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Report of Asian Quality Assurance Survey program (AQuAS) on laboratory hematology

Kap No Lee¹, Soo-Young Yoon¹, Han-Ik Cho²,
Noriyuki Tatsumi³, Tomas Maramba, Jr⁴

¹Department of Laboratory Medicine, College of Medicine, Korea University, Korea, ²Department of Laboratory Medicine, College of Medicine, Seoul National University, Korea, ³Department of Welfare Science, International Buddhst University, Japan, ⁴Department of Pathology, Dr. Victor R. Potenciano Medical Center, Philippines

Background

The Asian Quality Assurance Survey program (AQuAS) is one of the activities of the Asian Network of Laboratory Harmonization and Standardization (ANCLS). The ANCLS had been organized its first colloquium by the Indonesian hematologists led by Prof. Noriyuki Tatsumi and supported by Prof. Funahara in Jakarta, Indonesia in 1999, with aims of standardization and harmonization of clinical laboratories in Asia. Next year at Kobe, Japan, at the business meeting of the 2nd Asian Colloquium chaired by Dr. Tomas Maramba, Jr. the founding chairman of steering committee initiated its External Quality Assurance Survey program. The initial participants supposed to consist of 3 representative laboratories from seven countries.

The objectives of this quality assurance survey program is to improve and standardize the quality of clinical laboratory tests of Asian countries and help to remove inter-laboratory disparities, and finally improve human health.

The current (as of May 6, 2004) survey fields included are hematology, coagulation, chemistry and urinalysis.

Methods

1. Participating Labs

Current number (as of May 6, 2004) of participating laboratories are 66 from 13 countries; from Indonesia, Japan, Kiribati, Korea, Laos PR, Malaysia, Marshall Islands, Mongolia, Philippines, Singapore, Taiwan, Thailand and Vietnam (Table 1).

Table 1: participating hospitals (laboratories)

■ Date to Join	Name Hosp	Country
■ 2001-3-12	Philippine General Hospital	Philippines
■ 2001-3-15	Bangkok General Hospital	Thailand
■ 2001-3-15	Nopparat Rajathanee Hospital	Thailand
■ 2001-3-15	Faculty of Medical Technology, Mahidol Univ	Thailand
■ 2001-4-16	Fatmawati Hospital	Indonesia
■ 2001-4-16	Dharmais National Cancer Center	Indonesia
■ 2001-4-18	Makati Medical Center	Philippines
■ 2001-4-23	Dr. Victor R. Potenciano Medical Center	Philippines
■ 2001-5-1	Dr. Cipto Mangunkusumo National Referral Hosp	Indonesia
■ 2001-5-21	Seoul National University Hospital	Korea
■ 2001-5-21	Chung-Nam National University Hospital	Korea
■ 2001-5-21	Keio University Hospital	Japan
■ 2001-5-21	Osaka Prefectural College of Health Science	Japan
■ 2001-5-21	Osaka City University Medical School Hospital	Japan
■ 2001-5-28	National University Hospital	Singapore
■ 2001-5-31	Korea University Guro Hospital	Korea
■ 2001-5-31	Asan Medical Center	Korea
■ 2001-5-31	YoungDong Severance Hospital	Korea

■ 2001-6-4	Ramathibodi Hospital	Thailand
■ 2001-6-4	Siriraj Hospital	Thailand
■ 2001-6-26	Hospital Univ Kebangsaan Malaysia (HUKM)	Malaysia
■ 2001-9-10	Samsung Seoul Hospital	Korea
■ 2001-8-20	Hospital, Kuala Lumpur	Malaysia
■ 2001-8-20	Inst of Sci &T for R & D, Mahidol Univ, Salaya	Thailand
■ 2002-1-5	Raffles Hospital	Singapore
■ 2002-1-5	Changi General Hospital	Singapore
■ 2002-8-24	Tu Du Hospital	Vietnam
■ 2002-5-11	Pusat Jantung Nasional Harapan Kita Cardiac Hospital	Indonesia
■ 2002-6-6	Srinagarind Hospital	Thailand
■ 2002-6-8	Pasar Rebo General Hospital	Indonesia
■ 2002-6-28	Queen Sirikit National Institute of Child Health	Thailand
■ 2002-6-28	Faculty of Medicine, Prince of Songkla University	Thailand
■ 2002-7-15	University of Tokyo Hospital	Japan
■ 2002-7-16	National Health Systems Co., ltd	Thailand
■ 2002-9-11	Maharaj Nakornchiangmai Hospital	Thailand
■ 2002-9-16	Hue Central Hospital	Vietnam
■ 2002-9-18	Gleneagles Hospital	Singapore
■ 2002-9-18	Mount Elizabeth Hospital	Singapore
■ 2002-10-8	East Shore Hospital	Singapore
■ 2002-10-14	Boramae Hospital	Korea
■ 2002-10-15	19.8 Hospital	Vietnam
■ 2002-10-15	Bach Mai Hospital	Vietnam
■ 2002-10-15	ha tinh general Hospital	Vietnam
■ 2002-10-15	National Institute of Pediatrics	Vietnam
■ 2002-10-15	Phu tho town General Hospital	Vietnam
■ 2002-10-15	Saint Paul Hospital	Vietnam
■ 2002-10-15	Thanh nhan Hospital	Vietnam
■ 2002-10-15	Viet duc Hospital	Vietnam
■ 2002-10-15	Viet xo Hospital	Vietnam
■ 2002-12-27	Veterans General Hospital	Taiwan
■ 2003-6-18	Dr. Fe dle Mundo Medical Center Foundation Phils.Inc.	Philippines
■ 2003-8-12	San Lazaro Hospital	Philippines
■ 2003-8-26	Medical Laboratory Technology LTD (Medlatec Ltd., Co.	Vietnam
■ 2003-9-27	United Doctors Medical Center	Philippines
■ 2003-10-13	Veterans Memorial Medical Center	Philippines
■ 2003-10-30	Tongaru Central Hospital	Kiribati
■ 2003-10-30	Mahosot Hospital Lao PDR	Lao PDR
■ 2003-10-30	Philippine National Redcross	Philippines
■ 2003-10-30	St. Luke's Medical Center	Philippines
■ 2003-10-30	Majuro Hospital	Marshall Islands
■ 2003-10-30	Hospital of Univ of Med and Pharm in HoChi Minh City - Office 2	Vietnam
■ 2003-10-30	Central University Hospital	Mongolia
■ 2003-12-05	National Kidney Transplant Institute	Philippines
■ 2004-01-04	Eone Reference Laboratory	Korea
■ 2004-02-26	Pertamina Central Hospital (RSPP)	Indonesia
■ 2004-04-28	Asian Hospital & Medical Center	Philippines

The submission of the basic data of laboratory to the regional office would complete the application process to join AQuAS.

2. Survey materials/samples

The Sysmex have supplied the QA materials in hematology. They are liquid in status and can be tested directly but are easy to deteriorate.

3. Test items

The items were WBC, RBC, hemoglobin, hematocrit and platelet.

4. Process

Survey Samples have been sent three times per year (July, November, March). And have the answers returned to the regional office of AQuAS

via the Internet, express mail, fax or surface mail. And then analyze them statistically and send the analyzed results back to the participating laboratories. It has taken three months for a cycle.

Results

1. Test instruments and methods

In hematology, since each instrument uses its own methodology, we analyzed the results by instruments only. Some of the labs submitted several results by several different instruments.

Table 2. Number of laboratories using instruments according to Manufacturer in each test item (Hematology)

test/co	ABBOTT	ABX	Bayer	Beckman	Sysmex	Other
WBC	8	1	6	13	14	3
RBC	8	1	6	13	14	3
HGB	8	1	6	13	14	3
HCT	8	1	6	13	14	3
PLT	8	1	6	13	14	3

2. Result analysis and report

The analytic reports include mean, standard deviation, standard deviation index (SDI) without and with considering methods and instruments.

In statistics, the results lying outside of 3SD were

exempted from the statistics. Examples of the reports of results are in Table 3. The minimum value and maximum value and average values and histogram were reported.

Table 3: Examples of report of survey analytic results in hematology

Institute No.: 00011

Institute Name:

Survey material No.: **DH-01 0001**

Test No./Name	Instrument Code	No. Lab	Mean(total)	S.D.(total)	Your Value	SDI
01 WBC	10	21	3.0	0.2	2.8	-0.8
02 RBC	10	21	4.86	0.10	5.31	4.4
03 Hemoglobin	10	21	14.85	0.29	15.46	2.1
04 Hematocrit	10	21	41.0	2.4	44.2	1.3
05 Platelet	10	21	301	17	311	0.6

Survey material No.: **DH-01 0002**

Mean and SD are obtained from the result values in exempt of more than 3SD outlier. Standard Deviation Index (SDI) is defined as the result exempts mean divided by standard deviation.

Interpretation of SDI is as follows;- If the SDI is $-0.5 < SDI < 0.5$, it means excellent, $-1 < SDI < 1$, good, $-2 < SDI < 2$, acceptable, $SDI < -2$ or $SDI > 2$, need to improve.

1) SDI in Hematology (2001-3)

SDI of WBC appears to be getting better with the

survey number being increasing. SDI of Hct appears the best results among all test items. SDI of platelet appears worst among tests.

2) CV in hematology (2001-3)

CV of hematology survey appears to improve with the survey being continuing except platelet. The platelets usually show the worst CV's due to their natures such as size and clotting effect (Table 4).

Table 4. CV's of hematology 2001-2(DH01 001-02 006), 2002-3(DH02 007-03 012)

Survey No.	DH01 001	DH01 002	DH01 003	DH01 004	DH02 005	DH02 006	DH02 007	DH02 008	DH02 009	DH02 010	DH03 011	DH03 012
WBC	7.6	7.4	4.8	5.2	5.4	4.6	5.0	3.8	5.0	4.5	3.5	4.0
RBC	2.8	2.7	2.3	2.5	2.2	2.1	1.7	1.8	1.5	1.8	1.6	1.8
Hgb	1.9	2.1	1.3	1.4	1.4	1.6	2.0	1.8	1.4	1.6	1.3	1.8
Hct	5.8	5.8	5.8	5.9	6.7	6.5	5.3	5.4	7.3	5.4	4.1	4.7
Plt	5.5	7.6	4.7	4.4	6.1	6.8	7.2	11.2	8.3	7.2	6.4	5.1

Conclusion

With the surveys being continuing, all the processes of the Asian Quality Assurance Survey program were improved. The most difficult issues are efficient transportation system of QA materials, keeping the time schedule and effective communication tools.

Nevertheless I am sure that this program can provide a wide array of proficiency testing and educational solutions to assist in the improvement of participating laboratory's performance, and positive impact on patient care.

Key words; External Quality Assurance, Laboratory, Asia