



**WFH INTERNATIONAL EXTERNAL
QUALITY ASSESSMENT SCHEME (IEQAS)
PROGRAM**

**PARTICIPANTS' MANUAL
& GENERAL INFORMATION
2022 – 2023**

3rd Floor, Pegasus House, 463A Glossop Road, Sheffield S10 2QD, U.K.
Tel: +44 (0)114 267 3300
Fax: +44 (0)114 267 3309
E-mail: IEQAS ieqas@wfh.org
Web site: www.ukneqasbc.org

BACKGROUND

The World Federation of Hemophilia (WFH) improves and sustains care for people with inherited bleeding disorders around the world. The WFH has been supporting people with inherited bleeding disorders and treatment for over 60 years.

The WFH International External Quality Assessment Scheme (IEQAS) was launched in 2004 to monitor and improve laboratory performance in Hemophilia Treatment Centres (HTCs) worldwide. Laboratories can participate in this scheme to assess their quality assurance systems and the reliability of their test results.

IEQAS improves and standardizes laboratory diagnosis by auditing the effectiveness of the internal quality assurance systems in place and giving a measure of the laboratory's competence.

The scheme is operated by the United Kingdom's National External Quality Assessment Scheme (UK NEQAS) for Blood Coagulation, based in Sheffield, which has been inspected by the United Kingdom Accreditation Service Ltd (UKAS) and which has been granted full accreditation to ISO 17043 for all listed tests.

The mandate of the WFH IEQAS is to provide an external quality assessment (EQA) for tests of blood coagulation and to promote high standards of performance and practice. EQA, together with internal quality control (IQC) procedures, are vital components of overall laboratory quality assurance. In addition, the WFH IEQAS provides an advisory service to participants through exchanges on lab diagnosis, including a participants' meeting during the biennial WFH World Congress and onsite/virtual visits to provide training, as needed.

The WFH IEQAS Committee is responsible for overseeing the International External Quality Assessment Scheme (IEQAS) program. The committee is comprised of an independent chair appointed by the WFH, the Scheme program director, IEQAS program staff in the Sheffield Teaching Hospitals (host institution), and WFH staff and volunteers. The IEQAS Committee oversees all operational aspects of the program, reviews participation in the scheme, analyses results, monitors global laboratory performance, and provides advisory support for centres registered on the scheme.

REGISTRATION

A review process ensures that WFH evaluates IEQAS applications. Laboratories are chosen based on their involvement in the diagnosis of hemophilia and other related bleeding disorders. Generally, there is one main reference laboratory that is enrolled in IEQAS from each country. In some countries, several laboratories may be enrolled in the scheme. The WFH is prepared to sponsor the enrolment fee of certain centres in low and low middle income countries which are involved in other WFH programs.

Enrolment runs from February to the following February, and centres cannot join mid-year. IEQAS participation forms must be received by the WFH by February in order to be reviewed and included in the scheme for a year. Centres new to the scheme must submit a completed laboratory questionnaire and participation form by the deadline set by the WFH.

PARTICIPATION

Samples for blood coagulation tests are distributed to participating laboratories around the world. The WFH IEQAS ensures the protection of participants' confidential information but does share information with the WFH for laboratories whose participation is sponsored.

WFH IEQAS participants can select which tests they will complete and provide results for. It is recommended that participants register for all tests that their laboratory offers. The www.ukneqasbc.org website can be used for online result submission and to view survey reports. Participants are provided with a password in order to access the result entry pages of the website.

PERSONNEL

Members of the UK NEQAS team include:

Dr. S Kitchen	Scheme Director (steve.kitchen1@nhs.net)
Dr. I Jennings	Scheme Manager
Mrs. D P Kitchen	Scheme Program Scientist
Mrs. A Lowe	Scientific Lead for Haemophilia programmes
Mr. C Reilly-Stitt	Scheme Deputy Manager

Postal address: 3rd Floor Pegasus House, 463A Glossop Road, Sheffield, S10 2QD U.K.
Telephone: +44 (0)114 267 3300
Facsimile: +44 (0)114 267 3309
E-mail: ieqas@wfh.org
Web site: www.ukneqasbc.org

TESTS COVERED BY THE WFH IEQAS PROGRAM:

The WFH IEQAS surveys are distributed three times per year, typically in March, July, and November.

All surveys usually include:

- Prothrombin Time (PT)
- Activated Partial Thromboplastin Time (APTT)
- FVIII assay
- FIX assay

Two of the three surveys include:

- von Willebrand factor antigen assay
- VWF:Ristocetin cofactor/VWF activity assays

One out of the three surveys include:

- Two other factor assays so that FII, FV, FVII, FX and FXI assays are all assessed at some stage, along with fibrinogen.

EQA for genetic testing, in relation to inheritable bleeding disorders, is available through an international EQA program. For details, contact neqas@coageqa.org.uk.

SUPPLEMENTARY EXERCISES

Supplementary exercises are carried out to address other issues in haemostasis testing. Past exercises have included an exercise measuring the Fibrinogen and FVIII content of Cryoprecipitate. For the year 2022-2023 an Emicizumab supplementary exercise was circulated. Reports are circulated to participating centres and data is presented back to participants at the biennial participant's meeting.

REPORTS

Individual reports for each survey are sent approximately two weeks after the closing date for the respective survey. Reports are made available as online PDF documents. In the event that a participating centre submits their results after the deadline, they will receive a "retrospective report". Please submit all late results to ieqas@wfh.org

PERFORMANCE ANALYSIS

Performance is determined by the comparison of individual laboratory results with the target value for each test. Target values and median used for this test are typically determined prior to the survey when the same samples were tested by participants in the UK NEQAS Blood Coagulation Programme.

The UK NEQAS BC Programme has over 1000 participants, which means that the peer groups are large and the data is therefore robust enough for assessment of individual centre results. In general, the median results obtained by the WFH IEQAS participants are very similar to the median determined from the UK NEQAS BC group. As the number of participants in the WFH IEQAS program is relatively small, analysis of the minor reagent groups is only made meaningful by the use of the UK NEQAS BC values to define the target ranges. Use of the median avoids the effect of outlying results which can significantly impact on mean values in some cases.

Where consistent reagent or method-related differences have been identified, participants' results are assessed against their 'peer-groups' within UK NEQAS BC Programme. However, this only occurs if the number in that group is sufficient to be statistically valid.

For PT and APTT

For PT and APTT the percentage deviation of each individual laboratory's results from the reagent and overall medians are calculated, with the following criteria for performance applied:

Performance is considered "*within consensus*" if the deviation is <15% from:

- ✓ the **reagent median** if the number of users of that reagent is equal to or greater than 10 *or*
- ✓ the **overall median** if the number of users of the reagent is less than 10.

Results >15% deviation from the median are considered "*outwith consensus*."

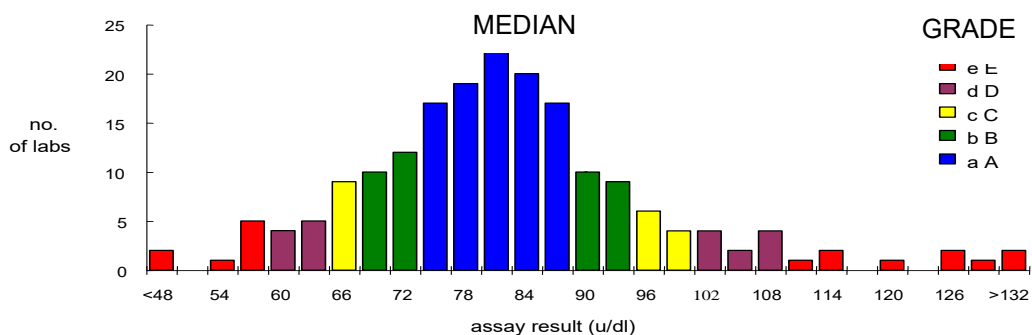
Factor Assays

For Fibrinogen assay, Clauss method results are assessed against the overall Clauss method median, with results >15% from this median considered outwith consensus. Multifibrin U users are assessed separately.

For other factor assays, WFH IEQAS distributes samples with factor concentrations covering the wide range encountered in clinical practice. A ranked grading analysis to evaluate performance was devised by Professor S. Thomson, Department of Public Health and Primary Care, University of Cambridge and is used in the UK NEQAS BC Programme as well as WFH IEQAS.

The overall consensus median is taken as the central reference point or “target value”. Individual results are ranked into five unequal quantiles above and below the median, each quantile being designated by a letter depending on ranked distance from the median:

- Group A:** The nearest 25% of results above (A) and below (a) the median (i.e. 50% of results);
- Group B:** The next 10% of results above (B) and below (b) the median (i.e. 20% of results);
- Group C:** The next 5% of results above (C) and below (c) the median (i.e. 10% of results);
- Group D:** The next 5% of results above (D) and below (d) the median (i.e. 10% of results);
- Group E:** The 5% of results furthest from the median, above (E) and below (e) (i.e. 10% of results).



Grades below the median are shown in lower case, and above the median in upper case, to aid in assessment of bias.

Performance is based on grades obtained in two consecutive exercises for any particular test. Performance “outwith consensus” is defined as a combination of a C (or ‘c’) grade together with an E (or ‘e’) grade, or any combination of D (or ‘d’) and E (or ‘e’) grades (e.g. cE, ec, Dd, de, ED and EE in consecutive distributions of that particular assay).

Persistent “outwith consensus” performance is defined as two consecutive “outwith consensus” performances. This will arise from three consecutive performances with the following combinations of grades (upper case only shown for example purposes):

DDD, DED, ECE, EEC, DDE, DEE, EDD, EED, CEE, EDE, EEE

A non-return for a registered test will be graded as 'F' and taken as equivalent to an E grading. Thus, designations which include 'F' grades are based on performance over two or three exercises, respectively.

In some cases, significant differences have been noted between different methodologies. Where this occurs on a consistent basis, separate analysis of the groups is carried out, using medians specific to each method group. However, the system is only effective if the number of participants is greater than 20; consequently, grading analysis is not applied to groups of results from fewer than 20 centres.

At present, the following groups are analysed separately (groupings are regularly reviewed):

- Factor VIII:C
- One stage and chromogenic
- VWF Ristocetin Cofactor/VWF activity assay
- ELISA, Aggregometry, individual Latex assays

If results of screening tests are outwith consensus on three consecutive occasions (including failure to return results), or results from factor assays are persistently outwith consensus, a letter of concern with an offer of assistance is sent by the Scheme Director to the head of the sponsored laboratory. For WFH sponsored centres, these concerns can also be communicated with the chairs of the WFH Laboratory Science and IEQAS committees.

Introduction of z scores

You will have seen that we have introduced z scores to our reports for factor assays. Currently your results are scored using the a-e grading system as explained above but we will be moving over to scoring using z scores in the future. Leading up to this change we are showing both a-e grade and z scores on the reports. The z score is calculated as follows. The central reference point is taken as the overall consensus median. The robust mean and SD are calculated by statistical exclusion of outlying results. The z-score is calculated as

$$\text{[result – mean] / SD}$$

A z-score between minus 2 and plus 2 is within the consensus and requires no action. A z score between minus 2 and minus 3 or between plus 2 and plus 3 is considered outwith consensus, with a warning flag that there could be a problem; a z-score greater than plus 3 or below minus 3 is considered outwith consensus and requires action – ie the result must be investigated. 'Action required' is also applied to two consecutive z scores of between plus 2 and plus 3 or between minus 2 and minus 3. Two consecutive surveys with z scores greater than 3 or below minus 3, or 3 surveys with z scores between 2 and 3 or between minus 2 and minus 3 will be considered persistently outwith consensus

The terminology "action" and "warning" is derived from ISO13528 guidance on use of z scores in proficiency testing programmes. We suggest that an "action required" flag would prompt a laboratory to review their assay results, and decide whether further action is warranted; in particular, the clinical implication of their performance should be considered. A "warning" flag indicates an outlying result, which should be monitored in future surveys.

In instances of results that are currently considered outwith consensus using the a-e grading system the z scores should also be reviewed to enable users to decide what further action may be required.

NON-RETURN OF RESULTS

The aim of the program is to help centres which need support and guidance; therefore, there should be a sense of responsibility for sponsored laboratories to maintain good communication with the WFH.

A follow-up letter is sent after 2 consecutive samples that have no results returned. After a third non-returned set of results, the sponsored centre maybe suspended from the IEQAS program unless they provide valid explanations for their non-response.

COMPLAINTS AND APPEALS

Any complaint about the WFH IEQAS program will be treated as serious, and will be dealt with as soon as possible by the director or manager. If a centre wishes to appeal the scoring they have received they can contact IEQAS as below.

Address for complaints:

Dr. S. Kitchen
WFH IEQAS Program Director
3rd Floor, Pegasus House, 463A Glossop Road, Sheffield S10 2QD, U.K.
Tel: +44 (0)114 267 3300 Fax: +44 (0)114 267 3309 E-mail: neqas@coageqa.org.uk

Or

Mirna Henin
WFH IEQAS Program Coordinator
1425 René- Lévesque Blvd. West, Suite 1200, Montréal, Québec, Canada H3G 1T7
Tel: +1(514) 875-7944 Email: ieqas@wfh.org

RESOURCES

In addition to an advisory role for individual laboratories WFH IEQAS and UK NEQAS BC also publishes and presents data through a variety of leading journals and meetings. An IEQAS participant's meeting is held biennially as part of the WFH World Congress.

The WFH Diagnosis of Hemophilia and Other Bleeding Disorders: A Laboratory Manual (2nd edition) is available for free on the WFH eLearning platform along with hundreds of other resources. The Laboratory Manual is available in English, French, Spanish, Arabic, Russian, and Simplified Chinese. [Click here](#) to view the laboratory manual.

Visit the WFH Guidelines for the Management of Hemophilia Resource Hub to find narrated videos, key messages, and more. [Click here to visit the resource hub.](#)

PUBLICATIONS

Jennings I, Kitchen S, Menegatti M, Palla R, | Walker I, Peyvandi F, Makris M

Potential misdiagnosis of dysfibrinogenaemia: Data from multicentre studies amongst UK NEQAS and PRO-RBDD project laboratories Int J Lab Hematol. 2017 Dec; 39 (6) 653-662

Jennings I, Kitchen S, Menegatti M, Palla R, Walker I, Makris M, Peyvandi F
Detection of Factor XIII deficiency: data from multicentre exercises amongst UK NEQAS and PRO-RBDD project laboratories Int J Lab Hematol. 2017; 39:350-358

Jennings I, Goodeve A, Theophilus B, Hill M, Cumming T, Kitchen S, Walker I, Perry DJ.
Confirmation of genetic testing results in haemostasis and thrombosis – survey of current practice in the field Haemophilia.2016 May;22 (3)239-41

Jennings I, DP Kitchen, Kitchen S, Woods TA, Walker ID. Stability of coagulation proteins in lyophilized plasma Int J Lab Hematol.2015;37 (4):495-502

Perry DJ, Cummings T, Goodeve A, Hill M, Jennings I, Kitchen S, Walker I
The UK National External Quality Assessment Scheme for Heritable Bleeding Disorders. Seminars in Thrombosis and Hemostasis. 2014; 40:261-8

Jennings I, Kitchen DP, Kitchen S, Woods TA, Walker ID
Investigation of a Prolonged APTT, Different approaches taken by laboratories to achieve the same diagnosis. Int. J Lab Hematol, 2013 April; 35(2): 177 – 82.

Kitchen S, Jennings, I, Preston FE, Kitchen DP, Woods TAL, Walker ID. FE. Inter-laboratory variation in Factor VIII:C Inhibitor assay results is sufficient to influence patient management: Data from the UK NEQAS for Blood Coagulation. Semin. Thromb. Hemost. 2009; 35:778-785.

Kitchen S, Jennings I, Woods TA, Kitchen DP, Walker ID, Preston FE. Laboratory tests for measurement of von Willebrand factor show poor agreement among different centres: results from the UK NEQA Scheme for Blood Coagulation. Semin. Thromb. Hemost. 2006 Jul;32(5):492-8.

Preston FE, Jennings I, Kitchen DP, Woods TAL, Kitchen S. Variability in Factor V:C assays in UK NEQAS surveys: There is a need for an International Standard. Blood Coagul Fibrinolysis. 2005 Oct;16(7):529-31.

Jennings I, Kitchen S, Woods TAL, Preston FE. Problems relating to the laboratory diagnosis of factor XIII deficiency: A UK NEQAS study. J Thromb Haemost 2003 Dec; 1(12):2603-8.

Preston FE, Kitchen S, Jennings I, Woods TAL, Makris M. SSC/ISTH Classification of Haemophilia A: Can haemophilia centres achieve the new criteria? Journal of Thrombosis and Haemostasis. 2003

The IEQAS Program is supported by funding from the Novo Nordisk Haemophilia Foundation

