Progress Report on "External Quality Assessment in Radioimmunoassay of Thyroid-Related Hormones in the Republic of Korea, 1986"

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Introduction

The objects of external quality assessment in which an external body sends samples for assay and processes the returned results for exchange of informations with participants are 1) to assess the degree of between-laboratory agreement for the analytes: 2) to attempt to identify the causes of difference in results: 3) to estimate the deviation each laboratory is away from the target value.

Since 1984, external quality assessment (EQA) in radioimmunoassay of thyroid related hormones contracted between International Atomic Energy Agency (IAEA) and Catholic University Medical College to establish a national external quality control system have been performed at our laboratory[1]. This report summarizes the progress of research coordination project for the 2nd year of 1986.

External Quality Assessment Scheme

1. Participation

The participating laboratories were 15 hospitals throughout the republic of Korea.

2. Preparation of Samples of Reference Serum

We collected sera from carefully chosen patients subjected to thyroid function study in our nuclear medicine laboratory and prepared 3 pools with hormonal concentrations which were expected to lie within particular concentration range, hyper-, eu- and hypo-thryoidism. We then throughly mixed, aliqueted, and freezed dried the sera so as to make samples.

3. Distribution of Samples

We distributed 9 samples to all participating laboratiories by mail.

4. Reporting of Results

All participating laboratories reported their results to our hospital on a pre-arranged schedules.

5. Analysis of Reported Results

All results were analyzed by computer system having memory capacity of 64 kRAM using the program worked out by us in conjoint study with computer specialist of the Korean Institution of Science and Technology. The data were calculated according to IAEA EQA scheme: thyroid related hormones[2]. The data were calculated according to the statistical theory described by Healy[3] by using all-laboratory trimmed mean, trimmed standard

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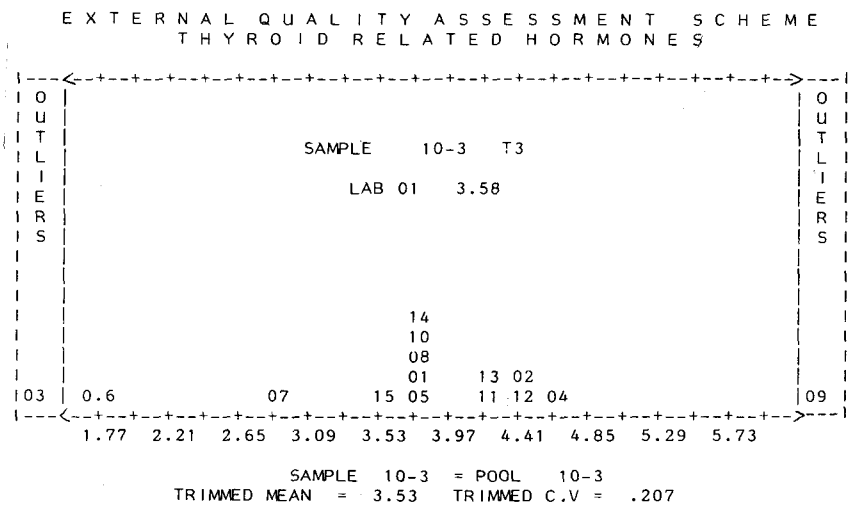

Fig. 1. CMC-IAEA collaborating center, Korea.

Table 1. Between Laboratory Variability (CVt%) for T3, T4 and TSH Analysis

Analysis	N	CVt (%)
T4	15	18.5
T3	15	21.3
TSH	15	87.7

Table 2. Example of Measuring Cumulative Statistics for Laboratory "7" (T4)

Sample	LAB result	Xt	"Bias"
1	17.5	18.58	−0.0617
2	12.9	14.09	−0.0922
3	27.1	25.16	0.0715
4	4.2	3.68	0.2717
5	15.6	13.60	0.1315
6	21.6	24.65	−0.1412
7	3.4	3.92	−0.1529
8	19.3	21.4	−0.1088
9	7.4	8.36	−0.1297
		CVt	28.47%
		Bias	

deviation, and trimmed coefficient of variation.

Outliers (X) were detected by following equation: X≷ trimmed mean ±3 trimmed SD. We obtained the histograms, the abscissa represents the trimmed mean±3 trimmed SD and outliers were printed in two outlier columns, for individual laboratories (Fig. 1).

Table 3. Frequency of Laboratory Mean Bias

Mean bias (%)	T4 (% LAB.)	T3 (% LAB.)	TSH (% LAB.)
< 10	26	13	0
10 − 20	48	60	13
20 − 30	26	27	13
> 30	0	0	74

6. Summary of Results

Recovery of specimens was 100%. An overall between-laboratory variability for the same hormones is given in Table 1. Cumulative statistics based on the use of trimmed mean and calculation of bias and variability of bias was made for individual laboratories (Table 2). The frequency of laboratory mean bias is as presented in Table 3.

7. Remedial Action by Participating Laboratories

We held a meeting of all participating laboratories to discuss the obtained results and to exchange infor-

mations concerning quality control.

Conclusion

The recovery rate of the distributed test sera was 100 percnet and this fact amply attests to the importance and acceptability of the present scheme. Bias of less than 20% was obtained in 73% for T3 and 74 % of T4, while the same value of bias was obtained only in 13% of laboratories for TSH. Poor performance in 27 and 26% of laboratories for T3 and T4 was considered to be due to inefficient internal quality control. It was, therefore, decided to continue the present external quality assessment scheme to improve the performance rate.

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