

External Quality Assurance (EQA) of G6PD Quantitative Test

Survey No. : RH2023-02
 Sample sent : 30 set

Sample sent on : 2023/05/29
 Results reported (%) : 30 (100%)

Reporting deadline : 2023/06/05

- 1. [Long term observation of inter laboratory CV vs. surveys](#)
- 2. [Long term observation of inter laboratory CV vs. G6PD activities](#)
- 3. [Deviation graph for individual laboratory](#)
- 4. [The distribution of G6PD reported in this survey](#)
- 5. [The distribution of Hb reported in this survey](#)
- 6. [Others](#)

Summary Report of G6PD and Hemoglobin (Hb) Quantitative Test Results

Lab	Referral Hosp.	Report (day)	G6PD Reagent Code	Sample 1				Sample 2				Sample 3				Hb 1 (g/dL)	Hb 2 (g/dL)	Hb 3 (g/dL)
				(U/g Hb)	D%	z score	SDI	(U/g Hb)	D%	z score	SDI	(U/g Hb)	D%	z score	SDI			
F02	F02	3	5	15.1	2.7%	0.4	0.6	4.5	0.0%	0.0	0.3	11.3	3.7%	0.5	0.8	2.1	2.5	1.9
F03	F03	7	5	14.1	-4.1%	-0.6	-0.6	4.3	-4.4%	-0.6	-0.3	10.8	-0.9%	-0.1	0.0	1.9	2.6	1.9
F04	F04	7	5	14.7	0.0%	0.0	0.1	4.6	2.2%	0.3	0.6	11.0	0.9%	0.1	0.3	2.1	2.5	1.9
F05	F05	7	5	14.9	1.4%	0.2	0.4	4.6	2.2%	0.3	0.6	11.3	3.7%	0.5	0.8	2.0	2.4	1.8
F07	F07	4	5	14.2	-3.4%	-0.5	-0.5	4.2	-6.7%	-1.0	-0.6	10.5	-3.7%	-0.5	-0.5	2.1	2.4	1.9
F09	F09	8	5	14.6	-0.7%	-0.1	0.0	4.2	-6.7%	-1.0	-0.6	10.6	-2.8%	-0.4	-0.3	2.1	2.4	1.8
F10	F10	4	5	14.0	-4.8%	-0.7	-0.8	4.3	-4.4%	-0.6	-0.3	10.2	-6.4%	-0.9	-0.9	2.0	2.5	1.8
F11	F11	7	5	14.5	-1.4%	-0.2	-0.1	4.3	-4.4%	-0.6	-0.3	10.8	-0.9%	-0.1	0.0	1.9	2.4	1.7
F12	F12	7	5	14.5	-1.4%	-0.2	-0.1	4.3	-4.4%	-0.6	-0.3	11.1	1.8%	0.3	0.5	2.2	2.5	2.1
F13	F13	4	5	13.6	-7.5%	-1.1	-1.3	4.0	-11.1%	-1.6	-1.3	9.9	-9.2%	-1.3	-1.4	1.9	2.2	1.7
F14	F14	7	5	14.8	0.7%	0.1	0.3	4.5	0.0%	0.0	0.3	11.2	2.8%	0.4	0.6	2.1	2.6	1.9
F15	F15	7	5	15.3	4.1%	0.6	0.9	4.7	4.4%	0.6	1.0	11.9	9.2%	1.3	1.7	1.8	2.2	1.7
F17	F17	4	5	15.2	3.4%	0.5	0.8	4.6	2.2%	0.3	0.6	11.4	4.6%	0.7	0.9	1.9	2.4	1.8
F18	F18	3	5	14.6	-0.7%	-0.1	0.0	4.6	2.2%	0.3	0.6	10.8	-0.9%	-0.1	0.0	1.9	2.3	1.8
F19	F19	7	5	15.2	3.4%	0.5	0.8	4.7	4.4%	0.6	1.0	11.4	4.6%	0.7	0.9	1.9	2.3	1.7
F20	F20	7	5	13.2	-10.2%	-1.5	-1.8	3.9	-13.3%	-1.9	-1.6	10.4	-4.6%	-0.7	-0.6	2.0	2.5	1.8
F21	F21	7	5	15.1	2.7%	0.4	0.6	4.5	0.0%	0.0	0.3	11.1	1.8%	0.3	0.5	2.2	2.4	1.8
F22	F22	2	5	14.2	-3.4%	-0.5	-0.5	4.3	-4.4%	-0.6	-0.3	10.9	0.0%	0.0	0.2	2.0	2.4	1.8
F24	F24	7	5	15.7	6.8%	1.0	1.4	4.8	6.7%	1.0	1.3	11.7	7.3%	1.0	1.4	2.0	2.4	1.8
F25	F25	8	5	12.7	-13.6%	-1.9	-2.4	4.2	-6.7%	-1.0	-0.6	10.0	-8.3%	-1.2	-1.2	2.2	2.5	1.9
F26	F26	7	5	14.3	-2.7%	-0.4	-0.4	4.5	0.0%	0.0	0.3	10.9	0.0%	0.0	0.2	2.0	2.4	1.9
F27	F27	4	5	13.5	-8.2%	-1.2	-1.4	4.0	-11.1%	-1.6	-1.3	9.8	-10.1%	-1.4	-1.5	2.2	2.4	2.1
F28	F28	2	5	16.9	15.0%	2.1	2.9	4.9	8.9%	1.3	1.6	11.1	1.8%	0.3	0.5	1.9	2.3	1.9
F29	F29	7	5	13.7	-6.8%	-1.0	-1.1	4.3	-4.4%	-0.6	-0.3	10.4	-4.6%	-0.7	-0.6	2.0	2.3	1.8
F30	F30	1	5	14.7	0.0%	0.0	0.1	4.4	-2.2%	-0.3	0.0	11.0	0.9%	0.1	0.3	1.9	2.3	1.7
F31	F31	4	5	15.0	2.0%	0.3	0.5	4.5	0.0%	0.0	0.3	10.7	-1.8%	-0.3	-0.2	1.8	2.3	1.9
F32	F32	4	5	13.0	-11.6%	-1.7	-2.0	4.0	-11.1%	-1.6	-1.3	9.7	-11.0%	-1.6	-1.7	2.1	2.4	2.1
F33	F33	4	5	15.1	2.7%	0.4	0.6	5.0	11.1%	1.6	1.9	11.6	6.4%	0.9	1.2	2.2	2.5	2.0
F34	F34	7	5	14.8	0.7%	0.1	0.3	3.8	-15.6%	-2.2	-1.9	9.8	-10.1%	-1.4	-1.5	1.9	2.4	1.9
F35	F35	5	5	15.4	4.8%	0.7	1.0	4.7	4.4%	0.6	1.0	11.5	5.5%	0.8	1.1	1.9	2.2	1.6

Total participating laboratories = 30

Xa (Median)	-	7	-	14.7	4.5	10.9	2.0	2.4	1.8
u_{Xa}	-	-	-	0.159	0.062	0.131	-	-	-
σ_p	-	-	-	1.029	0.315	0.763	-	-	-
σ_p'	-	-	-	-	-	-	-	-	-
Range	-	1-8	-	12.7-16.9	3.8-5.0	9.7-11.9	1.8-2.2	2.2-2.6	1.6-2.1
n	-	-	-	30	30	30	30	30	30
Mean	-	-	-	14.6	4.4	10.8	2.0	2.4	1.8
SD	-	-	-	0.79	0.31	0.65	0.14	0.11	0.11
CV	-	-	-	5.4%	7.0%	6.0%	7.0%	4.6%	6.1%

Note:

1. $D\% = [(X - X_a) / X_a] \times 100\%$; X = Your Results, X_a = Assigned value
2. u_{Xa} = uncertainty of the assigned value. $u_{Xa} = 1.1 \times SD / n^{1/2}$
3. SD for proficiency assessment (σ_p) = 7% x X_a; but while X_a < 2.9 U/g Hb, $\sigma_p = 0.2$ U/g Hb
4. Adjusted SD for proficiency assessment (σ_p') = $(\sigma_p^2 + u_{Xa}^2)^{1/2}$. σ_p' is used for proficiency assessment when $u_{Xa} \geq 0.3\sigma_p$
5. z score = D / σ_p ; D = X - X_a, σ_p = SD for proficiency assessment. When adjusted SD (σ_p') is used for proficiency assessment, z score = D / σ_p'
6. SDI = $(X - Mean) / SD$; SD = standard deviation of peer group; SDI is not calculated when SD equals 0
7. The assigned value (X_a) is the **median** of all the results reported of this EQA sample
8. Robust results (Mean and SD) were calculated by Algorithm A according to ISO 13528
9. The evaluation criteria for measurement result of each specimen : Acceptable : $|z| \leq 2$; Caution : $2 < |z| < 3$; Unsatisfactory : $|z| \geq 3$

Reagent Kit	G6PD Reagent Code	Lab
Medicon	5	F02, F03, F04, F05, F07, F09, F10, F11, F12, F13, F14, F15, F17, F18, F19, F20, F21, F22, F24, F25, F26, F27, F28, F29, F30, F31, F32, F33, F34, F35

Long Term Observation of Blood G6PD Quantitative Test EQA Survey Results

Survey No : RH2023-02 (in green ●)

- Total participants' CV result plotted against surveys

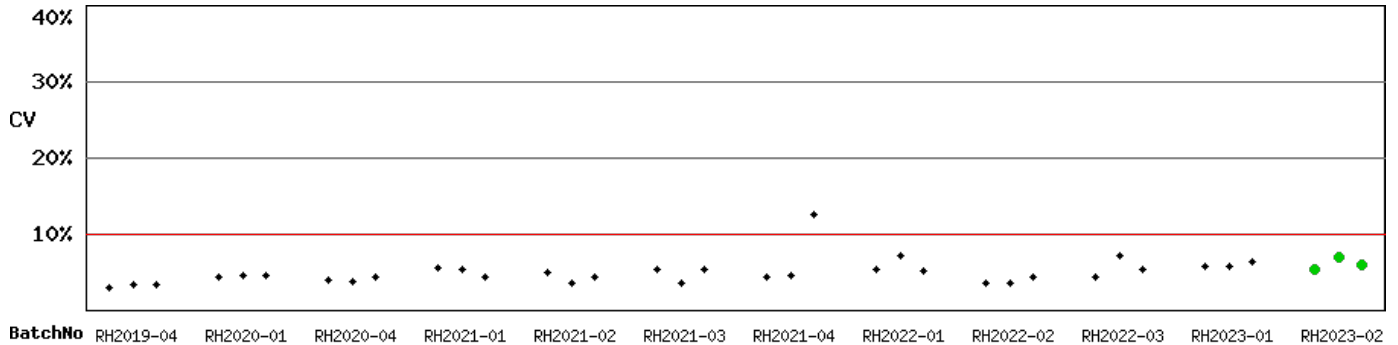


Fig RH-2.1

- Total participants' CV result plotted against G6PD activities

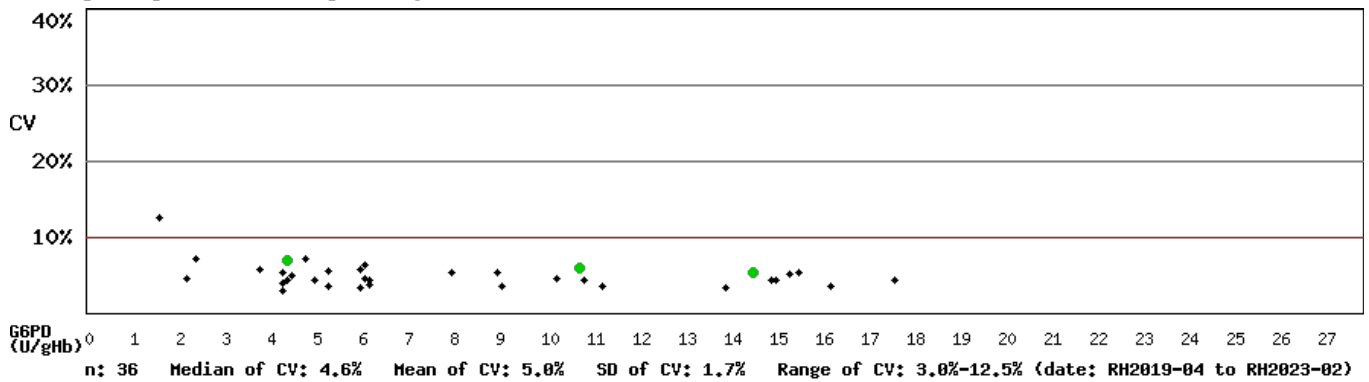


Fig RH-2.2

* Mean and SD are calculated by Robust method according to ISO 13528 since 2014

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(Report generated at 2023-06-07 10:03:57)

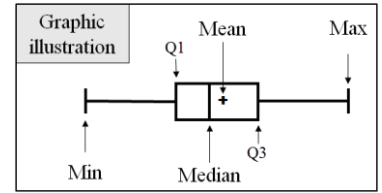
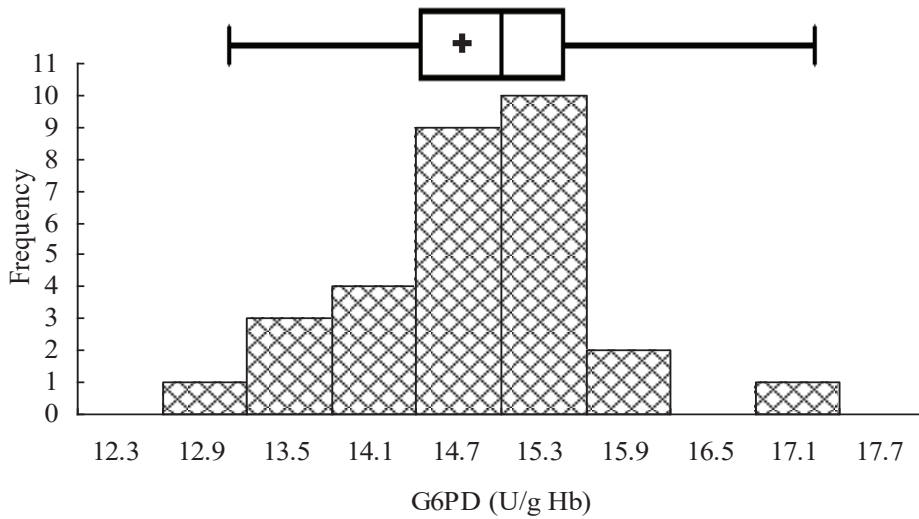
RH2023-02 Distribution of G6PD Test Results

Survey No. : RH2023-02

Sample sent on : 2023/05/29

Reporting deadline : 2023/06/05

Results reported (%) : 100%



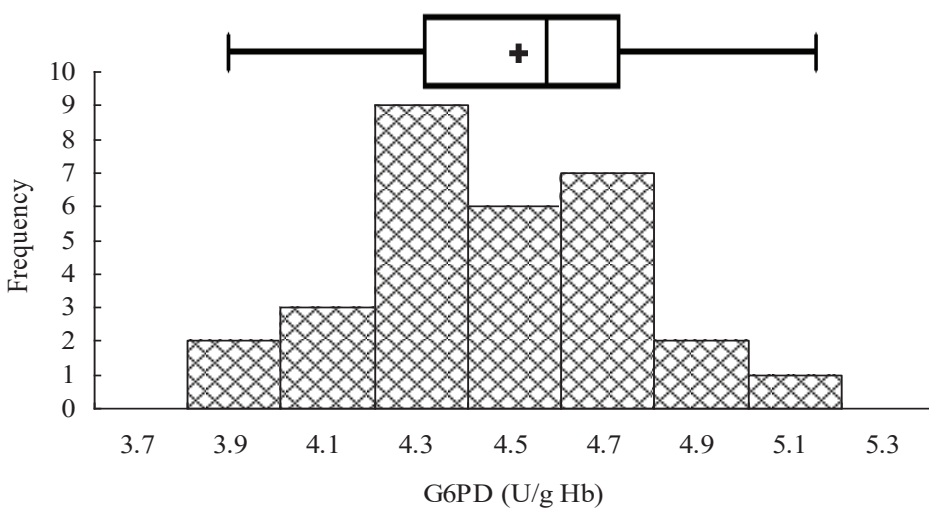
Sample 1

Median = 14.7 (n = 30)

Mean* = 14.6 (n = 30)

SD* = 0.79

CV = 5.4%



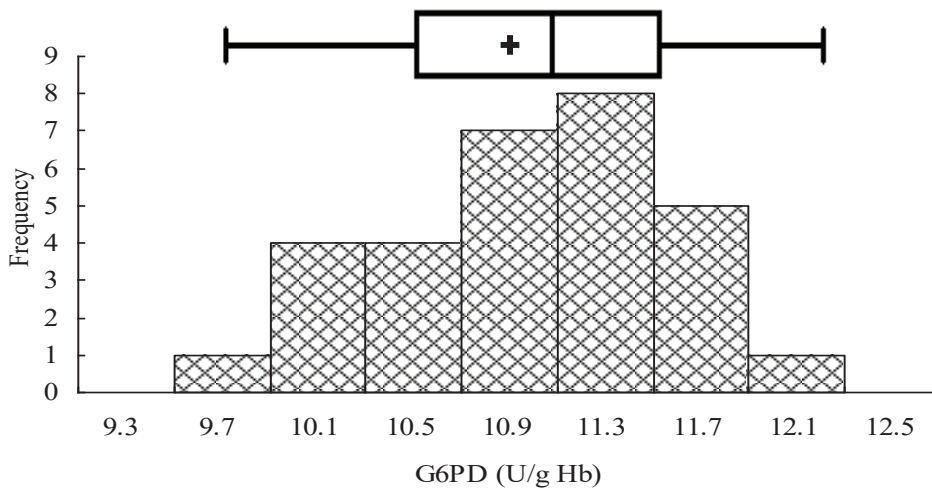
Sample 2

Median = 4.5 (n = 30)

Mean* = 4.4 (n = 30)

SD* = 0.31

CV = 7.0%



Sample 3

Median = 10.9 (n = 30)

Mean* = 10.8 (n = 30)

SD* = 0.65

CV = 6.0%

*Robust results (Mean and SD) were calculated by Algorithm A according to ISO 13528

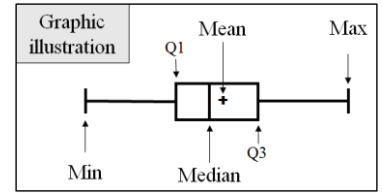
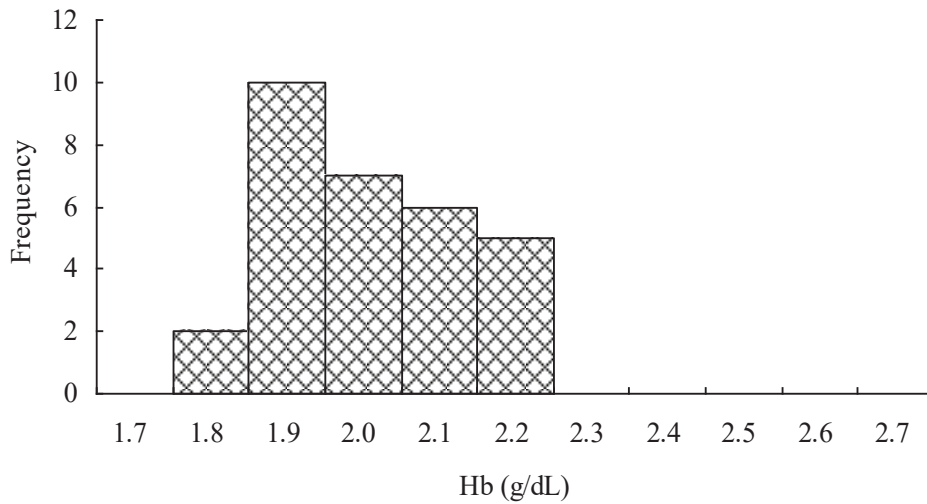
RH2023-02 Distribution of Hb Test Results

Survey No. : RH2023-02

Sample sent on : 2023/05/29

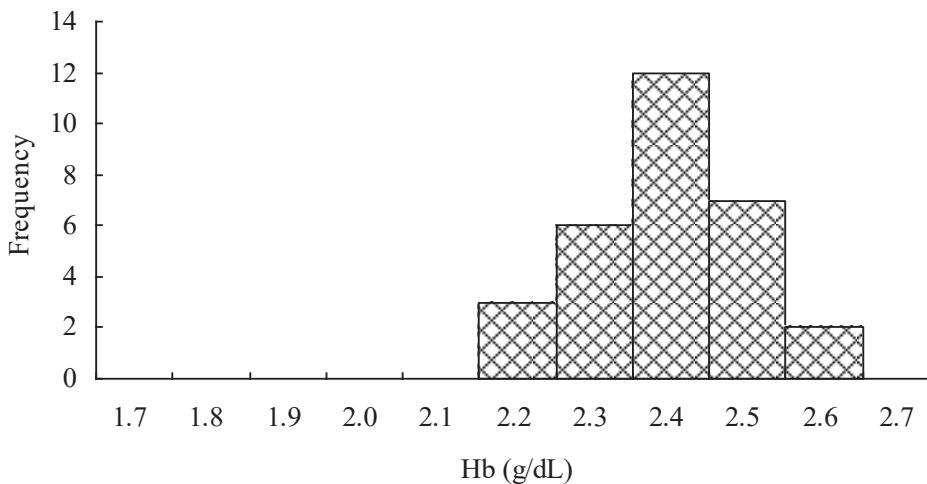
Reporting deadline : 2023/06/05

Results reported (%) : 100%



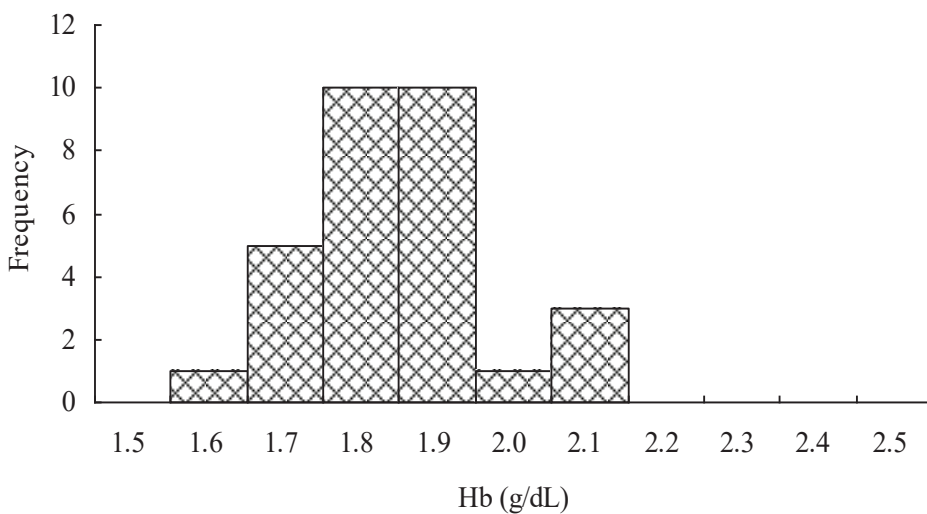
Sample 1

Median = 2.0 (n = 30)
Mean* = 2.0 (n = 30)
SD* = 0.14
CV = 7.0%



Sample 2

Median = 2.4 (n = 30)
Mean* = 2.4 (n = 30)
SD* = 0.11
CV = 4.6%



Sample 3

Median = 1.8 (n = 30)
Mean* = 1.8 (n = 30)
SD* = 0.11
CV = 6.1%

*Robust results (Mean and SD) were calculated by Algorithm A according to ISO 13528

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

Survey No. : RH2023-02 Sample sent on : 2023 / 05 / 29

Reporting deadline : 2023 / 06 / 05

This Survey **S2** has been used in 2018-2023 (n = 5; Survey / Sample No.) :
[RH2018-03/S1](#) ; [RH2019-04/S1](#) ; [RH2020-04/S1](#) ; [RH2021-03/S1](#) ; [RH2023-02/S2](#)

Intermediate Measurement Precision of G6PD Quantitative Test

Lab	Survey : RH2023-02 / Sample 2		Period : 2018 ~ 2023 ³				
	U/gHb	SDI ¹	Mean	n	SD	CV	CVR ²
F02	4.5	0.0	4.5	5	0.13	2.9%	0.61
F03	4.3	0.0	4.3	5	0.18	4.2%	0.89
F04	4.6	1.7	4.3	5	0.18	4.2%	0.89
F05	4.6	1.4	4.3	5	0.22	5.1%	1.09
F07	4.2	-0.5	4.3	5	0.19	4.4%	0.94
F09	4.2	-1.2	4.4	5	0.17	3.9%	0.82
F10	4.3	0.0	4.3	5	0.14	3.3%	0.69
F11	4.3	-0.5	4.4	5	0.22	5.0%	1.06
F12	4.3	-1.2	4.5	5	0.17	3.8%	0.80
F13	4.0	—	—	4	—	—	—
F14	4.5	0.0	4.5	5	0.18	4.0%	0.85
F15	4.7	1.5	4.2	5	0.33	7.9%	1.67
F17	4.6	—	—	3	—	—	—
F18	4.6	—	4.5	5	0.00	0.0%	0.00
F19	4.7	—	—	4	—	—	—
F20	3.9	-1.6	4.2	5	0.19	4.5%	0.96
F21	4.5	0.5	4.4	5	0.22	5.0%	1.06
F22	4.3	0.7	4.1	5	0.30	7.3%	1.56
F24	4.8	1.4	4.4	5	0.28	6.4%	1.35
F25	4.2	—	—	4	—	—	—
F26	4.5	0.9	4.2	5	0.34	8.1%	1.72
F27	4.0	-1.0	4.2	5	0.21	5.0%	1.06
F28	4.9	—	—	4	—	—	—
F29	4.3	—	—	4	—	—	—
F30	4.4	—	—	4	—	—	—
F31	4.5	—	—	4	—	—	—
F32	4.0	—	—	4	—	—	—
F33	5.0	—	—	3	—	—	—
F34	3.8	—	—	3	—	—	—
F35	4.7	—	—	1	—	—	—
Total participating laboratories = 30							
Median	4.5	0.0	4.3	—	0.19	4.5%	0.95
Range	3.8 ~ 5.0	-1.6 ~ 1.7	4.1 ~ 4.5	—	0.00 ~ 0.34	0.0% ~ 8.1%	0.00 ~ 1.72
Mean of all participating laboratory CVs						4.7%	—

1). Standard Deviation Index (SDI) = (Individual Result - Individual Mean) / Individual SD

2). Coefficient of Variation Ratio (CVR) = Individual CV / Mean of all participating laboratories CVs

3). Survey / Sample No. : [RH2018-03/S1](#) ; [RH2019-04/S1](#) ; [RH2020-04/S1](#) ; [RH2021-03/S1](#) ; [RH2023-02/S2](#)

* Intermediate Measurement Precision ; ISO 3534-2:2006, JCGM 200:2012 (VIM, 3rd ed.) 2.23

** Mean and SD are calculated by Robust method according to ISO 13528, Algorithm A.

*** n < 5, not calculated Mean and SD.