EXPERIENCES WITH REPEATED QUALITY CONTROLS OF SKIN SMEARS IN DIFFERENT ROUTINE SERVICES IN LEPROSY CONTROL PROGRAMMES

Sir,

In 1987 the leprosy reference laboratory at the Armauer Hansen Institut started an evaluation of skin smears with the objective to obtain more detailed information on the actual standard of laboratory work in various leprosy control programmes. By the end of 1989, 84 laboratory technicians had participated in this quality control. The performance of 50 technicians was evaluated and reported previously.[1]

In general, laboratory technicians whose performance was unsatisfactory according to the criteria set by the reference laboratory,[1] were asked to send a second set of slides for further evaluation. Among these, those with unsatisfactory results were asked to participate a third and—if necessary—fourth time in the quality control. Each check was followed by a written assessment which analysed deviations in the results, trying to explain them to the technicians and providing suggestions for improvement. Besides the evaluation of the reliability of the results, individual feedback was given to the technicians, in the hope of stimulating motivation and self-criticism. The results of these repeated quality controls are presented in the following:

Out of the 84 participating laboratory technicians, 58 (69%) were invited to take part in further evaluations. Twenty three (39·7%) actually sent a second set of slides. Twenty of these laboratory technicians (87%) came from Asia, 2 (8·7%) from Africa and 1 (4·4%) from South America. Table 1 compares the results of the first and second quality control according to taking, staining and reading of the skin smears. Out of the 23 laboratory technicians evaluated, 10 (43·5%) were asked to send slides for a third quality check, in which 7 technicians participated.

The results of this third quality control are presented in Table 2. This evaluation was followed by a fourth one, in which 5 laboratory technicians participated. Of these 5 laboratory technicians, 2 were asked for further slides, based on the results of the third quality control, and 3 laboratory technicians participated voluntarily. The results of this fourth quality check are presented in Table 3.

Table 1. Comparison of the first and second quality control results, according to taking, staining and reading of skin smears performed by 23 laboratory technicians

Continent	No. of technicians	Quality control	Taking			Staining			Reading			
			*	†	‡	*	†	‡	§	*	†	‡
Asia	20	I	7	3	10	1	14	5	0	4	7	9
		II	15	1	4	7	4	9	0	7	8	5
Africa	2	I		1	1			2				2
		II	1	0	1		1	1	0	1	1	0
South America	1	I		1			1			1		
		II		1		1				1	0	0

* good; † satisfactory; ‡ unsatisfactory; § very good.

Table 2. Comparison of the second and third quality control results, according to taking, staining and reading of skin smears performed by 7 laboratory technicians

Continent	No. of technicians	Quality control	Taking			Staining			Reading			
			*	†	‡	*	†	‡	§	*	†	‡
Asia	6	II	5	1	0	4	0	2	0	2	3	1
		III	4	0	2	3	1	2	1	1	1	3
Africa	1	II			1			1		1		
		III			1			1		1		

See Table 1 for notation.

Table 3. Comparison of the third and fourth quality control results, according to taking, staining and reading of skin smears performed by 5 laboratory technicians

Continent	No. of technicians	Quality control	Taking			Staining			Reading			
			*	†	‡	*	†	‡		*	†	‡
Asia	5	III	3	0	2	2		3		1	0	4
		IV	3	0	2	1	2	2	1	0	3	1

See Table 1 for notation.

Qualitative data were analysed using Yates continuity corrected Chi-square or—if an expected value in any cell was less than 5—by Fisher's exact test. According to our data, only the taking of smears had improved significantly ($p = 0{\cdot}041$), when comparing the second with the first quality control. Differences in staining and reading were not significant when the results of the quality controls were compared with each other.

Repeated assessments of skin smears have been performed during the last three years. Besides the evaluation of the actual standard of laboratory work in various leprosy control programmes, we

hoped that by giving a regular feedback to the participating laboratory technicians we might be able to improve their skills. We assumed that basically the laboratory technicians were sufficiently trained and that by pointing out possible reasons for differences between their skin-smear results and ours as well as through our suggestions, we might be able to improve their performance. The evaluation of our data does not indicate that a true improvement in the overall work performance has been achieved. However, there was little participation in the third and fourth quality control, so that statistical analysis alone might be misleading.

The ability to take good skin smears improved significantly when the results of the second quality control were compared with the first one. However, in the third quality control 2 of the laboratory technicians whose performance was good or satisfactory in the second quality check had unsatisfactory results and no change in skills was found when the results of the third were compared to the fourth quality control.

After the first assessment, 6 participants changed their staining method from hot to cold staining or vice versa. Of the 5 participants who changed from hot to cold staining, 1 laboratory technician improved from satisfactory to good. One laboratory technician, whose previous stains were satisfactory, obtained unsatisfactory ones when changing staining methods from cold to hot. Seventeen participants did not modify their method, but followed the suggestions given by the reference laboratory, leading to an improvement of 6 and a worsening in performance of 2 laboratory technicians. In the third and fourth evaluation of skin smears, none of the participating technicians improved their staining convincingly.

Even though reading did not improve significantly during the various quality controls, some of the laboratory technicians were able to better their reading, leading particularly to a decrease in unsatisfactory results. During the first quality control, misclassification into paucibacillary or multibacillary leprosy was found in 8 slides (4·4%), decreasing to 2 slides (1%) out of the 184 examined.

In conclusion, we are not able to state clearly whether quality controls in the leprosy reference laboratory at the Armauer Hansen Institute lead to a definite improvement in the working skills of the participating laboratory technicians or whether this improvement occurred by chance. Nevertheless, we think that the quality control of skin smears does benefit the laboratory technicians. Whether this feedback is more important in terms of 'moral support' or is able to effectively improve performance in the long run, will have to be shown by collecting more data. Improvement as a result of suggestions based on regular evaluation of skin smears might only be of limited value, because it does not replace lack of knowledge or technical 'know-how'. How refresher courses and quality controls can be combined effectively should be discussed and evaluated further.

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Reference

[1] Vettom L, Pritze S. Reliability of skin smear results: experiences with quality control of skin smears in different routine services in leprosy control programmes. *Lepr Rev*, 1989; **60:** 187–96.