

Feasibility of a screening program for lung cancer in 1119 former asbestos workers

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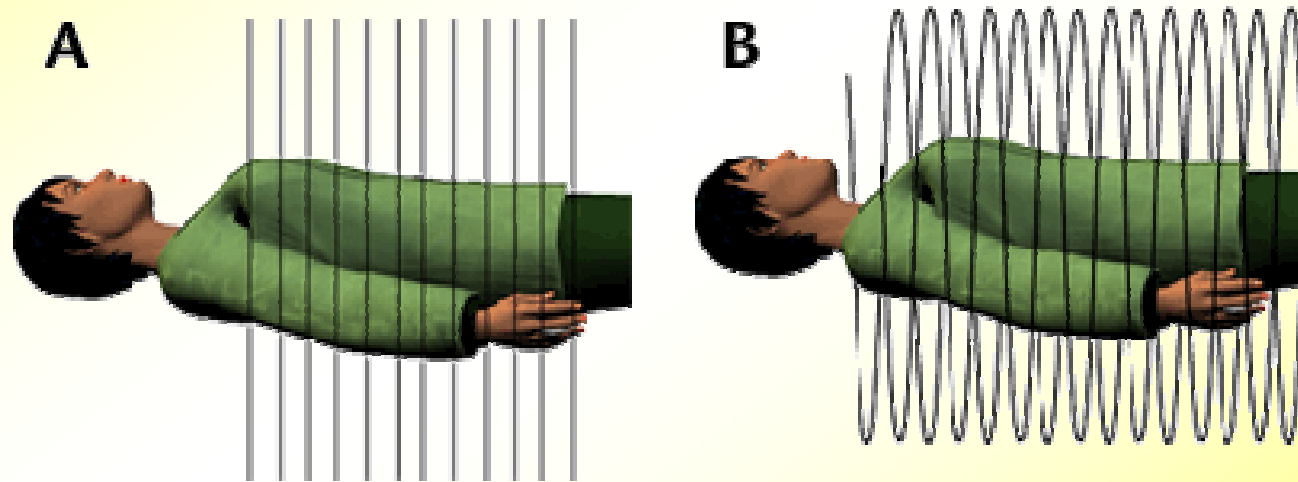
U Fedeli – C.R.R.C. S.E.R. Region of Veneto, Castelfranco Veneto

Early Lung Cancer Action Project [Hensche 1999]

	Rx+	Rx -	Total	Cases
CT+	33	200	233	27
CT-	35	732	767	
Total	68	932	1000	

Cases **7**

Figure A: Conventional CT scan
Figure B: Spiral CT scan



Assessment of asbestos exposure [Magnani 2000]



Factors that effect the level of airborne asbestos:

- the nature of the asbestos materials
- how the work is performed
- the availability of controls to limit exposure

Criterion for cohort selection

Workers at high risk of exposure to asbestos
engaged in:

railway stock fabrication and repair

manufacture of cement/asbestos products

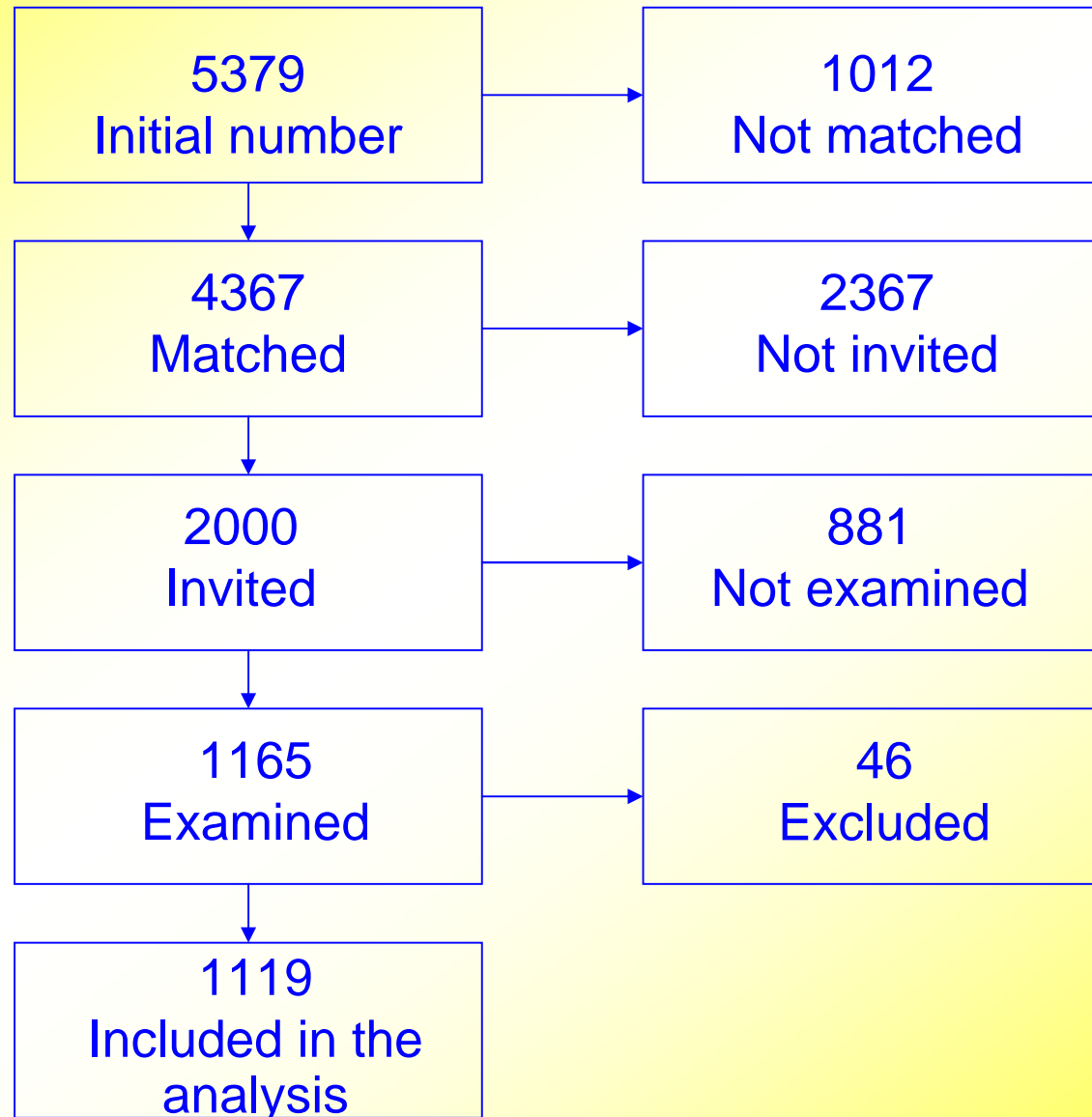
shipyards

insulators

Identification of cohorts

The relevant companies were identified through the application forms completed by their workers according to an Italian law (decree no. 257/92) providing benefits for workers formerly exposed to asbestos

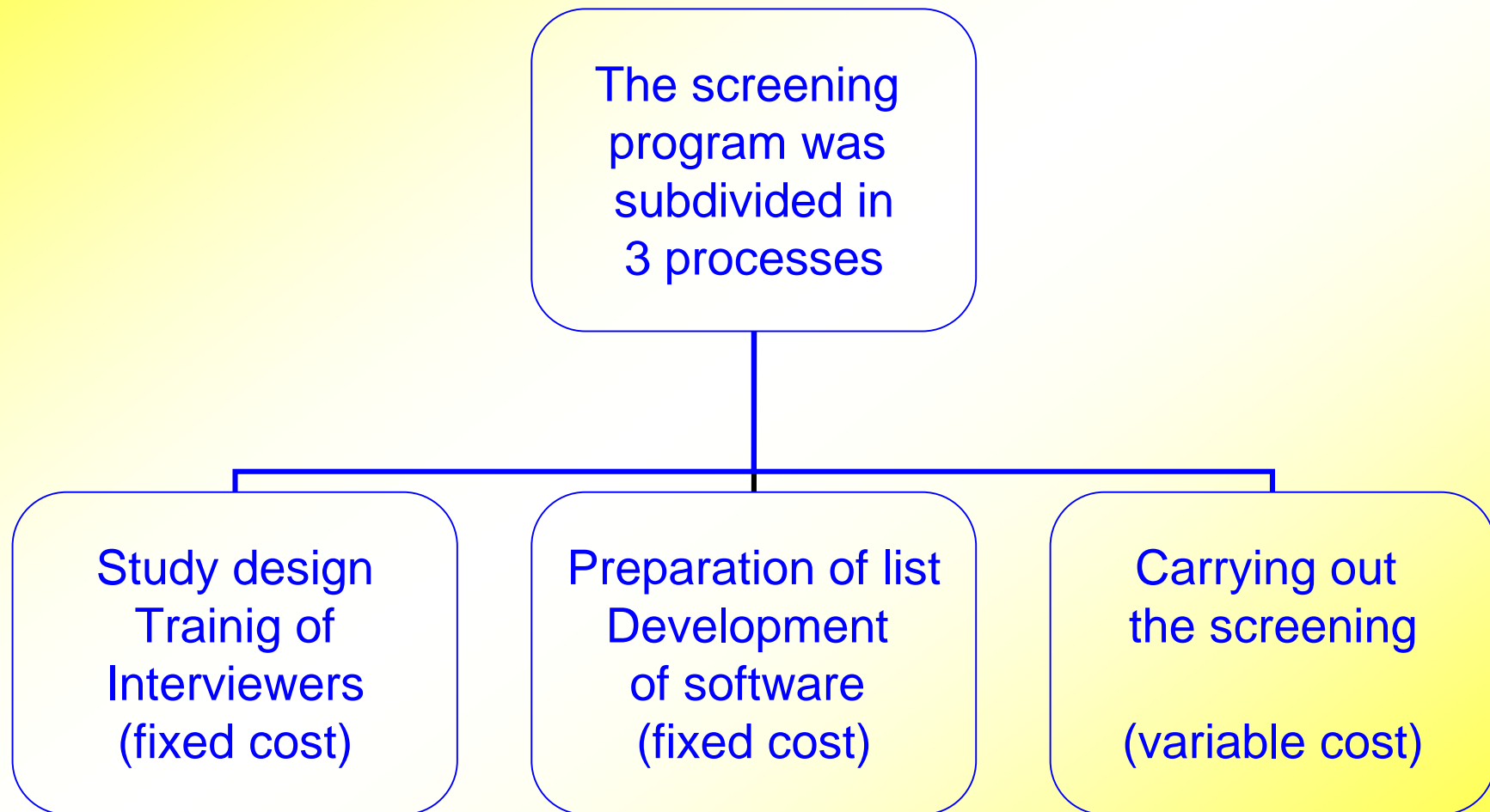
Subjects



Diagnostic workup of screen-detected NCN

Characteristics of NCN (number < 6)				CT follow-up
Size	Shape	Margins	Calcification	
< 1 cm	Regular	Sharp	Yes	6 months
< 1 cm	Irregular	Spiculate	No	3 months
> 1 cm	-	-	-	Biopsy

Cost analysis



25 biopsies and 5 lung cancer cases

25 biopsies:

- 13 of lung
- 9 of pleura
- 3 of both

Out of 16 lung biopsies:

- 5 lung cancers (4 primary and 1 secondary)

1 additional lung cancer diagnosed by cytology

Screening outcomes

		Cases	Non cases	Total
Screening	+	5	11	16
	-	0	1103	1103
Total		5	1114	1119

Sensitivity = $(5/5) = 100\%$

Specificity = $(1103/1114) = 99\%$

Positive predictive value = $(5/16) = 31\%$

Lung cancer incidence rates

Rates $\times 10^5$	Populations
149	1119 screened workers
154	4367 workers in the original cohort
149	Veneto, males, aged 55-59 years

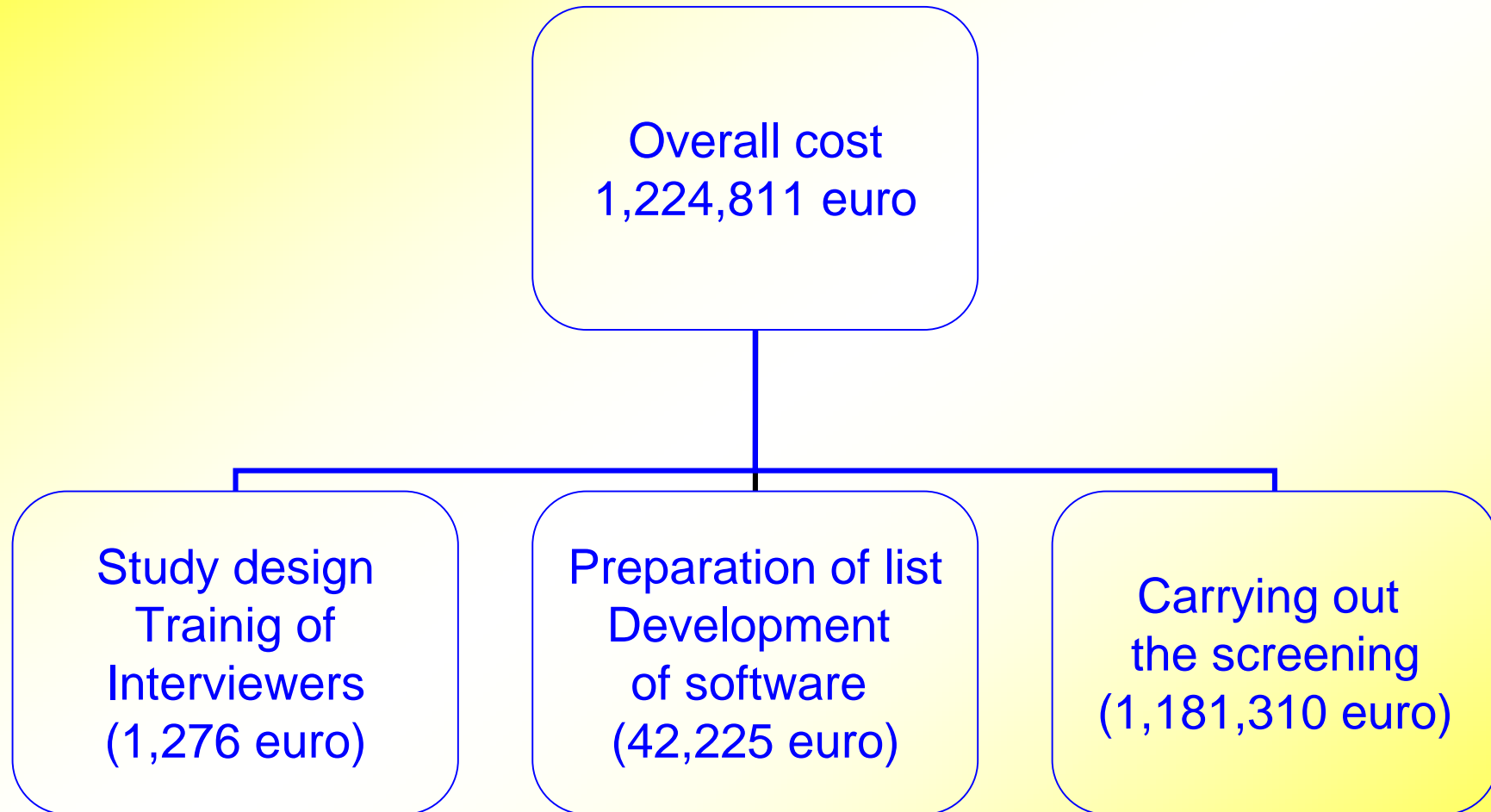
Characteristics of cases

Cases	Age, Smoking	Cumulative asbestos exposure (f/mlxyears)	TSFE, TSLE (years)	Asbestosis Pleural plaques
1	61, ExS	13.6	18, 15	A ₀ , P ₀
2	65, ExS	182	50, 17	A ₁ , P ₀
3	63, ExS	108	25, 11	A ₁ , P ₀
4	56, CS	4.0	25, 13	A ₀ , P ₀
5	52, CS	35.0	36, 17	A ₀ , P ₁

Characteristics of cases

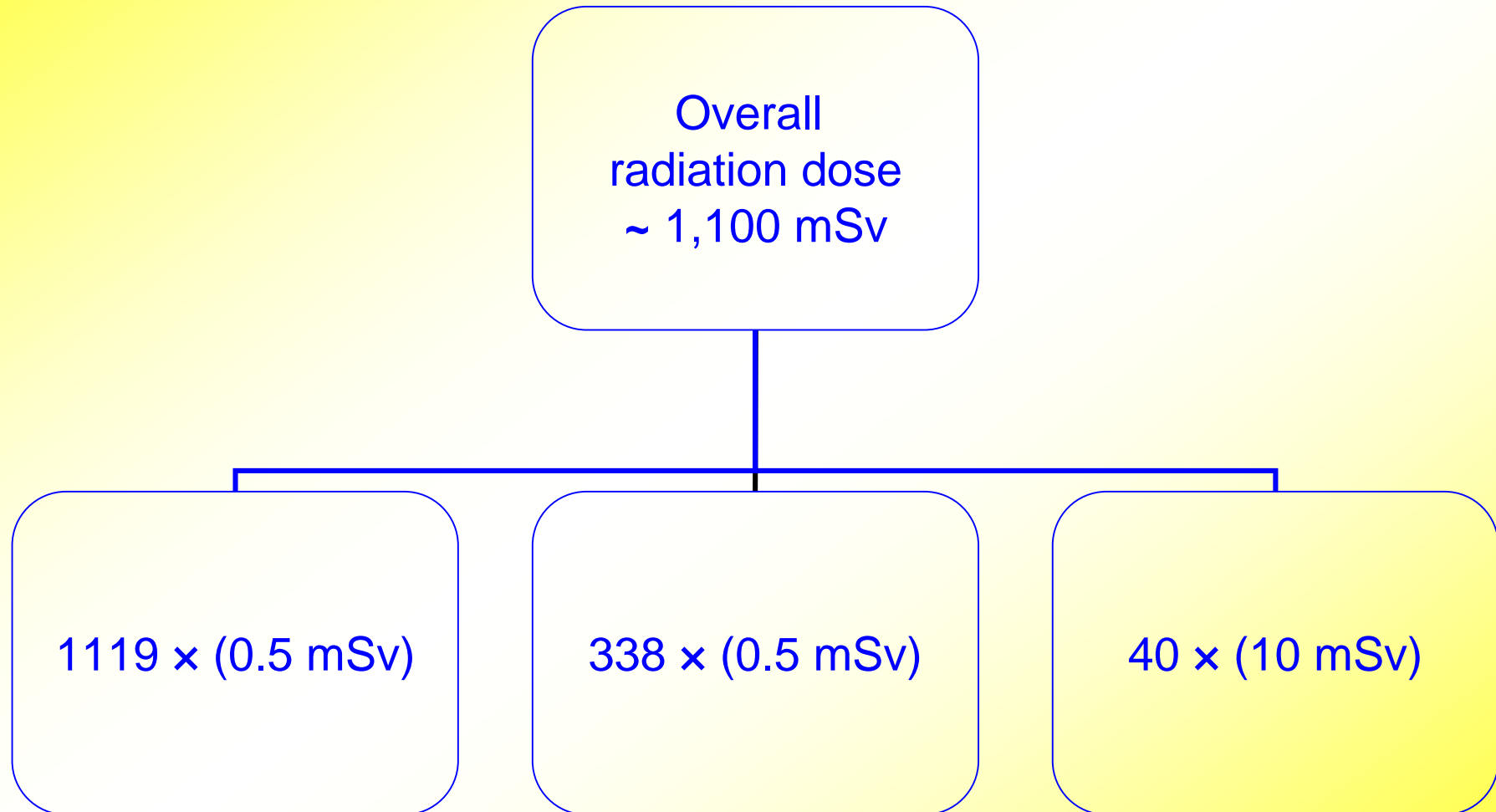
Cases	First CT: date and ∅ of NCN	Last CT: date and ∅ of NCN	Histology	TNM classification and Stage
1	May 2002 ∅ < 1 cm	Feb 2005: ∅ > 1 cm	AC	T2/N1/M0 Stage IIB
2	Jun 2002 ∅ > 2 cm		NSCC	
3	Sep 2002 ∅ < 1cm	May 2003 ∅ =1.5 cm	AC, SC	T1/N2/M0 Stage IIIA
4	Oct 2001 ∅ = 1 cm	Apr 2002: ∅ = 1 cm	AC	T1/N2/M0 Stage IIIA
5	Dec 2001 ∅ < 1 cm	Nov 2004: ∅ > 1 cm	SC	T1/N0/M0 Stage IA

Costs



Cost for screen-detected lung cancer case = 244,962 euro

Radiation dose



Radiation dose for screen-detected lung cancer case ~ 220 mSv

Conclusions

Screening with low-dose CT for early diagnosis of lung cancer in former asbestos workers was unsatisfactory because of:

- low adherence
- low yield of cases detected
- high cost and radiation dose delivered to healthy subjects

As no advantage concerning prevention could be achieved in the target group, the screening program was discontinued

Our findings do not support testing for early lung cancer detection in asymptomatic individuals previously exposed to asbestos