ± 7.95	n = 3	[SYG] Sysmex POCHi
387.8 ± 9.83	427.5 ± 7.15	244.9 ± 9.34	94.0 ± 3.23	255.4 ± 6.59	n = 18	[SYI] Sysmex XT-2000i,XT-1800i
357.5 ± 22.59	406.3 ± 12.15	224.4 ± 7.94	87.0 ± 0.90	234.1 ± 10.75	n = 3	[SYO] Sysmex XE2100
377.1 ± 9.83	426.5 ± 9.99	239.6 ± 5.64	89.3 ± 3.19	247.4 ± 6.79	n = 19	[SYP] Sysmex XS-1000i,XS-1000iAL
382.0 ± 6.48	446.1 ± 12.64	250.3 ± 4.29	100.8 ± 3.07	257.9 ± 10.53	n = 4	[SYQ] Sysmex XE 2100D(Blood Center)
379.6 ± 6.40	426.5 ± 12.96	244.8 ± 6.60	94.4 ± 2.32	256.2 ± 8.52	n = 12	[SYV] Sysmex XT 4000i

Prothrombin Time   (seconds)

Specimen: C26	Specimen: C27	Specimen: C28	Specimen: C29	Specimen: C30	Number	[Code] Instrument or Reagent System
11.22 ± 0.73	28.90 ± 4.55	29.02 ± 4.58	50.70 ± 9.35	10.86 ± 0.75	n = 159	[---] All Methods & Instruments
						<Instruments>
11.01 ± 0.32	25.55 ± 0.86	25.65 ± 0.92	43.79 ± 1.64	10.32 ± 0.25	n = 9	[BEB] Siemens BCS,BCSXP
13.00 ± 0.49	33.63 ± 1.23	33.59 ± 1.25	58.84 ± 2.94	12.76 ± 0.36	n = 15	[DGC] Diagnostica Stago STA Compact
13.31 ± 0.33	34.25 ± 0.87	34.00 ± 1.03	58.42 ± 2.62	13.36 ± 0.26	n = 5	[DGD] Diagnostica Stago STA-R,STA-R Evo
11.73 ± 0.09	21.96 ± 0.43	22.04 ± 0.80	34.50 ± 1.30	10.90 ± 0.23	n = 5	[ILA] IL ACL(All except810,ELITE,EPRO,8
11.43 ± 0.49	28.65 ± 7.85	28.31 ± 7.77	48.76 ± 16.07	10.97 ± 0.68	n = 4	[ILC] IL ACL Futura/Advance
11.37 ± 0.31	31.28 ± 1.97	31.14 ± 1.75	55.66 ± 4.13	11.24 ± 0.23	n = 11	[ILD] IL ACL(ELITE,ELITE PRO,8/9/10000)
11.50 ± 0.32	32.65 ± 1.55	33.06 ± 1.41	59.34 ± 2.89	11.17 ± 0.27	n = 42	[ILE] IL ACL TOP Series
10.85 ± 0.32	25.56 ± 0.98	25.75 ± 0.90	44.10 ± 1.79	10.52 ± 0.23	n = 31	[SYD] Sysmex CA1500, CA7000
10.62 ± 0.28	25.81 ± 0.75	25.88 ± 1.02	44.61 ± 1.87	10.22 ± 0.23	n = 32	[SYW] Sysmex CA500,CA600
						<Reagents>
13.09 ± 0.45	33.82 ± 1.23	33.63 ± 1.24	58.79 ± 3.09	12.90 ± 0.43	n = 22	[TA3] STA Neoplastine CL+
10.76 ± 0.33	25.67 ± 0.87	25.79 ± 0.96	44.29 ± 1.84	10.36 ± 0.27	n = 72	[TD2] Siemens Innovin
11.38 ± 0.44	21.86 ± 0.66	22.06 ± 0.90	34.29 ± 1.70	10.83 ± 0.35	n = 8	[TJ2] HemosIL PT-Fibrinogen
11.51 ± 0.32	32.49 ± 1.73	32.78 ± 1.60	58.80 ± 3.28	11.20 ± 0.27	n = 53	[TJ8] HemosIL RecombiPlasTin 2G
						<Reagent & Instrument>
13.00 ± 0.49	33.63 ± 1.23	33.59 ± 1.25	58.84 ± 2.94	12.76 ± 0.36	n = 15	[TA3]&[DGC] STA Neoplastin & Diagnostic
13.31 ± 0.33	34.25 ± 0.87	34.00 ± 1.03	58.42 ± 2.62	13.36 ± 0.26	n = 5	[TA3]&[DGD] STA Neoplastin & Diagnostic
11.01 ± 0.32	25.55 ± 0.86	25.65 ± 0.92	43.79 ± 1.64	10.32 ± 0.25	n = 9	[TD2]&[BEB] Siemens Innovi & Siemens BC
10.85 ± 0.32	25.56 ± 0.98	25.75 ± 0.90	44.10 ± 1.79	10.52 ± 0.23	n = 31	[TD2]&[SYD] Siemens Innovi & Sysmex CA1
10.62 ± 0.28	25.81 ± 0.75	25.88 ± 1.02	44.61 ± 1.87	10.22 ± 0.23	n = 32	[TD2]&[SYW] Siemens Innovi & Sysmex CA5
11.73 ± 0.09	21.96 ± 0.43	22.04 ± 0.80	34.50 ± 1.30	10.90 ± 0.23	n = 5	[TJ2]&[ILA] HemosIL PT-Fib & IL ACL(All
11.38 ± 0.33	31.32 ± 1.88	31.16 ± 1.67	55.68 ± 4.06	11.24 ± 0.25	n = 10	[TJ8]&[ILD] HemosIL Recomb & IL ACL(ELI
11.52 ± 0.30	32.59 ± 1.54	33.00 ± 1.35	59.22 ± 2.78	11.17 ± 0.27	n = 41	[TJ8]&[ILE] HemosIL Recomb & IL ACL TOP

Summary of Participant Responses
Mean ± One Standard Deviation

INR   (International Normalized Ratio)

Specimen: C26	Specimen: C27	Specimen: C28	Specimen: C29	Specimen: C30	Number	[Code] Instrument or Reagent System
1.024 ± 0.049	2.726 ± 0.372	2.751 ± 0.372	4.889 ± 1.003	0.997 ± 0.043	n = 162	[---] All Methods & Instruments
						\<Instruments\>
1.038 ± 0.052	2.586 ± 0.096	2.605 ± 0.113	4.383 ± 0.248	1.000 ± 0.000	n = 8	[BEB] Siemens BCS,BCSXP
0.995 ± 0.065	3.370 ± 0.200	3.351 ± 0.183	6.933 ± 0.535	0.966 ± 0.054	n = 15	[DGC] Diagnostica Stago STA Compact
1.014 ± 0.040	3.434 ± 0.115	3.419 ± 0.142	6.773 ± 0.411	1.010 ± 0.036	n = 5	[DGD] Diagnostica Stago STA-R,STA-R Evo
0.985 ± 0.022	2.885 ± 0.147	2.818 ± 0.020	6.160 ± 0.454	0.866 ± 0.042	n = 5	[ILA] IL ACL(All except810,ELITE,EPRO,8
1.009 ± 0.025	3.214 ± 0.280	3.176 ± 0.323	6.741 ± 1.541	0.910 ± 0.094	n = 4	[ILC] IL ACL Futura/Advance
1.027 ± 0.055	2.916 ± 0.200	2.951 ± 0.148	5.369 ± 0.376	1.004 ± 0.060	n = 11	[ILD] IL ACL(ELITE,ELITE PRO,8/9/10000)
1.027 ± 0.047	2.851 ± 0.143	2.906 ± 0.135	5.154 ± 0.268	1.006 ± 0.046	n = 45	[ILE] IL ACL TOP Series
1.026 ± 0.038	2.374 ± 0.121	2.380 ± 0.102	4.002 ± 0.237	1.001 ± 0.014	n = 31	[SYD] Sysmex CA1500, CA7000
1.036 ± 0.051	2.467 ± 0.111	2.482 ± 0.147	4.247 ± 0.232	0.997 ± 0.033	n = 32	[SYW] Sysmex CA500,CA600
						\<Reagents\>
1.000 ± 0.057	3.402 ± 0.161	3.361 ± 0.164	6.926 ± 0.498	0.979 ± 0.052	n = 22	[TA3] STA Neoplastine CL+
1.032 ± 0.046	2.440 ± 0.134	2.445 ± 0.143	4.154 ± 0.270	0.999 ± 0.021	n = 72	[TD2] Siemens Innovin
0.987 ± 0.029	2.914 ± 0.182	3.013 ± 0.309	6.516 ± 1.001	0.870 ± 0.047	n = 8	[TJ2] HemosIL PT-Fibrinogen
1.029 ± 0.045	2.875 ± 0.167	2.912 ± 0.142	5.188 ± 0.314	1.008 ± 0.049	n = 56	[TJ8] HemosIL RecombiPlasTin 2G
						\<Reagent & Instrument\>
0.995 ± 0.065	3.370 ± 0.200	3.351 ± 0.183	6.933 ± 0.535	0.966 ± 0.054	n = 15	[TA3]&[DGC] STA Neoplastin & Diagnostic
1.014 ± 0.040	3.434 ± 0.115	3.419 ± 0.142	6.773 ± 0.411	1.010 ± 0.036	n = 5	[TA3]&[DGD] STA Neoplastin & Diagnostic
1.038 ± 0.052	2.586 ± 0.096	2.605 ± 0.113	4.383 ± 0.248	1.000 ± 0.000	n = 8	[TD2]&[BEB] Siemens Innovi & Siemens BC
1.026 ± CA.038	2.374 ± 0.121	2.380 ± 0.102	4.002 ± 0.237	1.001 ± 0.014	n = 31	[TD2]&[SYD] Siemens Innovi & Sysmex CA1
1.036 ± 0.051	2.467 ± 0.111	2.482 ± 0.147	4.247 ± 0.232	0.997 ± 0.033	n = 32	[TD2]&[SYW] Siemens Innovi & Sysmex CA5
0.985 ± 0.022	2.885 ± 0.147	2.818 ± 0.020	6.160 ± 0.454	0.866 ± 0.042	n = 5	[TJ2]&[ILA] HemosIL PT-Fib & IL ACL(All
1.035 ± 0.044	2.932 ± 0.206	2.932 ± 0.146	5.334 ± 0.389	1.015 ± 0.049	n = 10	[TJ8]&[ILD] HemosIL Recomb & IL ACL(ELI
1.028 ± 0.046	2.852 ± 0.146	2.903 ± 0.137	5.151 ± 0.272	1.007 ± 0.046	n = 44	[TJ8]&[ILE] HemosIL Recomb & IL ACL TOP

Summary of Participant Responses
Mean ± One Standard Deviation

Activated Partial Thromboplastin Time   (seconds)

Specimen: C26	Specimen: C27	Specimen: C28	Specimen: C29	Specimen: C30	Number	[Code] Instrument or Reagent System
28.80 ± 2.97	55.50 ± 6.56	55.77 ± 6.75	77.70 ± 11.64	28.71 ± 2.66	n = 159	[---] All Methods & Instruments
						\<Instruments\>
25.60 ± 0.70	50.08 ± 1.14	49.95 ± 1.23	66.91 ± 1.23	24.08 ± 0.44	n = 9	[BEB] Siemens BCS,BCSXP
30.04 ± 0.75	53.39 ± 1.62	53.37 ± 1.22	75.59 ± 2.62	31.05 ± 0.92	n = 15	[DGC] Diagnostica Stago STA Compact
29.48 ± 0.68	50.42 ± 1.15	49.95 ± 0.23	71.51 ± 1.63	30.36 ± 0.67	n = 5	[DGD] Diagnostica Stago STA-R,STA-R Evo
28.69 ± 1.14	54.20 ± 10.63	54.47 ± 9.07	76.34 ± 13.69	28.01 ± 0.64	n = 5	[ILA] IL ACL(All except810,ELITE,EPRO,8
31.36 ± 0.52	66.01 ± 0.95	66.09 ± 0.25	94.78 ± 1.25	30.50 ± 0.55	n = 4	[ILC] IL ACL Futura/Advance
29.27 ± 0.54	61.11 ± 7.46	62.18 ± 6.87	89.39 ± 12.37	28.93 ± 0.75	n = 10	[ILD] IL ACL(ELITE,ELITE PRO,8/9/10000)
32.17 ± 0.94	62.74 ± 1.57	63.44 ± 1.55	90.56 ± 2.08	31.05 ± 0.94	n = 45	[ILE] IL ACL TOP Series
26.79 ± 0.62	52.73 ± 1.29	52.77 ± 1.13	71.39 ± 2.07	27.27 ± 0.84	n = 32	[SYD] Sysmex CA1500, CA7000
25.88 ± 0.54	51.02 ± 0.98	50.76 ± 0.98	68.82 ± 1.99	26.06 ± 0.66	n = 29	[SYW] Sysmex CA500,CA600
						\<Reagents\>
29.97 ± 0.92	52.58 ± 2.19	52.55 ± 2.40	74.54 ± 3.48	30.99 ± 0.95	n = 18	[AA2] Diagnostica Stago STA PTT-Auto
30.27 ± 0.61	53.82 ± 1.06	53.73 ± 0.69	76.13 ± 1.67	30.63 ± 0.38	n = 4	[AA3] Diagnostica Stago PTT-LA
26.26 ± 0.80	51.67 ± 1.72	51.63 ± 1.73	69.80 ± 2.78	26.40 ± 1.30	n = 69	[AD4] Siemens Actin FSL
28.48 ± 0.61	48.77 ± 2.11	49.78 ± 2.50	69.64 ± 0.36	28.10 ± 0.57	n = 6	[AJ3] HemosIL Test APTT-SP
31.77 ± 1.31	63.26 ± 2.11	63.89 ± 1.81	91.43 ± 2.93	30.75 ± 1.15	n = 58	[AO4] HemosIL SynthASil
						\<Reagent & Instrument\>
29.93 ± 0.77	53.14 ± 1.83	53.21 ± 1.95	75.24 ± 2.88	31.25 ± 1.00	n = 11	[AA2]&[DGC] Diagnostica St & Diagnostic
29.48 ± 0.68	50.42 ± 1.15	49.95 ± 0.23	71.51 ± 1.63	30.36 ± 0.67	n = 5	[AA2]&[DGD] Diagnostica St & Diagnostic
30.27 ± 0.61	53.82 ± 1.06	53.73 ± 0.69	76.13 ± 1.67	30.63 ± 0.38	n = 4	[AA3]&[DGC] Diagnostica St & Diagnostic
25.60 ± 0.70	50.08 ± 1.14	49.95 ± 1.23	66.91 ± 1.23	24.08 ± 0.44	n = 9	[AD4]&[BEB] Siemens Actin & Siemens BC
26.79 ± 0.62	52.73 ± 1.29	52.77 ± 1.13	71.39 ± 2.07	27.27 ± 0.84	n = 32	[AD4]&[SYD] Siemens Actin & Sysmex CA1
25.88 ± 0.56	51.02 ± 1.03	50.77 ± 1.04	68.93 ± 1.98	26.07 ± 0.64	n = 27	[AD4]&[SYW] Siemens Actin & Sysmex CA5
27.99 ± 0.57	47.18 ± 1.22	48.61 ± 1.69	67.98 ± 2.50	27.70 ± 0.55	n = 3	[AJ3]&[ILA] HemosIL Test A & IL ACL(All
28.89 ± 0.29	50.46 ± 1.26	51.32 ± 2.57	69.81 ± 0.29	28.43 ± 0.31	n = 3	[AJ3]&[ILD] HemosIL Test A & IL ACL(ELI
31.36 ± 0.52	66.01 ± 0.95	66.09 ± 0.25	94.78 ± 1.25	30.50 ± 0.55	n = 4	[AO4]&[ILC] HemosIL SynthA & IL ACL Fut
29.48 ± 0.51	65.85 ± 1.00	65.48 ± 1.39	95.47 ± 1.02	29.24 ± 0.80	n = 7	[AO4]&[ILD] HemosIL SynthA & IL ACL(ELI
32.17 ± 0.94	62.74 ± 1.57	63.44 ± 1.55	90.56 ± 2.08	31.05 ± 0.94	n = 45	[AO4]&[ILE] HemosIL SynthA & IL ACL TOP

Fibrinogen   (mg/dL)

| Specimen: C26	Specimen: C27	Specimen: C28	Specimen: C29	Specimen: C30	Number	[Code] Instrument or Reagent System
289.0 ± 30.05	290.4 ± 26.62	293.5 ± 29.15	285.8 ± 28.52	496.2 ± 64.60	n = 91	[---] All Methods & Instruments
						<Instruments>
313.9 ± 22.71	309.2 ± 14.88	318.7 ± 19.37	320.0 ± 13.59	545.9 ± 10.05	n = 8	[BEB] Siemens BCS,BCSXP
283.9 ± 11.63	285.2 ± 10.99	289.7 ± 13.93	286.5 ± 14.82	500.5 ± 28.19	n = 13	[DGC] Diagnostica Stago STA Compact
282.0 ± 17.46	287.5 ± 11.95	282.9 ± 11.17	278.6 ± 14.56	493.5 ± 25.21	n = 5	[DGD] Diagnostica Stago STA-R,STA-R Evo
309.6 ± 28.15	305.1 ± 18.64	313.4 ± 16.93	298.8 ± 18.58	543.4 ± 43.38	n = 31	[ILE] IL ACL TOP Series
263.9 ± 18.58	265.5 ± 19.83	269.6 ± 15.21	260.5 ± 18.15	423.8 ± 28.90	n = 24	[SYD] Sysmex CA1500, CA7000
274.1 ± 25.87	280.1 ± 19.71	268.1 ± 31.63	259.2 ± 41.15	447.1 ± 39.99	n = 3	[SYW] Sysmex CA500,CA600
						<Reagents>
303.5 ± 16.33	345.1 ± 47.75	337.3 ± 33.79	330.8 ± 60.73	532.5 ± 35.58	n = 3	[TJ2] HemosIL PT-Fibrinogen
336.9 ± 4.04	318.4 ± 8.94	317.9 ± 11.24	311.1 ± 8.50	527.2 ± 25.23	n = 13	[TJ8] HemosIL RecombiPlasTin 2G
283.6 ± 13.13	285.9 ± 11.47	287.4 ± 13.70	284.2 ± 15.28	498.5 ± 27.56	n = 18	[FA4] Stago STA-Fibrinogen 5
313.9 ± 22.71	309.2 ± 14.88	318.7 ± 19.37	320.0 ± 13.59	545.9 ± 10.05	n = 8	[FB2] Siemens Multifibren U
264.8 ± 19.66	267.0 ± 20.38	270.2 ± 16.64	260.4 ± 20.56	425.8 ± 30.68	n = 27	[FD2] Siemens Fibrinogen Determination
317.0 ± 24.93	306.1 ± 20.69	330.9 ± 15.36	299.8 ± 15.11	578.7 ± 53.41	n = 7	[FJ2] HemosIL Fibrinogen C,XL
286.4 ± 15.78	297.0 ± 18.54	299.4 ± 23.20	287.1 ± 18.07	554.7 ± 55.16	n = 12	[FO3] HemosIL QFA(bovine)
						<Reagent & Instrument)
336.9 ± 4.04	317.6 ± 7.29	317.0 ± 8.42	311.1 ± 8.49	529.1 ± 21.90	n = 12	[TJ8]&[ILE] HemosIL Recomb & IL ACL TOP
283.9 ± 11.63	285.2 ± 10.99	289.7 ± 13.93	286.5 ± 14.82	500.5 ± 28.19	n = 13	[FA4]&[DGC] Stago STA-Fibr & Diagnostic
282.0 ± 17.46	287.5 ± 11.95	282.9 ± 11.17	278.6 ± 14.56	493.5 ± 25.21	n = 5	[FA4]&[DGD] Stago STA-Fibr & Diagnostic
313.9 ± 22.71	309.2 ± 14.88	318.7 ± 19.37	320.0 ± 13.59	545.9 ± 10.05	n = 8	[FB2]&[BEB] Siemens Multif & Siemens BC
263.9 ± 18.58	265.5 ± 19.83	269.6 ± 15.21	260.5 ± 18.15	423.8 ± 28.90	n = 24	[FD2]&[SYD] Siemens Fibrin & Sysmex CA1
274.1 ± 25.87	280.1 ± 19.71	268.1 ± 31.63	259.2 ± 41.15	447.1 ± 39.99	n = 3	[FD2]&[SYW] Siemens Fibrin & Sysmex CA5
311.6 ± 21.18	302.5 ± 13.77	327.1 ± 11.60	297.7 ± 9.93	568.1 ± 36.22	n = 6	[FJ2]&[ILE] HemosIL Fibrin & IL ACL TOP
286.4 ± 15.78	297.0 ± 18.54	299.4 ± 23.20	287.1 ± 18.07	554.7 ± 55.16	n = 12	[FO3]&[ILE] HemosIL QFA(bo & IL ACL TOP

NEW YORK STATE HEMATOLOGY PROFICIENCY TEST PROGRAM

Test event of June 6, 2016

Images on the New York State Department of Health – Wadsworth Center web page: http://www.wadsworth.org/chemheme/cellPT were used to test all laboratories that perform manual white cell differentials. A summary of responses appear below, acceptable responses are shown in shaded areas.
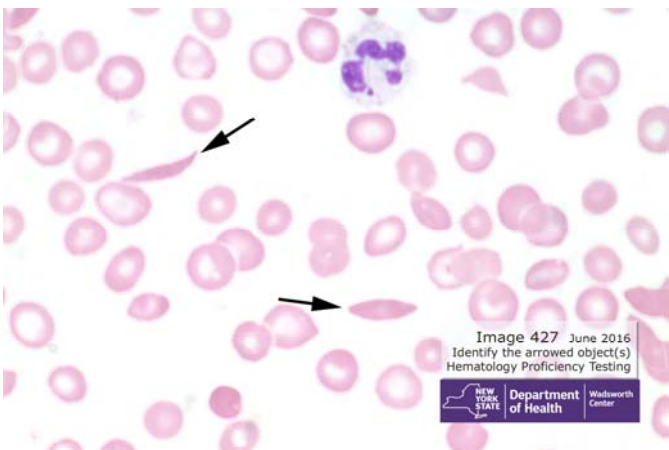
Image 426
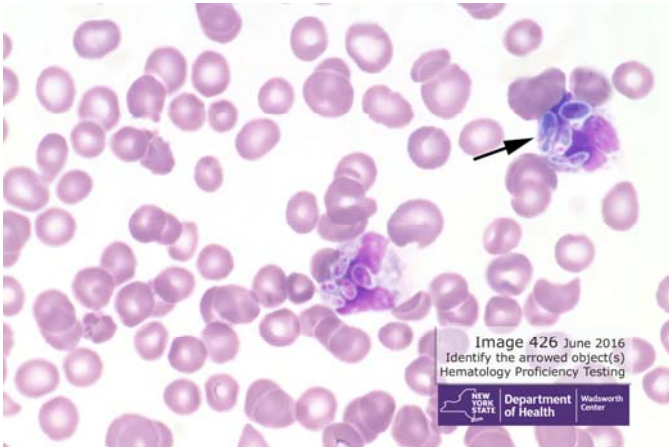
Number of Responses	Percent of Laboratories	Cell type or finding
178	100.0%	Yeast-Fungus

The arrowed object in Image 426 consists of oval shaped, dark blue-purple bodies with delineated peripheries. The objects are yeast-fungus as correctly identified by all of the participants. Image 426 was taken from a case of septicemia where many intracellular and extracellular yeast were observed. The yeast in this image are intracellular as evident by the presence of clear halos surrounding the organisms. The halo is formed after the organism is engulfed in a vacuole by either a neutrophil or a monocyte. The most common fungus found in the peripheral blood is *Candida albicans*, *Histoplasma capsulatum* can also be seen but is very rare.
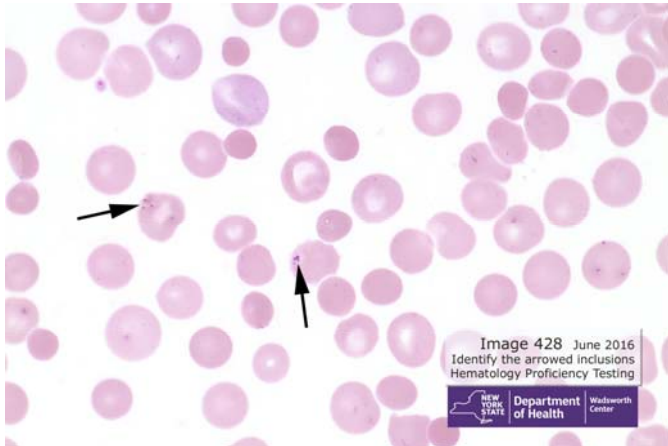

Image 427

Number of Responses	Percent of Laboratories	Cell type or finding
177	99.4%	Sickle cell (drepanocyte)
1	0.6%	Elliptocyte / Ovalocyte

The arrowed red blood cells in Image 427 are crescent shaped and possess pointed ends. They were correctly identified as sickle cells by 177 of the participants. Image 427 was taken from the peripheral blood smear of a 30 year-old female with sickle cell anemia. Sickle cell anemia is an inherited red blood cell disorder and is one in the group known as sickle cell disease (SCD), other forms of SCD include HbSC and HbS beta thalassemia.
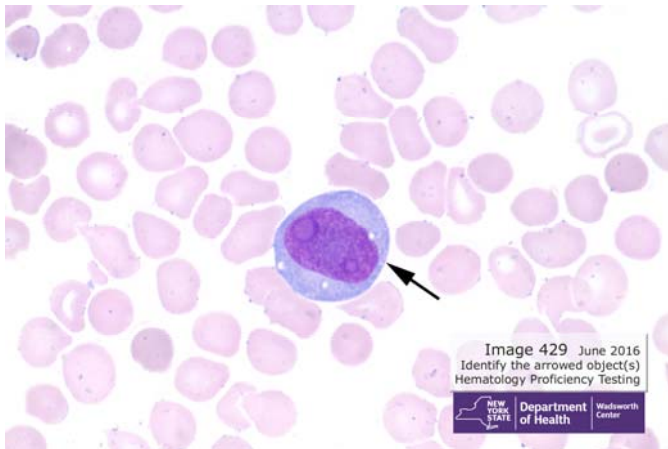
Image 428

Number of Responses	Percent of Laboratories	Cell type or finding
156	**87.6%**	**Pappenheimer body**
20	11.2%	Parasite
1	0.6%	Platelet
1	0.6%	Schüffner's granule(s)

The arrowed inclusions in the red blood cells of Image 428 are bluish in color, irregularly shaped and located near the periphery of the cell. The inclusions were correctly identified by 87.6% of the participants as Pappenheimer bodies.

Image 428 was captured from the peripheral blood smear of an 82 year-old male with jaundice post-splenectomy and later diagnosed with spherocytic anemia. In a case of anemia post-splenectomy Pappenheimer bodies (iron inclusions) would be an expected finding. The inclusions are ordinarily discharged from the cell or removed by the spleen.

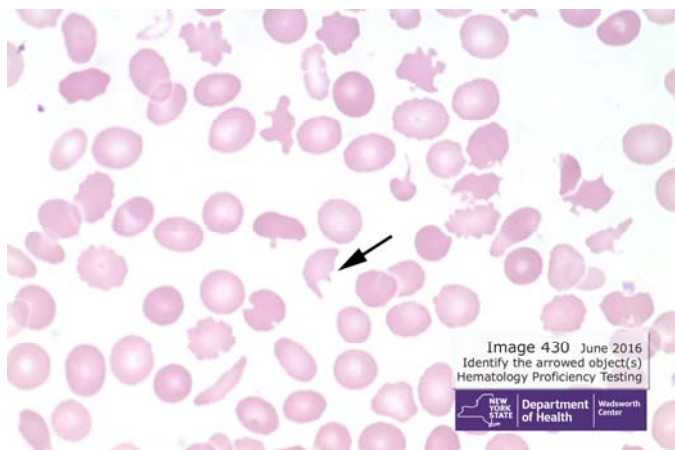# Image 429

Number of Responses	Percent of Laboratories	Cell type or finding
173	**97.2%**	**Blast cell, not classified**
2	1.1%	Reactive/Atypical lymphocyte
2	1.1%	Monocyte
1	0.6%	Promyelocyte

The arrowed white blood cell in Image 429 is large, the nucleus is oval shaped, the chromatin is smooth, and nucleoli are pronounced. The cell was correctly identified as a blast cell by 173 of the participants. Image 429 was obtained from the peripheral blood smear of a 74 year-old male with a white blood cell count of 249.7x10^9/L and a previous diagnosis of chronic myelomonocytic leukemia (CMML). The high white blood cell count in addition to the presence of more than twenty percent blast cells is suggestive of an acute myeloid leukemia (AML). Due to the advanced disease a bone marrow examination was not performed, however, immunophenotyping revealed the following; CD33, CD13, CD14(66%), CD16(23%), CD11b(variable), CD4(weak) and HLA-DR.

Image 430

Image 430 June 2016
Identify the arrowed object(s)
Hematology Proficiency Testing

Number of Responses	Percent of Laboratories	Cell type or finding
147	**82.6%**	**Schistocyte**
31	17.4%	Acanthocyte

The arrowed fragmented red blood cell is a schistocyte as 147 (82.6%) of the participants concur. Image 430 was taken from the peripheral blood smear of an individual who presented with bloody diarrhea, anemia and thrombocytopenia. The diagnosis was microangiopathic hemolytic anemia (MAHA) as the direct result of hemolytic uremic syndrome (HUS). The individual in this case presented with the characteristic profile of HUS; destruction of red blood cells, decreased platelet count and diarrhea. Most cases of HUS occur following a gastrointestinal illness with E. coli bacteria (*Escherichia coli* O157:H7).

Thirty-one participants identified the arrowed cell in Image 430 as an acanthocyte. An acanthocyte is described as a red blood cell possessing a round center that is lacking central pallor and whose cell membrane includes irregular-shaped and unevenly distributed spikes. Since these features are not present in the arrowed cell of Image 430, acanthocyte was not the best choice.