EuroFlow BCP-ALL MRD EQA scheme 2026

Contents

The EuroFlow BCP-ALL MRD EQA scheme

The B-Cell Precursor Acute Lymphoblastic Leukemia Measurable Residual Disease (BCP-ALL MRD) external quality assessment (EQA) scheme consists of a wet lab and dry part. The wet lab part is designed to mimic routine sample preparation, data acquisition, and data analysis as used for local diagnostic samples. The BCP-ALL MRD scheme is intended for laboratories that use the EuroFlow BCP-ALL MRD antibody panel in accordance with the relevant EuroFlow standard operating procedures (SOPs) in their routine diagnostics. The dry part is designed to evaluate a laboratory's ability to analyze and interpret flow cytometry standard (FCS) files obtained using the EuroFlow methodology using BCP-ALL patient samples.

In the wet lab part, peripheral blood samples of 3 healthy donors are sourced locally in each participating laboratory (note that no samples are provided by ESLHO). These samples should be treated in the same manner as routine samples. Participants stain the samples with the EuroFlow BCP-ALL MRD Tube 1 antibody panel and measure them on the local flow cytometer, following the EuroFlow SOP for sample preparation and the EuroFlow SOP for instrument set-up and compensation, which can be accessed via https://app.euroflow.org/downloads/public. The FCS files are recommended to be analyzed in BD Infinicyt™ software, using a provided EQA profile and a recommended gating strategy. Alternative analytical software can also be used. Participants report the 11 median fluorescence intensity (MedFI) values of 5 cell subsets of each sample.

In the dry part, participants are provided with 3 FCS files by ESLHO. These FCS files are generated by EuroFlow-affiliated expert laboratories from BCP-ALL patient samples (either on treatment or post treatment) using the EuroFlow BCP-ALL MRD antibody panel and following the standardized EuroFlow SOPs for sample preparation and bulk lysis. Participants merge the provided FCS files with the FCS files measured within the wet part. Participants are advised to analyze the merged files

using BD Infinicyt™ software. Alternative analytical software may be used; however, files will only be validated for analysis with BD Infinicyt™. Therefore, we cannot guarantee compatibility with other software. Participants who encounter issues analyzing files with software other than Infinicyt are advised to contact ESLHO, so we can look for a solution.

Participants report the results from the analyses of the merged file, including the number of nucleated cells, the number and the percentage of MRD events, the immunophenotype of the aberrant B-cell population, the limit of detection, and the limit of quantitation of the assay.

All EQA results, both for the wet lab and dry part, are submitted by the participants via an online results form in the ESLHO EQA Portal.

As EQA provider, ESLHO offers the BCP-ALL MRD scheme in collaboration with the EuroFlow EQA Committee. The EuroFlow EQA Committee is composed of members of the EuroFlow Consortium (www.euroflow.org). Two rounds of the BCP-ALL MRD scheme are offered in 2026: one in spring and one in autumn.

Data analysis, reference values, and participant performance

Data analysis, scoring participant performance, and preparation of the reports are carried out by qualified and experienced experts within the EuroFlow Consortium.

Wet lab part

MedFI values reported by the participants are compared to the EuroFlow reference dataset (calculations made based on 60 measurements across 11 laboratories) using performance score metrics. The p-score for each reported numerical value is calculated using the below function,

$$p-score = \frac{\log_{10} MedFI - \log_{10} qaMedFI}{D^{max}}$$

where qaMedFI is the median of the MedFIs in the reference dataset and D^{max} is the maximal allowed difference from qaMedFI. D^{max} is determined by calculating the 5^{th} and 95^{th} percentiles of the differences between all MedFI values in the reference dataset and qaMedFI. These two percentiles are expressed as absolute values, and the larger value is used as D^{max}.

The absolute value of the p-score equals or exceeds the value ’1’ when the maximum allowed difference from the reference dataset is exceeded. In such case, the reported value is considered out of range and therefore incorrect. Based on the calculation of D^{max}, it is expected that 90 – 95% of the p-scores fall within the acceptable range. Thus, the performance of participants with a maximum of 3 incorrect values (out of 33 reported values) is scored as **successful with a perfect score**. Participants with 4 to 7 incorrect values are scored as **successful with an acceptable score** and those with more than 7 incorrect values as **unsuccessful**.

In summary, performance in the wet lab part of the BCP-ALL MRD scheme is scored as follows:

- **Successful (perfect score)**: 30, 31, 32, or 33 correct values
- **Successful (acceptable score)**: 26, 27, 28, 29 correct values

- **Unsuccessful**: 25 or less correct values

In case all three reported values for a given marker are incorrect, this indicates a systematic error in that marker.

Dry part

The dry part of the BCP-ALL MRD scheme does not include a performance scoring system. Instead, participants can compare their results to the reference values of the 3 BCP-ALL MRD cases to understand how they performed in comparison to the experts. The reference results are defined by the lead expert based on the consolidated results of analysis by (typically) three experts per case. The reference result is defined as follows:

- The reference **number of MRD events** will be the median value of the three experts' results
- The reference **phenotypic characterization of the aberrant cells** will be the mode of the three experts' results. In case there is no concordance between the experts on this parameter, there is no reference value for this parameter.

Where appropriate, the median, minimum, and maximum of participants' reported values in the round are provided so that each participant can also compare their own results to those of the group's median (and min. – max. range).

Each participating laboratory will be provided with an EQA certificate that shows their performance in the wet lab and dry part, a summary of the round's results, general information regarding the round, and an overview of common mistakes. Note that individual performance is specific to and only provided to the individual participant.

Educational meeting

All EuroFlow schemes' EQA rounds offered in 2026 will be concluded with an online educational meeting, which will include all rounds performed throughout the year. During the meeting, the rounds' results will be shown (anonymized), possible problems and pitfalls will be discussed, and there will be the opportunity to receive direct feedback from the experts involved. More information regarding the educational meeting, including dates and times, will be announced at the end of 2026.

Timelines

Activity	Date
Registration for rounds 1 & 2 (spring & autumn)	5 Jan – 30 Jan 2026 (23:59 CET)
Round 1: Release of round instructions	2 Mar 2026
Round 1: Reporting of results	2 Mar – 27 Mar 2026 (23:59 CET)
Round 1: Release of certificates (v1)	Jun 2026
Round 1: Appeals period	21 calendar days following release of certificates (v1)
Round 1: Release of certificates (final)	Jul – Aug 2026

Activity	Date
Registration for round 2 (autumn)	1 Jun – 28 Aug 2026 (23:59 CEST)
Round 2: Release of round instructions	28 Sep 2026
Round 2: Reporting of results	28 Sep – 23 Oct 2026 (23:59 CEST)
Round 2: Release of certificates (v1)	Jan 2027
Round 2: Appeals period	21 calendar days following release of certificates (v1)
Round 2: Release of certificates (final)	Feb – Mar 2027

Registration

Registering for the EuroFlow BCP-ALL MRD EQA scheme 2026 can be done via the ESLHO EQA Portal.

Appeals

Appeals regarding performance results can be submitted within 21 calendar days following the release of the EQA certificate (v1) via the ESLHO EQA Portal. A clear description of the appeal should be included and providing illustrating images is recommended.

Complaints

Complaints related to ESLHO's EQA program, or specifically to the EuroFlow BCP-ALL MRD EQA scheme, can be submitted at any time via the Complaints form that is available on the ESLHO EQA Portal.

Participation fee

- Participation in one BCP-ALL MRD round: **€ 270,-**
- Participation in both BCP-ALL MRD rounds: **€ 490,-**
- Participation is free for participants of the EuroFlow Consortium

Organization

The BCP-ALL MRD scheme is organized by ESLHO in collaboration with the EuroFlow EQA Committee. The laboratory at the Charles University, Prague, Czech Republic, operates as the lead expert laboratory of the BCP-ALL MRD scheme, with Dr. Michaela Reiterová in the role of lead subject-matter expert.

Name	Organization/Institute	Role	Tasks
ESLHO			
Prof. Dr. Jacques J. M. van Dongen	ESLHO, Zutphen, NL	EQA Program Coordinator	Final responsibility over EuroFlow EQA program; authorizes the BCP-ALL MRD round report.
Evelien Rijkers	ESLHO, Zutphen, NL	EQA Officer (lead)	Overall responsible for organization and operation of the BCP-ALL MRD scheme by ESLHO.
Dr. Bart Lubbers	ESLHO, Zutphen, NL	EQA Officer	Supports in the organization and operation of the BCP-ALL MRD scheme.

Lead expert laboratory			
Dr. Michaela Reiterová	Charles University, Prague, CZ	Lead subject-matter expert	Pre-round: Case collection, evaluation of expert data, case selection Post-round: Round summary report
Dr. Naděžda Brdičková	Charles University, Prague, CZ	Subject-matter expert	Pre-round: Supports preparation of the rounds and case selection. Post-round: Cleaning and analysis of the submitted results, preparation of the EQA certificate, support in performance evaluation and reporting.
Dr. Ester Mejstříková	Charles University, Prague, CZ	Subject-matter expert	Pre-round: Case selection, expert analysis, input for determination of reference results
Prof. Dr. Tomáš Kalina	Charles University, Prague, CZ	Subject-matter expert	Pre-round: Case selection, expert analysis, input for determination of reference results Post-round: Round summary report

The lead expert laboratory receives support from subject-matter experts at the following EuroFlow-affiliated laboratories for case selection, expert analysis, and/or input for determination of reference results:

- Canton Hospital Aarau (Aarau, CH)
- Ghent University Hospital (Ghent, BE)
- University Hospital Schleswig-Holstein (Kiel, Germany)
- Portuguese Institute of Oncology (Lisbon, Portugal)
- Tettamanti Foundation (Monza, Italy)
- Princess Máxima Center (Utrecht, The Netherlands)
- Medical University of Silesia (Zabrze, Poland)
- University of Rostock (Rostock, Germany)
- Flow Cytometry Units, Hematology Department of the University Hospital of Salamanca and University of Salamanca (Salamanca, Spain)
- Federal University of Rio de Janeiro (Rio de Janeiro, BR)

For more information or in case you have questions about the BCP-ALL MRD scheme, or other EuroFlow EQA schemes, please contact EuroFlow.EQA@eslho.org.