

PERSPECTIVES FOR REVISION OF THE ILO 2000 CLASSIFICATION OF RADIOGRAPHS

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Presentation topics

- I. Conventional chest radiography
- II. Digital radiography
- III. Revision of the ILO 2000
Classification

Presentation topic I

Conventional chest radiography

Chest Radiography

- Impressive technical advances in diagnosis of lung diseases during the last 20 years
- CXR has been useful in screening and health surveillance, clinical care, diagnosis and evaluation of response to treatment
- Widely used in epidemiologic studies of occupational and environmental lung disorders
- CXR remains universally available tool
- Minor radiation exposure and inexpensive

Conventional chest radiograph

Advantages

- Simple to perform
- Cost effective
- Relatively specific in certain conditions
 - advanced silicosis, advanced coal worker's pneumoconiosis or advanced asbestosis
 - extensive and/or calcified pleural thickening
- Low radiation exposure: effective dose 0.03 mSv
- Standardized classification method - ILO Scheme

Chest radiograph vs pathologic findings

- Relatively good correlation between lung pathological findings and radiographic interpretation for dust-exposed workers with high profusion of small opacities
- Good correlation between the dust content in the lung and the profusion of small opacities in coal miners

Chest Radiography in Dust Exposed Workers

- Chest radiography remains the most common and widely used tool in screening and surveillance of dust exposed workers
- Dust-related pulmonary disorders may amount up to 30% of all work-related illnesses
- Chest radiograph may be an important sentinel for failure of dust control
- Chest radiograph is helpful in exposure response relationships

Limitations of Radiographic Imaging

- Imperfect tool, not diagnostic gold standard
- Airway disorders are not always seen
- Functional impairment does not always correlate with imaging
- Can not provide certainty about the etiology of observed findings due to limited lung response patterns

Medical screening and health surveillance

- Chest radiography remains most widely used radiological tool for screening of large populations
- Radiographs of good quality, classified with the ILO scheme, reported with consistency and accuracy, are the most important tool for medical screening and health surveillance of workers exposed to mineral dusts

Presentation topic II

- Digital radiography

Digital techniques for chest radiograph

- Conventional radiograph: film-screen system
- Digital techniques
 - Computed radiography: using imaging plate to store x-ray image, then a scanning device convert x-ray image to digital data
 - Digital radiography: flat-panel detector for converting x-ray to digital data

Advantages of digital radiography

Film-less imaging system

- produces better quality of images for diagnosis
- eliminates over- and under-exposure
- digital images can be manipulated to help with interpretation
- easy access to images, cheaper storage, less subject to loss
- use of PACS for telemedicine
- teleradiology for image transmission through network connections

Digital radiography - challenges

- High equipment cost, lower film/image cost
- Hardware & software should be standardized
- Trials needed to decide on comparability of films
- Digital standard images are necessary
- Use of CR/DR will soon become standard practice in many countries
- Replacement of CXR in diagnosis, medical screening and health surveillance

TOTOKU Medical Monitor QA Standard

Standard	IEC 61223-2-5	DIN V 6868-57	EUREF	AAPM- TG18	JESRA
Testing	Constancy testing	Acceptance testing + Constancy testing (QS guideline)	Acceptance testing+ Constancy testing	Acceptance testing+ Constancy testing	Acceptance testing+ Constancy testing
Established	1994	February 2001	November 2003	April 2005	August 2005
Performer		Vendors	Medical physicists	Medical physicists	Manufacturer Or Hospital
Performer of Constancy testing/ Interval	None specified 3 months	Hospitals 1/3, 6 months	Medical physicists 6 months	Medical physicists 1/3, 12 months	Hospitals 1/3/, 12 months
Other Information	Will be new IEC by 2009	Enshrined into law Acceptance testing: in July 2002 Constancy testing: in December 2003	Digital mammography QA guideline	OR3	Based on AAPM and IEC

Difficulties when introducing digital x-ray for diagnosis and screening of pneumoconiosis

- Does the law provides for use of CXR or digital images (CR/DR?)
- Compensation for lung injury
- Availability of equipment for digital radiography
- Cost as compared with CXR
- ILO digital standard images are not yet available for comparisons with CR/DR subject films

Future scheme for medical screening of Pneumoconioses

- Using digital subject films with standard digital images of ILO Classification
 - CRT/LCD reading
 - PACS: telemedicine
- Using CT Classification of pneumoconioses as supplementary method
- Classification of radiographs will remain a major screening tool

Presentation topic III

- Revision of ILO 2000 Classification

ILO 2000 Classification

- *Uses of the Classification*
- Epidemiological research
- Screening and surveillance of workers in dusty occupations
- Clinical purposes
- Promotes improved international comparison of data concerning the pneumoconioses

ILO 2000 Classification

Object

To codify the radiological abnormalities of pn in a simple, reproducible manner

The Classification:

- does not define pathological entities
- does not take into account working capacity
- does not imply legal definitions of pn for compensation purposes
- does not set or imply a level at which compensation is payable

International Labor Office Classification System in the Age of Imaging: Relevant or Redundant

Daniel A. Henry, M.D.

Summary: The 1980 International Labor Office International Classification of Radiographs of Pneumoconioses is a widely used epidemiologic tool with a storied past. This article reviews its development and examines its applications to occupational lung disease and the controversies generated in that process. The question of its relevancy to current imaging practices is discussed.

Key Words: Pneumoconioses—ILO classification—B reader.

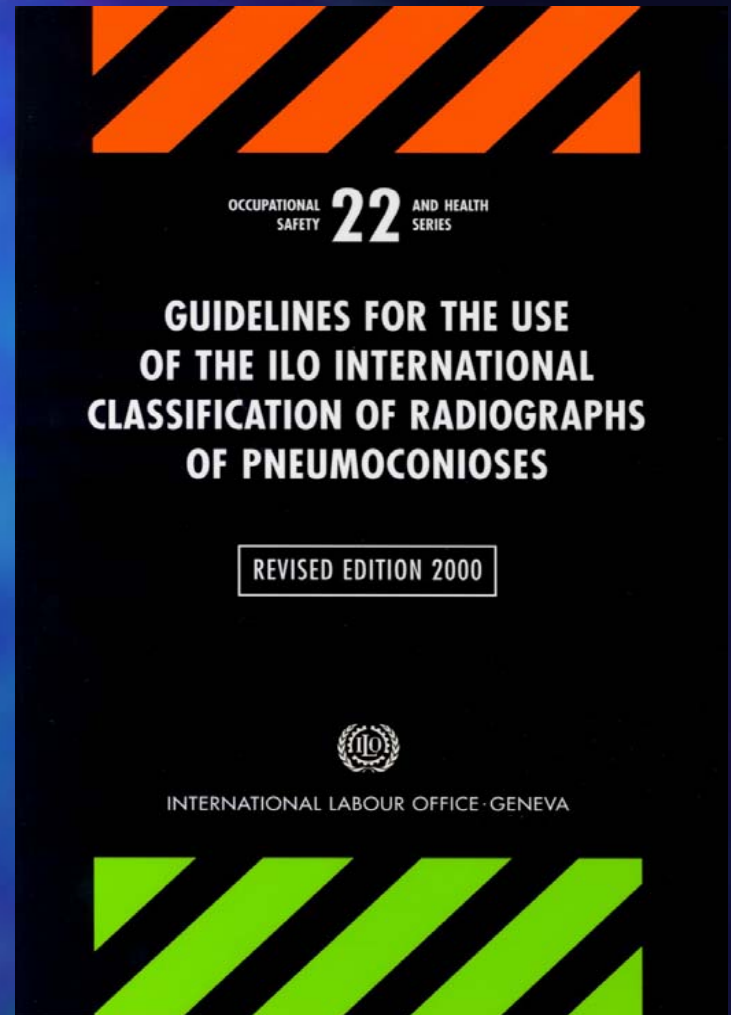
Standardization and interpretation are terms that seem at odds by simple definition. Standardization implies consensus and agreement whereas interpretation embodies translation, deduction, and inference. A system that seeks to systematically record chest radiographic findings produced by the inhalation of dusts for purposes of detection and measurement is a straightforward and a seemingly easily understood concept. However, when that goal is combined with a process that invites the subjective explanation of the radiographic findings to make them understandable, controversy occurs. The International Labor Office (ILO) International Classification of Radiographs of the Pneumoconioses (1) embodies such an attempt at integrating these principles and does not disappoint at provoking controversy. The process has been with us for decades in varied forms and is founded on the posterior-anterior (PA) chest radiograph. The system has always had its proponents and critics for one reason or another. Now, at the dawn of the 21st century,

time and technology have raised questions regarding the system's relevance. Other contributions submitted to this issue on environmental and occupational lung disease will discuss the "imaging" of these maladies. Where does the ILO system belong in this continuum of imaging?

The 1980 ILO International Classification of Radiographs of the Pneumoconioses is the current version of the system used internationally for the recording of chest radiographic findings related to the inhalation of dusts. It is the offspring of previous versions and systems and represents the significant efforts of many individuals, institutions, and organizations with the intent of standardizing classification methods and facilitating international comparisons of pneumoconiosis statistics and research reports (1). The classification entails the paper tabulation of the following: the presence of parenchymal opacities and their profusion or concentration based on a 12-point scale ranging from "cold" normal to advanced disease; the detection and scoring of both large parenchymal opacities and pleural abnormalities; and other diseases or findings represented by symbols. Its evolution will provide insights into today's applications and controversies.

From the American College of Radiology Committee (formerly Task Force) on the Pneumoconioses and Department of Radiology, Medical College of Virginia Hospitals, School of Medicine, Virginia Commonwealth University, Richmond, VA.

“The ILO system has worked, is working and has substantially achieved the intended task. It continues to play a key role in research and epidemiology of occupational lung disease and in the compensation of exposed individuals. Improvements in or modifications to the system, especially the integration of new imaging technologies, could provide both young and established investigators many opportunities.”



In: Journal of Thoracic Imaging, 17:179-188, 2002

Historical Perspective

Radiographic Readings for Asbestosis: Misuse of Science—Validation of the ILO Classification

Albert Miller, MD*

Background *Radiographic readings for pneumoconiosis (both asbestosis and silicosis), even those using the International Labour Office (ILO) Classification, have received widespread negative coverage in the media and strong judicial rebuke.*

Methods *The medical literature over the past 90 years was reviewed for the relationships between radiographic severity (standardized as the ILO profusion score) and indices of exposure to silica or asbestos, tissue burden of silica particles or asbestos fibers, histologic fibrosis, various measurements of pulmonary function and mortality.*

Results *Evidence from many different disciplines has demonstrated that the ILO profusion score correlates with occupational exposure, dust burden in the lung, histologic fibrosis and, more recently, with physiologic impairment and mortality.*

Conclusions *The ILO Classification has therefore been validated as a scientific tool. Its fraudulent misuse by "hired-gun" physicians, attorneys and elements of the compensation system to falsify claims of asbestosis and/or silicosis (often in the same claimant) must be condemned. Am. J. Ind. Med. 50:63–67, 2007. © 2006 Wiley-Liss, Inc.*

KEY WORDS: *radiographic readings; International Labour Office (ILO) classification; asbestosis; pneumoconiosis*

ILO Classification

- Evidence from many different disciplines has demonstrated that the ILO profusion score correlates with occupational exposure, dust burden in the lung, histologic fibtosis and, more recently, with physiologic impairment and mortality.
- The ILO classification has therefore been validated as a scientific tool
- *In: Am. J. Ind. Med. 50:63-67, 2007*

ILO Classification

- Intensively used and validated over the last 25 years
- The Classification continues to provide the univervally recognized method to systematically record abnormalities on chest radiographs of individuals exposed to dusts
- Voluntarily used for compesation of individuals exposed to dusts although it was not designed for this purpose
- New technologies such as digital radiography will be driving its modification

ILO 2000 CLASSIFICATION

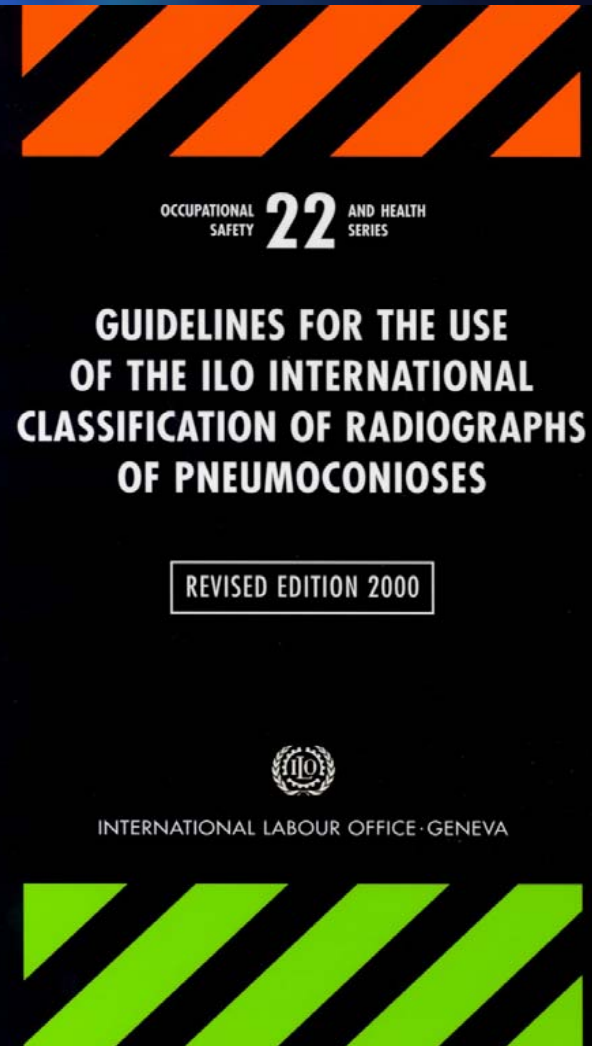
ILO 2000 Classification of Radiographs of Pneumoconioses

Universal tool to improve health surveillance, conduct epidemiological research and compare statistical data

Legal requirements – voluntary use for compensation claims

ILO Panel at 10th ICORD

“Proceed with the selection of new standard films taken with the use of digital techniques”



Revision of ILO Classification - I

- Using “hard” copies of current 22 CXR standards
- Producing CD with the same 22 standard images as digital “soft” copies to respond to users of modern digital techniques
- Producing a chapter with recommendations for use of digital standard images
- Creating new edition of 2008 Classification

Revision of ILO Classification - II

- Selecting new 22 “soft” standards from digitally acquired images
- Producing new “hard” copies from 22 standard digital images
- Revising a chapter with recommendations for use of digital standard images
- Creating next edition of 200X Classification

Future of ILO Classification

HARD
COPIES



- Use of hard copies will be decreasing
- Use of soft (digital) copies will be increasing
- New 200X edition may create a « filmless » environment

SOFT
COPIES

ILO 2008 Classification

Draft text with Recommendations

- Meeting in South Africa, 2007
- NIOSH/ILO consultations, 2007
- Meeting of experts in Japan, 2007
- To be finalized by ILO Panel – USA, 2008

Digital standard images

- Tests by Canon experts in Japan, 2007
- CD is prepared in Germany, 2008

Revision of ILO Classification

Technical issues

- standardization of digital file formats for pneumoconiosis classification
- implications for image processing and display with different brands of equipment
- assuring image quality for classification of digital chest radiographs
- compensation level determined with different sets? (1/1 analogue may look like 1/0 digital)

Revision of ILO Classification

Technical issues

- Protocol for selection - countries
- Compatibility of candidate digital radiographs
- Digital format of CRs/DRs – DICOM 3?
- New 22 digital standards to be used with different equipment - consistency
- Prescription of different parameters for diagnosis and for viewing/teaching
- Issues that can transpire from NIOSH Workshop

Revision of ILO Classification

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