2020 BALL-A
PARTICIPANT SUMMARY

Evaluation Criteria
Results for the BALL Survey are not formally evaluated; however, statistics will appear in the Participant Summary for your information.

To provide a timely evaluation of your results, statistics presented in this Participant Summary reflect participant data received by the due date.

Cell markers with less than ten reported results were not included in this Participant Summary.

In the event a result is not graded, a numeric code will appear next to your result. A definition of the code will appear on the first page of your evaluation. Please see "Actions laboratories should take when a PT result is not graded" on page 14.

Note: To view the discussion images in color, go to cap.org to access the Participant Summary via e-LAB Suite.

Discussion
Albeit the Survey is not formally evaluated, the committee generally utilizes 80% consensus approach and overall interpretation in determining the correct responses. In addition, the committee also considers that ≥ 20 percent of participating laboratories perform testing for any particular antigen to be included.

Case BALL-01 Positive for MRD at approximately 0.5%
Beginning with this mailing, the BALL survey will include one "wet" challenge in which a B-lymphoblastic leukemia cell line is "spiked" into whole blood, then stabilized. In this challenge, the sample was targeted to have leukemic B lymphoblasts represent 0.5% of total viable leukocytes.

Of the 74 participants who reported a result, 72 (97.3%) correctly reported this sample as positive, with the remaining 2 (2.7%) participants reporting negative. Of those reporting the sample as positive, 7 participants reported in the 0.01 - 0.09% range, 60 in the 0.1 - 0.9% range, and 3 participants reported in the 1% - 9.9% range.

The consensus phenotype reported by the majority (>80%) of the participants was as follows:

Positive: CD9, CD10, CD19, CD22, CD34, CD38 and CD58
Negative: CD5

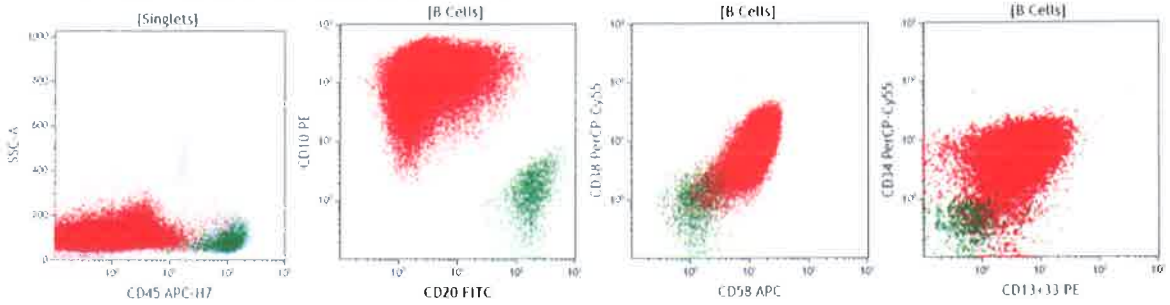
Consensus was not reached for the expression of CD13/33, CD20, CD24, CD45, and CD123.

Fewer than 10 participants reported results for the following antibodies: CD56, CD79a, kappa, lambda, and TdT.

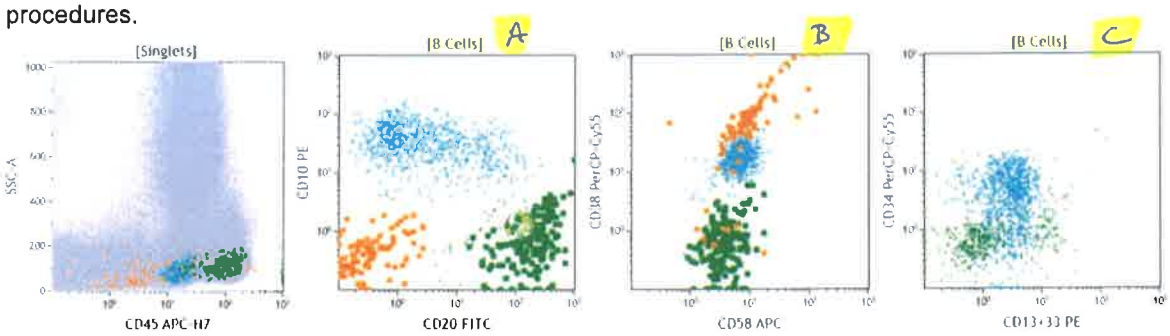
Overall the participating laboratories performed well. The two participants that reported the sample as negative for B-ALL MRD should review their antibody panels and analysis techniques. Based on feedback from this survey, the committee will clarify the kit instructions and modify the result form.

Case BALL-02 List Mode Case Negative for MRD

This case did not contain an abnormal CD45 dim blast population. However, normal mature B cells, some hematogones (light blue), and a small population of plasma cells (colored in orange) were also visible (CD38 positive, CD10 negative, CD20 negative). The diagnostic population of cells (colored in red) in Tube 1 was CD45 dim, CD10 bright, CD58 bright, CD20 dim to negative, CD38 positive. Tube 2 showed a diagnostic population that was CD34 positive, CD13/33 dim positive, and positive for CD9 (data not shown). The day 29 sample was clearly distinct from the prior diagnostic immunophenotype with normal mature B cells (green), hematogones (light blue), and a few plasma cells (orange) present. (representative dot plots shown below).



A total of 61.8% (47/76) of participants reported this case as negative, with 38.2% (29/76) calling it positive. Of those calling it positive, the majority reported 0.1% - 0.9%. Of note there was debris in the sample that had very low SS and picked up antibody which could be mistaken for residual disease. The hematogones (light blue) in the sample have lower CD10 than the original phenotype and do not have the high level of CD58 present in the diagnostic sample. Participants who reported positive results for this sample should review their analysis procedures.

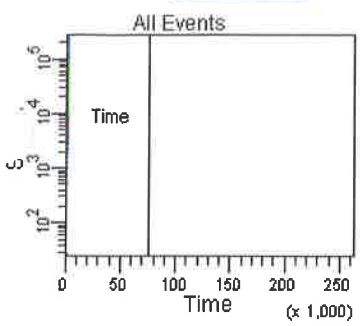


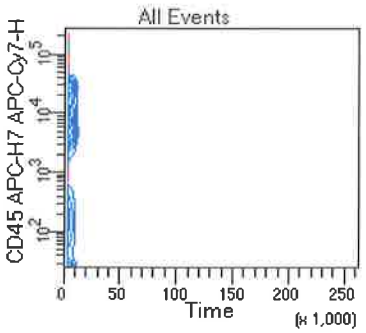
Case BALL-03 List Mode Case Positive for MRD (phenotypic shift) at approximately 0.2% of mononuclear cells

This case contained an abnormal population colored in red. The diagnostic population of cells in Tube 1 was CD45 dim, CD10 variable, CD58 bright, CD20 negative, and CD38 variable. Tube 2 showed a diagnostic population that was CD34 positive, CD9 variable, and CD13/33 negative (not shown here). The day 29 sample showed a shift from variable CD9 expression to mostly positive, and CD10 variable to negative. Antigenic shifts after treatment are not uncommon and have previously been reported. However, this population had an abnormal phenotype, as the cells in Tube 1 were CD20 and CD10 negative, brighter CD45, and dimmer CD38. Tube 2 showed that this CD10 negative population was also positive for CD34 and negative for CD13/33, the latter part being consistent with the original phenotype.

BALL-02

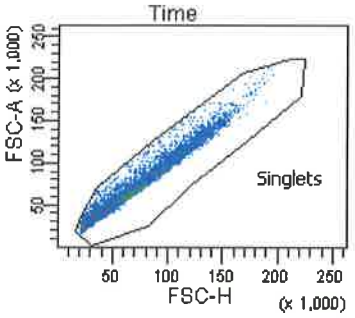
Children's Hospitals and Clinics

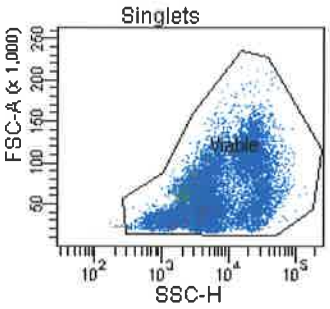


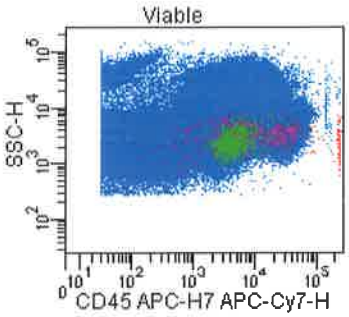


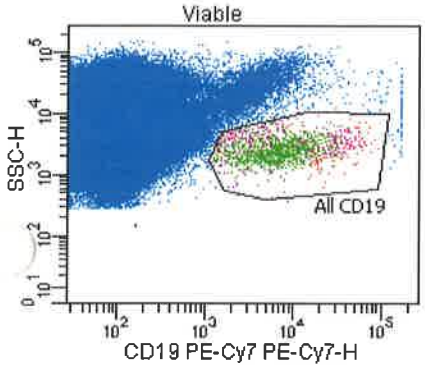
Tube: A-MRD

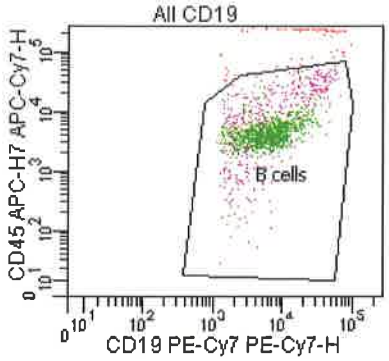
Population	#Events	%Parent	%Total
All Events	291,583	####	100.0
Time	291,583	100.0	100.0
Singlets	287,736	98.7	98.7
Viable	287,185	99.8	98.5
All CD19	1,503	0.5	0.5
B cells	1,404	93.4	0.5
P1	921	65.6	0.3

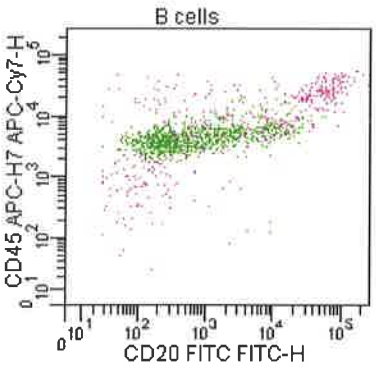


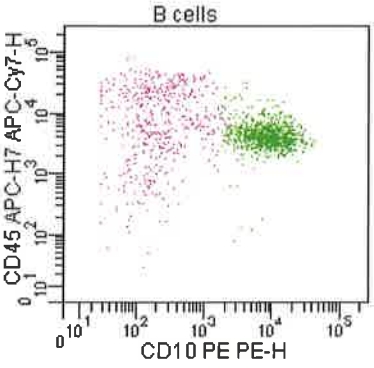


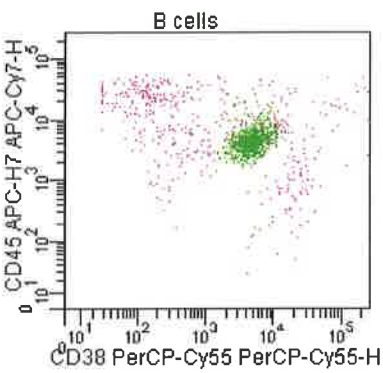


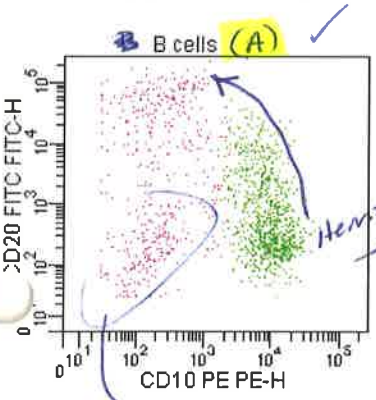




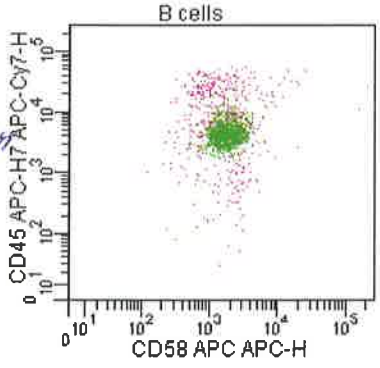








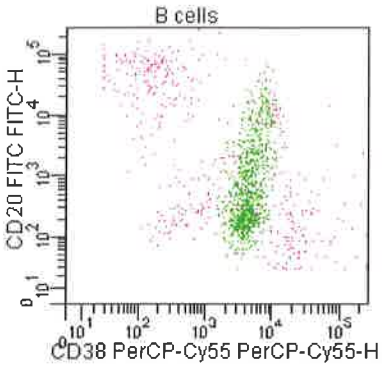
Heterogeneous

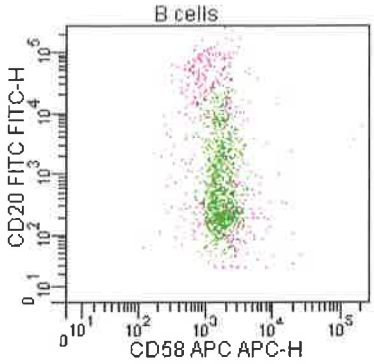


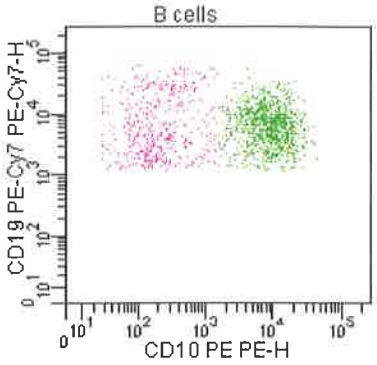
Plasma cells

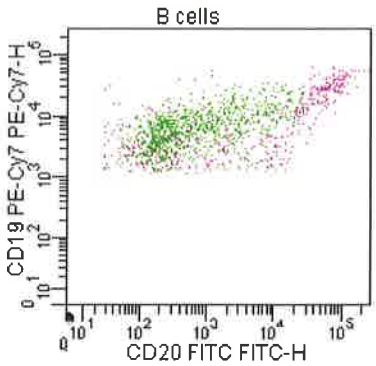
BALL-02

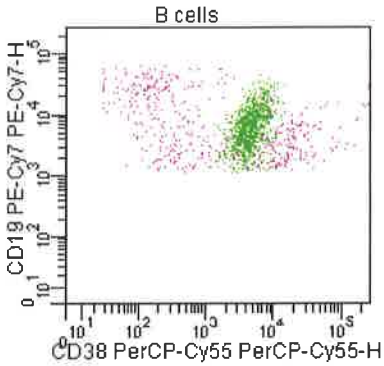
Children's Hospitals and Clinics

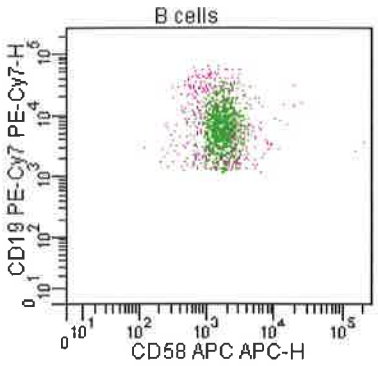


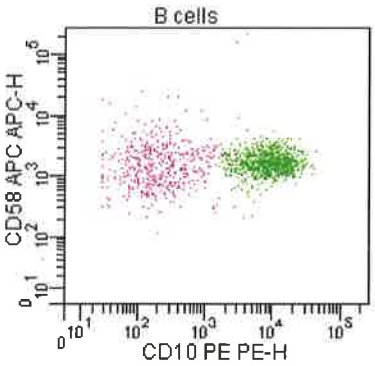


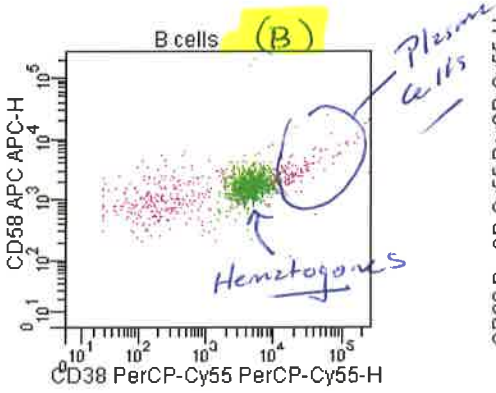


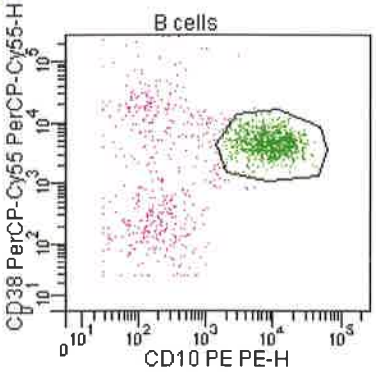










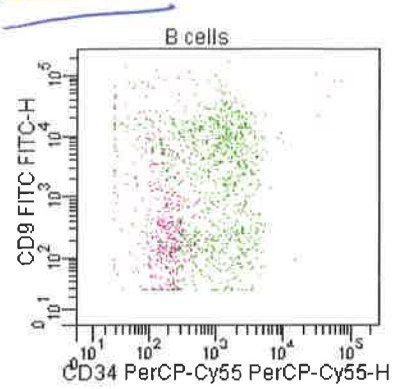


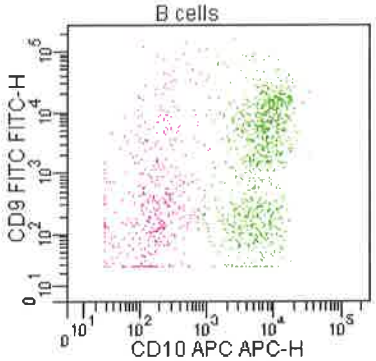
Experiment Name:	BALL-A 2020 CASE 2
Specimen Name:	Case 4
Tube Name:	A-MRD
Record Date:	May 5, 2015 2:05:40 PM
$OP:	Administrator
GUID:	9d743e42-2e2d-40b5-af1d-a64a3f867e9c
Serial Number:	

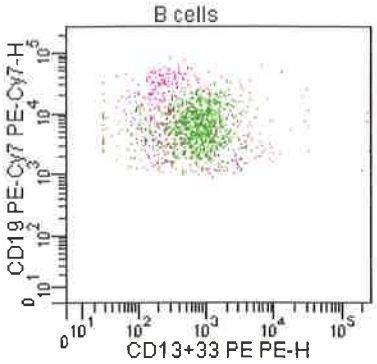
Population	#Events	%Parent	%Grand Parent	%Total
All Events	291,583	####	####	100.0
Time	291,583	100.0	####	100.0
Singlets	287,736	98.7	98.7	98.7
Viable	287,185	99.8	98.5	98.5
All CD19	1,503	0.5	0.5	0.5
B cells	1,404	93.4	0.5	0.5
P1	921	65.6	61.3	0.3

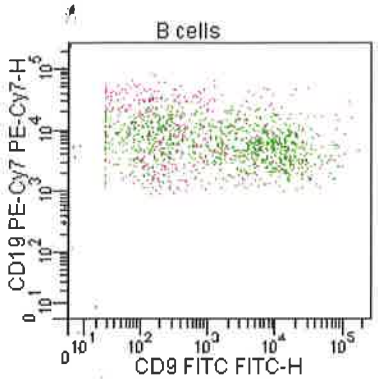
BALL-02

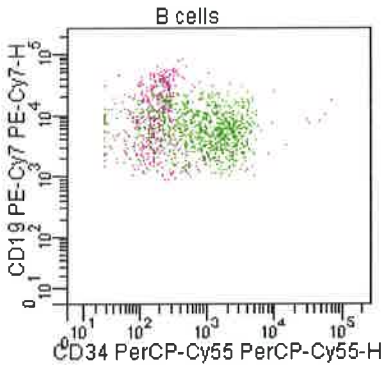
Children's Hospitals and Clinics

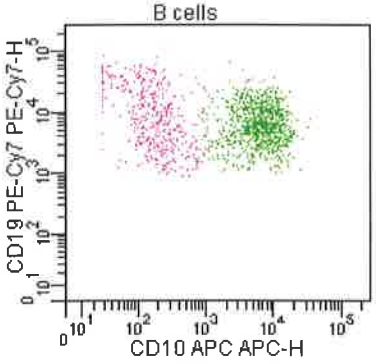


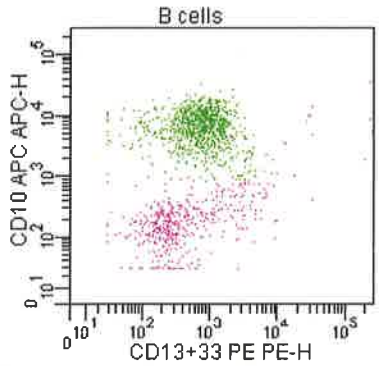


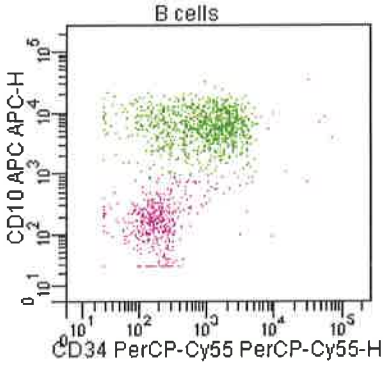


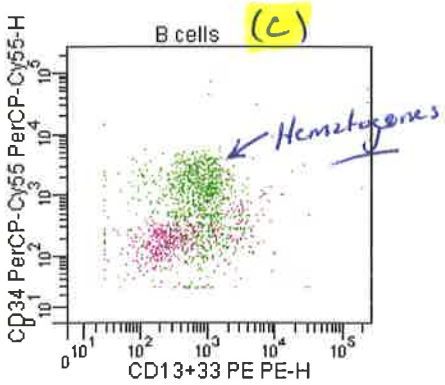








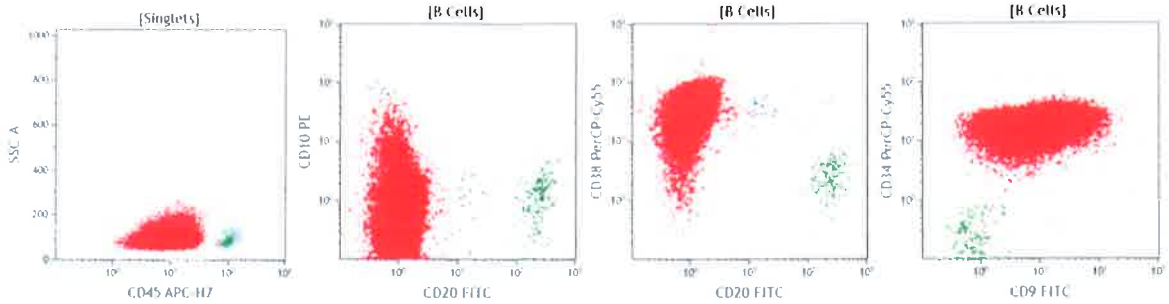




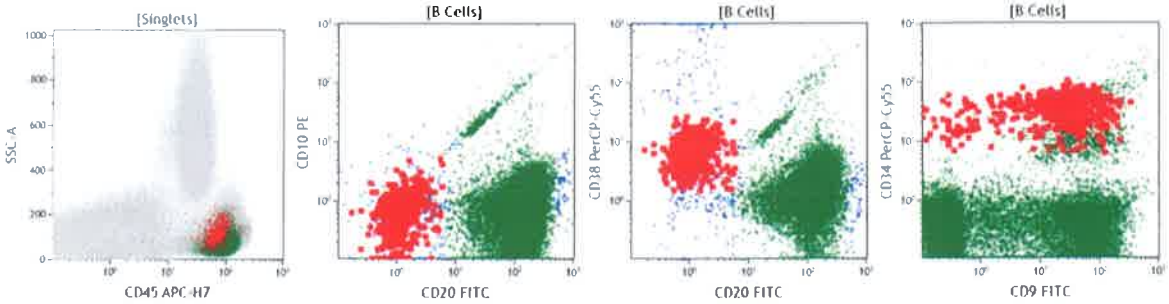
Experiment Name:	BALL-A 2020 CASE 2
Specimen Name:	Case 4
Tube Name:	B -MRD
Record Date:	May 5, 2015 2:09:15 PM
$OP:	Administrator
GUID:	c4d91dcc-1ed9-498c-b852-2dd9b4802c4a
Serial Number	

Population	#Events	%Parent	%Grand Parent	%Total
All Events	285,505	####	####	100.0
Time	285,505	100.0	####	100.0
Singlets	278,845	97.7	97.7	97.7
Viable	278,381	99.8	97.5	97.5
All CD19	1,386	0.5	0.5	0.5
B cells	1,355	97.8	0.5	0.5
P1	895	66.1	64.6	0.3

BALL-03



A total of 88.2% (67/76) of participants reported this case as positive, with 11.8% (9/76) calling it negative. Of those calling it positive, the majority reported 0.1 - 0.9%. Participants who reported negative results for this sample should review their analysis procedures and consult recent literature on gating strategy.



References

1. Borowitz MJ, Pullen DJ, Winick N, Martin PL, Bowman WP, Camitta B. Comparison of diagnostic and relapse flow cytometry phenotypes in childhood acute lymphoblastic leukemia: implications for residual disease detection: a report from the children's oncology group. *Cytometry B Clin Cytom.* 2005;68(1):18-24.

2. Keeney M, Wood BL, Hedley BD, et al. A QA program for MRD testing demonstrates that systematic education can reduce discordance among experienced interpreters. *Cytometry B Clin Cytom.* 2018;94(2):239-249. doi: 10.1002/cyto.b.21528.

Flavia N. Rosado, MD, FCAP
Benjamin Hedley, PhD, SCYM(ASCP)
Michael A. Linden, MD, PhD, FCAP
Diagnostic Immunology and Flow Cytometry Committee