Νεότερα δεδομένα από τον προληπτικό έλεγχο για καρκίνο του πνεύμονα

ΚΟΝΤΟΠΥΡΓΙΑΣ ΓΕΩΡΓΙΟΣ

ΠΝΕΥΜΟΝΟΛΟΓΟΣ MD, MSc, FCCP

ΝΟΣΟΚΟΜΕΙΟ METROPOLITAN

Σύγκρουση συμφερόντων

ΠΡΟΛΗΠΤΙΚΟ ΑΚΤΙΝΟΛΟΓΙΚΟ ΕΛΕΓΧΟ

ΔΕΔΟΜΕΝΑ → ΜΕΛΕΤΕΣ

→ ΠΡΟΒΛΗΜΑΤΙΣΜΟΙ

→ ΕΦΑΡΜΟΓΗ

The problem

World Health Organization

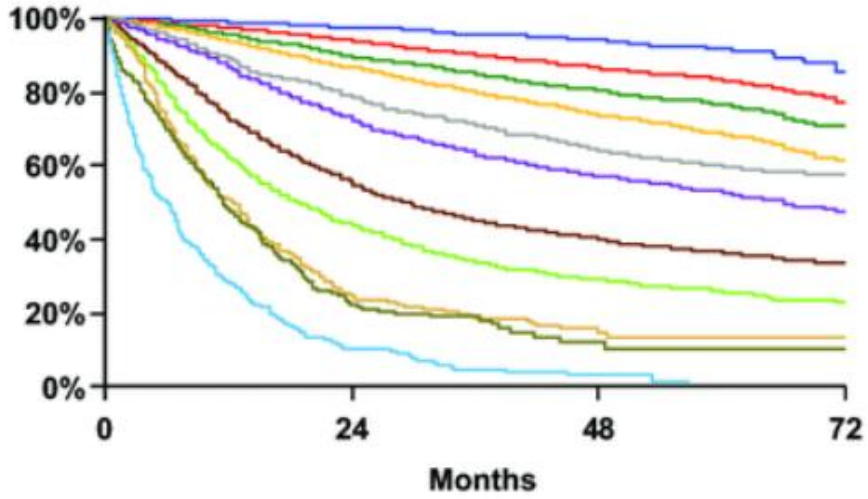
Cancer is a leading cause of death worldwide, accounting for an estimated 9.6 million deaths in 2018. The most common cancers are:

- Lung (2.09 million cases)
- Breast (2.09 million cases)
- Colorectal (1.80 million cases)
- Prostate (1.28 million cases)
- Skin cancer (non-melanoma) (1.04 million cases)
- Stomach (1.03 million cases)

The most common causes of cancer death are cancers of:

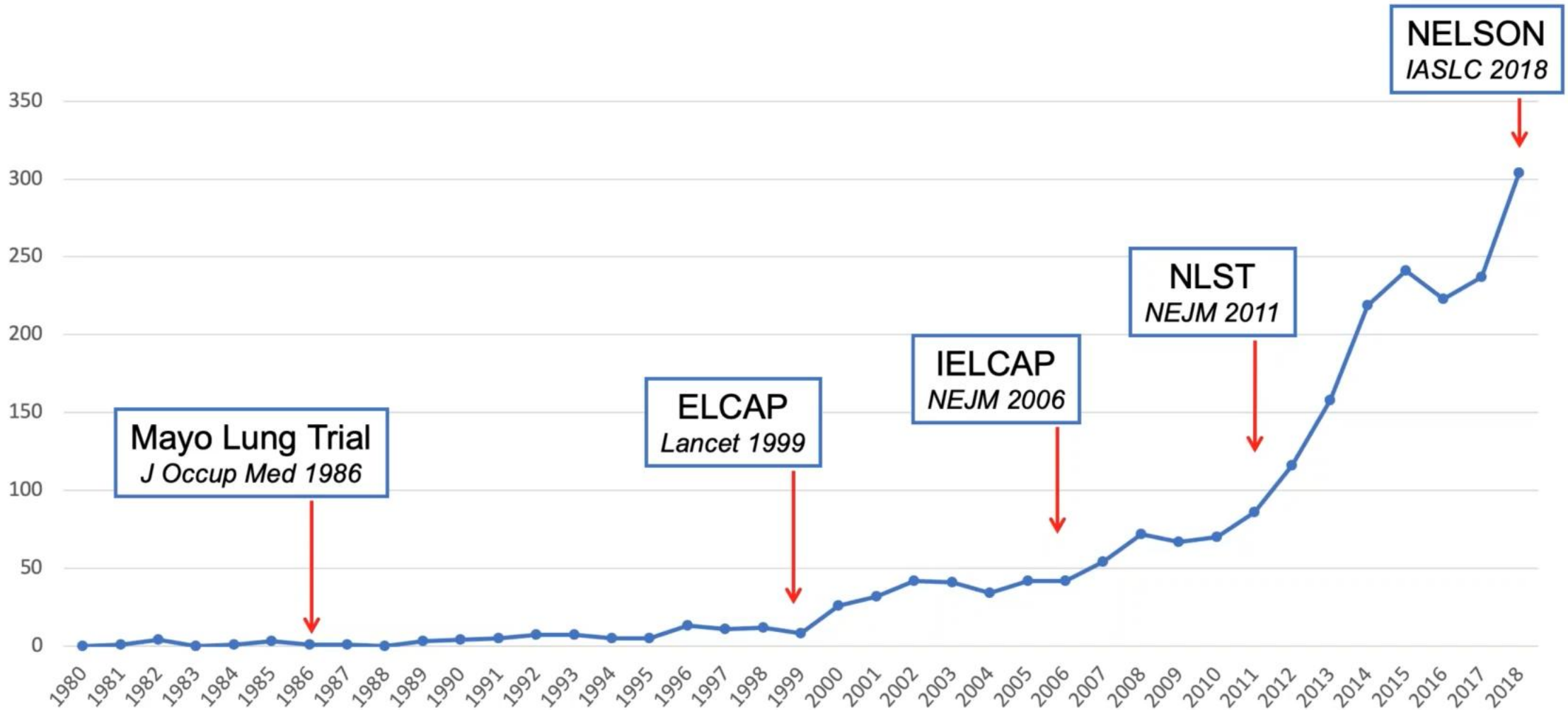
- Lung (1.76 million deaths)
- Colorectal (862 000 deaths)
- Stomach (783 000 deaths)
- Liver (782 000 deaths)
- Breast (627 000 deaths)

Επιβίωση ανά στάδιο κατά τη διάγνωση



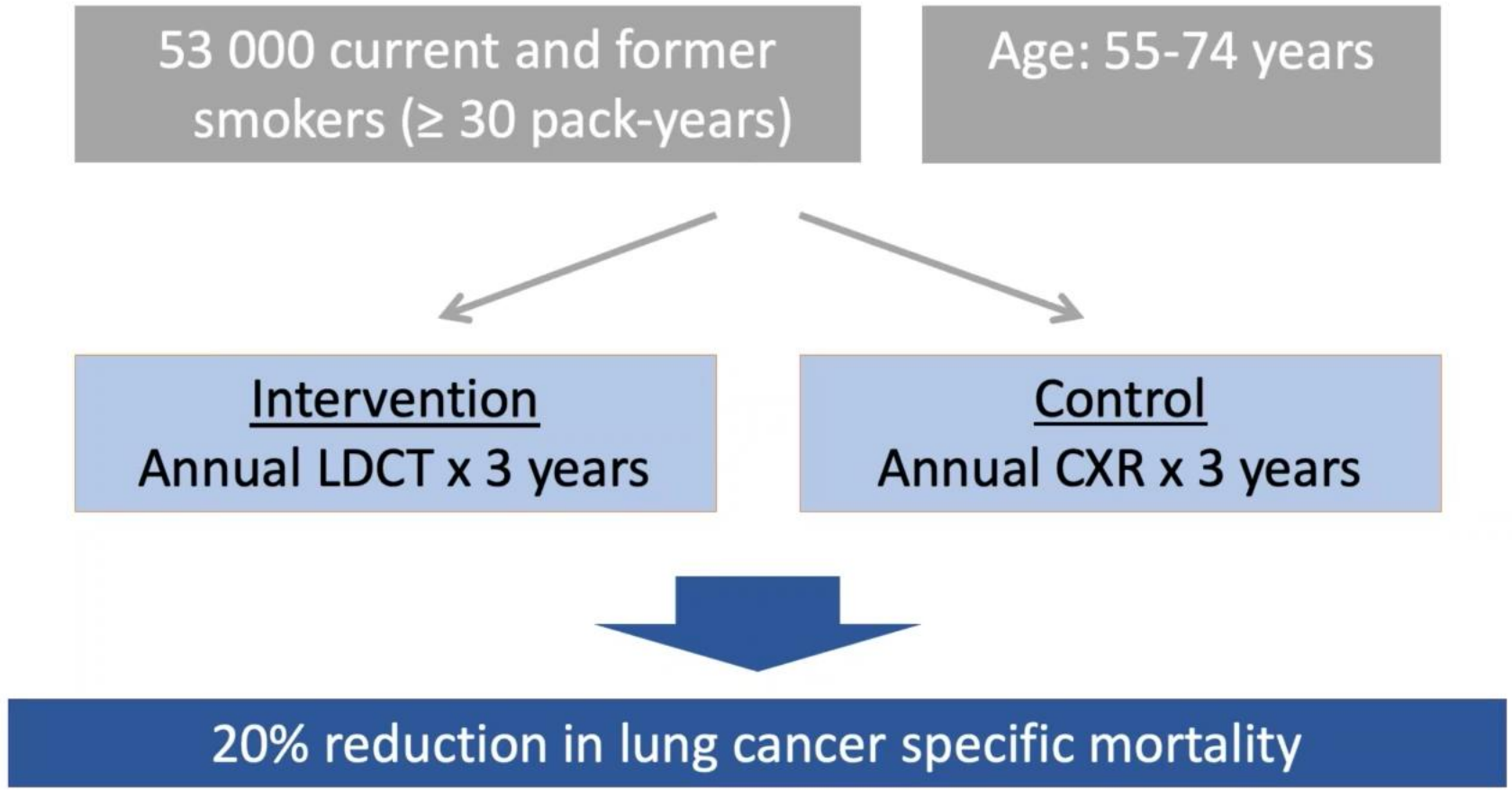
Proposed	Events / N	MST	24 Month	60 Month
IA1	68 / 781	NR	97%	92%
IA2	505 / 3105	NR	94%	83%
IA3	546 / 2417	NR	90%	77%
IB	560 / 1928	NR	87%	68%
IIA	215 / 585	NR	79%	60%
IIB	605 / 1453	66.0	72%	53%
IIIA	2052 / 3200	29.3	55%	36%
IIIB	1551 / 2140	19.0	44%	26%
IIIC	831 / 986	12.6	24%	13%
IVA	336 / 484	11.5	23%	10%
IVB	328 / 398	6.0	10%	0%

Number of publications on lung cancer screening



Fontana et al. J Occup Med.1986;28(8):746-50; Henschke et al. Lancet. 1999;354(9173):99-105;
IELCAP Investigators. N Engl J Med 2006;355:1763-71; NLST Research Team. N Engl J Med 2011;365:395-409

NLST – National Lung Cancer Screening Trial (2002-2010)



NLST Research Team. N Engl J Med 2011;365:395-409

NLST – National Lung Cancer Screening Trial (2002-2010)

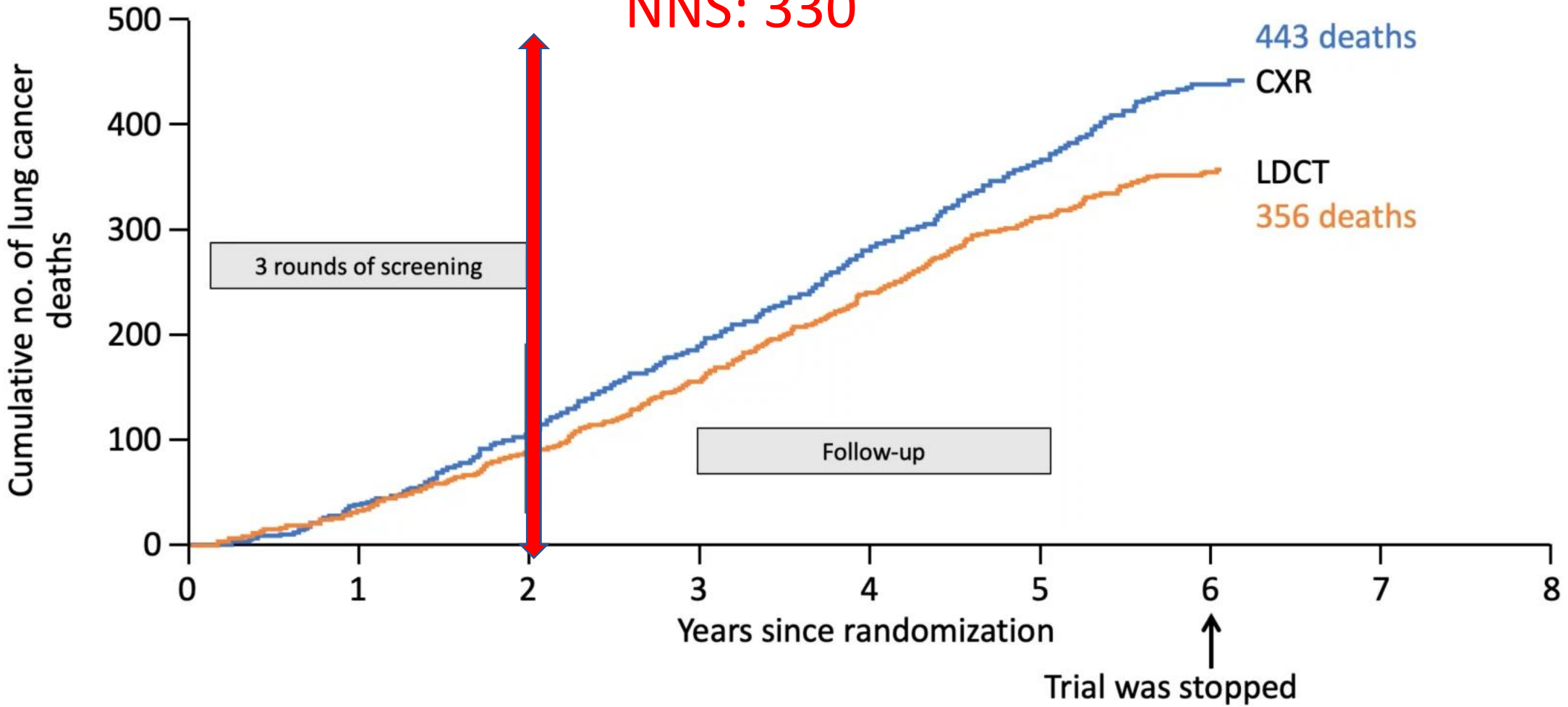
Cancer stage	Low dose CT N=1060		Chest X-Ray N=941	
	Number	Percent	Number	Percent
IA	▶416	40	▶196	21
IB	104	10	93	10
II	73	7	74	8
III	221	21	231	25
IV	▶226	22	▶335	36
total	1040	100	929	100

NLST showed a 20% reduction in the 6-year cumulative mortality rates for CT vs CXR

(356 vs 443 deaths)

All cause mortality reduction 7%

NNS: 330



CT, computed tomography; CXR, chest radiography

NLST Research Team. N Engl J Med 2011;365:395-409

Smoking Cessation Counseling

Shared Decision Making

Annals of Internal Medicine

U.S. Preventive Services TASK FORCE
www.USPreventiveServicesTaskForce.org

SCREENING FOR LUNG CANCER
CLINICAL SUMMARY OF U.S. PREVENTIVE SERVICES TASK FORCE RECOMMENDATION

Population	Asymptomatic adults aged 55 to 80 y who have a 30 pack-year smoking history and currently smoke or have quit smoking within the past 15 y
Recommendation	Screen annually for lung cancer with low-dose computed tomography. Discontinue screening when the patient has not smoked for 15 y. Grade: B

Risk Assessment	Age, total cumulative exposure to tobacco smoke, and years since quitting smoking are the most important risk factors for lung cancer. Other risk factors include specific occupational exposures, radon exposure, family history, and history of pulmonary fibrosis or chronic obstructive lung disease.
Screening Tests	Low-dose computed tomography has high sensitivity and acceptable specificity for detecting lung cancer in high-risk persons and is the only currently recommended screening test for lung cancer.
Treatment	Non–small cell lung cancer is treated with surgical resection when possible and also with radiation and chemotherapy.
Balance of Benefits and Harms	Annual screening for lung cancer with low-dose computed tomography is of moderate net benefit in asymptomatic persons who are at high risk for lung cancer based on age, total cumulative exposure to tobacco smoke, and years since quitting smoking.
Other Relevant USPSTF Recommendations	The USPSTF has made recommendations on counseling and interventions to prevent tobacco use and tobacco-caused disease. These recommendations are available at www.uspreventiveservicestaskforce.org.

For a summary of the evidence systematically reviewed in making this recommendation, the full recommendation statement, and supporting documents, please go to www.uspreventiveservicestaskforce.org.

Screening Coverage Decisions: USA

MEDICARE

- Final rule February 5, 2015
- NLST criteria ages 55 – 77
- Smoking cessation counseling
- Submit data to CMS-approved national registry:
  - American College of Radiology is approved registry

CHEST

Screening for Lung Cancer

CHEST Guideline and Expert Panel Report

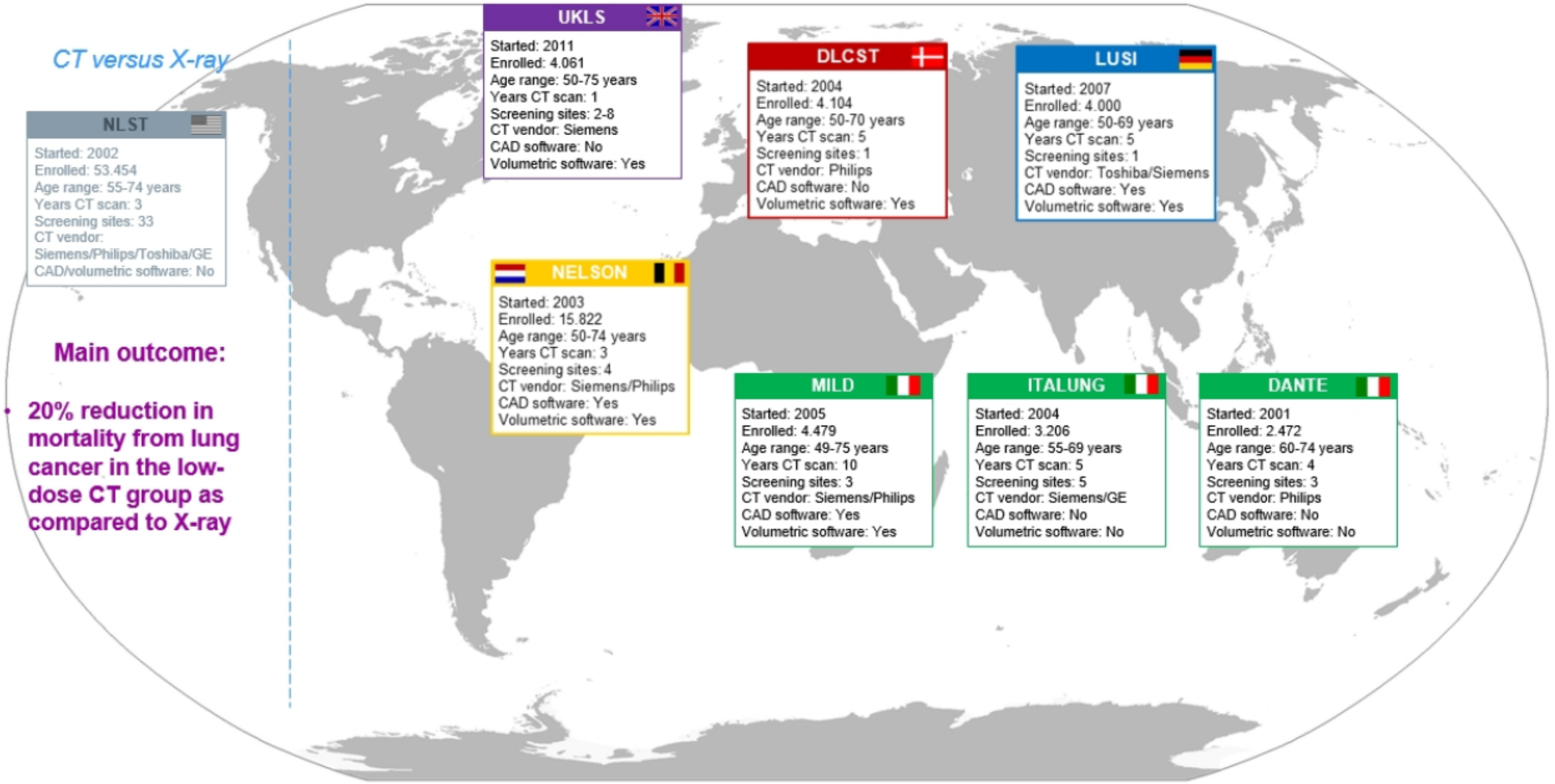
Peter J. Mazzone, MD, MPH, FCCP; Gerard A. Silvestri, MD, FCCP; Sheena Patel, MPH; Jeffrey P. Kanne, MD, FCCP; Linda S. Kinsinger, MD; Renda Soylemez Wiener, MD, MPH; Guy Soo Hoo, MD, FCCP; and Frank C. Detterbeck, MD, FCCP

CrossMark

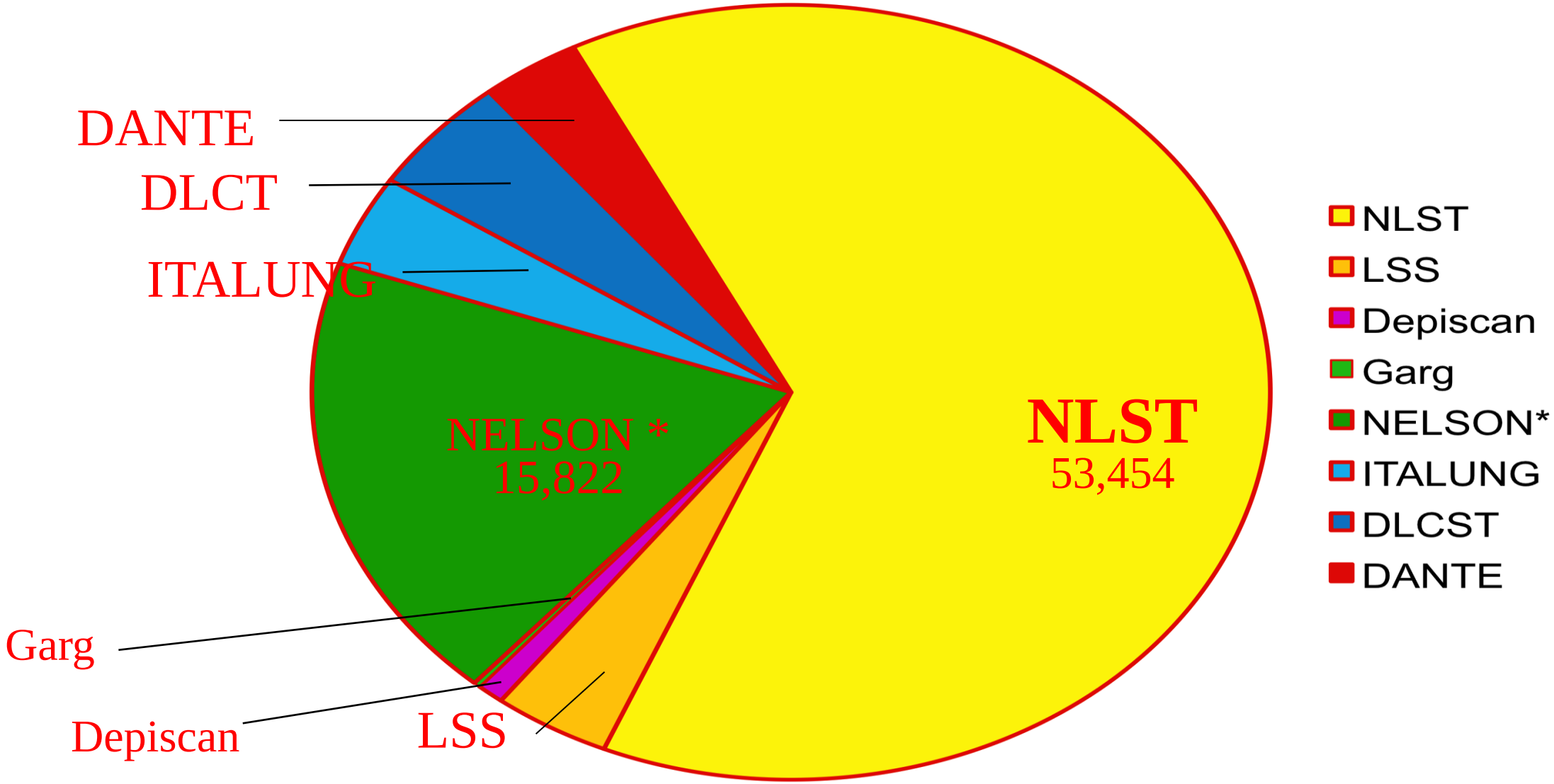
PODCAST

1. For asymptomatic smokers and former smokers age 55 to 77 who have smoked 30 pack years or more and either continue to smoke or have quit within the past 15 years, we suggest that annual screening with low-dose CT should be offered. (Weak recommendation, moderate-quality evidence)

CHEST 2018; 153(4):954-985


CT versus X-ray
NLST
Started: 2002
Enrolled: 53.454
Age range: 55-74 years
Years CT scan: 3
Screening sites: 33
CT vendor: Siemens/Philips/Toshiba/GE
CAD/volumetric software: No
Main outcome:
20% reduction in mortality from lung cancer in the low-dose CT group as compared to X-ray
UKLS
Started: 2011
Enrolled: 4.061
Age range: 50-75 years
Years CT scan: 1
Screening sites: 2-8
CT vendor: Siemens
CAD software: No
Volumetric software: Yes
DLCST
Started: 2004
Enrolled: 4.104
Age range: 50-70 years
Years CT scan: 5
Screening sites: 1
CT vendor: Philips
CAD software: No
Volumetric software: Yes
LUSI
Started: 2007
Enrolled: 4.000
Age range: 50-69 years
Years CT scan: 5
Screening sites: 1
CT vendor: Toshiba/Siemens
CAD software: Yes
Volumetric software: Yes
NELSON
Started: 2003
Enrolled: 15.822
Age range: 50-74 years
Years CT scan: 3
Screening sites: 4
CT vendor: Siemens/Philips
CAD software: Yes
Volumetric software: Yes
MILD
Started: 2005
Enrolled: 4.479
Age range: 49-75 years
Years CT scan: 10
Screening sites: 3
CT vendor: Siemens/Philips
CAD software: Yes
Volumetric software: Yes
ITALUNG
Started: 2004
Enrolled: 3.206
Age range: 55-69 years
Years CT scan: 5
Screening sites: 5
CT vendor: Siemens/GE
CAD software: No
Volumetric software: No
DANTE
Started: 2001
Enrolled: 2.472
Age range: 60-74 years
Years CT scan: 4
Screening sites: 3
CT vendor: Philips
CAD software: No
Volumetric software: No

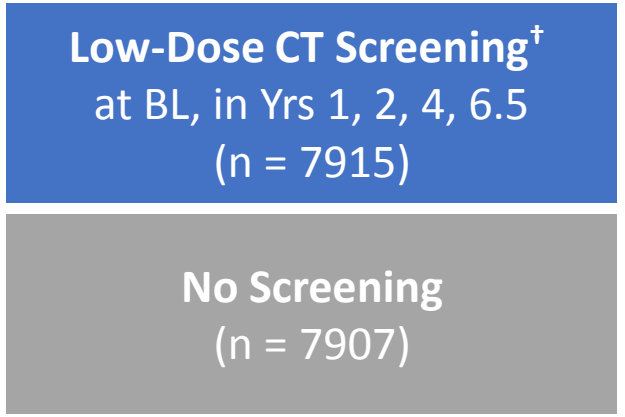
LDCT – Randomized Trials



NELSON: Study Design

- Randomized, controlled trial with population-based registry recruitment in the Netherlands and Belgium

Individuals 50-74 yrs of age weighing < 140 kg; current smokers or smoking cessation in last 10 yrs*; no prior lung cancer diagnosis or ongoing treatment; no CT chest exam in last yr; no renal cancer, melanoma, or breast cancer (N = 15,822)



Mortality analyses at Yr 10

- Primary endpoint: lung cancer mortality reduction ≥ 25% at Yr 10
  - Initially 80% power to show specified mortality reduction for high-risk males

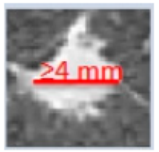
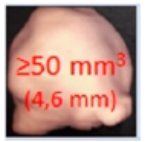
*Smoking history: > 10 cigarettes/day for > 30 yrs or > 15 cigarettes/day for > 25 yrs.
†Central reading of CTs with measured volume, volume doubling time of nodules.

de Koning HJ, et al. WCLC 2018. Abstract PL02.05. TrialRegister.nl. ISRCTN63545820.

SCOPE

DESIGN

METHOD

	NLST	NELSON
Country	USA	BE/NL
Enrollment	2002–2004	2003–NR
Number of Centers	33	4
Number of screens		3
Screening planned at years	1, 2 and 3	1, 2 and 4
Comparison	LDCT vs. Xray	LDCT vs. usual care
Population		
Age	55–74	50–69 (50–75)
Smoking (pack-years)	≥30	>15 *
Sex	both (male 59%)	men ° (male 84%)
Years since quit	≤15	≤10
Patients Screened, *n*	26,722 vs. 26,732	7907 vs. 7915
Planned follow-up, y	>7	10
Nodule Size warranting Follow-up	2011 	2009  + VDT
		2014 ≥100 mm³ (≥5 mm) + VDT
LC diagnosed at screening, %	1.02	0.9
5 mm Reduction of LC mortality	20%	26% [a]

*, ≥15 cigarettes/day for 25 years or ≥10 cigarettes/day for 30 years; °, both in Belgium; VDT, volume doubling time; [a], in men.

Cancers **2019**, *11*, 212; doi:10.3390/cancers11020212

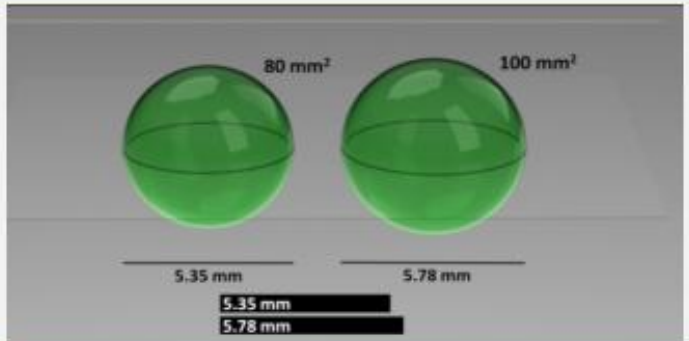
NELSON trial

Lung Cancer 3

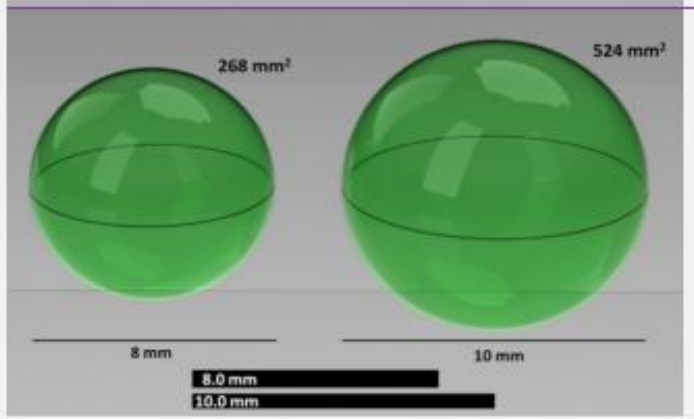
Prospects for population screening and diagnosis of lung cancer

Lancet 2013; 382: 732–41

John K Field, Matthijs Oudkerk, Jesper Holst Pedersen, Stephen W Duffy



volume increase of 25%
defined as growth by NELSON criteria
hardly appreciable by diameter measurement: 8% diameter increase
!*no growth according to existing criteria*



diameter increase of 25%
- ie, the threshold for the current growth definition - represents almost a doubling in volume (95%)
! *insensitivity of diameter measurement for growth*

NELSON: Mortality Reduction

Lung Cancer mortality Rate Ratio (LCDT/control)	**Yr 8**	**Yr 9**	**Yr 10**
Males	25%	24%	**26%**
Females	61%	53%	**39%**

Randomization began December 23, 2003. Follow-up through Decemeber 31, 2015; 94% complete to Yr 10.

NELSON trial

- Lung cancer deaths in men: with CT, n = 157; without CT, n = 214
- Similar rates of first lung cancer diagnosis through Yr 10 across arms
- Up to December 2011, ≈ 50% of lung cancer cases in men detected at stage Ia in CT screening arm vs ≈ 75% at stage III/IV in control arm

de Koning HJ, et al. WCLC 2018. Abstract PL02.05.

MILD Study

2005-2019

Current or former smokers (< 10yrs), 20 pack-yrs, 49-75 yrs-old

N=4099

- Screening arm – LDCT:
  - Annual: n = 1190
  - Biannual: n= 1186
- Control arm: n = 1723

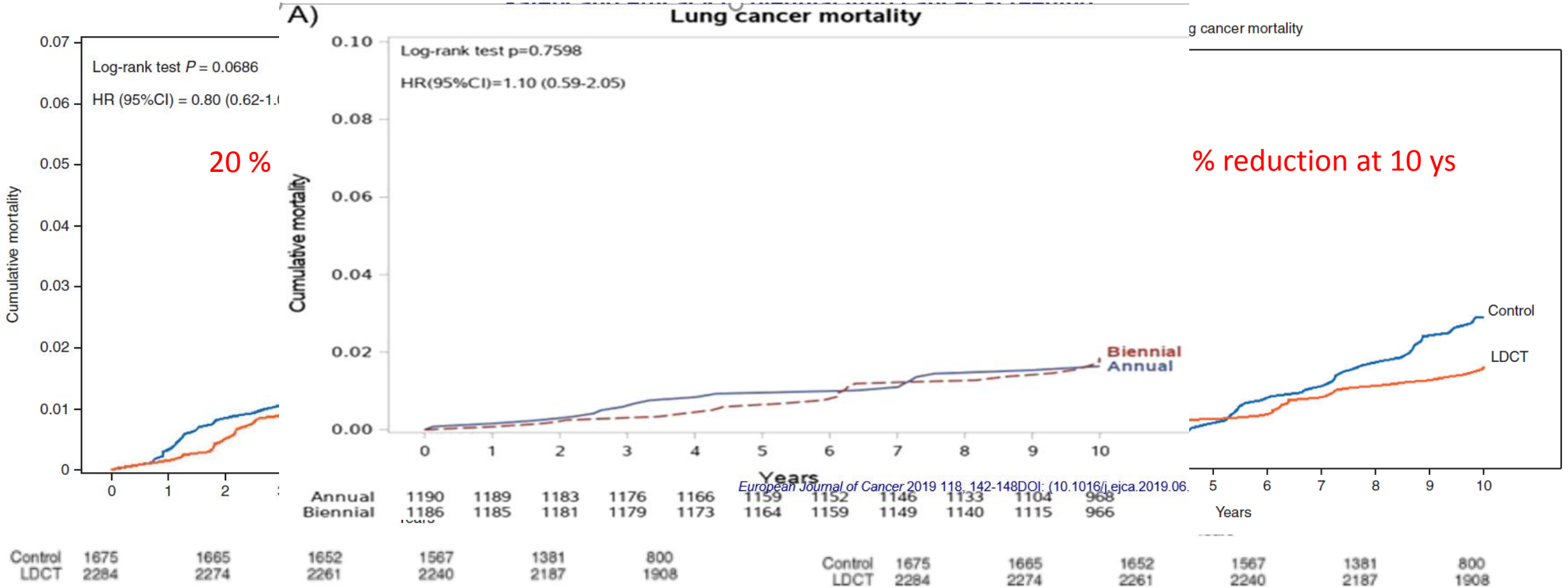
End point: LC mortality in 10 years

Pastorino. Annals of Oncology 0: 1–8, 2019

MILD

Overall mortality
HR 0.68; 95% CI 0.49–0.94; P.0.01

Lung cancer mortality
HR 0.42, 95% CI 0.22–0.79; P.0.0037



20 %

% reduction at 10 ys

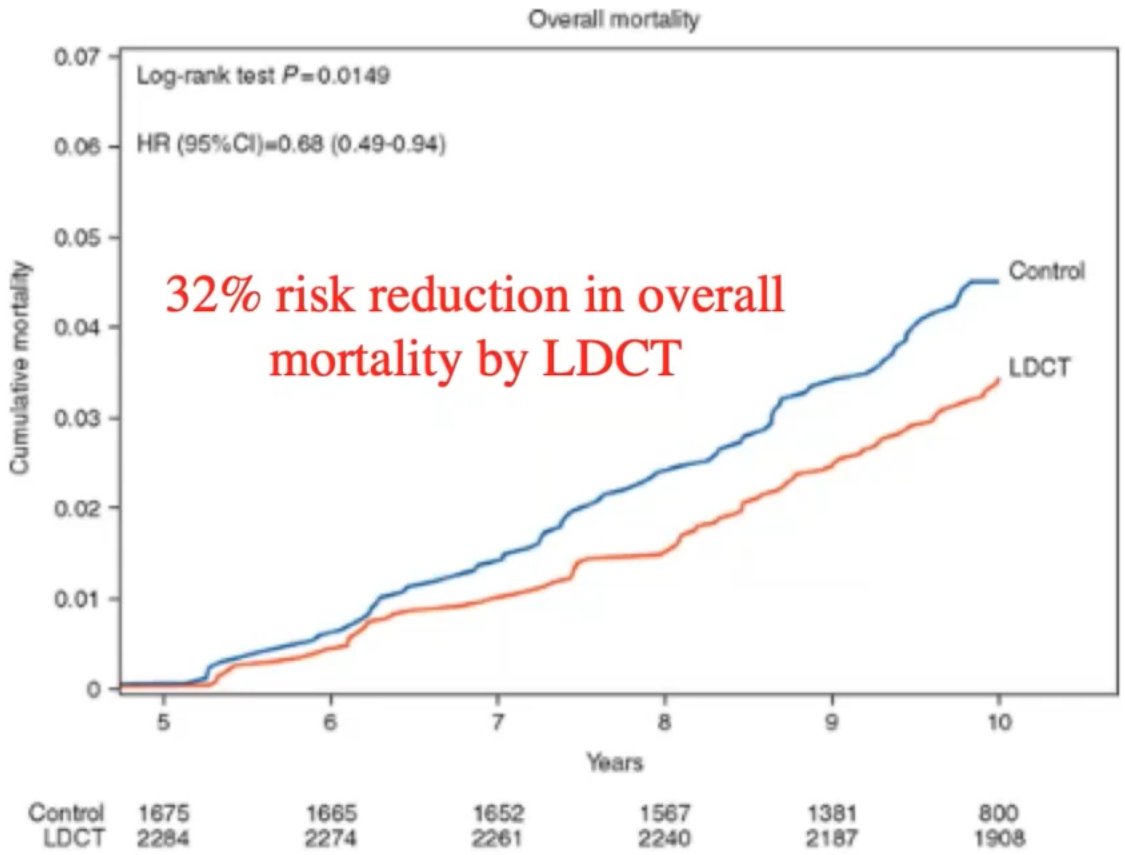
European Journal of Cancer 2019 118, 142-148DOI: (10.1016/j.ejca.2019.06.

Landmark analysis of cumulative mortality and LC mortality by arm beyond 5 years

Pastorino. Annals of Oncology 0: 1–8, 2019

MILD – Landmark analysis beyond 5 yrs

Overall mortality
HR 0.68; 95% CI 0.49–0.94; P.0.01



Lung cancer mortality
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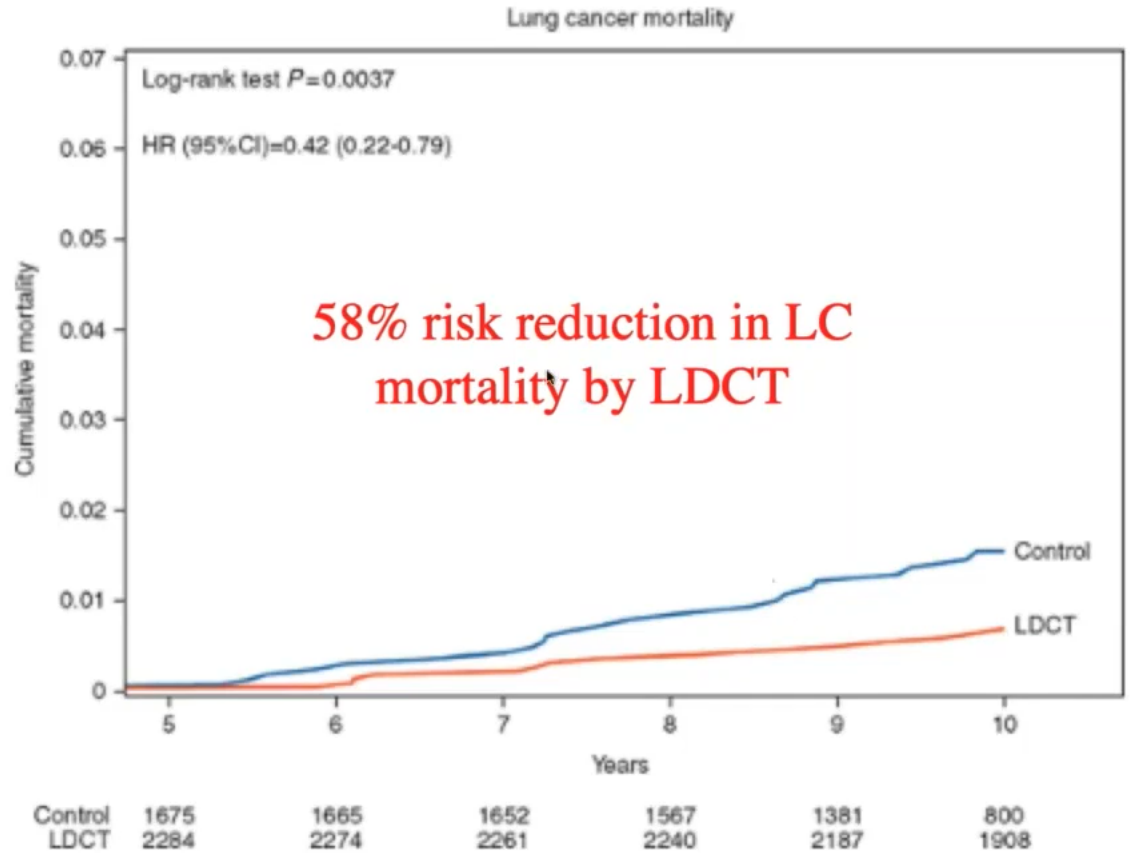


Landmark analysis of cumulative mortality and LC mortality by arm beyond 5 years

Pastorino. Annals of Oncology 0: 1–8, 2019

MILD trial, strong confirmation of lung cancer screening efficacy

Matthew B. Schabath and Denise R. Aberle

> we have moved beyond speculation to evidence of substantial beneficial mortality reductions with LDCT screening

> Our challenge will be to ensure systematic implementation of LDCT screening programmes on a global scale

IASLC Issues Statement on Lung Cancer Screening with Low-Dose Computed Tomography

Thursday, October 25, 2018

Lung cancer screening rates: Data from the lung cancer screening registry.

In 2016, 1.9% of 7.6 million eligible smokers were screened. These rates varied by region from 1.0% in the West to 3.5% in the Northeast

Phan, D. ASCO 2018

Σκεπτικισμός

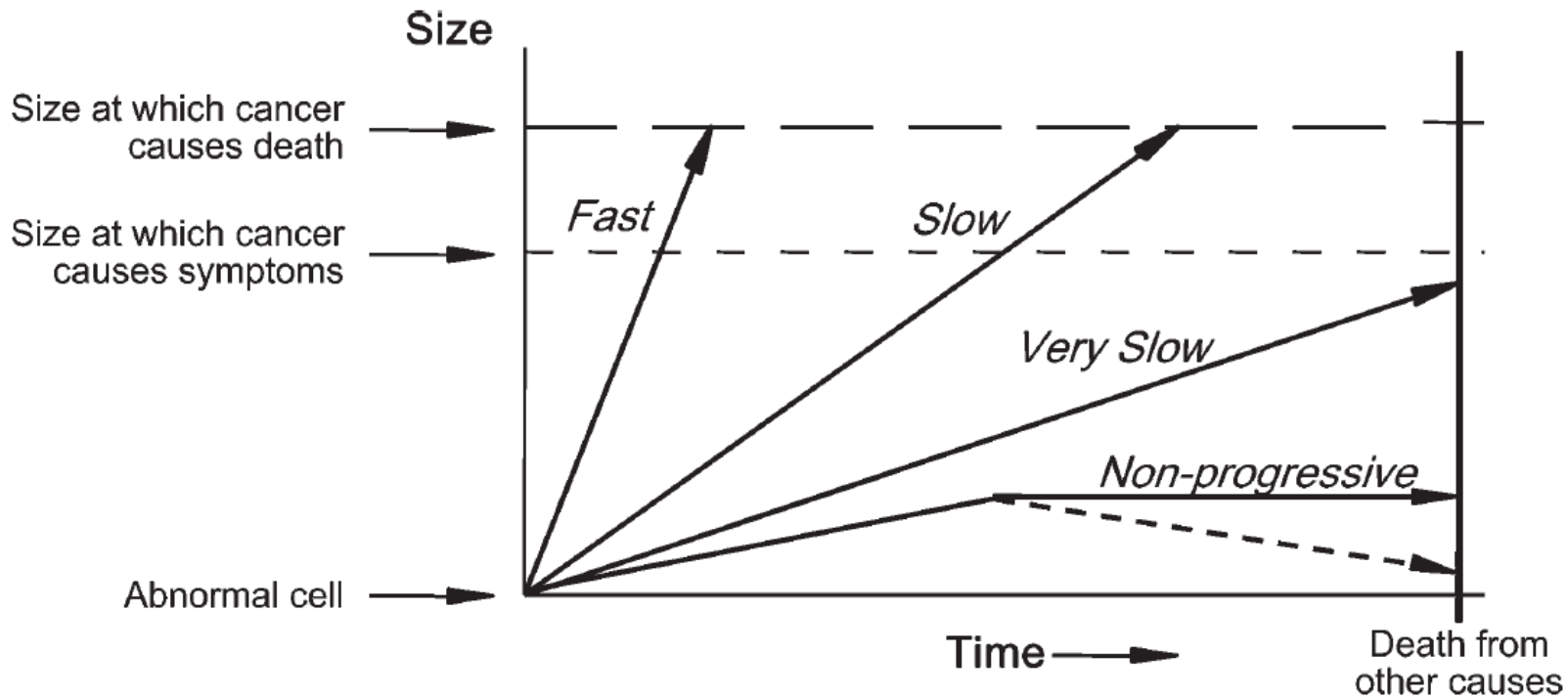
- Overdiagnosis
- Ψευδώς θετικά
- Ακτινοβολία
- Κόστος

Overdiagnosis in Cancer

H. Gilbert Welch, William C. Black

Manuscript received September 3, 2009; revised March 1, 2010; accepted March 5, 2010.

J Natl Cancer Inst 2010;102:605–613



NLST: overdiagnosis

Original Investigation

Overdiagnosis in Low-Dose Computed Tomography Screening for Lung Cancer

Edward F. Patz Jr, MD; Paul Pinsky, PhD; Constantine Gatsonis, PhD; JoRean D. Sicks, MS; Barnett S. Kramer, MD, MPH; Martin C. Tammemägi, PhD; Caroline Chiles, MD; William C. Black, MD; Denise R. Aberle, MD; for the NLST Overdiagnosis Manuscript Writing Team

CONCLUSIONS AND RELEVANCE More than 18% of all lung cancers detected by LDCT in the NLST seem to be indolent, and overdiagnosis should be considered when describing the risks of LDCT screening for lung cancer.

JAMA 2014;174:269-74

NLST – National Lung Cancer Screening Trial (2002-2010)

- **False-Positive CT Screening Results**

✓ ≈ 27% during first round of screening

✓ ≈ 37% during all three rounds of screening

✓ Most common follow-up was a single low-dose CT

✓ < 7% of false positive participants had invasive procedure

ΣΤΟΧΟΣ < 10 % ΕΞΑΙΡΕΣΗ ΚΑΛΟΗΘΩΝ ΒΛΑΒΩΝ

ΠΡΟΣΟΧΗ ΣΕ ΑΣΘΕΝΕΙΣ ΜΕ ΣΥΝΝΟΣΗΡΟΤΗΤΕΣ

Positive LDCT

	Definition of a positive	% of baseline screenings
NLST	Solid nodule ≥ 4 mm	27%
I-ELCAP	Solid nodule ≥ 5 mm	13%
NELSON	Solid nodule > 9.8 mm or 4.6-9.8 mm and 3 m f/u LDCT with growth	2.6%

International Early Lung Cancer Action Program Investigators. N Engl J Med 2006;355:1763-71; National Lung Screening Trial Research Team. N Engl J Med 2011;365:395-409; Xu et al. Lung Cancer. 2006;54(2):177-84

LDCT: ακτινοβολία

Attending annual screening (NLST)

Up to 25 CT scans

1 radiation-induced cancer per 2,500 screened individuals in the next 10-20 years

ULTRA Low Dose CT ➔ xRay

Cost-effectiveness

	Cost of QALY
I-ELCAP	$28 000
NLST	$47 000

Pyenson. PLoS One. 2013 Aug 7;8(8):e71379

	Cost of QALY
UKLS RCT Pilot study	£8 466*

Field JK, et al. Thorax 2015;0:1–10. doi:10.1136/thoraxjnl-2015-207140

* Incremental cost of a LDCT in comparison to symptomatic presentation.

Σκεπτικισμός

- Overdiagnosis
- Ψευδώς θετικά
- Ακτινοβολία
- Κόστος

Σκεπτικισμός

- Overdiagnosis
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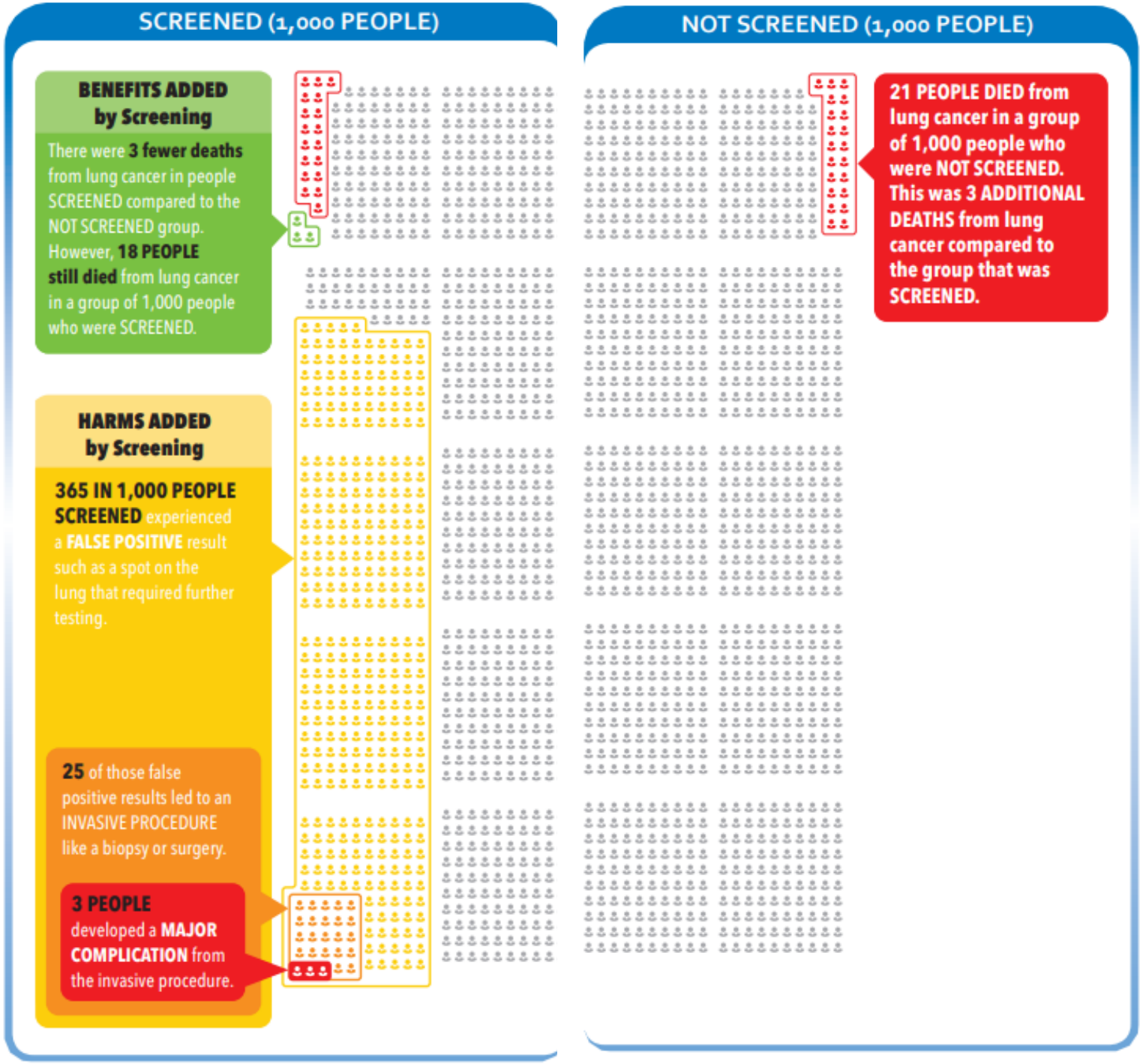
- Ακτινοβολία
- Κόστος



Ερωτήματα

- Επιλογή ατόμων για screening
- Κάθε πότε;
- Πώς εκτιμάμε τα ευρήματα;

Επιλογή ατόμων για screening

Annals of Internal Medicine

U.S. Preventive Services TASK FORCE
www.USPreventiveServicesTaskForce.org

SCREENING FOR LUNG CANCER
CLINICAL SUMMARY OF U.S. PREVENTIVE SERVICES TASK FORCE RECOMMENDATION

Population	Asymptomatic adults aged 55 to 80 y who have a 30 pack-year smoking history and currently smoke or have quit smoking within the past 15 y
Recommendation	Screen annually for lung cancer with low-dose computed tomography. Discontinue screening when the patient has not smoked for 15 y. Grade: B

Risk Assessment	Age, total cumulative exposure to tobacco smoke, and years since quitting smoking are the most important risk factors for lung cancer. Other risk factors include specific occupational exposures, radon exposure, family history, and history of pulmonary fibrosis or chronic obstructive lung disease.
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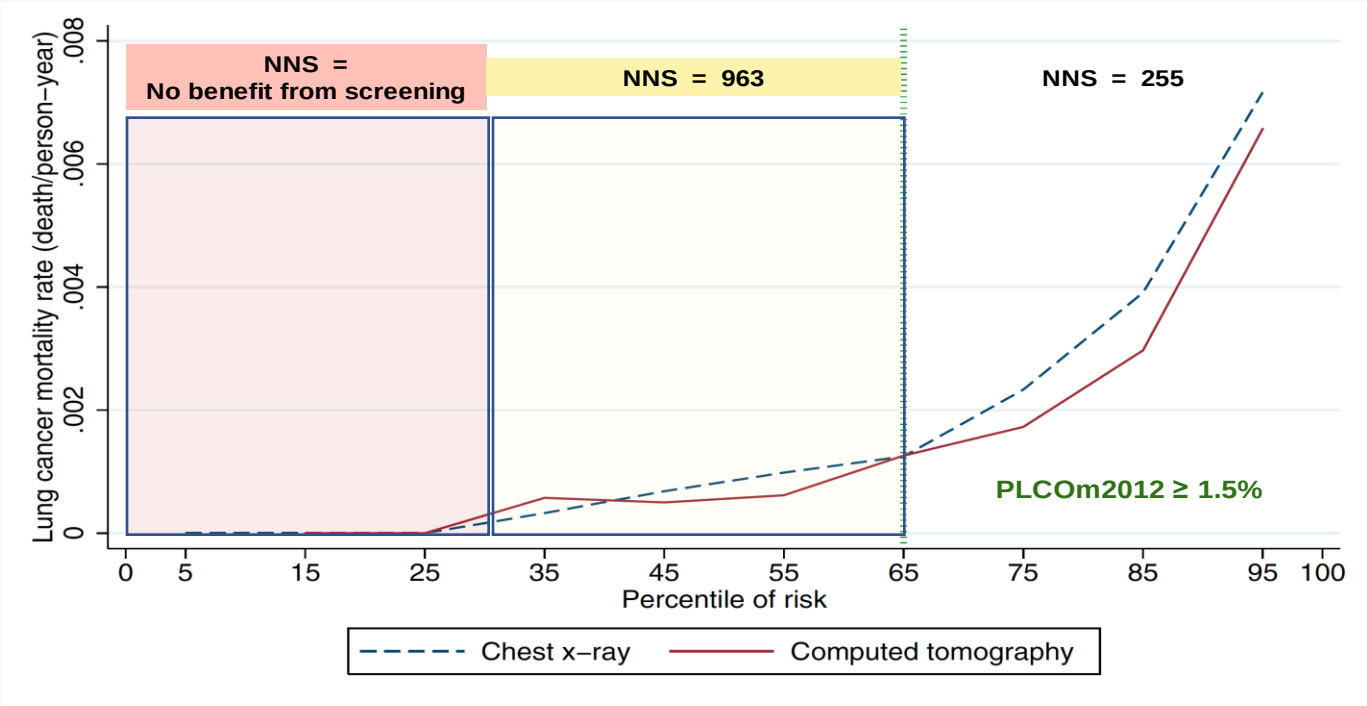
For a summary of the evidence systematically reviewed in making this recommendation, the full recommendation statement, and supporting documents, please go to www.uspreventiveservicestaskforce.org.

40 % ασθενών θα ήταν πριν τη διάγνωση υποψήφιοι για screening

Επιλογή ατόμων για screening

Lung cancer mortality rates in NLST intervention arms by $PLCO_{m2012}$ model risks



Επιλογή ατόμων για screening

USPSTF Criteria vs. $PLCO_{m2012}$ ≥1.51% in PLCO Intervention Arm Smokers

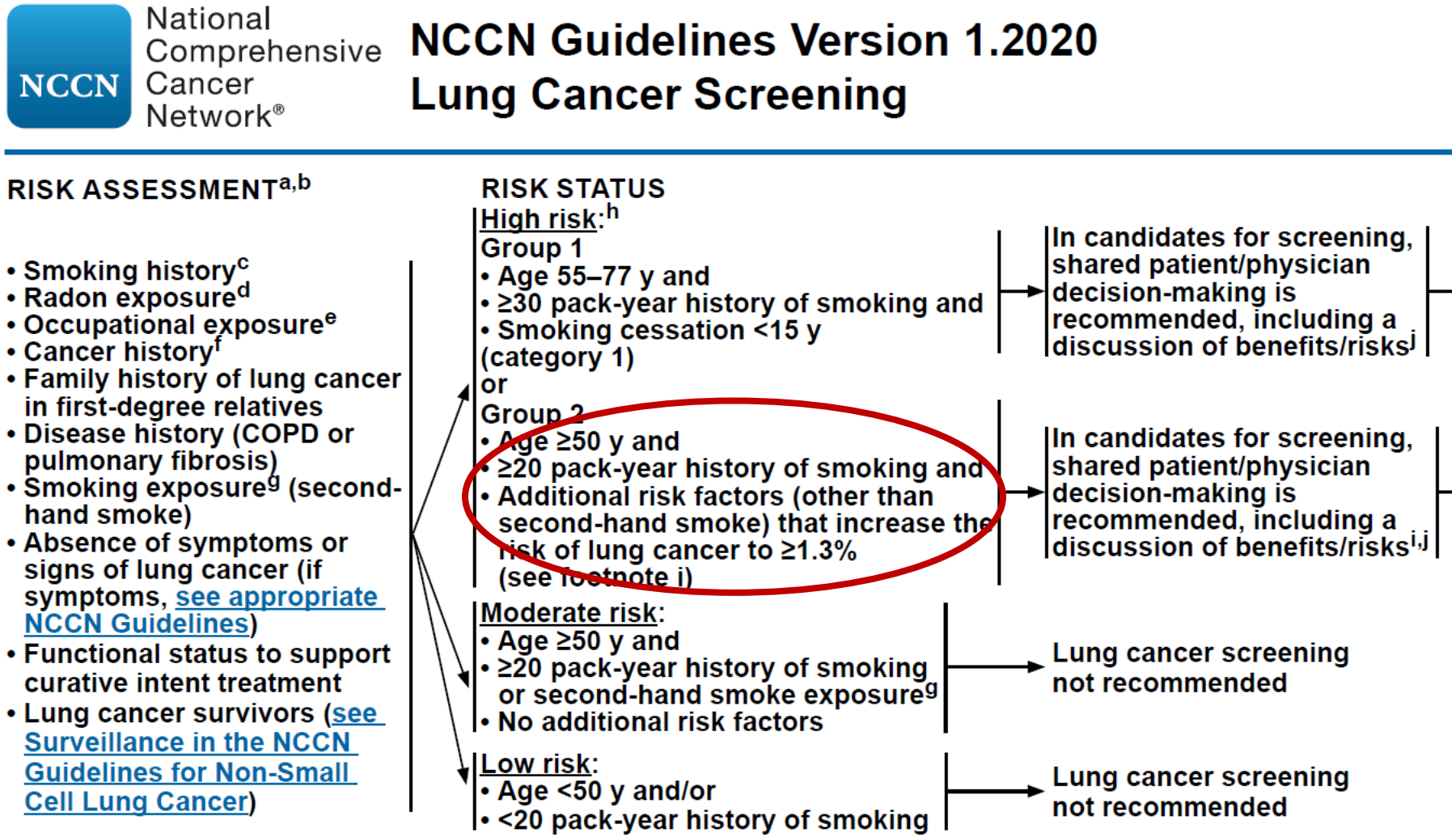
	USPSTF	$PLCO_{m2012}$	P-value
Sensitivity	71.2%	**80.1%**	p<0.001
Specificity	62.7%	**66.2%**	p<0.001
PPV	3.4%	**4.2%**	P<0.001

12.4% more lung cancers would be detected (p<0.001)

8.8% fewer individuals would be selected (p<0.001)

Tammemagi et al. PLoS medicine 2014; 11(12):e1001764.

Επιλογή ατόμων για screening



Επιλογή ατόμων για screening

Table 1. Characteristics of investigated risk models.

Model	Predicted outcome	Model prediction time frame	Development dataset(s)	Risk factors incorporated in model
Bach model*	Lung cancer incidence	1 y (iterative)	Carotene and Retinol Efficacy Trial (CARET)	Age, gender, smoking duration, smoking intensity, years since cessation, asbestos exposure
Liverpool Lung Project (LLP) model†	Lung cancer incidence	5 y	Liverpool Lung Project (LLP) case–control study	Age, gender, smoking duration, personal history of cancer, family history of lung cancer, personal history of pneumonia, asbestos exposure
PLCOm2012 model†	Lung cancer incidence	6 y	Prostate, Lung, Colorectal and Ovarian Cancer Screening Trial (PLCO)	Age, race, education, BMI, COPD, personal history of cancer, family history of lung cancer, smoking status, smoking duration, smoking intensity, years since cessation
Two-Stage Clonal Expansion (TSCE) lung cancer incidence model	Lung cancer incidence	1 y (iterative)	Nurses' Health Study (NHS), Health Professionals Follow-up Study (HPFS)	Age, gender, smoking status, smoking duration, smoking intensity, years since cessation
Knoke model	Lung cancer death	1 y (iterative)	American Cancer Society's first Cancer Prevention Study (CPS-I)	Age, smoking status, smoking duration, smoking intensity, years since cessation
Two-Stage Clonal Expansion (TSCE) CPS lung cancer death model	Lung cancer death	1 y (iterative)	British Doctors Study, American Cancer Society's first Cancer Prevention Study (CPS-I), American Cancer Society's second Cancer Prevention Study (CPS-II)	Age, gender, smoking status, smoking duration, smoking intensity, years since cessation
Two-Stage Clonal Expansion (TSCE) NHS/HPFS lung cancer death model	Lung cancer death	1 y (iterative)	Nurses' Health Study (NHS), Health Professionals Follow-up Study (HPFS)	Age, gender, smoking status, smoking duration, smoking intensity, years since cessation


GNTM TOP 20
GREECE'S NEXT TOP MODEL
ΚΑΤΙΑ
ΣΟΥΖΑΝΑ
ΜΑΡΤΙΝΑ
ΑΝΝΑ
ΜΑΡΙΑ
ΧΑΡΑ
ΙΛΝΤΑ
ΣΙΛΙΑ
ΑΣΗΜΙΝΑ
ΚΑΤΕΡΙΝΑ
ΕΜΜΑΝΟΥΕΛΑ
ΣΠΥΡΟΥΛΑ

NIH U.S. National Library of Medicine

ClinicalTrials.gov

Home > Search Results > Study Record Detail

International Lung Screen Trial (ILST) (ILST)

ISRCTN registry

View all studies | Why register? | Register your study

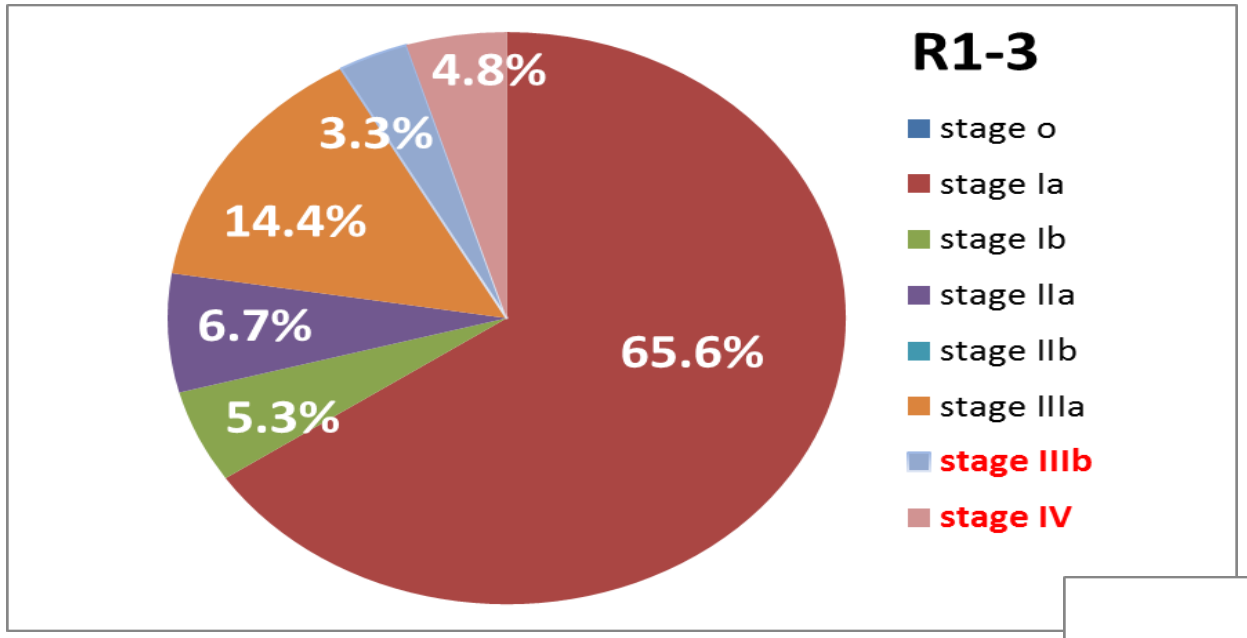
ISRCTN42704678 https://doi.org/10.1186/ISRCTN42704678

The Yorkshire Lung Screening Trial

Κάθε πότε;

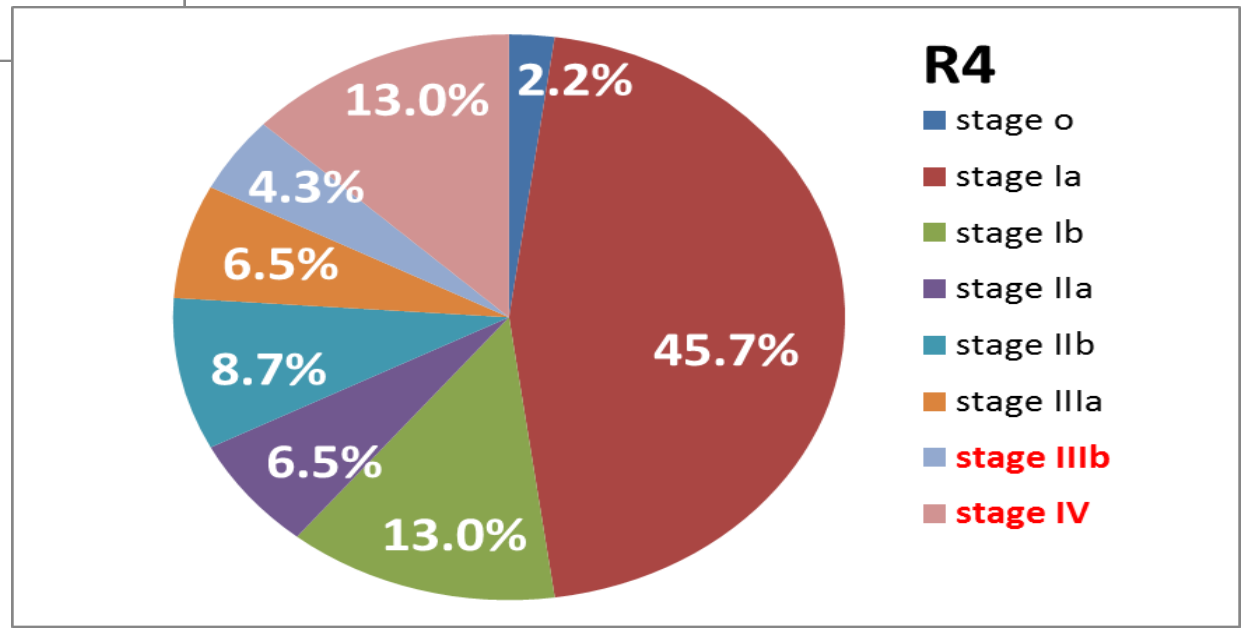
- ✓ Unclear whether annual screens are needed for all high-risk individuals
- ✓ 2.5-year timeframe in the fourth round of NELSON resulted in a significant increase in interval cancers ***but*** more cancers detected at a later stage
- ✓ Biennial LDCT screening may be as efficient as the annual screening in the MILD-trial

NELSON trial



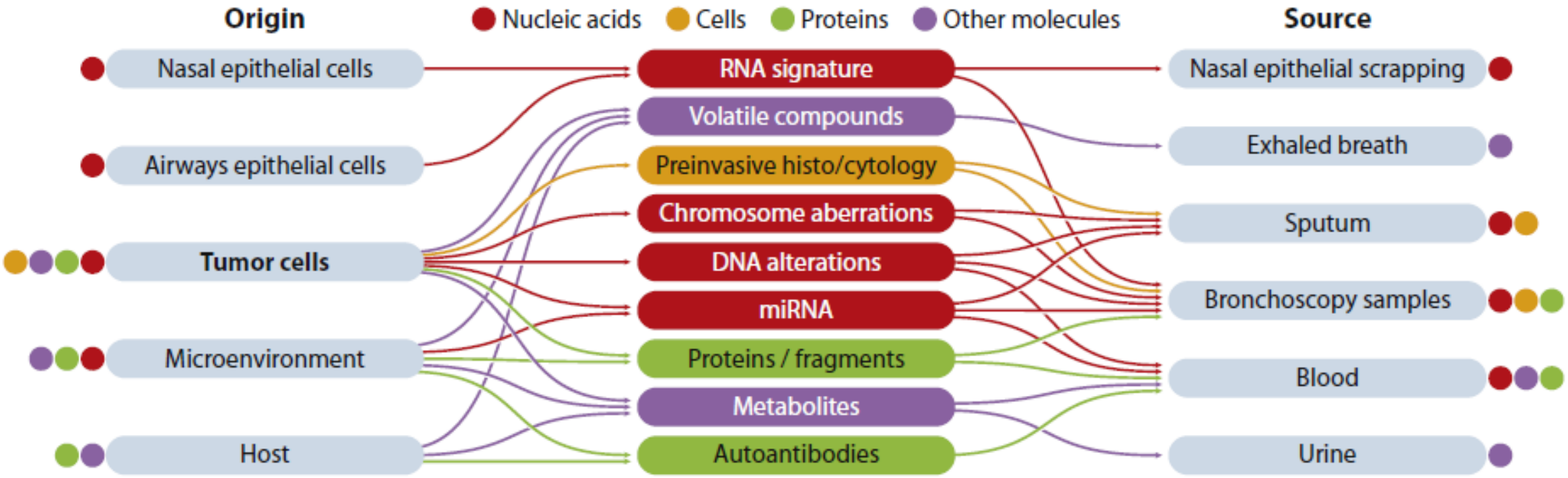
Advanced disease

P < 0.001



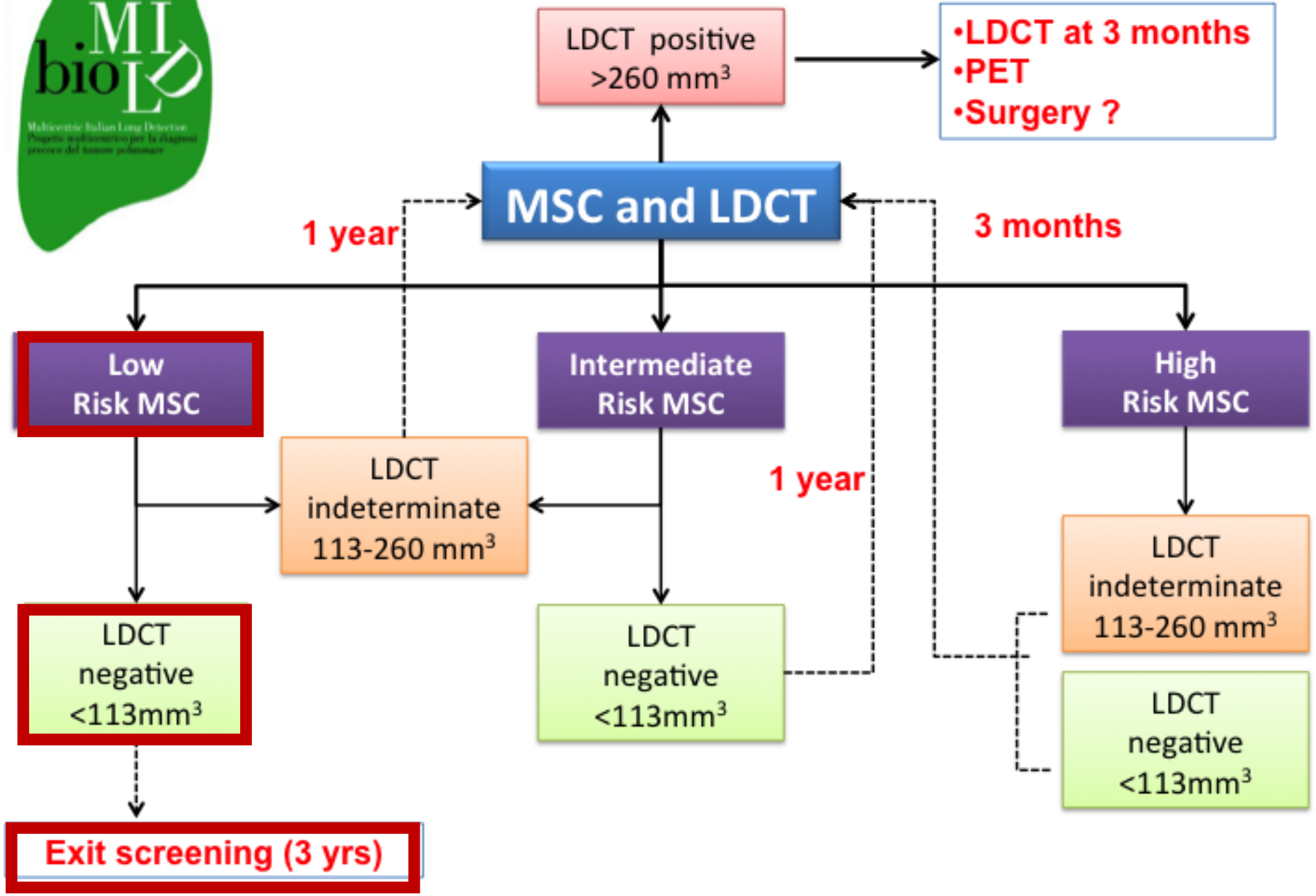
N. Horeweg et al., Am J Respir Crit Care Med 2013

There is a long way to … BIOMARKER currently explored candidates/options



Journal of Thoracic Oncology Vol. 14 No. 3: 343-357

bioMILD trial: decisional tree



Πώς εκτιμάμε τα ευρήματα;

1. Lung-RADS (ACR)
2. British Thoracic Society 2015 guideline
3. NELSON-EU volumetric protocol
4. Fleischner Society 2017 guideline
5. Pan-Can (Brock) nodule malignancy calculator
6. NCCN guideline
7. I-ELCAP protocol
8. ACCP management protocol

Πώς εκτιμάμε τα ευρήματα;

Τυχαίες βλάβες (μη οζώδεις, λεμφαδενοπάθεια κ.α.)

ΧΑΠ – ΣΤΕΦΑΝΙΑΙΑ ΝΟΣΟΣ ➔ Μείωση ολικής θνητότητας
(LDCT εξέταση για 3πλο screening)

European position statement on lung cancer screening

Matthijs Oudkerk, Anand Devaraj, Rozemarijn Vliegenthart, Thomas Henzler, Helmut Prosch, Claus P Heussel, Gorka Bastarrika, Nicola Sverzellati, Mario Mascalchi, Stefan Delorme, David R Baldwin, Matthew E Callister, Nikolaus Becker, Marjolein A Heuvelmans, Witold Rzyman, Maurizio V Infante, Ugo Pastorino, Jesper H Pedersen, Eugenio Paci, Stephen W Duffy, Harry de Koning, John K Field

Lung cancer screening with low-dose CT can save lives. This European Union (EU) position statement presents the available evidence and the major issues that need to be addressed to ensure the successful implementation of low-dose CT lung cancer screening in Europe. This statement identified specific actions required by the European lung cancer screening community to adopt before the implementation of low-dose CT lung cancer screening. This position statement recommends the following actions: a risk stratification approach should be used for future lung cancer low-dose CT programmes; that individuals who enter screening programmes should be provided with information on the benefits and harms of screening, and smoking cessation should be offered to all current smokers; that management of

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Center for Medical Imaging, University Medical Center Groningen, University of

22 Multidisciplinary screening professionals from 8 European countries

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Matthijs Oudkerk, Anand Devaraj, Rozemarijn Vliegenthart, Thomas Henzler, Helmut Prosch, Claus P Heussel, Gorka Bastarrika, Nicola Sverzellati, Mario Mascalchi, Stefan Delorme, David R Baldwin, Matthew E Callister, Nikolaus Becker, Marjolein A Heuvelmans, Witold Rzyman, Maurizio V Infante, Ugo Pastorino, Jesper H Pedersen, Eugenio Paci, Stephen W Duffy, Harry de Koning, John K Field

Consensus statements

- **LDCT** is the **only evidence based** methodology for the early detection of lung cancer.
- Based on level *one* evidence, the EUPS recommend that we **start to plan for the implementation** of lung cancer in Europe.
- Future lung cancer LDCT programmes should utilise a **validated risk stratification approach**.
- **Carefully constructed participant information**; potential benefits and harms of screening.

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Consensus statements

- **Smoking cessation** advice should be offered to all current smokers
- Future management of CT-screen detected solid nodules should utilise semi-automatically derived **volume and volume-doubling time**
- **National quality assurance boards** - set up by professional bodies.
- Management of prevalent lung nodules in CT screening programmes, lung nodules at incident screening (**newly detected**) and CT-detected lung nodules in clinical practice should be managed with **different protocols**.

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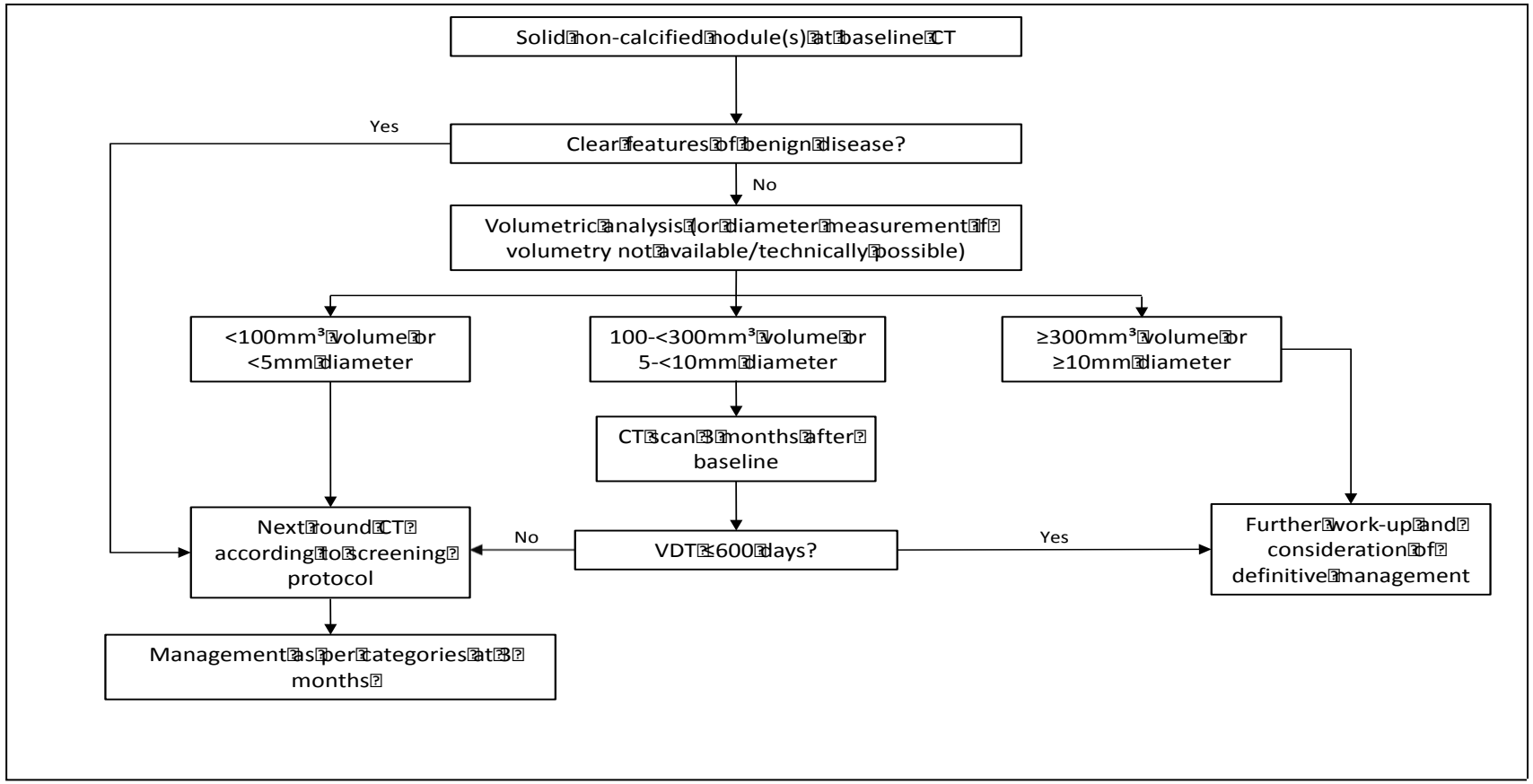
EU Baseline screen protocol



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Nodule management protocol for screen detected solid nodules at baseline.
For nodules with volume-doubling time (VDT) between 400 and 600 days (intermediate cancer risk of ~4%), a second repeat CT in 3 months should be considered as an initial workup option.

European position statement on lung cancer screening

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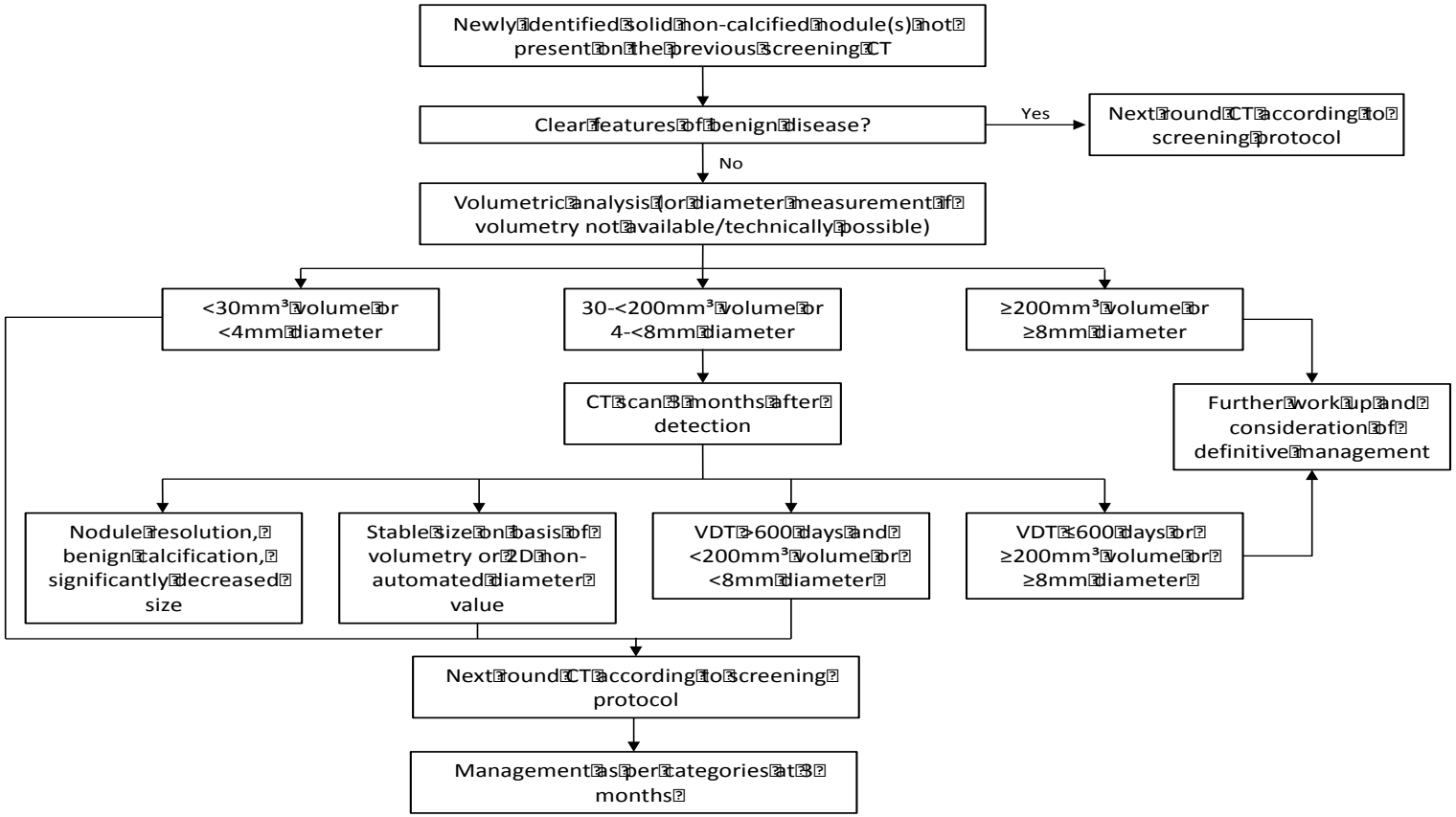
EU Incident screen protocol



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Nodule management protocol for screen detected incidental solid nodules at follow-up.

European position statement on lung cancer screening

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Consensus statements

- To date we only have evidence for **annual** LDCT lung cancer screening, **however.. ..**
- Management of lung nodules by the lung cancer MDTs should be according to the EUPS recommendations.
- The EUPS Expert Group recommends planning for implementation of LDCT screening should be started **throughout Europe NOW**.

Lancet oncol 2017

Open access Review

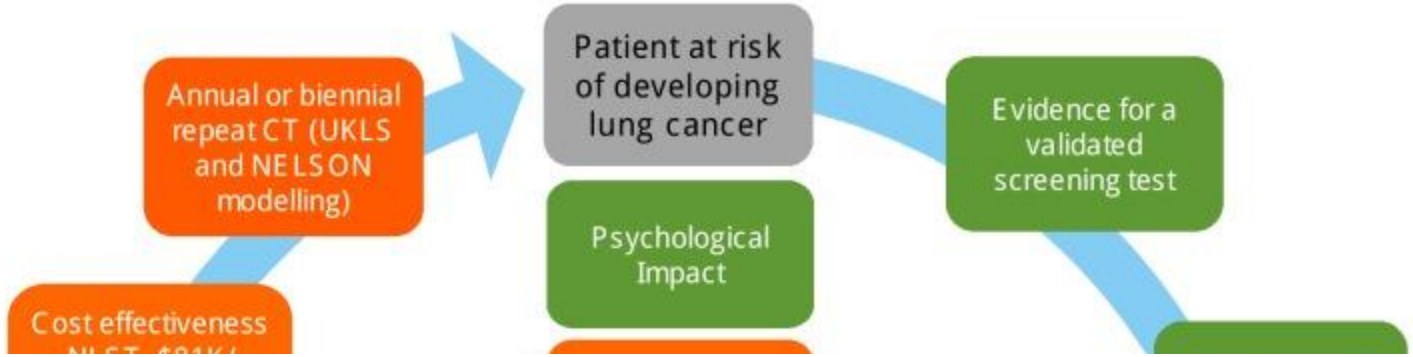
ESMO Open
Cancer Horizons

Check for updates

Implementation of lung cancer screening in Europe: challenges and potential solutions: summary of a multidisciplinary roundtable discussion

John K Field,[1] Harry deKoning,[2] Mattijs Oudkerk,[3] Sadia Anwar,[4] James Mulshine,[5] Ugo Pastorino,[6] Wilfried Eberhardt,[7] Helmut Prosch[8]

ESMO Open 2019;4:e000577



Overall recommendations

- Implementation of LC screening should be a priority in Europe. It needs to be driven scientifically, politically and also using patient advocacy.
- Europe needs to plan 'Implementation Research Programmes'.
- Investment is needed into recruitment challenges especially in 'hard to reach' communities.

An **individual eligible for lung cancer screening** applies online for chest-CT. To get an appointment he/she needs to enter his/her data : age, comorbidities, risk factors (screening is a voluntary process)

Chest CT

The algorithm automatically detects the nodules

no nodule
70% of the population

appointment in 1 year

+12 months

nodule
30% of the population

blood sample

GENOMICS

biological signature

clinical signature

radiological signature

RADIOMICS

The algorithm helps the radiologist to characterize the nodule

The Radiologist characterizes the nodule

Ευχαριστώ

Cancer scan at the supermarket: NHS rolls out screening trucks in Tesco and Asda car parks in bid to improve detection rates of the disease

- Scheme is being expanded after trial led to four-fold increase in detection rate
- At risk patients aged 55 to 75 were sent letters urging them to get a scan done
- They were then directed to mobile scanners in Tesco and Asda car parks