THE CANADIAN PNEUMOCONIOSIS READING PANEL STUDY

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ABSTRACT

The Canadian Pneumoconiosis Reading Panel was organized to determine the reading levels of volunteer Canadian physicians on the 1980 pneumoconiosis classification, and to develop a feedback method for influencing a uniform level of readings. 999 chest X-rays were selected from three groups:[1] 40–70 year old males with no fibrogenic dust exposure and whose X-rays were taken because of a statutory requirement. No films from this group were rejected because of symptoms or radiologic abnormality.[2] Workers in silica or asbestos exposure with normal initial films who later developed silicosis or asbestosis.[3] Additional films represented several other industrial lung diseases. 30 randomized films were read every 2 weeks in rotation by 26 readers. Feedback analysis indicated whether a reading was within 1 minor category of the group average for a given film on small opacities or was over or under that criterion. It is hypothesized that with continuing experience most readers will eventually read near the group mean and outliers may be identified. Subsequent group readings are proposed on an annual or bi-annual basis. At the present stage all films have not been read by every member and no overall group mean categorization of each film is available. Feedback has, therefore, been provided in relation to readings by a single reader from the National Coal Board who has evaluated all films. Results of the first returns show that 31% of films were overread by panel members in comparison with this reader, 4% were underread and 65% were in agreement, as defined above. Subsequent feedback results are under analysis. Advantages and disadvantages associated with the method will be discussed.

The ILO Classification was developed to help in the coding of X-ray appearances of the Pneumoconioses for epidemiologic purposes. This should allow comparison between readings done under different jurisdictions.

Since its introduction in 1958, the ILO system has undergone several changes, until the (1980) protocol confirmed that reference films and the not definitions should take precedence in cases of doubt.[1] The absence of such proviso prior to 1980 has led to quite marked differences of opinions between expert readers in different areas. The 1980 modification of the ILO Classification was introduced for routine use by the Chest Clinics run by the Government of the Province of Ontario in 1983, once the MESU (Medical Surveillance) computer data entry facilities became available.

With routine use of the ILO Classification arose a need to ensure that all readers interpret the code uniformly. While various attempts to meet this problem have been made elsewhere, there existed no system of quality control of ILO readers in Canada. A national network of readers was required in order to assure that consistency and reliability of readings are maintained. The Canadian Pneumoconiosis Reading Panel[2] was formed to meet two essential requirements: 1) to determine the current reading levels of physicians in all Canadian provinces who employ the ILO 1980 radiographic pneumoconiosis classification, and 2) to develop a method of feedback which would influence those physicians to approach a uniform standard level of reading.

The initiative to form the panel came from physicians at the Ministry of Labour (Ontario) and from the McMaster University. The two best known models of quality control of ILO readers, the British and the American were reviewed.

In the United Kingdom the program is run entirely by the National Coal Board which decides who shall sit on the panel of readers. Panel members are regularly tested and their reading patterns evaluated. Incorrigible outliners are eliminated.

As run by the National Coal Board, the British system is very efficient. It is however, designed for and operating in a small, densely populated country.

In the United States, a different system is used. Regulations under the Federal Mine Safety and Health Act[3] give statutory recognition to official users of the ILO system who are known as "A" and "B" readers. The status of an A or B reader is obtained after successfully passing appropriate examinations set up by NIOSH. The recent proposals for requalification every three years rather than four indicates that some doubt arose about qualified readers being able to sustain an even quality of readings between examinations and in maintaining uniformity of readings in International com-

parisons. Some 40 Canadian physicians known to be reading pneumoconiosis films were contacted and agreed to become members of an all-provinces germinal body of the reading panel.

METHODOLOGY

More than 10,000 films were gathered by the Ministry of Labour and from that quantum a test collection of 1,000 plates was made. The final selection of films was made by three readers from the Ministry of Labour and one from the University of McMaster (Table I).

The 309 "normal" films were from government employees whose X-rays were taken because of a statutory requirement of the day, and who according to records had never worked in fibrogenic dust exposure; they were males between the ages of 40 and 70; and no films were rejected because of symptoms or observed abnormality.

Table I

Sources for Film Selection

Civil servants, obligatory films	309
Asbestos (insulators)	104
Asbestos (Quebec miners)	49
Asbestos + silica	4
Silica (foundry)	57
Silica (Ontario hard rock miners)	339
Coal workers (British)	100
Nepheline syenite	15
Hard metal (tungsten c. - cobalt)	8
Talc	6
Beryllium	4
Bauxite (hydrous aluminum oxide)	5
TOTAL	1,000

Three hundred and thirty-nine films were selected from known Ontario hard rock miners in silica exposure who had normal initial films and who by consensus reading eventually developed silicosis.

A large proportion of films from that series were selected from the stage where half of the selection panel readers read 1/0 and the other half 1/1 for small regular opacities.

Analogous selection methods were used for choosing 104 films from Ontario Asbestos Workers. Additional films were received from the British National Coal Board and from Quebec Asbestos Mine Survey.

The selected films were completely randomized, their labels of origin blackened out and then divided into lots of 30 films which were sent every two weeks in rotation to each of 26 readers, who remained available of the original 40.

Readers record their findings and return reports to a central depository. At quarterly intervals, feedback is provided with indication of whether a reader is within 1 minor category of the group average for a given film or is over or under the criterion. For this presentation, complete records are available on only 16 readers. Ten dropped out because of inability to maintain a regular flow of 30 films every 2 weeks and held up the distribution process.

It is hypothesized that with continuing feedback most serious readers will eventually read near the group mean and the outliners will be identified.

After an initial development period, group readings with all available members are proposed on an annual or bi-annual basis.

At the present stage all films have not been read by each member of the panel and no overall group mean categorization of each film is available. Feedback has therefore been provided in relation to readings by a single reader from the British National Coal Board who has evaluated all films.

DISCUSSION

Looking at the available data (Table II, Figures: 1, 2, 3, 4 and 5) it appears that our hypothesis is supported by subsequent facts. During the time of the study, 14 out of the 16 readers agree more with the standard while 2 of them agree less. Also there is less over as well as under reading. However, one has to be very much aware of the shortcomings

Table II

88-07-19 ILO Panel Comparisons

Analyzed Data Presented as a Percentage of Valid Readings

PHYS	OVER-READING			AGREEMENT			UNDER-READING		
	1ST	2ND	3RD	1ST	2ND	3RD	1ST	2ND	3RD
01	23	15	17	74	75	77	3	10	6
02	27	30	32	68	64	61	5	7	6
03	35	35	25	62	61	70	3	4	5
04	21	11	7	73	82	89	7	7	4
05	17	11	9	74	81	84	9	8	7
06	40	35	40	57	61	56	3	3	4
07	29	24	21	69	70	74	2	5	5
08	20	12	7	74	82	93	6	5	0
09	50	42	25	49	57	75	2	2	0
10	27	25	15	68	74	85	0	0	0
11	6	9	5	86	81	88	8	9	7
12	28	22	13	71	72	82	2	6	5
13	35	29	21	63	70	75	3	1	3
14	18	13	11	76	81	88	5	6	7
15	30	—	18	66	—	78	4	-	4
16	38	19	23	61	80	74	1	1	3

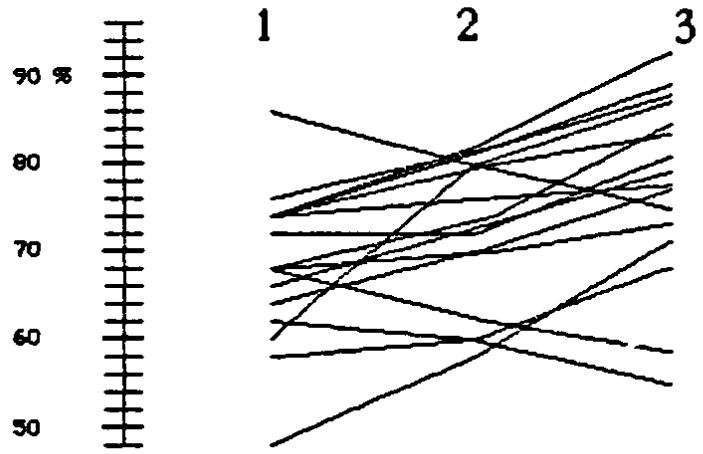

Figure 1. Agreement with provisional standard.

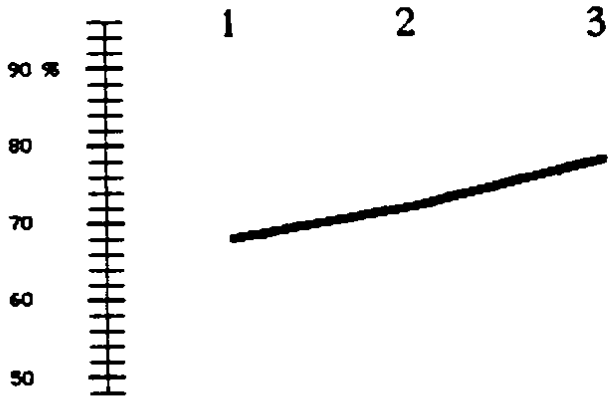

Figure 2. Average agreement with standard.

	Agree	Over-read	Under-read
More	14	1	8
No change	0	1	3
Less	2	14	5

Figure 3. Change in agreement with standard.

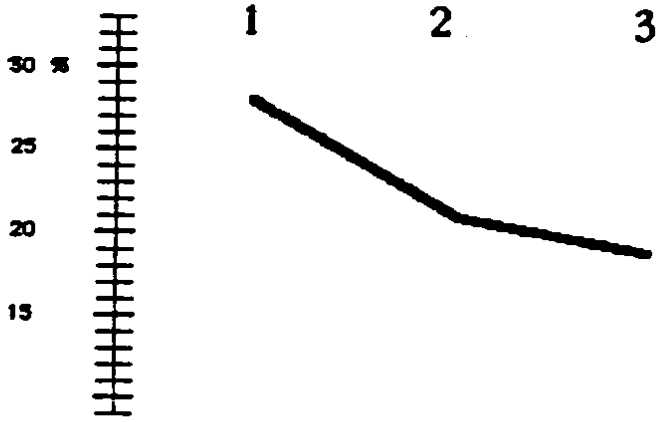

Figure 4. Over-reading of small opacities.

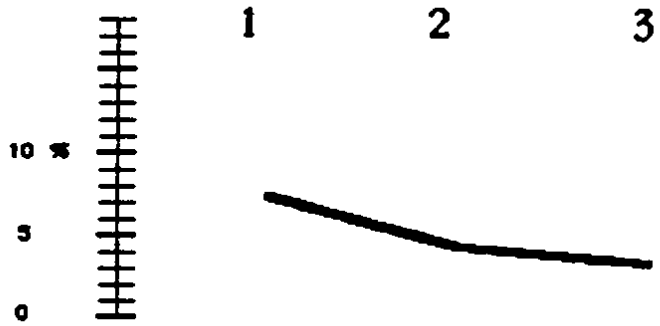

Figure 5. Under-reading of small opacities.

of this study which is no more than a preliminary communication on an ongoing project.

The number of readers was small as is the number of films reported in the third reading, (due to a slow distribution system that had to be revised). In this context, it should be noted however, that the apparent trend is the product of roughly 8,000 individual reports, as each of the 16 readers has read around 500 of the test films currently available.

No comparison with other countries other than Great Britain. Last, but not least, there were no controls. Bluntly put, one does not know to what extent the apparent trend is the result of the feedback information offered, and what would happen if members of the panel were left to their own devices.

Future efforts therefore, should include 1) setting up a control group of readers who will receive less or no feedback; 2) current standard may need to be revised using a larger number of films.

REFERENCES

1. Guidelines For The Use of ILO International Classification of Radiographs of Pneumoconioses—Revised Edition 1980, p. 4.
2. Occupational Health in Ontario, Vol. 5, Number 3, July 1984, pp. 119–121.
3. Federal Register, Vol. 43, No. 148, August 1, 1978, pgs. 33719 and 33720.

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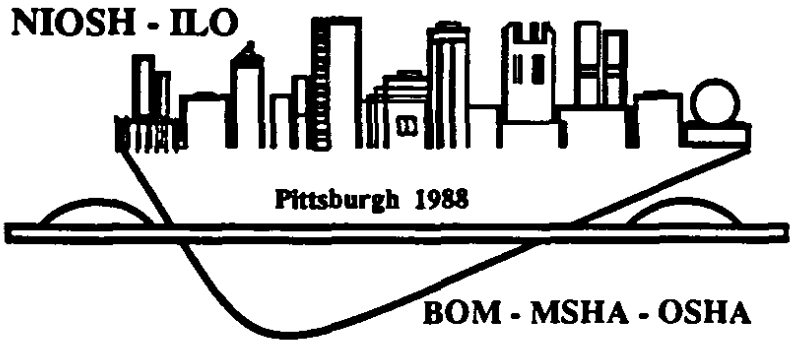

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