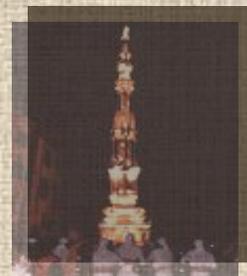
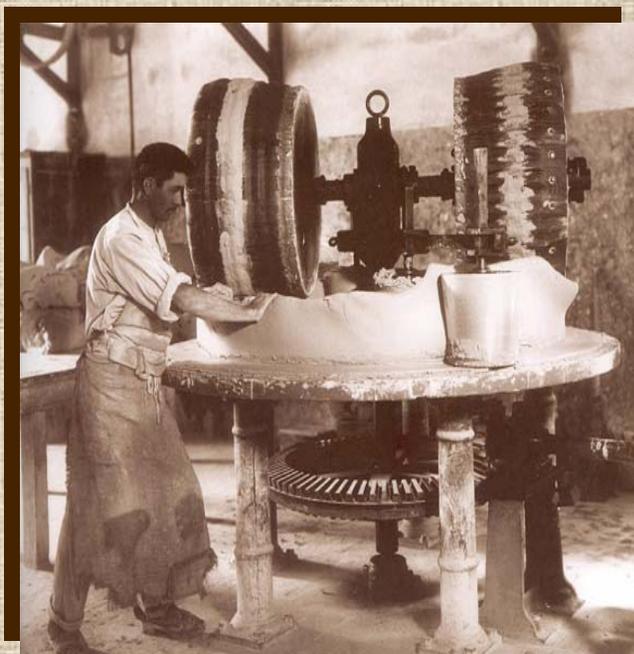


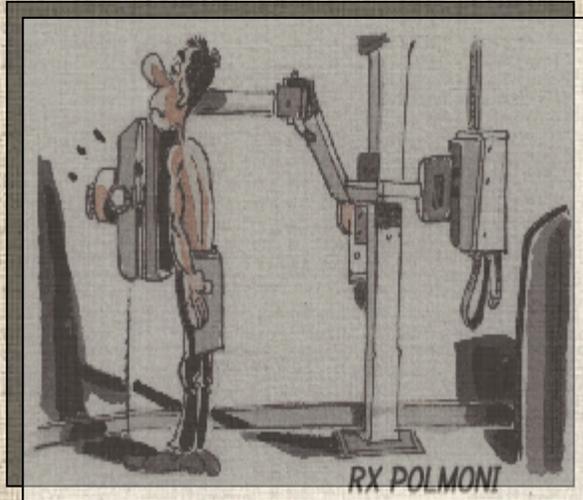
**“La formazione dei B readers: l'esperienza italiana di collaborazione con il NIOSH.**

**I controlli di qualità delle radiografie eseguite in gruppi di lavoratori a rischio:**

**l'esperienza della  
AUSL di Viterbo”**

Augusto Quercia





## 1. La formazione dei B-readers

OCCUPATIONAL  
SAFETY **22** AND HEALTH  
SERIES

**GUIDELINES FOR THE USE  
OF THE ILO INTERNATIONAL  
CLASSIFICATION OF RADIOGRAPHS  
OF PNEUMOCONIOSES**

REVISED EDITION 2000



INTERNATIONAL LABOUR OFFICE · GENEVA

# ILO Guidelines



- larga diffusione
- consenso unanime

## In Italia

- applicazione non costante
- applicazione parziale

JOM • Volume 34, Number 9, September 1992

# The NIOSH B Reader Certification Program

An Update Report

Gregory R. Wagner, MD

Michael D. Attfield, PhD

Richard D. Kennedy, MS

John E. Parker, MD

*Physicians trained in the use of the International Labour Office system for classification of radiographs of pneumoconioses who pass a competence test administered by the National Institute for Occupational Safety and Health are designated as B readers. The current certification and recertification examinations for qualification under the NIOSH B reader program are described. Details of the rationale and format of each examination are given, and information on candidates' scores provided for the years 1987-1990.*



## Corso NIOSH



- ✓ Linee guida ILO
- ✓ Esercitazione sul syllabus
- ✓ scheda di lettura
- ✓ Esame certificazione/ricertificazione

# NIOSH Reading Sheet

1544192534

DEPARTMENT OF HEALTH AND HUMAN SERVICES  
PUBLIC HEALTH SERVICE

OMB No.: 0920-0020

DATE OF RADIOGRAPH  
MONTH DAY YEAR

CENTERS FOR DISEASE CONTROL & PREVENTION  
National Institute for Occupational Safety and Health  
Federal Mine Safety and Health Act of 1977  
Medical Examination Program

Coal Workers' Health Surveillance Program  
NIOSH  
PO Box 4258  
Morgantown, West Virginia 26504

WORKER'S Social Security Number

ROENTGENOGRAPHIC INTERPRETATION

TYPE OF READING

FACILITY IDENTIFICATION

Note: Please record your interpretation of a single film by placing an "x" in the appropriate boxes on this form.

1. FILM QUALITY  Overexposed (dark)  Improper position  Underinflation  
 1  2  3  3/4  Underexposed (light)  Poor contrast  Mottle  
 (If not Grade 1, mark all boxes that apply)  Artifacts  Poor processing  Other (please specify) \_\_\_\_\_

2A. ANY PARENCHYMAL ABNORMALITIES CONSISTENT WITH PNEUMOCONIOSIS? YES  Complete Sections 2B and 2C NO  Proceed to Section 3A

2B. SMALL OPACITIES  b. ZONES  c. PROFUSION

a. SIZE		b. ZONES		c. PROFUSION	
PRIMARY	SECONDARY	R	L	0/4	0/0
<input type="checkbox"/> p <input type="checkbox"/> s	<input type="checkbox"/> p <input type="checkbox"/> s	<input type="checkbox"/>	<input type="checkbox"/>	1/0	1/1
<input type="checkbox"/> q <input type="checkbox"/> t	<input type="checkbox"/> q <input type="checkbox"/> t	<input type="checkbox"/>	<input type="checkbox"/>	2/1	2/2
<input type="checkbox"/> f <input type="checkbox"/> u	<input type="checkbox"/> f <input type="checkbox"/> u	<input type="checkbox"/>	<input type="checkbox"/>	3/2	3/3
				3/4	3/4

2C. LARGE OPACITIES  
SIZE  O  A  B  C Proceed to Section 3A

3A. ANY PLEURAL ABNORMALITIES CONSISTENT WITH PNEUMOCONIOSIS? YES  Complete Sections 3B, 3C NO  Proceed to Section 4A

3B. PLEURAL PLAQUES (mark site, calcification, extent, and width)

Chest wall	Site	Calcification	Extent (chest wall; combined for in profile and face on)	Width (in profile only) (3mm minimum width required)
In profile	<input type="checkbox"/> R <input type="checkbox"/> L	<input type="checkbox"/> O <input type="checkbox"/> R <input type="checkbox"/> L	Up to 1/4 of lateral chest wall = 1	3 to 5 mm = a
Face on	<input type="checkbox"/> O <input type="checkbox"/> R <input type="checkbox"/> L	<input type="checkbox"/> O <input type="checkbox"/> R <input type="checkbox"/> L	1/4 to 1/2 of lateral chest wall = 2	5 to 10 mm = b
Diaphragm	<input type="checkbox"/> O <input type="checkbox"/> R <input type="checkbox"/> L	<input type="checkbox"/> O <input type="checkbox"/> R <input type="checkbox"/> L	> 1/2 of lateral chest wall = 3	> 10 mm = c
Other site(s)	<input type="checkbox"/> O <input type="checkbox"/> R <input type="checkbox"/> L	<input type="checkbox"/> O <input type="checkbox"/> R <input type="checkbox"/> L	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	<input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c

3C. COSTOPHRENIC ANGLE OBLITERATION  R  L Proceed to Section 3D NO  Proceed to Section 4A

3D. DIFFUSE PLEURAL THICKENING (mark site, calcification, extent, and width)

Chest wall	Site	Calcification	Extent (chest wall; combined for in profile and face on)	Width (in profile only) (3mm minimum width required)
In profile	<input type="checkbox"/> O <input type="checkbox"/> R <input type="checkbox"/> L	<input type="checkbox"/> O <input type="checkbox"/> R <input type="checkbox"/> L	Up to 1/4 of lateral chest wall = 1	3 to 5 mm = a
Face on	<input type="checkbox"/> O <input type="checkbox"/> R <input type="checkbox"/> L	<input type="checkbox"/> O <input type="checkbox"/> R <input type="checkbox"/> L	1/4 to 1/2 of lateral chest wall = 2	5 to 10 mm = b
			> 1/2 of lateral chest wall = 3	> 10 mm = c

4A. ANY OTHER ABNORMALITIES? YES  Complete Sections 4B, 4C, 4D, 4E NO  Proceed to Section 5

4B. OTHER SYMBOLS (OBLIGATORY)

na  at  ax  bu  ca  ce  ch  co  cp  cv  di  ef  em  es  fr  hi  ho  id  ih  kl  mc  pa  pb  pl  px  ra  rp  th

OD If other diseases or significant abnormalities, findings must be recorded on reverse. (section 4C/4D) Date Physician or Worker notified? MONTH DAY YEAR

4E. Should worker see personal physician because of findings in section 4? YES  NO  Proceed to Section 5

5. PHYSICIAN'S Social Security Number\*

\* Furnishing your social security number is voluntary. Your refusal to provide this number will not affect your right to participate in this program.

FILM READER'S INITIALS MONTH DAY YEAR

LAST NAME - STREET ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP CODE \_\_\_\_\_

4961192530

4C. MARK ALL BOXES THAT APPLY: (Use of this list is intended to reduce handwritten comments and is optional)

**Abnormalities of the Diaphragm**

- Eventration
- Hiatal hernia

**Airway Disorders**

- Bronchovascular markings, heavy or increased
- Hyperinflation

**Bony Abnormalities**

- Bony chest cage abnormality
- Fracture, healed (non-rib)
- Fracture, not healed (non-rib)
- Scoliosis
- Vertebral column abnormality

**Lung Parenchymal Abnormalities**

- Azygos lobe
- Density, lung
- Infiltrate
- Nodule, nodular lesion

**Miscellaneous Abnormalities**

- Foreign body
- Post-surgical changes/sternal wire
- Cyst

**Vascular Disorders**

- Aorta, anomaly of
- Vascular abnormality

4D. OTHER COMMENTS

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Public reporting burden of this collection of information is estimated to average 3 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. Send comments regarding this burden estimate or any other aspect of this collection information, including suggestions for reducing this burden to CDC, Project Clearance Officer, 1600 Clifton Road, MS E-11, Atlanta, GA 30333, ATTN: PRA (09020-0020). Do not send the completed form to this address.

## Corsi di certificazione e ricertificazione e B-readers certificati sul totale dei partecipanti

Corsi	N°certificaz.	%	N° ricertificaz.	%
1998	9/9	100	/	/
2002	6/12	50	4/7	57
2004	5/12	41	/	/
2006	10/13	77	9/10	90
2008	?/12	-	?/2	-

## **B Readers per specializzazione ed anzianità di certificazione**

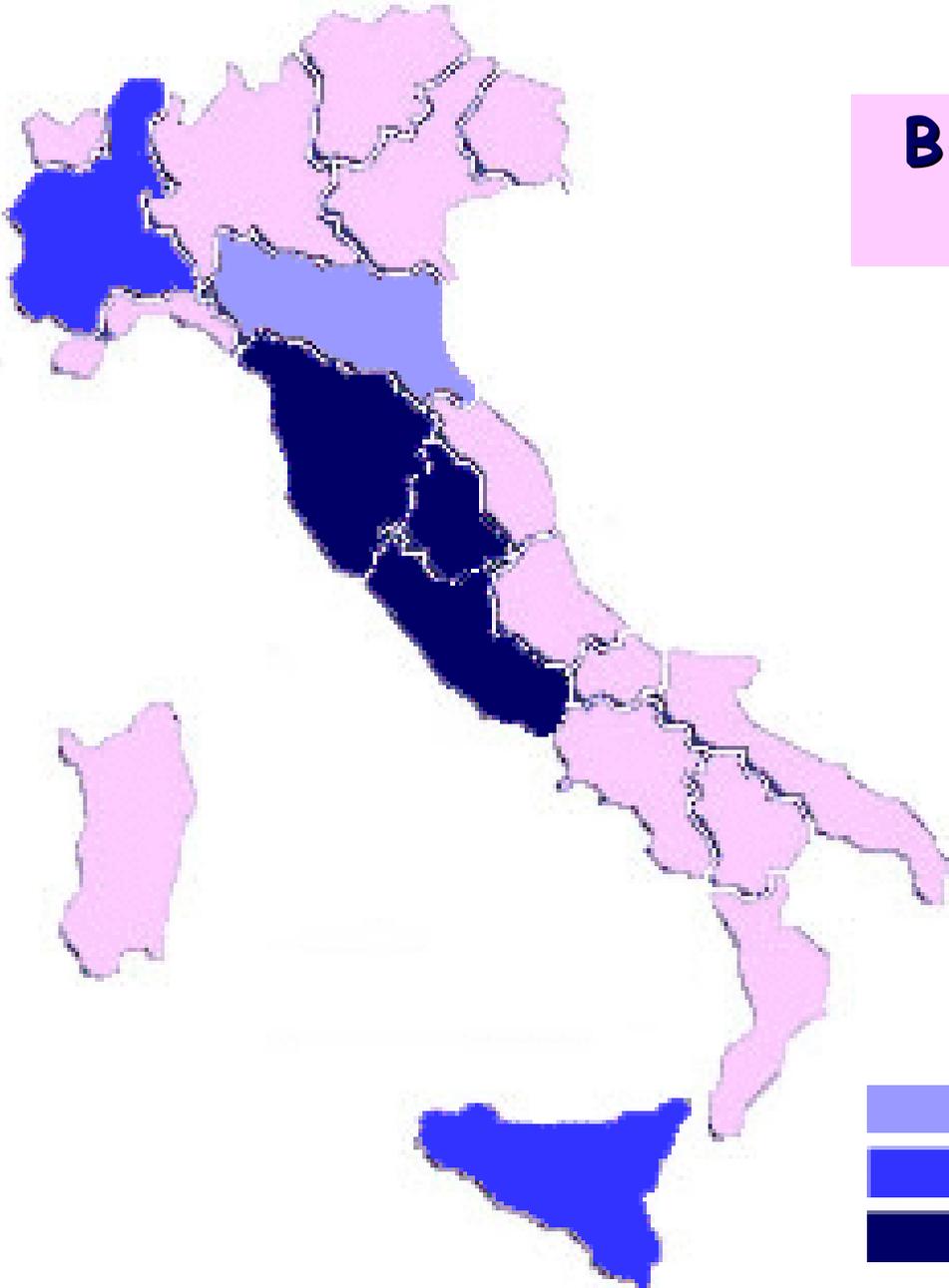
<b>Corsi</b>	<b>Radiologi</b>	<b>Medici del lavoro</b>
<b>Certificazione</b>	<b>9</b>	<b>6</b>
<b>1<sup>a</sup> Ricertificazione</b>	<b>1</b>	<b>5</b>
<b>2<sup>a</sup> Ricertificazione</b>	<b>2</b>	<b>1</b>
<b>Totale</b>	<b>12</b>	<b>12</b>



## DISTRIBUZIONE GEOGRAFICA B-READERS IN ITALIA



## B-READERS: ATTIVITA' IN CORSO



-  in progetto
-  lettori singoli
-  gruppi di lettori (doppio/triplo cieco)



## **2. I controlli di qualità: l'esperienza della AUSL di Viterbo**



# La Medicina del Lavoro

RIVISTA BIMESTRALE DI MEDICINA DEL LAVORO E IGIENE INDUSTRIALE  
ITALIAN JOURNAL OF OCCUPATIONAL HEALTH AND INDUSTRIAL HYGIENE

CONTIENE INDICE 2003

## ARTICOLI SPECIALI / SPECIAL ARTICLES

- 183 Modelli *in vitro* per la valutazione della neurotossicità del metilmercurio. Stato attuale delle conoscenze *In vitro models for assessment of the neurotoxicity of methylmercury - current state of knowledge* M.V. Vettori, R. Altucci, S. Belletti, M. Goldoni, I. Franchini, A. Matti
- 192 Studio degli effetti genotossici da esposizione a radiazioni cosmiche nel personale aeronavigante mediante tecniche citogenetiche e molecolari Evaluation of genotoxic effects caused by cosmic radiation exposure in flight personnel using cytogenetic and molecular techniques S. Iacovioli, A. Marinaccio, B. Perniconi, S. Palmi, D. Cavallo

## ARTICOLI ORIGINALI / ORIGINAL ARTICLES

- 200 Studio del rilascio *in vitro* di radicali ossidrilici (HO<sup>•</sup>) da parte di polveri contenenti fibre di fluoro-edenite identificate nella roccia lavica di Biancavilla (Sicilia orientale) *In vitro hydroxyl radical (HO<sup>•</sup>) generation from dust containing fluoro-edenite in volcanic rock in Biancavilla (Eastern Sicily)* V. Rappiarida, M. Amati, S. Colocini, L. Bolognini, L. Gobbi, D. Duccio
- 207 Esposizione a *Saccharopolyspora Rectivirgula* degli allevatori di bestiame bovino della provincia di Reggio Emilia e rischio di alveolite allergica estrinseca (*Farmer's Lung*) Exposure of cattle breeders to *Saccharopolyspora Rectivirgula* in the Reggio Emilia Province and risk of Farmer's Lung F. Ferri, M. Dattori, L. Bolognini, S. Perini, M. Ligabue
- 216 Esposizione a solventi organici volatili in un gruppo di falegnamerie artigiane Exposure to volatile organic solvents in a group of small carpentry enterprises G. Miscenti, P. Garofani, P. Bodo, A. Menarvelli, A. Ballerani, A. Ceppinelli, R. Angeloni, V. Proietti
- 224 Audit della sorveglianza sanitaria negli esposti a polvere di legno Audit of medical surveillance in wood dust exposure L. Becilacqua, A. Sacco, N. Magnacita
- 231 Significato degli indicatori biologici di esposizione a mercurio Exposure indicators for inorganic mercury: an updating P. Apotoli, A. Mangili, L. Alessio

## APPUNTI DI METODO / NOTES ON METHODS

- 242 Controllo di qualità tecnica sui radiogrammi del torace effettuati per la sorveglianza sanitaria dei lavoratori esposti al rischio di pneumoconiosi: proposta di un metodo di screening qualitativo Technical quality control of chest radiographs performed for purpose of health control of workers exposed to pneumoconiosis risk: proposal of a qualitative screening method G. Manzari, E. Valenti, F. D'Epifanio, A. Quercia, E. Cardona

## NOTIZIARIO / NEWS

- 250 10th Congress on Occupational Health Services, Amsterdam 13-16 Novembre 2002 (G. Franco) - Conferenza Internazionale "Indoor Air 2002" (P. Carrer, M. Della Torre)

## RECENSIONI / BOOK REVIEWS

- 252 Nuovi testi di Medicina del Lavoro (L. Soleo)
- 253 66° Congresso Nazionale SIMLII - Bari, 15-18 ottobre 2003
- 254 Ringraziamenti ai revisori scientifici / Acknowledgement of Scientific Reviewers

## APPUNTI DI METODO

## Controllo di qualità tecnica sui radiogrammi del torace effettuati per la sorveglianza sanitaria dei lavoratori esposti al rischio di pneumoconiosi: proposta di un metodo di screening qualitativo

GIOVANNA MANZARI, E. VALENTI, F. D'EPIFANIO\*, A. QUERCIA, E. CARDONA\*

Dipartimento di Prevenzione - Servizio PISLL, ASL Viterbo  
\*Dipartimento Ospedaliero di Civita Castellana - UO Radiologia

## KEY WORDS

Chest radiography; quality control; pneumoconiosis

## SUMMARY

**Technical quality control of chest radiographs performed for purpose of health control of workers exposed to pneumoconiosis risk: proposal of a qualitative screening method.** Background: The necessity of a qualitative screening has arisen from the fact that good technical quality is of fundamental importance for evaluating initial pneumoconiosis, for reducing inter- and intra-reader variability, for effective secondary prevention and for forensic medicine purposes. Objectives: The authors report experience in use of a method to evaluate the quality of chest radiographs performed in health surveillance programs for workers at risk for development of pneumoconiosis. Methods: 747 postero-anterior chest radiographs concerning employees of 21 ceramic factories in the Province of Viterbo were examined. A standardized pattern was created for this evaluation. The pattern considers the main factors that can influence the quality of chest radiographs and assigns points for each of them. That factors are: 1) reproduced image of the lung's vascular structure, chiefly in the peripheral portions; 2) reproduced image of heart border, aorta, diaphragm; 3) deep inspiration; 4) symmetric image of the chest; 5) position of the scapulae; 6) visualization of the costal-phrenic angles; 7) technical impairments. Results: The application of the method revealed that half of the chest radiographs examined had poor image quality for a suitable reading, in conformity with the ILO 1980 guidelines. The critical points are poor visualization of the lung's vascular structure due to overexposure or underexposure, technical impairments, non-correct scapulae position. Conclusions: The authors believe that the suggested method can be a useful instrument for self-testing the quality of chest radiographs performed in radiology centers and for the National Health Service to test the quality of chest radiographs performed in health surveillance programs.

Pervenuto il 14.12.2001 - Accettato il 9.9.2002

Corrispondenza: D.ssa G. Manzari Servizio Prevenzione Igiene e Sicurezza nei Luoghi di Lavoro ASL Viterbo, Via Ferretti 169, 01033 Civita Castellana (VT) - Tel. 0761.541034 - Fax 0761.541032 - e-mail spiallciv@libero.it

**SCHEDA DI VALUTAZIONE QUALITATIVA DEI RADIOGRAMMI  
DEL TORACE IN POSTERO-ANTERIORE**

DITTA \_\_\_\_\_ LABORATORIO \_\_\_\_\_

COGNOME \_\_\_\_\_ NOME \_\_\_\_\_

DATA NASCITA \_\_\_\_\_ DATA RX \_\_\_\_\_

	0	1	2	3	4	5	FRAZIONI
SOVRAESP./SOTTOESP. ERRATO RAPP. KV/mA							
SFUMATURA DA MOVIMENTO							
INSPIRAZIONE PROFONDA							
SIMMETRIA TORACE							
BORDI SCAPOLARI							
ANGOLI COSTO-FRENICI							
DIFETTI TECNICI							

PUNTEGGIO TOTALE:

GIUDIZIO CONCLUSIVO:  SUFFICIENTE

INSUFFICIENTE

DATA \_\_\_\_\_

FIRMA DEI COMPILATORI

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Valutazione Rx mediante griglia: n. e % di esami sufficienti e insufficienti, punteggio medio, mediana e moda per singolo laboratorio**

Lab.	n. Rx	Suff.		Insuff.		P. Medio	Mediana	Moda
		n.	(%)	n.	(%)			
1	511	164	(32)	347	(68)	4,5 $\pm$ 2,5	4	3
2	189	169	(89)	20	(11)	7,3 $\pm$ 1,5	7,5	8
3	29	23	(79)	6	(21)	6,4 $\pm$ 1,4	6,5	6
4	18	18	(100)	/	(/)	9,2 $\pm$ 0,6	9	9
<b>Totale</b>	<b>747</b>	<b>374</b>	<b>(50,1)</b>	<b>373</b>	<b>(49,9)</b>	<b>5,4 <math>\pm</math> 2,6</b>	<b>6</b>	<b>6</b>

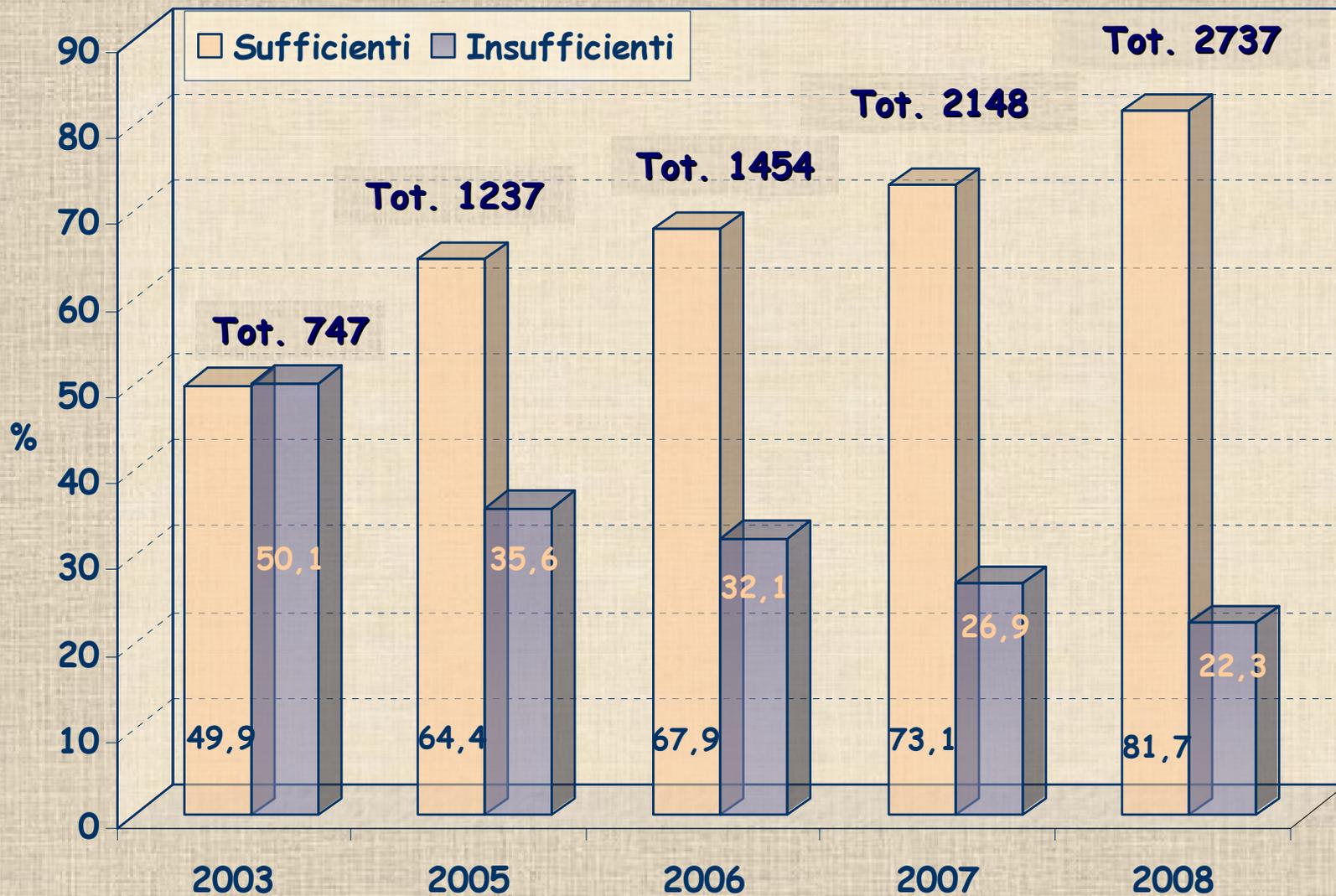
## **Analisi dei punti sottratti con applicazione della griglia**

<b>Aspetto esaminato</b>	<b>N. prove con sottraz. punti</b>	<b>%</b>	<b>Media punti sottratti</b>	<b>D.S.</b>
Vis. Vasi/linee med.	664	89,5	2,1	1,1
Difetti tecnici	479	64,1	2,5	1,1
Pos. Scapole	387	52,2	1,2	0,5
Bordi cuore/diaframma	150	20,2	0,8	0,5
Simm. Campi polmonari	150	20,2	0,6	0,3
Angoli costo-frenici	106	14,3	0,9	0,4
Inspirazione profonda	81	10,9	0,8	0,3

## Valutazione Rx mediante griglia: n. e % di esami sufficienti e insufficienti, punteggio per singolo laboratorio

Lab.	n. Rx	Suff.		Insuff.	
		n.	(%)	n.	(%)
1	855	443	(52)	412	(48)
2	795	756	(95)	99	(5)
3	295	255	(86)	40	(14)
4	18	18	(100)	/	(/)
5	96	26	(27)	70	(73)
6	54	40	(74)	14	(26)
7	22	20	(99)	2	(1)
8	102	81	(9)	21	(21)
<b>Totale</b>	<b>2237</b>	<b>1639</b>	<b>(77)</b>	<b>598</b>	<b>(23)</b>

# Qualità degli Rxt di lavoratori esposti a silice esaminati da B-readers



# RADIOLOGIA OSPEDALE DI CIVITA CASTELLANA.

## Qualità rx prima e dopo il corso NIOSH

	Suff.	Insuff.	Tot.
Pre '98	382	35 (8.4)	417
Post '98	83	0	83
	465	35	500

**Confronto letture B-readers/Aziende in base alla profusione radiologica delle immagini (profusione ILO 0/0-0/1 =NEG; profusione ILO 1/0 o maggiore = POS. Anno 2008.**

		AZIENDE		
		POS	NEG	
B rea ders	POS	28	30	58 (5.2%)
	NEG	7	1052	1059 (94.8%)
		35 (3.1%)	1082 (96.9%)	1117

# Evidenze disponibili

- Elevata % Rx non leggibili
- necessità ed efficacia di azioni di controllo

- significativo n° casi "persi" (falsi negativi)
- utilità indagini epidemiologiche di confronto

# Prospettive

- ✓ **Nuovi corsi**
- ✓ **Gruppi di lettura "regionali" (anche per i medici competenti)**
- ✓ **Attivazione indagine specifiche**
- ✓ **"Rete" dei B Readers**