The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces through safety and health research

Application of the ILO International Classification of Radiographs of Pneumoconioses to Digital Chest Radiographic Images

DHHS (NIOSH) PUBLICATION NUMBER 2008-139 JULY 2008

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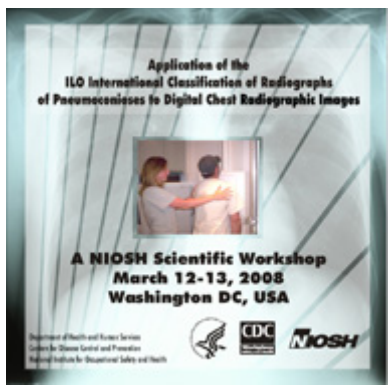
A NIOSH Scientific Workshop



The following content has been adapted from a presentation given at the NIOSH Scientific Workshop: Application of the ILO International Classification of Radiographs of Pneumoconioses to Digital Chest Radiographic Images.

American College of Radiology Perspective

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Objectives, organizational perspective

- To implement digital acquisition and display for local x-ray facilities
- To implement digital classification for readers who classify images

Stakeholder actions / challenges

- Facilitate the development of technical guidelines for the acquisition and display of digital chest images suitable for ILO classification
- Based on the above, transition established teaching methods of classification from an analog to digital format and environment

The Beginning

- Collaboration with National Institute of Occupational Safety and Health & ILO
- An Integrated Mission
  - Education
  - Technical development and support

ACR The Beginning

- 1969 – Federal Coal Mine Health & Safety Act
  - Active miners: CXR within 18 mos, 3yr, 5yr
  - Retired miners
  - Disability / compensation benefits
  - Length of exposure / radiographic findings
  - International Union Against Cancer/Cincinnati system (based on 1958 ILO system)
- NIOSH / US Public Health Service requests assistance
- 1970 – ACR Pneumoconiosis Task Force

ACR Education

- Meeting the Instructional Challenge
- A crash program was developed
- Weekend Symposia for attendee convenience
- 6 courses in the first year
- > 30 meetings since 1970
- 4,000-5,000 physician attendees

- Viewbox teaching method
- Test-Teach-Test sequence of instruction*
- Compels active participation in the learning process
- Incorporated into other ACR subspecialty teaching seminars
- Remains the backbone of the current ACR Symposia on the Pneumoconioses

*Felson B, Jacobson G, Pendergrass E, Bristol L, Linton O, Harrington R. Viewbox seminar: A new method for teaching roentgenology. Radiology 1975; 116:75-78.

- Symposia restricted to physicians
- 6 Technical Symposia for radiographers on chest radiographic technique
- Special seminars for administrative judges & lawyers interpreting the law for state and federal programs

- Development of Home Study Syllabi
  - Classification for Physicians / B-reader candidates
  - Chest technique for radiographers
- Exhibits detailing proper radiographic technique and the ILO classification system
- Cinematic production explaining the law and the obligation of physicians

- Support for and validation of the “B reader” examination
- Implementation of the step wedge for improving radiographic technique*
- Development of a teaching module on asbestos related diseases

*E. DALE TROUT and JOHN P. KELLEY A PHANTOM FOR THE EVALUATION OF TECHNIQUES AND EQUIPMENT USED FOR ROENTGENOGRAPHY OF THE CHEST Am. J. Roentgenol., Apr 1973; 117: 771 – 776.

- ACR Pneumoconiosis Task Force consulted with various federal agencies conducting related programs:
  - Food and Drug Administration
  - Department of Labor
  - Social Security Administration
  - National Cancer Institute

- Development of Technical Guidelines prepared for NIOSH
- Home Study Syllabus on Technique for Chest Radiography
- Technique for Chest Radiography for Pneumoconiosis

ACR

- Members of the Task Force have been or are members of ILO committees
- Participated in the development/revisions of ILO Guidelines 1971, 1980, & 2000
- ACR sponsored conferences in Washington, D.C. which subsequently led to the 1980 & 2000 Guidelines
- ACR instrumental in the production of the 1980 ILO Standard Radiographs & the subsequent quadrant standards
- Participated as consultants to NIOSH for the review of teaching materials including the transition to digital

- 1982-84: ACR-NEMA collaboration
- ACR members requested non-proprietary format for image production from digital sources (CT, NM, US)
- National Electrical Manufacturers Association
- ACR-NEMA Digital Communication Standard
- Digital Imaging and Communication in Medicine standard – DICOM

Technique for Chest Radiography for Pneumoconiosis

- Overview
- Equipment
- Technique guides
- Scatter control
- Quantum mottle
- Screen/film combinations
- Sensitometric monitoring
- Radiation protection

- ACR practice guidelines
  - Performance of Adult Chest Radiography (10/06)
  - Digital Radiography* (10/07)
- ACR Technical Standard for Electronic Practice of Medical Imaging (10/07)

*Developed collaboratively by American College of Radiology
American Association of Physicists in Medicine
Society for Imaging Informatics in Medicine

DICOM

- To promote communication of digital image information, regardless of manufacturer
- To facilitate the development and expansion of PACS that can interface with other systems of hospital information
- To allow the creation of information databases that can be accessed by a wide variety of devices distributed geographically

- Used by other specialties utilizing digital imaging such as cardiology, GI endoscopy, pathology, dentistry, & dermatology
- Consists of 13 layers or sections
- Ongoing evolution
- Critical to digital imaging and this transition

American College of Radiology “Dust to Digital”

- Collaboration with National Institute of Occupational Safety and Health
- An Integrated Mission
  - Education
  - Technical development and support

ACR: Dust to Digital

- Transition to digital “viewbox” seminars
- Maintain the individual or registrant oriented approach for instruction
- Test – Teach – Test, interactive model
- What type of digital display devices will be necessary?
- Emulate the test and practice environment

- The challenge for teaching
- Transition away from the viewbox
- Classroom of the future
- New logistical paradigm using digital media but maintaining the benefits of the viewbox seminar
- Converting analogue material

- New facility
- Site of future teaching seminars?
- Site of future b-reader testing?

- Image processing driving display market
- Industry has moved to color LCD monitors
- More versatile for cross sectional imaging and CR/DR
- Color monitors generally load images faster
- Cheaper
- Can we use color monitors for B-reading?
- Will we require a B/W monitor?

- Established models for image acquisition
- Reestablish the primacy of high quality standard procedures in acquiring images regardless of modality
- Integrate digital acquisition and display guidelines with basic elements of chest radiography

- Reinvent the 1984 monograph as “Technique for Digital Chest Radiography for Pneumoconiosis”

- Use past experience as template
- Transition the current ACR Pneumoconiosis Committee to a Task Force, once again
- Draw from ACR Digital Guidelines authors & collaborators and members of this workshop
- Expand the Task Force’s role and composition from primarily education to a more integrated and supportive posture with NIOSH & ILO to assist in the “dust to digital” technical and educational transition
- Explore accreditation/ QA function

Page last reviewed: June 6, 2014