

External Quality Assurance (EQA) of G6PD Quantitative Test

Survey No. : RH2021-03  
 Sample sent : 28 set

Sample sent on : 2021/09/20  
 Results reported (%) : 28 (100%)

Reporting deadline : 2021/09/27

- 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](#)
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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/gHb)	D%	z score	SDI	(U/gHb)	D%	z score	SDI	(U/gHb)	D%	z score	SDI			
F02	F02	7	5	4.4	2.3%	0.3	0.4	9.5	5.6%	0.8	1.2	9.6	5.5%	0.8	1.3	2.3	2.4	2.2
F03	F03	6	5	4.0	-7.0%	-1.0	-1.3	8.9	-1.1%	-0.2	-0.6	8.8	-3.3%	-0.5	-0.4	2.4	2.5	2.4
F04	F04	7	5	4.3	0.0%	0.0	0.0	8.9	-1.1%	-0.2	-0.6	8.9	-2.2%	-0.3	-0.2	2.5	2.6	2.6
F05	F05	3	5	4.1	-4.7%	-0.7	-0.9	9.0	0.0%	0.0	-0.3	8.9	-2.2%	-0.3	-0.2	2.4	2.5	2.5
F07	F07	7	5	4.3	0.0%	0.0	0.0	9.1	1.1%	0.2	0.0	9.1	0.0%	0.0	0.2	2.4	2.4	2.5
F09	F09	7	5	4.6	7.0%	1.0	1.3	9.0	0.0%	0.0	-0.3	9.6	5.5%	0.8	1.3	2.6	2.5	2.6
F10	F10	4	5	4.2	-2.3%	-0.3	-0.4	8.8	-2.2%	-0.3	-0.9	9.2	1.1%	0.2	0.4	2.3	2.4	2.4
F11	F11	10	5	4.7	9.3%	1.3	1.7	9.3	3.3%	0.5	0.6	9.3	2.2%	0.3	0.6	2.4	2.5	2.4
F12	F12	7	5	4.7	9.3%	1.3	1.7	9.8	8.9%	1.3	2.1	9.6	5.5%	0.8	1.3	2.3	2.5	2.5
F13	F13	5	5	4.2	-2.3%	-0.3	-0.4	8.6	-4.4%	-0.6	-1.5	9.1	0.0%	0.0	0.2	2.2	2.3	2.4
F14	F14	7	5	4.6	7.0%	1.0	1.3	9.5	5.6%	0.8	1.2	7.4	-18.7%	-2.7	-3.4	2.6	2.7	2.5
F15	F15	3	5	4.2	-2.3%	-0.3	-0.4	9.7	7.8%	1.1	1.8	7.3	-19.8%	-2.8	-3.6	2.3	2.3	2.4
F18	F18	4	5	4.5	4.7%	0.7	0.9	8.9	-1.1%	-0.2	-0.6	8.8	-3.3%	-0.5	-0.4	2.5	2.5	2.5
F19	F19	15	5	4.6	7.0%	1.0	1.3	9.0	0.0%	0.0	-0.3	8.9	-2.2%	-0.3	-0.2	2.3	2.4	2.3
F20	F20	5	5	4.2	-2.3%	-0.3	-0.4	9.1	1.1%	0.2	0.0	9.1	0.0%	0.0	0.2	2.4	2.6	2.6
F21	F21	7	5	4.3	0.0%	0.0	0.0	9.0	0.0%	0.0	-0.3	8.7	-4.4%	-0.6	-0.6	2.4	2.4	2.5
F22	F22	3	5	4.3	0.0%	0.0	0.0	9.3	3.3%	0.5	0.6	9.3	2.2%	0.3	0.6	2.3	2.3	2.3
F24	F24	7	5	4.2	-2.3%	-0.3	-0.4	8.8	-2.2%	-0.3	-0.9	8.6	-5.5%	-0.8	-0.9	2.3	2.5	2.6
F25	F25	7	5	4.4	2.3%	0.3	0.4	9.3	3.3%	0.5	0.6	9.2	1.1%	0.2	0.4	2.3	2.3	2.3
F26	F26	7	5	3.7	-14.0%	-2.0	-2.6	7.7	-14.4%	-2.1	-4.2	6.3	-30.8%	-4.4	-5.7	2.5	2.6	2.3
F27	F27	4	5	4.5	4.7%	0.7	0.9	9.5	5.6%	0.8	1.2	8.4	-7.7%	-1.1	-1.3	2.3	2.4	2.5
F28	F28	2	5	4.4	2.3%	0.3	0.4	9.2	2.2%	0.3	0.3	9.2	1.1%	0.2	0.4	2.6	2.6	2.7
F29	F29	7	5	4.6	7.0%	1.0	1.3	9.4	4.4%	0.6	0.9	9.3	2.2%	0.3	0.6	2.4	2.4	2.4
F30	F30	6	5	4.2	-2.3%	-0.3	-0.4	9.0	0.0%	0.0	-0.3	9.0	-1.1%	-0.2	0.0	2.5	2.4	2.4
F31	F31	4	5	4.4	2.3%	0.3	0.4	9.2	2.2%	0.3	0.3	9.3	2.2%	0.3	0.6	2.4	2.5	2.5
F32	F32	5	5	4.3	0.0%	0.0	0.0	9.0	0.0%	0.0	-0.3	9.0	-1.1%	-0.2	0.0	2.4	2.5	2.4
F33	F33	6	5	4.5	4.7%	0.7	0.9	9.0	0.0%	0.0	-0.3	9.5	4.4%	0.6	1.1	2.2	2.7	2.4
F34	F34	4	5	4.0	-7.0%	-1.0	-1.3	8.2	-8.9%	-1.3	-2.7	8.2	-9.9%	-1.4	-1.7	2.5	2.5	2.6
Total participating laboratories = 28																		
Xa (Median)	-	6	-	4.3				9.0				9.1				2.4	2.5	2.5
u <sub>Xa</sub>	-	-	-	0.048				0.069				0.098				-	-	-
σ <sub>p</sub>	-	-	-	0.301				0.630				0.637				-	-	-
σ <sub>p</sub> '	-	-	-	-				-				-				-	-	-
Range	-	2-15	-	3.7-4.7				7.7-9.8				6.3-9.6				2.2-2.6	2.3-2.7	2.2-2.7
n	-	-	-	28				28				28				28	28	28
Mean	-	-	-	4.3				9.1				9.0				2.4	2.5	2.5
S.D.	-	-	-	0.23				0.33				0.47				0.12	0.12	0.12
C.V.	-	-	-	5.3%				3.6%				5.2%				5.0%	4.8%	4.8%

Note:

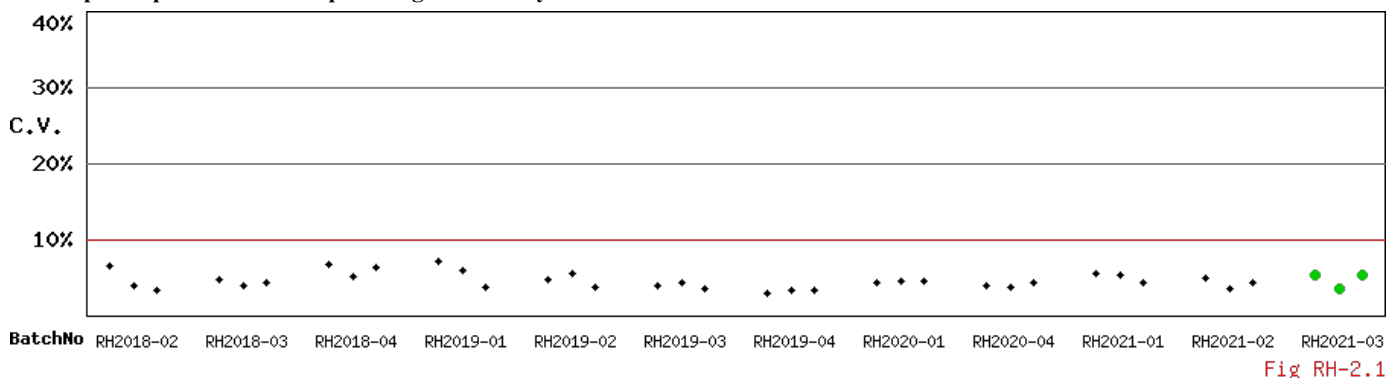
1.  $D\% = [(X - X_a) / X_a] \times 100\%$ ; X = Your Results, X<sub>a</sub> = Assigned value
2.  $u_{X_a}$  = uncertainty of the assigned value.  $u_{X_a} = 1.1 \times SD / n^{1/2}$
3. SD for proficiency assessment ( $\sigma_p$ ) = 7% x X<sub>a</sub>; but while X<sub>a</sub> < 2.9 U/gHb,  $\sigma_p = 0.2$  U/gHb
4. Adjusted SD for proficiency assessment ( $\sigma_p'$ ) =  $(\sigma_p^2 + u_{X_a}^2)^{1/2}$ .  $\sigma_p'$  is used for proficiency assessment when  $u_{X_a} \geq 0.3\sigma_p$
5. z score = D /  $\sigma_p$ ; D = X - X<sub>a</sub>,  $\sigma_p$  = SD for proficiency assessment
6. SDI = (X - Mean) / SD; SD = standard deviation of peer group; SDI is not calculated when SD equals 0
7. The assigned value (X<sub>a</sub>) 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:  $2 < |z| \leq 3$ ; Unsatisfactory:  $|z| > 3$

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

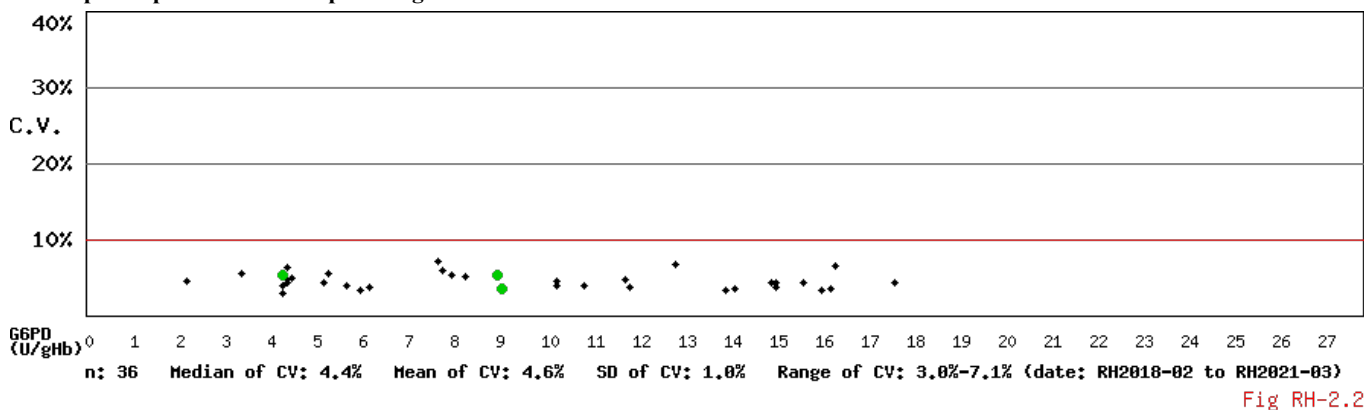
# Long Term Observation of Blood G6PD Quantitative Test EQA Survey Results

Survey No : RH2021-03 (in green ●)

- Total participants' CV result plotted against surveys



- Total participants' CV result plotted against G6PD activities



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

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(Report generated at 2021-10-05 10:57:24)

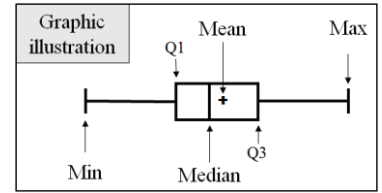
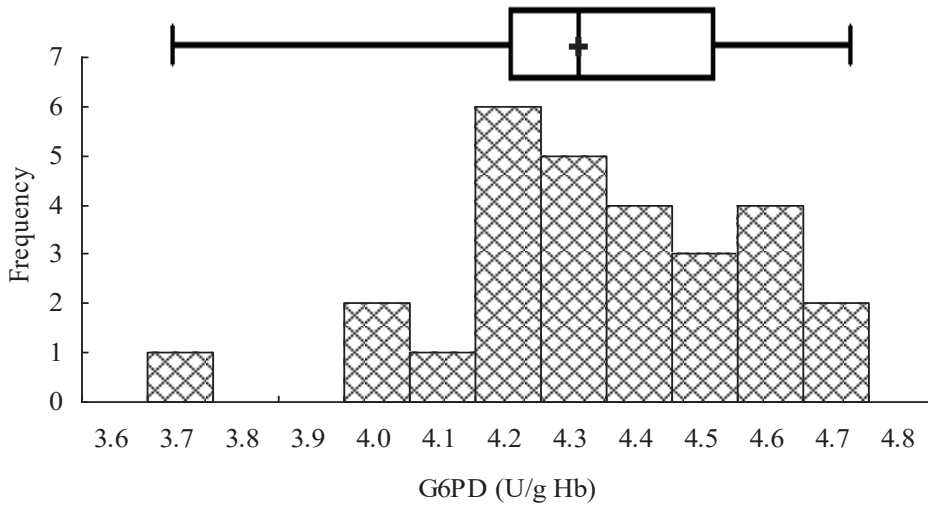
## RH2021-03 Distribution of G6PD Test Results

Survey No. : RH2021-03

Sample sent on : 2021/09/20

Reporting deadline : 2021/09/27

Results reported (%) : 100%



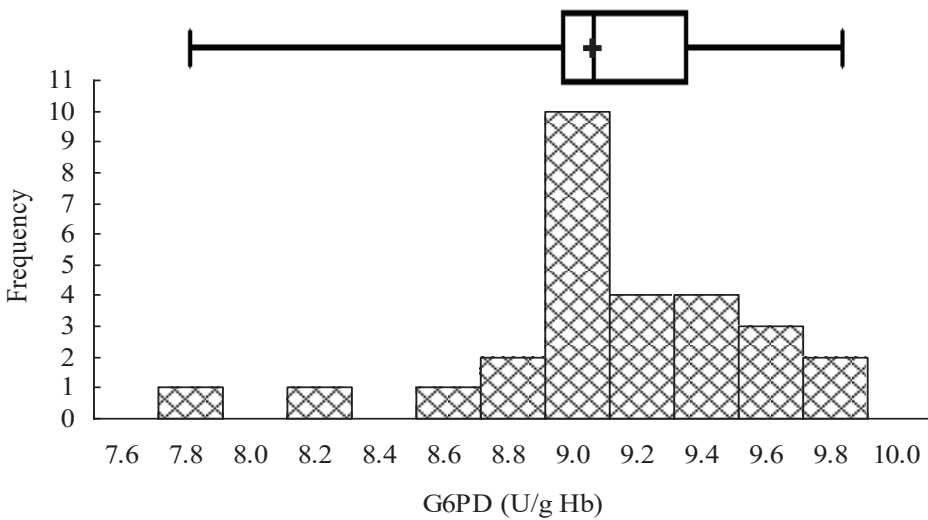
### Sample 1

**Median = 4.3 (n = 28)**

**Mean\* = 4.3 (n = 28)**

**SD\* = 0.23**

**CV = 5.3%**



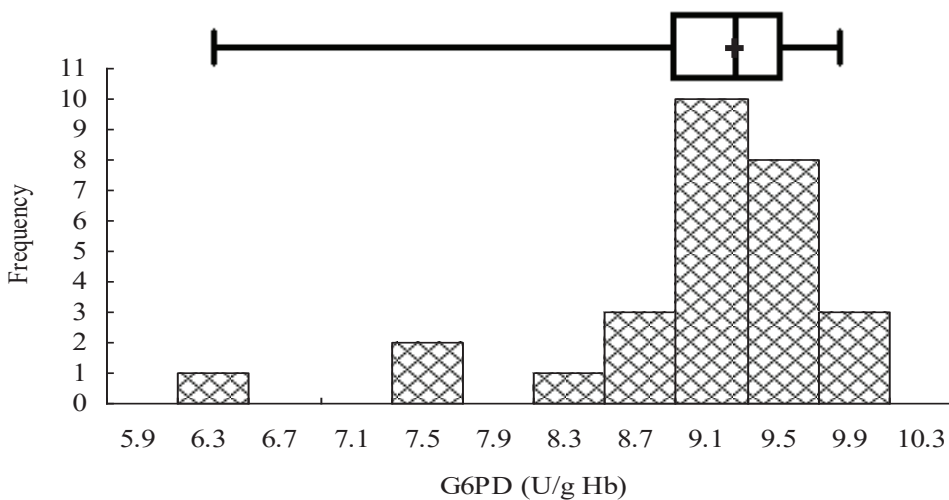
### Sample 2

**Median = 9.0 (n = 28)**

**Mean\* = 9.1 (n = 28)**

**SD\* = 0.33**

**CV = 3.6%**



### Sample 3

**Median = 9.1 (n = 28)**

**Mean\* = 9.0 (n = 28)**

**SD\* = 0.47**

**CV = 5.2%**

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

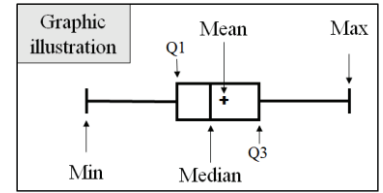
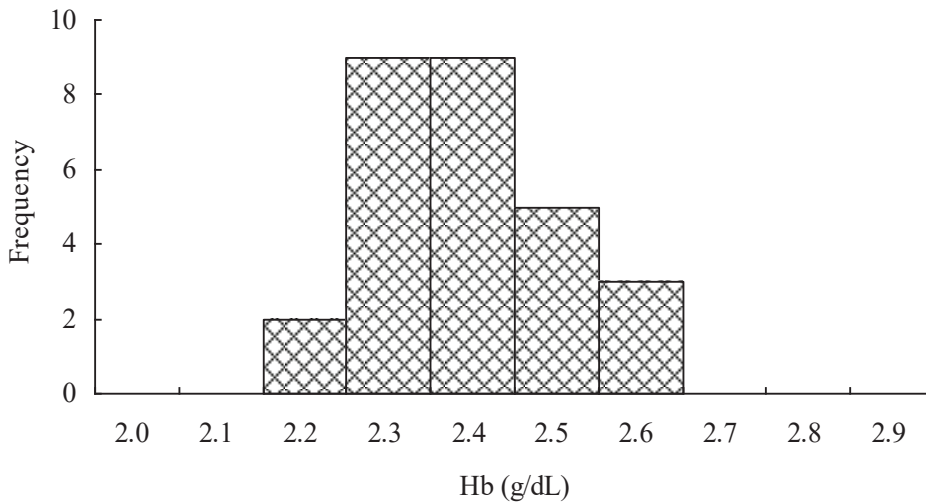
## RH2021-03 Distribution of Hb Test Results

Survey No. : RH2021-03

Sample sent on : 2021/09/20

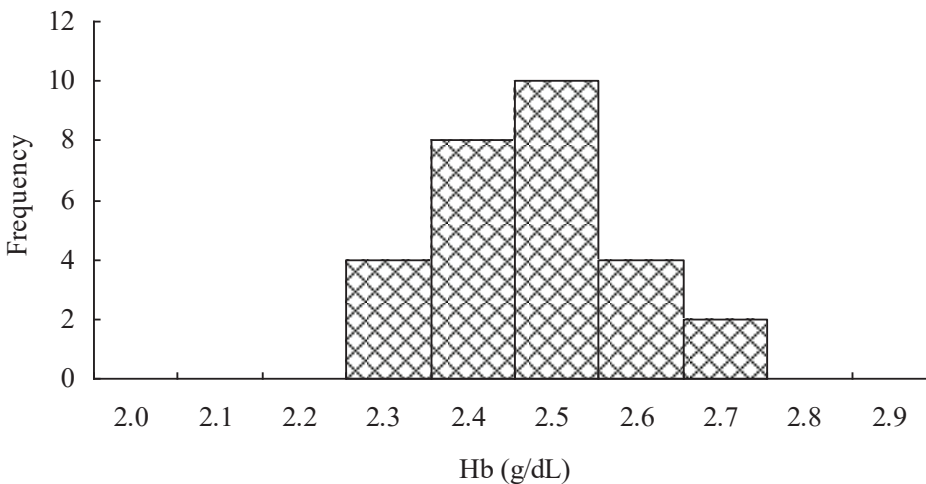
Reporting deadline : 2021/09/27

Results reported (%) : 100%



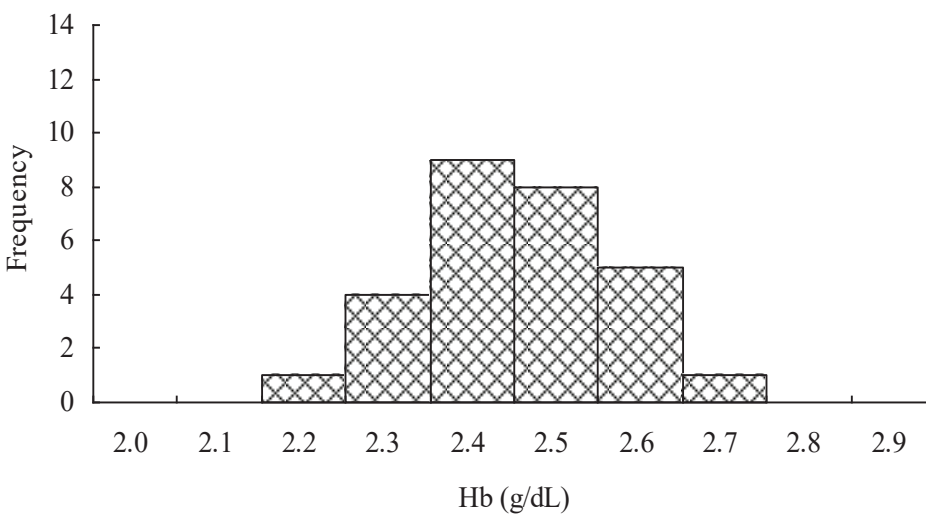
### Sample 1

**Median = 2.4 (n = 28)**  
**Mean\* = 2.4 (n = 28)**  
**SD\* = 0.12**  
**CV = 5.0%**



### Sample 2

**Median = 2.5 (n = 28)**  
**Mean\* = 2.5 (n = 28)**  
**SD\* = 0.12**  
**CV = 4.8%**



### Sample 3

**Median = 2.5 (n = 28)**  
**Mean\* = 2.5 (n = 28)**  
**SD\* = 0.12**  
**CV = 4.8%**

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

### Repeatability of G6PD Quantitative Test ( I )

Survey No.: RH2021-03

Sample sent on: 2021/09/20

Reporting deadline: 2021/09/27

In this survey, Sample 2 and Sample 3 used the same lot of quality control sample. To evaluate the repeatability of each participant, we compared the difference between the test results of the two samples and its percentage of the mean. )

LabID	S2 (U/g Hb)	S3 (U/g Hb)	Mean <sup>a</sup> (U/g Hb)	Δ <sup>b</sup> (U/g Hb)	Δ% <sup>c</sup>
F02	9.5	9.6	9.55	0.10	1.0%
F03	8.9	8.8	8.85	0.10	1.1%
F04	8.9	8.9	8.90	0.00	0.0%
F05	9.0	8.9	8.95	0.10	1.1%
F07	9.1	9.1	9.10	0.00	0.0%
F09	9.0	9.6	9.30	0.60	6.5%
F10	8.8	9.2	9.00	0.40	4.4%
F11	9.3	9.3	9.30	0.00	0.0%
F12	9.8	9.6	9.70	0.20	2.1%
F13	8.6	9.1	8.85	0.50	5.6%
F14	9.5	7.4	8.45	2.10	24.9%
F15	9.7	7.3	8.50	2.40	28.2%
F18	8.9	8.8	8.85	0.10	1.1%
F19	9.0	8.9	8.95	0.10	1.1%
F20	9.1	9.1	9.10	0.00	0.0%
F21	9.0	8.7	8.85	0.30	3.4%
F22	9.3	9.3	9.30	0.00	0.0%
F24	8.8	8.6	8.70	0.20	2.3%
F25	9.3	9.2	9.25	0.10	1.1%
F26	7.7	6.3	7.00	1.40	20.0%
F27	9.5	8.4	8.95	1.10	12.3%
F28	9.2	9.2	9.20	0.00	0.0%
F29	9.4	9.3	9.35	0.10	1.1%
F30	9.0	9.0	9.00	0.00	0.0%
F31	9.2	9.3	9.25	0.10	1.1%
F32	9.0	9.0	9.00	0.00	0.0%
F33	9.0	9.5	9.25	0.50	5.4%
F34	8.2	8.2	8.20	0.00	0.0%
Xa (Median)	—		9.00	0.10	1.1%
Range	—		7.00 ~ 9.70	0.00 ~ 2.40	0.0% ~ 28.2%
Mean	—		8.95	0.38	4.4%

Note :

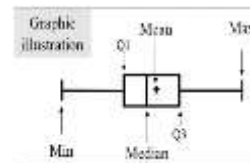
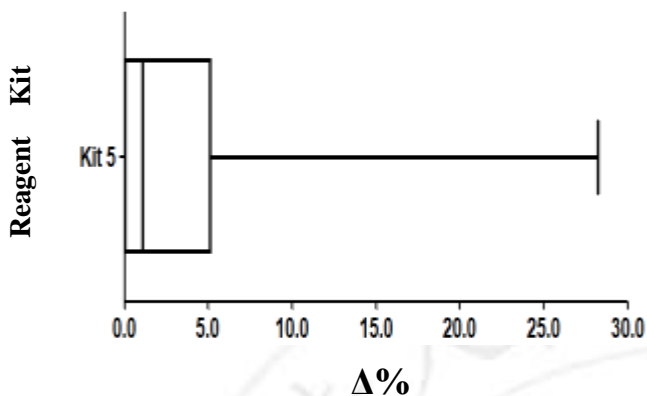
- a) Mean = ( S2 + S3 ) / 2
- b) Δ = | S2 - S3 |
- c) Δ% = Δ / ( Mean )

## Repeatability of G6PD Quantitative Test ( II )

Survey No.: RH2021-03

Sample sent on: 2021/09/20

Reporting deadline: 2021/09/27



Reagent Kit	Labs (n)	$\Delta\%$ median	$\Delta\%$ mean	$\Delta\%$ range
5	28	1.1%	4.4%	0.0% ~ 28.2%

RReagent kit 5 : Medicon  
 n < 5, NOT calculated

