

## 2025 External Quality Assurance (EQA) Program for G6PD Blood Quantitative Test in Philippines

### I. Introduction

Preventive Medicine Foundation Quality Assurance Program Center (PMF QAP Center) has been providing "EQA Program for Glucose-6-Phosphate Dehydrogenase (G6PD) Blood Quantitative Test" for G6PD confirmatory laboratories in Taiwan since 1988. This EQA program has been adopted by Newborn Screening Reference Center (NSRC) in the Philippines since 2009. More than 30 G6PD confirmatory laboratories in the Philippines have participated in the EQA program at the present time. This EQA program has been officially accredited by Taiwan Accreditation Foundation (TAF, a member of ILAC Mutual Recognition Arrangement Signatories) for conformity to ISO/IEC 17043 since 2017.

### II. General information

#### 1. Contact information

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#### 2. External service providers

a) Determination of G6PD activities for the evaluation of homogeneity and stability of the quality control (QC) samples

i) Union Clinical Laboratory (ISO 15189 and CAP certified)

1F., No.33, Ln. 151, Sec. 2, Fuxing S. Rd., Taipei City 106, Taiwan  
( R.O.C. )

Phone : +886-2-27049980

ii) Taipei Institute of Pathology ( ISO 15189 certified )

No.146, Sec.3, Chongqing N. Rd., Taipei City 103, Taiwan ( R.O.C. )

Phone : +886-2-85962065

b) Delivery of the quality control ( QC ) samples

Air21, Website : <https://air21.com.ph>

3. Collaborative institution

NSRC, Manila, Philippines

Contact information

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Fax: +63-2-2476008

4. Eligibility criteria for participation

G6PD confirmatory laboratories designated by NSRC, Manila, Philippines.

5. Schedule for 2025

Three EQA surveys for G6PD quantitative test are scheduled in 2025 ( 3 QC samples per survey ).

No.	Survey No	Scheduled Shipping Date*	Scheduled Reporting Deadline*
1	RH2025-01	02/17	02/24
2	RH2025-02	06/02	06/09
3	RH2025-03	09/15	09/22

\* Date: Month/Day

## 6. QC samples

- a) The QC samples ( Medical Device Registration No.: MOHW-MD-(I)-No.004851 ) were lyophilized hemolysate prepared from human red blood cells with no extra G6PD added ;
- b) Analyte : G6PD ( U/g Hb ) ;
- c) The G6PD activity of the QC samples conforms to the activity range required for newborns ;
- d) All of the blood materials used to produce QC samples have been tested and were found negative for HBsAg, Anti-HCV, STS ( RPR or TPPA ), HIV-1/HIV-2 /HIV-O Ab, HIV p24 antigen, and Anti-HTLV. However, presence of these or other infectious agents cannot be excluded absolutely and therefore the QC samples should be treated as potential biohazards in use and for disposal ;
- e) The homogeneity and stability of QC samples conform to the requirements of the international standard ISO/IEC 17043:2023.

## 7. Requirements of G6PD quantitative test used by participants

- a) G6PD activity determined by " Enzyme Kinetic Method " ( at 37°C ) ;
- b) All routine quantitative methodologies for Hb used in the participating laboratories are acceptable.

## 8. Terms, definitions, and statistic methods

8.1 The assigned value (  $X_a$  ) = the median of all the results reported for this QC sample.

8.2  $D = X - X_a$  ,  $X$  = Your results ,  $X_a$  = Assigned value.

8.3  $D\% = [D / X_a ] \times 100\%$ .

8.4 Robust results ( Mean and SD ) were calculated, when  $n \geq 5$ , by Algorithm A according to ISO 13528:2022.

8.5 Coefficient of Variation ( CV ),  $CV = SD / \text{Mean}$ .

8.6 Standard Deviation Index ( SDI )

- a)  $SDI = ( X - \text{Mean} ) / SD$  ;  $SD$  = standard deviation of peer group
- b) SDI is not calculated when SD equals 0.

### 8.7 SD for proficiency assessment ( $\sigma_p$ )

- a)  $\sigma_p$  of this EQA program is defined based on the evaluation criteria established over the past 20+ years.
- b)  $\sigma_p = 7\% \times X_a$  ; but when  $X_a < 2.9$  U/g Hb ,  $\sigma_p = 0.2$  U/g Hb.

### 8.8 $z'$ score

Applicable  
from 2025

The performance evaluation criteria is established based on  $z'$  score, according to the suggestion of ISO/IEC 17043:2023. The  $z'$  score is with allowance for the uncertainty of the assigned value.  $z' = (X - X_a) / ( \sigma_p^2 + u_{X_a}^2 )^{1/2}$ .

8.9 Repeatability of each laboratory will be analyzed when there are more than 1 QC samples from the same lot in one survey, and it is calculated as the ratio of " difference of the measurement results of QC samples from the same lot" to the " average of the measurement results of QC samples from the same lot ", expressed as a percentage ( $\Delta\%$ ).  $\Delta\% = \{ |(X_1 - X_2)| / [ (X_1 + X_2) / 2 ] \} \times 100\%$ .

8.10 Coefficient of Variation Ratio ( CVR ) = Individual CV / Mean of All Individual CVs.

8.11 Following the guidance of ISO/IEC 17043:2010, test results with miscalculations, transpositions, and other gross errors are inappropriate and will be excluded from statistical evaluation.

### 9. Assigned value ( $X_a$ ) and uncertainty of the assigned value ( $u_{X_a}$ )

9.1 The assigned value (  $X_a$  ) = the median of all the results reported for this QC sample.

9.2 Uncertainty of the assigned value (  $u_{X_a}$  ) = ( Factor  $\times$  SD ) / (  $n$  )<sup>1/2</sup> ( according to ISO 13528:2022 Section 7.7 ). The coverage factor = 1.1 will be used in this survey.

9.3 The result will not be evaluated if the assigned value is incorrect or the QC sample is found to be unsuitable for performance evaluation, e.g. because of inhomogeneity, instability, damage or contamination.

### 10. Evaluation criteria

Applicable  
from 2025

10.1 The evaluation criteria for measurement result of " each QC sample "

- a) Acceptable :  $|z'| \leq 2$  ;
- b) Caution :  $2 < |z'| < 3$  ;
- c) Unsatisfactory :  $|z'| \geq 3$ .
- d) Not evaluated : For example, when no assigned value could be set.

10.2 The performance evaluation criteria for participant survey report

Applicable  
from 2025

- a) Acceptable : all results  $|z'| < 3$  and more than one result  $|z'| \leq 2$  ;
- b) Acceptable with caution : only one result  $|z'| \geq 3$  or more than one result  $2 < |z'| < 3$  ;
- c) Unsatisfactory : more than one result  $|z'| \geq 3$  or only one result  $|z'| \geq 3$  with more than one result  $2 < |z'| < 3$ .

11. Reports provided by PMF QAP center

- a) Summary report of EQA survey for G6PD quantitative test ;
- b) Participant report of EQA survey for G6PD quantitative test ;
- c) Website for EQA survey results : EQA Program for G6PD Quantitative Test in Philippines < <https://g6pd.qap.tw/phi.htm> > ;
- d) The a) and b) reports will be provided to participants in electronic file format.
- e) The annual summary of EQA Program will be published online.

12. Confidentiality

The participant ( individual laboratory ) report is confidential, and will only be released to individual laboratory and the authority concerned. Every participant is shown by its unit code on the disclosed summary reports of EQA Surveys.

13. Delivery of the QC samples

QC samples will be sent to participating laboratories via express delivery ( e.g. Air21 etc. ) by NSRC, Manila.

14. Proof of participation

14.1 Proof of participation letter

- a) " Proof of Participation Letter " is issued annually ;

- b) All participants will receive this letter to prove that they have participated in which survey(s) of the year and reported results in time.

#### 14.2 Certificate of participation

- a) " Certificate of Participation " is issued annually ;
- b) The certificate is issued to whom has participated in all the surveys of the year and reported results in time ;
- c) If the participants already have a certificate from previous year, an annual certification label will be issued only.



#### 15. Application for participation

To apply for participating in " 2025 External Quality Assurance ( EQA ) Program for G6PD Quantitative Test in Philippines " , please download the application form from the website

< <https://g6pd.qap.tw/pdf/R409010101G6Ren.pdf> >, or contact us or NSRC to request the application form. Participants who have already enrolled before 2025 do not need to apply again.

#### 16. Charge

This program is free of charge for all the participating laboratories in 2025.

#### 17. Complain and suggestion

17.1 Participants or related parties may make a complaint and/or suggestion to PMF QAP center regarding the EQA programs or the services provided by PMF QAP center.

17.2 If you would like to make a complaint and/or suggestion, you may call us on: +886-2-27036080. Alternatively you may send us your comments and/or complaints via email < [g6pd@pmf.tw](mailto:g6pd@pmf.tw) / [g6pdqa@gmail.com](mailto:g6pdqa@gmail.com) > or Fax ( +886-2-27036070 ). Anonymous complaints will not be considered.

#### 18. Appeal

19.1 Participants may appeal against the evaluation of EQA survey to PMF QAP center within 30 days after received the EQA survey reports. Appeals concerning statistical performance evaluations will not be

considered.

19.2 A formal appeal must be submitted in written form ( with contact information ) within 30 days after received the EQA survey reports. Anonymous appeals will not be considered. The formal written appeal may be submitted via email < g6pd@pmf.tw / g6pdqa@gmail.com > or Fax ( +886-2-27036070 ) to PMF QAP center.

## 20. Changes of data or information

If participants would like to change data or laboratory information, please download the application form from the website < <https://g6pd.qap.tw/pdf/R406010103G6Ren.pdf> >, or contact us to request the application form.

