Advances in Lung Cancer Screening

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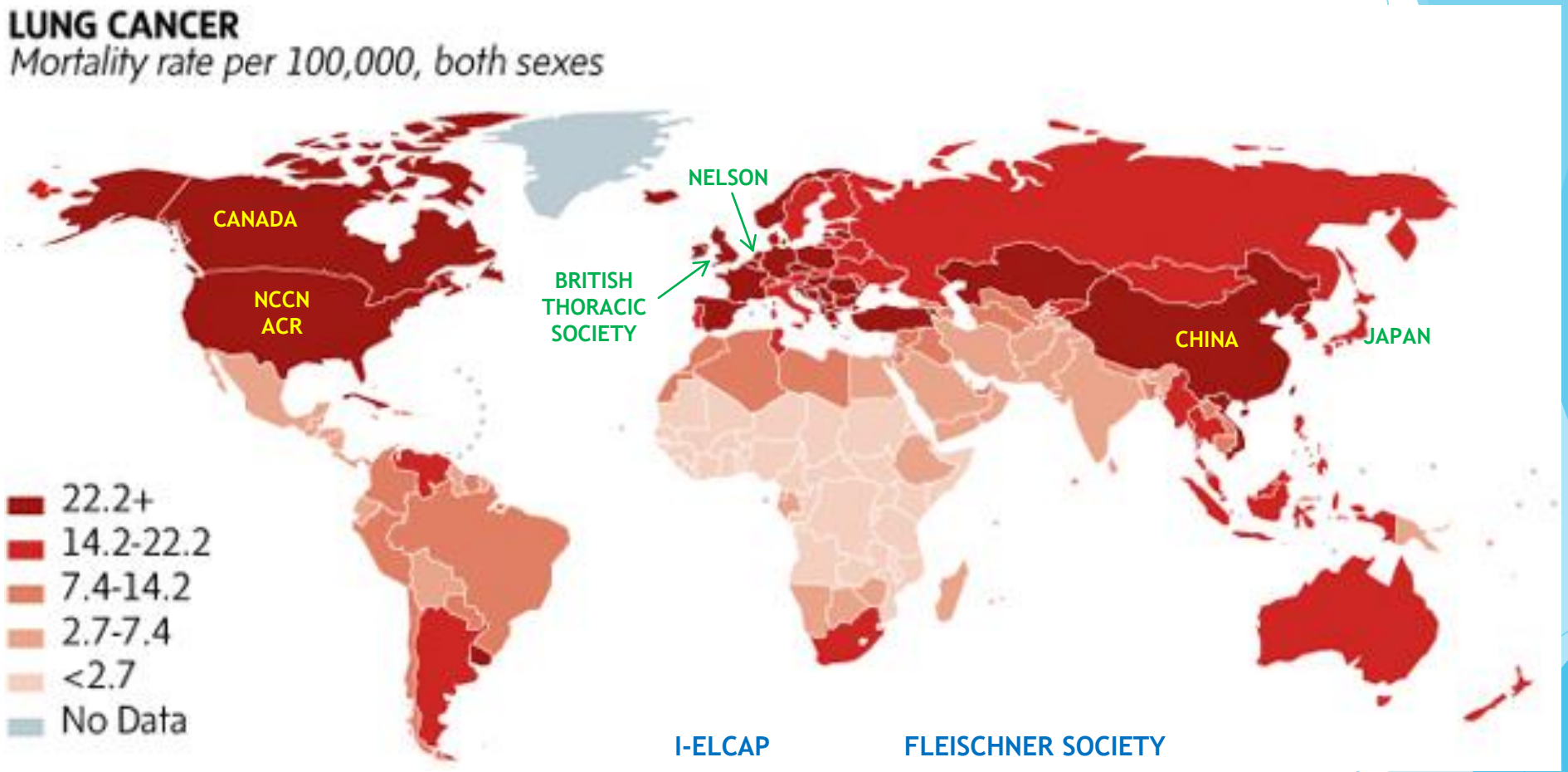
Γ.Ν.΄Γ. Παπανικολάου΄

Τμήμα Ημ. Νοσηλείας Χημειοθεραπειών



Source: GLOBOCAN 2012.

Effects of volume CT lung cancer screening

Mortality results of the NELSON randomised-controlled population-based screening trial

Background

- The National Lung Screening Trial (NLST) demonstrated a 20% relative reduction in lung cancer mortality for annual screening over three years with low dose CT to chest radiography
- The trial recruited 53,454 persons at high risk (59% men)
- In a post-hoc analysis, there was weak evidence of a differential benefit by gender: RR=0.92 for men, versus RR=0.73 for women (p=0.08), and a slightly smaller point estimate
- Differential effect by gender was found consistent with the natural history of lung cancer by histology, with a potential greater advancement (lead time) by CT screening in women than in men
- Except for the NLST, no other RCT has published mortality benefits

NELSON - trial ISRCTN 63545820

- **Randomized Controlled Trial**
- **Recruitment through population-based registries**
- **CT screening vs. no screening**
- **Different screening intervals**
- **Volume & Volume Doubling Time of nodules**
- **Central reading of CT images**
- **Expert causes of death committee &**
- **Follow up through national registries**

Trial, initially powered (80%) for high risk **males**, to detect a lung cancer mortality reduction of ≥ 25% at 10 years after randomization (individual FU)

And includes a small subgroup of women (16%)

PL02.05
Harry De Koning

NELSON Trial

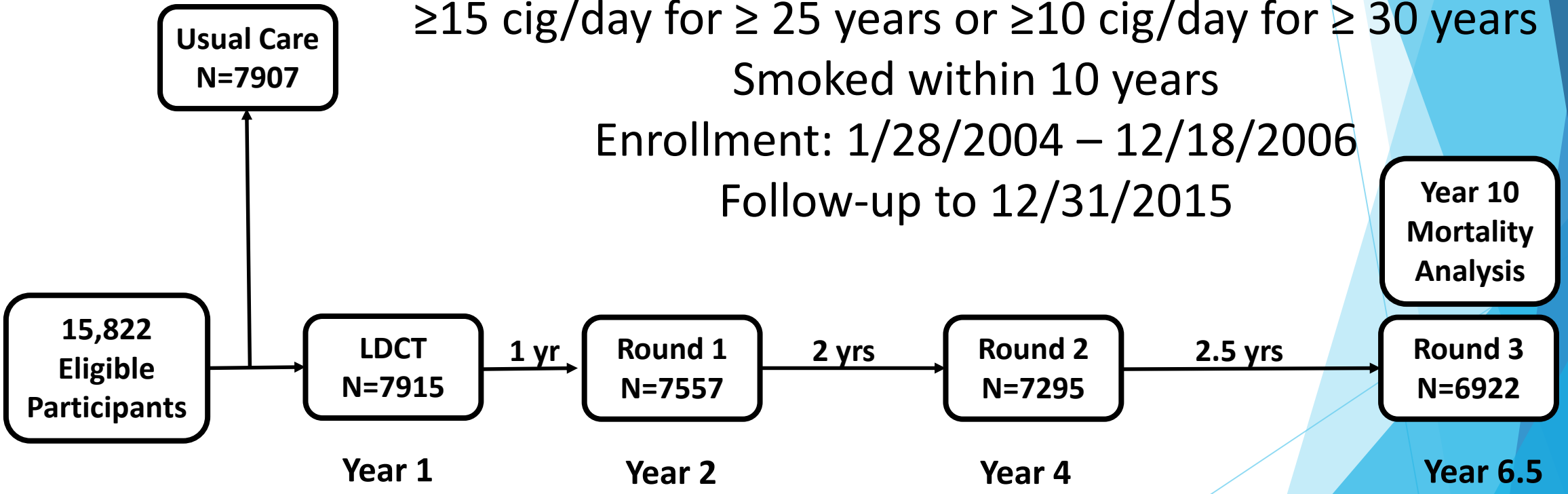
Ever smokers age 50 -70 years

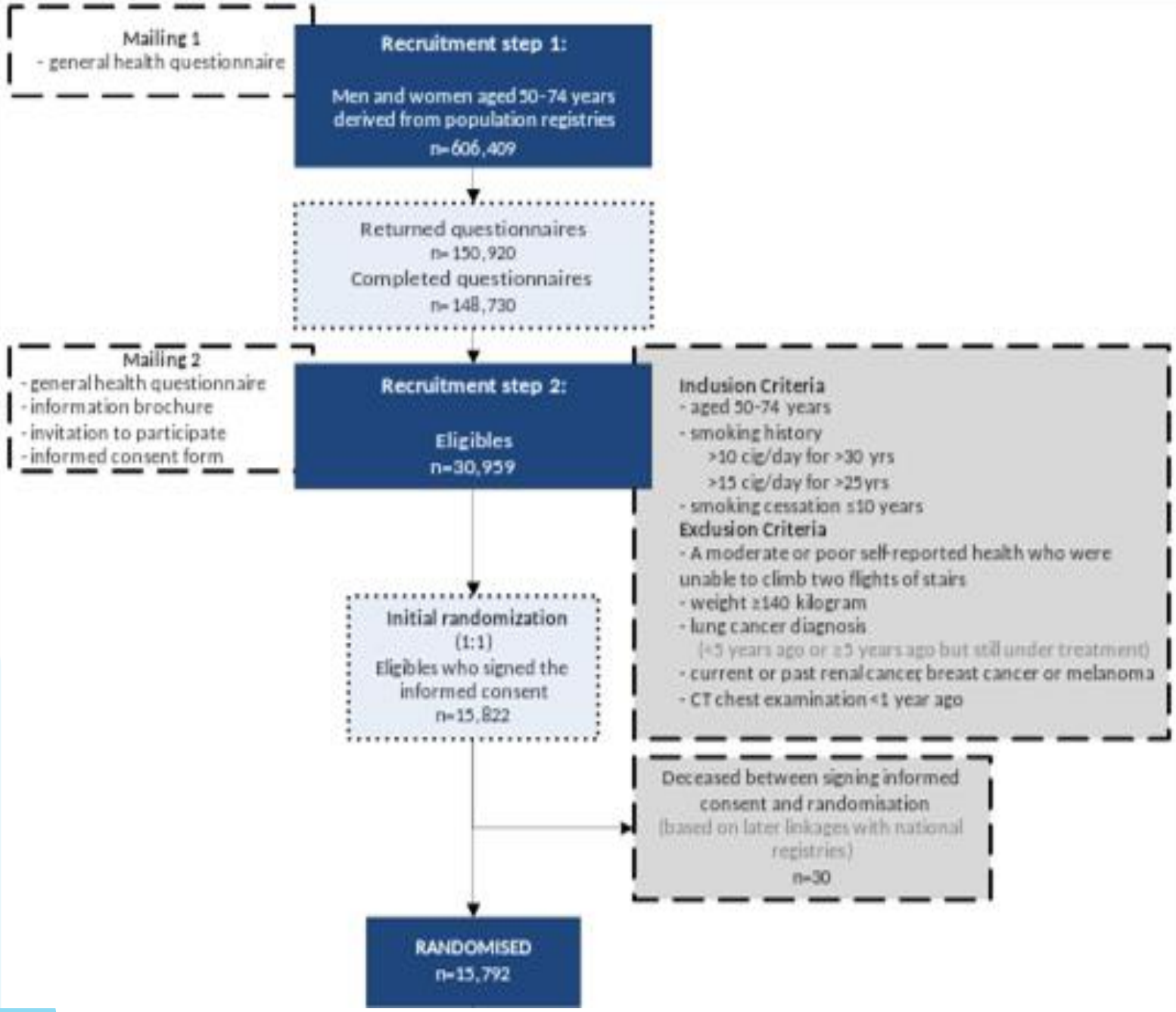
≥15 cig/day for ≥ 25 years or ≥10 cig/day for ≥ 30 years

Smoked within 10 years

Enrollment: 1/28/2004 – 12/18/2006

Follow-up to 12/31/2015





Int. J. Cancer: **120,** 868–874 (2007)

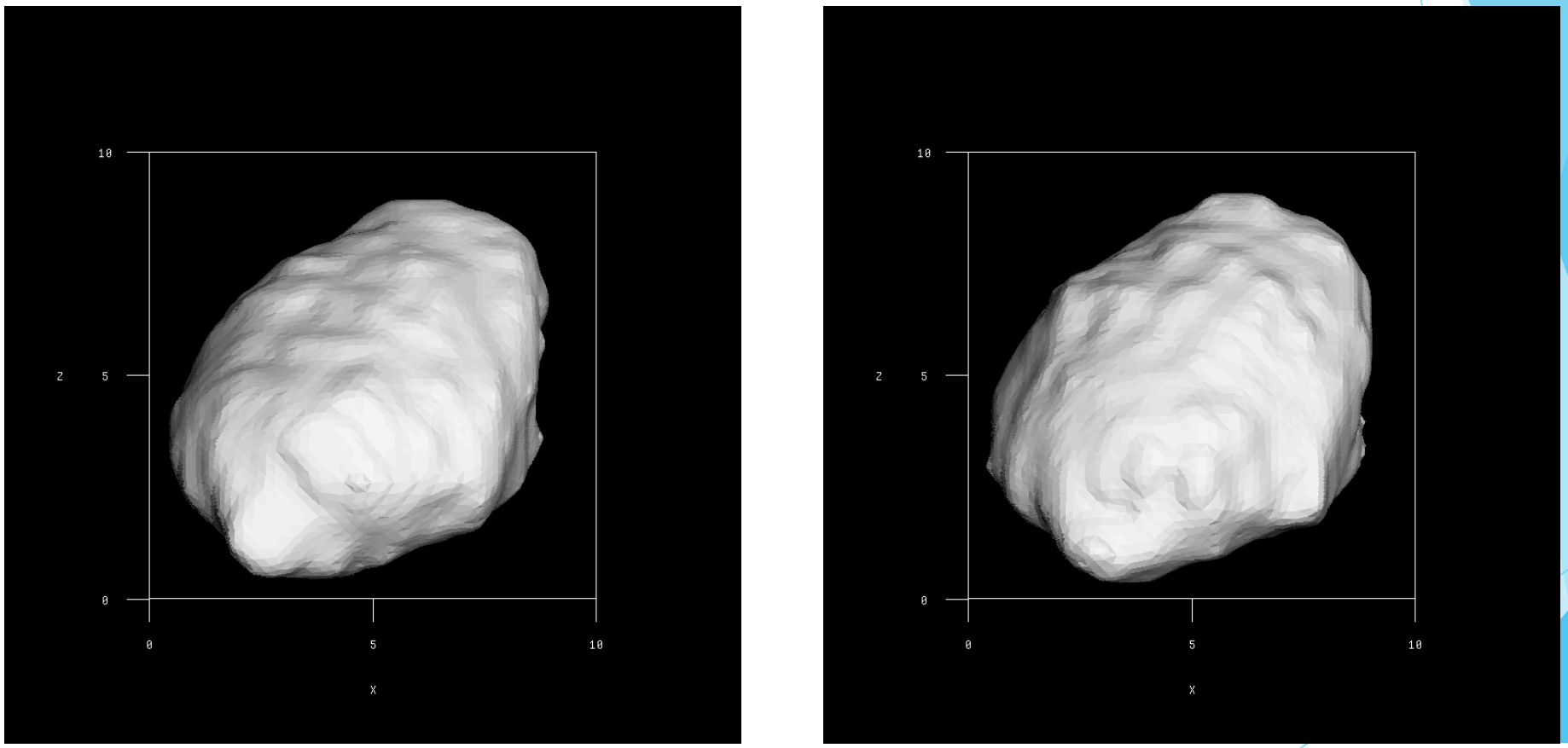
Risk-based selection from the general population in a screening trial: Selection criteria, recruitment and power for the Dutch-Belgian randomised lung cancer multi-slice CT screening trial (NELSON)

Carola A. van Iersel[1,2*], Harry J. de Koning[1], Gerrit Draisma[1], Willem P.T.M. Mali[3], Ernst Th. Scholten[4], Kristiaan Nackaerts[5], Mathias Prokop[3], J.Dik.F. Habbema[1], Mathijs Oudkerk[6] and Rob J. van Klaveren[2]

Baseline Characteristics and Mortality Outcomes of Control Group Participants and Eligible Non-Responders in the NELSON Lung Cancer Screening Study

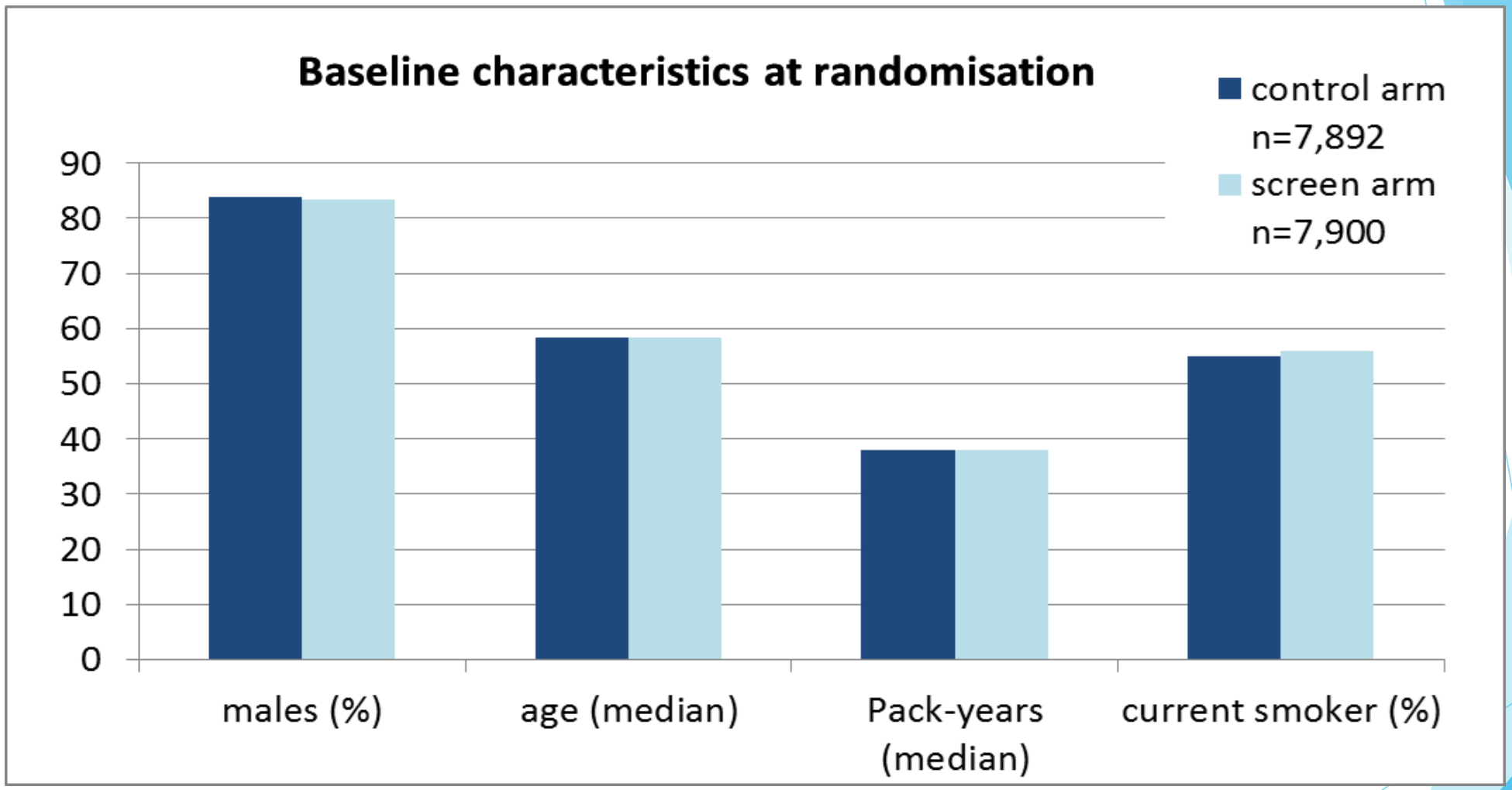
Uraujh Yousaf-Khan, MD, Nanda Horeweg, PhD, MD,* Carlijn van der Aalst, PhD,* Kevin ten Haaf, MSc,* Mathijs Oudkerk, PhD, MD,† and Harry de Koning, PhD, MD**

Volumetric Growth Rate Analysis



8 mm stable pulmonary nodule at baseline and 181 days later

MVGI = 0.57%

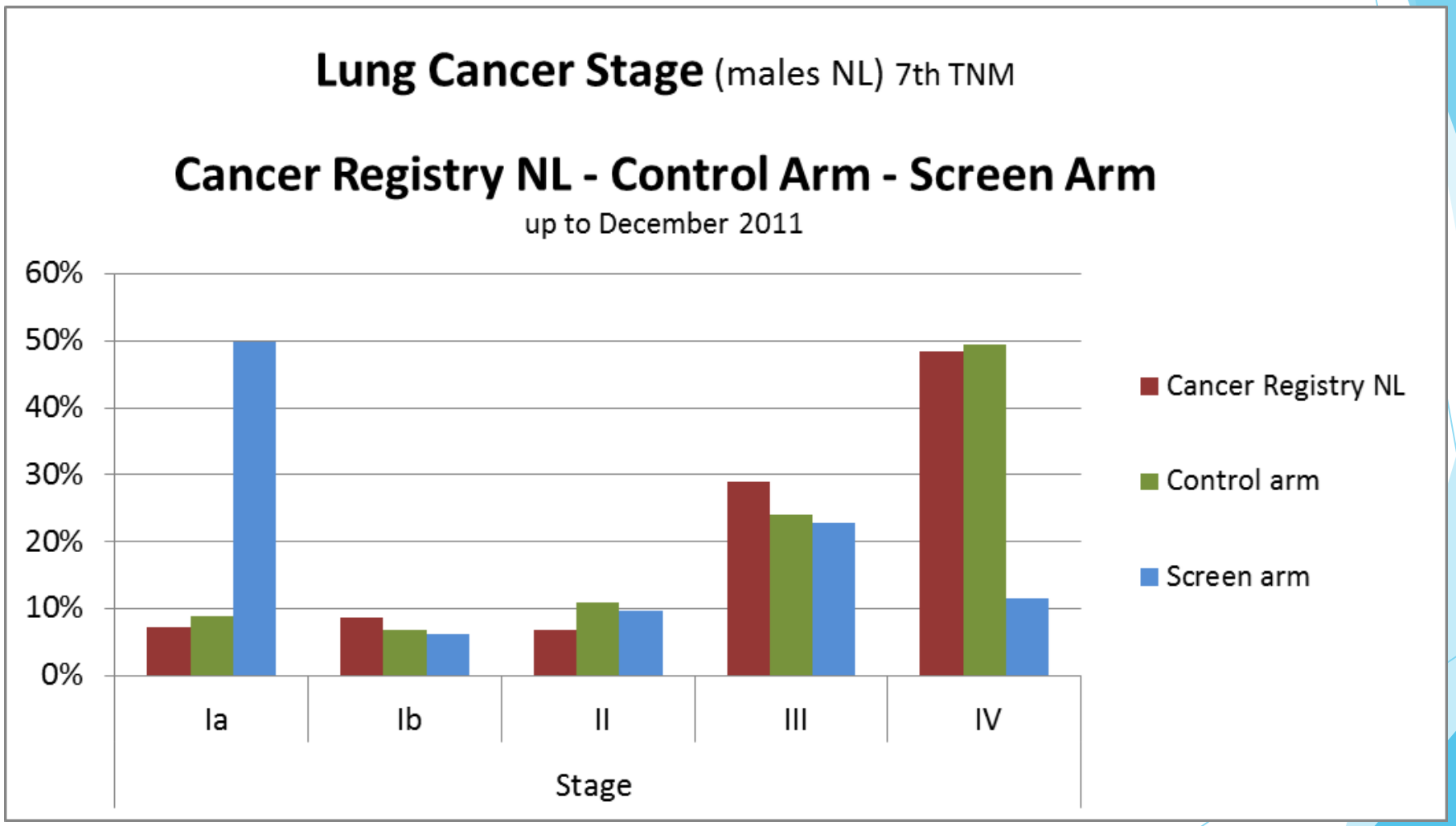

Baseline characteristics at randomisation
control arm n=7,892
screen arm n=7,900
90
80
70
60
50
40
30
20
10
0
males (%)
age (median)
Pack-years (median)
current smoker (%)

	Year 1	Year 2	Year 4	Year 6.5	Year 10
	CT screening	CT screening	CT screening	CT screening	
Screen arm n=7,900					
	n=7,557 95.6% uptake	n=7,295 92.3% uptake	n=6,922 87.6% uptake	n=5,279 66.8% uptake	
Control arm n=7,892	Usual care (no screening)				

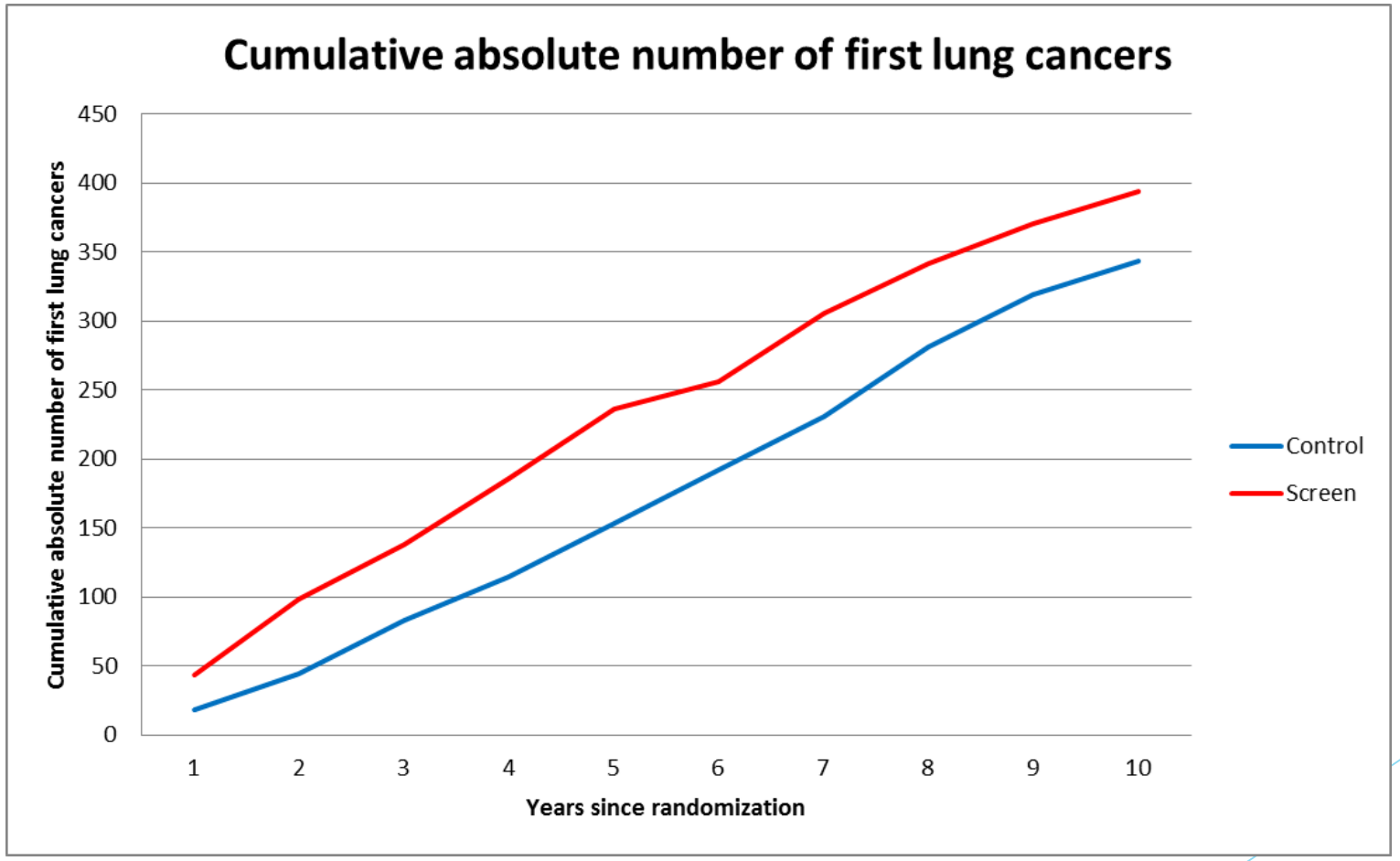
NATIONAL LINKAGES
- Statistics Netherlands/ Belgium
- Dutch/ Belgium Cancer Registry
- Centre for Genealogy

CAUSE OF DEATH REVIEW

	screening uptake	indeterminate test result	positive test result (final result)	lung cancer detection (participants)	positive predictive value positive test result
ROUND 1	7,557 (95.6%)	1,451 (19.2%)	197 (2.6%)	70 (0.9%)	36%
ROUND 2	7,295 (92.3%)	480 (6.6%)	131 (1.8%)	55 (0.8%)	42%
ROUND 3	6,922 (87.6%)	471 (6.8%)	165 (2.4%)	75 (1.1%)	45%
ROUND 4	5,279 (66.8%)	101 (1.9%)	105 (2.0%)	43 (0.8%)	41%
TOTAL	**27,053 (85.6%)**	**2,503 (9.3%)**	**598 (2.2%)**	**243 (0.9%)**	**41%**



Yousaf-Khan et al., in preparation


Cumulative absolute number of first lung cancers
Cumulative absolute number of first lung cancers
450
400
350
300
250
200
150
100
50
0
1
2
3
4
5
6
7
8
9
10
Years since randomization
Control
Screen

Lung Cancer Mortality Rate Ratio (95% CI)	Year 8	Year 9	Year 10
MALES	**0.75** P=0.015 (0.59-0.95)	**0.76** P=0.012 (0.60-0.95)	**0.74** P=0.003 (0.60-0.91)
FEMALES	**0.39** P=0.0037 (0.18-0.78)	**0.47** P=0.0069 (0.25-0.84)	**0.61** P=0.0543 (0.35-1.04)

26% mortality reduction with screening in men

39% to 61% mortality reduction in women (only 16% of the study)

Rand: 23-12-2003 – 06-07-2006

FU: 23-12-2003 – 31-12-2015

FU 94% complete year 10

NELSON Volume CT screening

- **MALES at high risk for lung cancer have a reduced risk of dying from lung cancer of 26% in the screen arm compared to the male control arm (95% CI 9-40%)**
- **In WOMEN, reductions are consistently more favourable: 39-61%**
- **These results are more favourable than the NLST-results & suggest gender differences**
- **Volume CT lung cancer screening of high risk former and current smokers results in low referral rates (2.3%), and a very substantial reduction in lung cancer mortality (in both genders)**

Fundamental screening considerations

- Frequency of cancers are greater in baseline versus each repeat (annual) rounds (which remains essentially constant)
- Diagnostic (stage) distribution of cancers is essentially stable in each annual round of screening and different from the baseline round (smaller but faster growing)
- Longer intervals between each annual round will allow for tumors to get larger and potentially become symptomatic or progress in stage
- Cure rates are inversely correlated with size

NELSON: Stage I

1 year | 2 years | 2.5 years

Table 3 Stage distribution of screening-detected lung cancers of all rounds

	Round 1			p Value*	Round 2			p Value†	Round 3			p Value‡	Round 4		
	n	Per cent	Cumulative %		n	Per cent	Cumulative %		n	Per cent	Cumulative %		n	Per cent	Cumulative %
				0.37				0.02				0.10			
Stage															
Ia	44	59.5	59.5		43	74.1	74.1		50	64.9	64.9		22	47.8	47.8
Ib	4	5.4	64.9		1	1.7	75.9		6	7.8	72.7		6	13.0	60.9
IIa	7	9.5	74.3		4	6.9	82.8		–	–	76.6		3	6.5	67.4
IIb	–	–	–			–	–		3	3.9	–		4	8.7	76.1
IIIa	10	13.5	87.8		6	10.3	93.1		14	18.2	94.8		3	6.5	82.6
IIIb	4	5.4	93.2		2	3.4	96.6		1	1.3	96.1		2	4.3	87.0
IV	5	6.8	100		2	3.4	100		3	3.9	100		6	13.0	100
Total	74	100	–		58	100	–		77	100	–		46	100	–

*p Value: comparison of stage distribution of the screening-detected lung cancers of round 1 vs round 4.
†p Value: comparison of stage distribution of the screening-detected lung cancers of round 2 vs round 4.
‡p Value: comparison of stage distribution of the screening-detected lung cancers of round 3 vs round 4.

Yousaf-Khan U: Thorax 2016

75.9 vs. 72.7 vs 60.9

- Second large randomized trial that showed a mortality reduction benefit of LDCT screening
- NLST compares LDCT versus Chest X-ray
- A small but statistically insignificant benefit of chest X-ray screening could explain the slightly better benefit with NELSON

Category	Category Descriptor	Category	Findings	Management	Probability of Malignancy	Estimated Population Prevalence
Negative	No nodules and definitely benign nodules	1	no lung nodules nodule(s) with specific calcifications: complete, central, popcorn, concentric rings and fat containing nodules	Continue annual screening with LDCT in 12 months	< 1%	90%
Benign Appearance or Behavior	Nodules with a very low likelihood of becoming a clinically active cancer due to size or lack of growth	2	solid nodule(s): < 6 mm new < 4 mm part solid nodule(s): < 6 mm total diameter on baseline screening non solid nodule(s) (GGN): < 20 mm OR ≥ 20 mm and unchanged or slowly growing category 3 or 4 nodules unchanged for ≥ 3 months			
Probably Benign	Probably benign finding(s) - short term follow up suggested; includes nodules with a low likelihood of becoming a clinically active cancer	3	solid nodule(s): ≥ 6 to < 8 mm at baseline OR new 4 mm to < 6 mm part solid nodule(s) ≥ 6 mm total diameter with solid component < 6 mm OR new < 6 mm total diameter non solid nodule(s) (GGN) ≥ 20 mm on baseline CT or new	6 month LDCT	1-2%	5%
Suspicious	Findings for which additional diagnostic testing and/or tissue sampling is recommended	4A	solid nodule(s): ≥ 8 to < 15 mm at baseline OR growing < 8 mm OR new 6 to < 8 mm part solid nodule(s: ≥ 6 mm with solid component ≥ 6 mm to < 8 mm OR with a new or growing < 4 mm solid component endobronchial nodule	3 month LDCT; PET/CT may be used when there is a ≥ 8 mm solid component	5-15%	2%
		4B	solid nodule(s) ≥ 15 mm OR new or growing, and ≥ 8 mm part solid nodule(s) with: a solid component ≥ 8 mm OR a new or growing ≥ 4 mm solid component	chest CT with or without contrast, PET/CT and/or tissue sampling depending on the *probability of malignancy and comorbidities. PET/CT may be used when there is a ≥ 8 mm solid component.	> 15%	2%
		4X	Category 3 or 4 nodules with additional features or imaging findings that increases the suspicion of malignancy			

LUNG-RADS classification

Category	Category Descriptor	Category	Findings	Management	Probability of Malignancy	Estimated Population Prevalence
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		4X	Category 3 or 4 nodules with additional features or imaging findings that increases the suspicion of malignancy	malignancy and comorbidities. PET/CT may be used when there is a ≥ 8 mm solid component		

LUNG-RADS classification

4X

Category 3 or 4 nodules with additional features or imaging findings that increases the suspicion of malignancy

Automating the steps in Lung-RADS

- **Detect** nodules
- Determine the **type** of each nodule
- **Measure the size** of each nodule (and its solid core)
- Estimate **malignancy risk** (4X, benign appearance)

B3 disease burden

- Lung cancer, CVD and COPD: ‘B3’
- In top-10 of global causes of death
- >75% of deaths due to non-communicable diseases

NL:	Lungca	CVD	COPD	
Annual incidence	11,287	82,100	53,300	
Reduction in disability-adjusted live years	2,9	5,0		3,4

Annual NL health care costs 10 billion euros

Concept B3 diseases

- Major burden on health care
- Often indolent start; only detected when symptoms occur
- Share major risk factors (aging and smoking)
- Share mechanisms (chronic inflammation)
- Early treatment delays or stops progression and can allow therapy at a treatable stage in many patients

Instead of treating as three independent diseases, 'big-3'(B3) concept to manage these three diseases holistically may be more effective

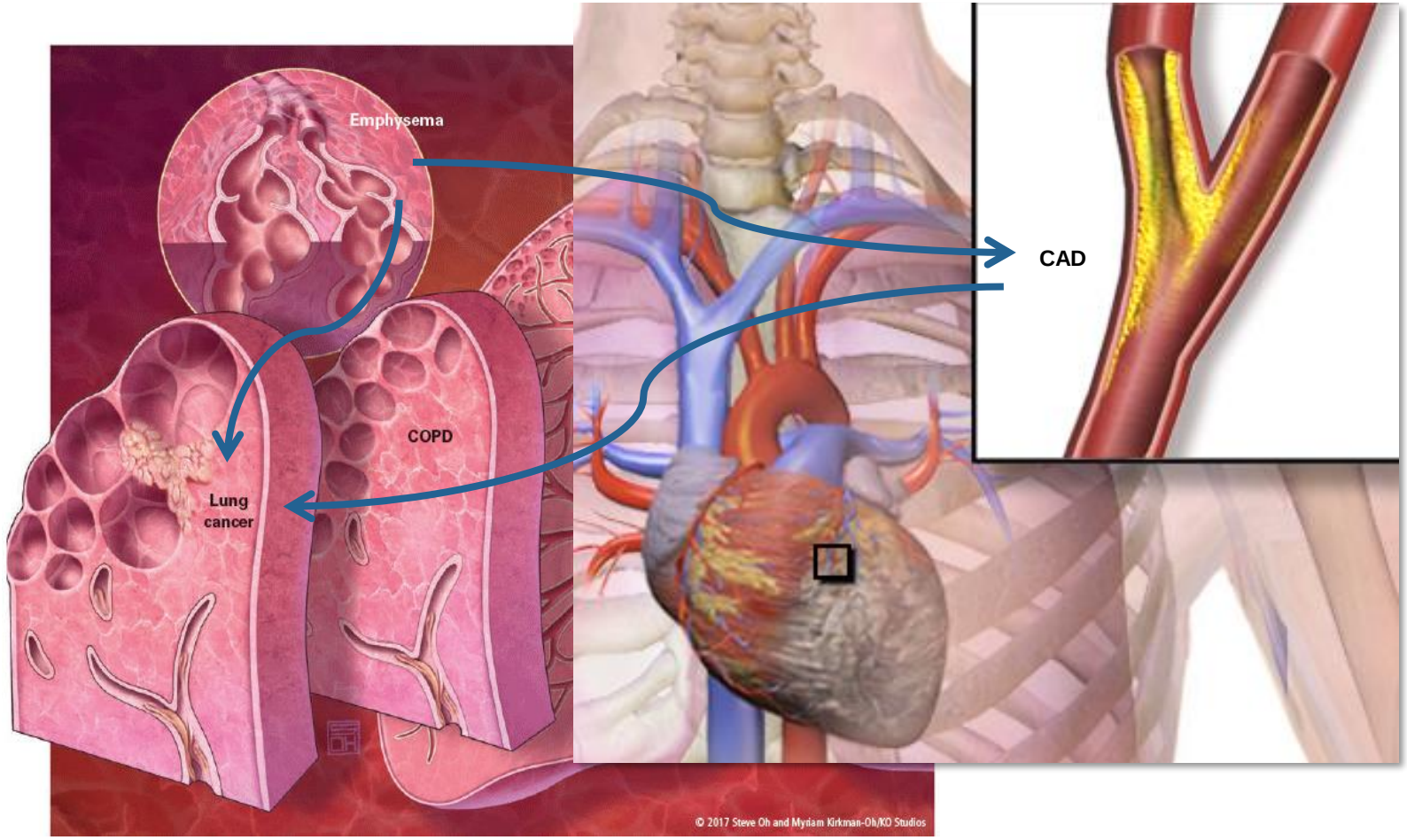
B3 mortality in relation to smoking

- 5 US cohorts (N=954,029)
- 9% current smokers
- F-up 10 y

Cause of Death	Women				Men			
	Never Smoked		Current Smoker		Never Smoked		Current Smoker	
	no. of deaths	*relative risk*	*no. of deaths*	*relative risk (95% CI)*	*no. of deaths*	*relative risk*	*no. of deaths*	*relative risk (95% CI)*
All causes	31,786	1.0	8150	2.8 (2.7–2.9)	24,863	1.0	8325	2.8 (2.8–2.9)
Lung cancer, C33–C34	735	1.0	1872	22.9 (21.0–25.0)	480	1.0	1754	25.3 (22.8–28.1)
Ischemic heart disease, I20–I25	4,119	1.0	1014	3.0 (2.8–3.2)	4,947	1.0	1522	2.6 (2.4–2.7)
COPD, J40–J44	410	1.0	941	25.0 (21.2–28.1)	259	1.0	825	27.8 (24.1–32.0)

About 50% of smoking-related mortality due to B3
Population attributable risk for B3 mortality 24-38%

B3 diseases: interrelatedness

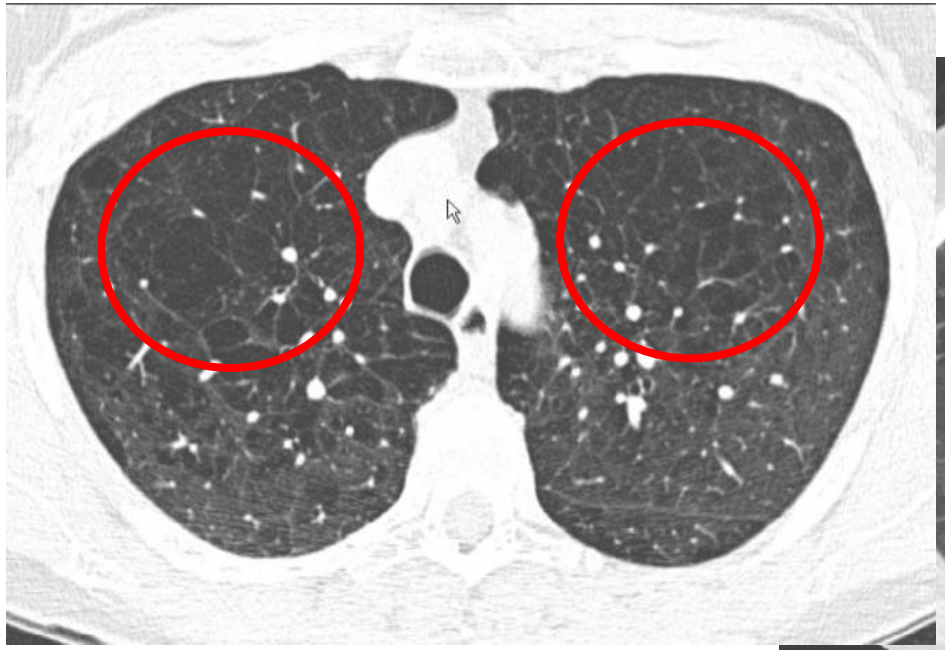


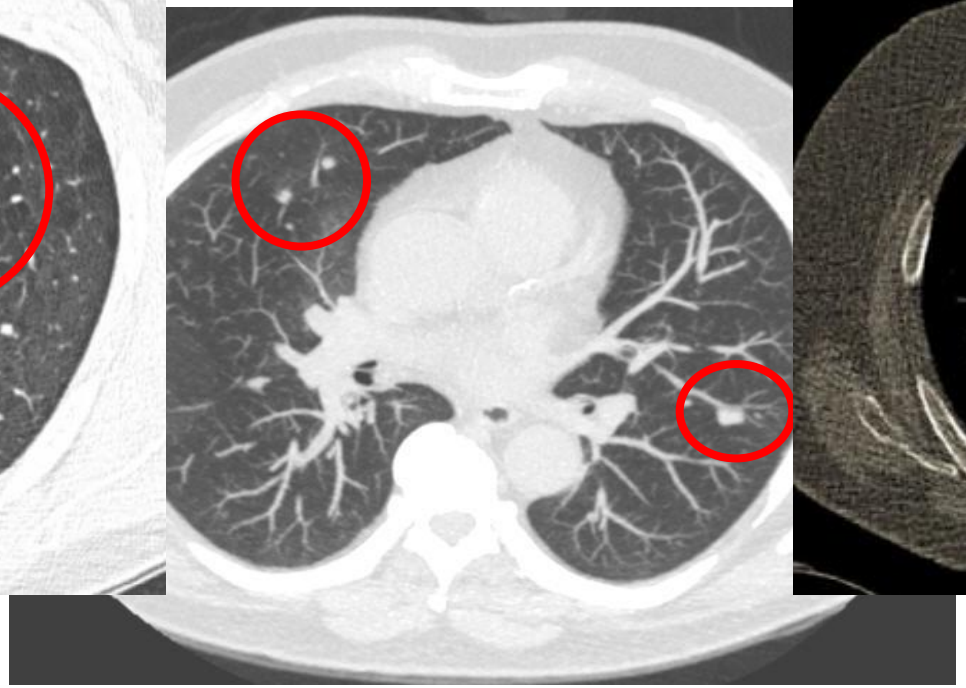
COPD increases risk of CAD

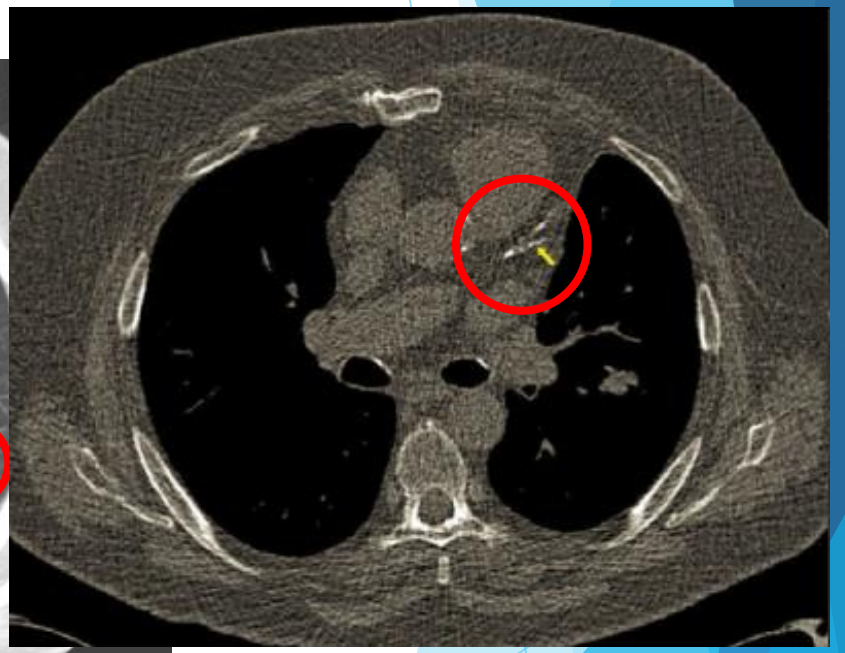
COPD increases risk of lung cancer, also in never smokers, and is related to worse prognosis in lung cancer

Self-reported CAD related to risk of lung cancer in smokers

CT lung cancer screening in long-term smokers







Inherent information on lung cancer, cardiovascular disease, COPD:
the 'B3' – potential for better cost-efficiency of screening

B3 screening: which population?

Organization	Groups Eligible for Screening	Year
American Academy of Family Practice[97]	Evidence is insufficient to recommend for or against screening	2013
American Association for Thoracic Surgery[77]	1. Age 55 to 79 yrs with ≥ 30 pack-yr smoking history 2. Long-term lung cancer survivors who have completed 4 yrs of surveillance without recurrence, and who can tolerate lung cancer treatment in order to detect second	2012
[illegible]	[illegible]	13
American College of Chest Physicians[80]	Age 55 to 74 yrs with ≥ 30 pack-yr smoking history and either continue to smoke or have quit within the past 15 yrs	2013
American College of Chest Physicians and American Society of Clinical Oncology[99]	Age 55 to 74 yrs with ≥ 30 pack-yr smoking history and either continue to smoke or have quit within the past 15 yrs	2012
American Lung Association[100]	Age 55 to 74 yrs with ≥ 30 pack-yr smoking history and no history of lung cancer	2012
National Comprehensive Cancer Network[78]	1. Age 55 to 74 yrs with ≥ 30 pack-yr smoking history and smoking cessation < 15 yrs 2. Age ≥ 50 yrs and ≥ 20 pack-yr smoking history and 1 additional risk factor (other than secondhand smoke)[a]	2017
US Preventive Services Task Force[75]	Age 55 to 80 yrs with ≥ 30 pack-yr smoking history and smoking cessation < 15 yrs	2013

Current CT lung cancer screening recommendations: Based on age and long-term smoking

B3 disease: Early health technology assessment

- Current/former smokers aged 50-75 years; N= 3.5 million (NL)

Disease	Stage	Distribution	Distr. Screening (Realistic)	QALYs
COPD *n = 53,300*	Mild	17.3%	39.3%	0.1
	Moderate	58.4%	51.1%	-1.1
	Severe	20.2%	8.9%	-3.1
	Very Severe	4.0%	< 0.1%	-3.0
CVD *n = 82,100*	Mild	9.5%	30.7%	-2.2
	Moderate	25.0%	31.2%	-3.3
	Severe	37.2%	16.6%	-5.6
	Very Severe	28.3%	21.5%	-8.2

Key criteria in decision to screen

- 1. The disease should be an important health problem, as measured by morbidity, mortality, and other measures of disease burden.
- 2. The disease should have a detectable preclinical phase.
- 3. Treatment of disease detected before the onset of clinical symptoms should offer benefits compared with treatment after the onset of symptoms.
- 4. The screening test should meet acceptable levels of accuracy and cost.
- 5. The screening test and follow-up requirements should be acceptable to individuals at risk and to their healthcare providers.

Low-dose CT screening: incidental findings

	Reported	Not reported
Chest	Aortic aneurysm ≥50 mm	Valve calcification (aortic, mitral, etc)
	Calcified pleural plaques	Annulus calcification
	Pleural fluid, ≥ 2 cm thickness	Pericardial abnormalities (thickening, calcification, etc)
	Lung nodule ≥ 0.8 cm (300mm^3)	Hiatus hernia
Abdomen	Very large liver cyst(s)	Small to medium size liver cyst(s)
	Identifiable abdominal mass	

Incidentally detected, potentially clinically relevant findings are reported to GP and participant

Take home messages

- B3 diseases in top-10 of global causes of death
- B3 share major risk factors and mechanisms
- CT lung cancer screening scan can identify early stages of the B3
- Potential for better cost efficiency for B3 screening
- Emphysema on CT: stratifier of lung cancer risk (selection criterion?)
- Questions: impact of CVD screening (ROBINSCA), optimal scan protocol, optimal screening population

Lung Cancer Screening 1999—Today
What Have We Learnt

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

Harvard Medical Blog

"To keep one person from dying of lung cancer, an estimated 320 heavy smokers need screening. Or put another way, 319 out of 320 people who get screened will not benefit from screening. And some will be harmed"

Mortality Reduction (5 years)

- 40 deaths/5,000 person-years in LDCT
- 50 deaths/5000 person-years in usual care

- Relative reduction in mortality = 20%

(50-40)/50 X 100% = 20%

IASLC
INTERNATIONAL ASSOCIATION FOR THE STUDY OF LUNG CANCER
IASLC 19th World Conference on Lung Cancer
September 23–26, 2018 Toronto, Canada
WWW.IASLC.ORG
#WCLC2018

EU Position Statement on Lung cancer screening

Matthijs Oudkerk MD PhD

Professor of Radiology / Center for Medical Imaging
University of Groningen/University Medical Center Groningen,
The Netherlands

S01.10

WCLC Toronto 23 sept 2018

Trial (Ref.)	Participants in Screening Arm (*n*)	Screening Rounds (*n*)	Length of Screening Interval (*yr*)	Males to Females (%:%)	No. of Published CT-Detected Lung Cancers	Stage IA + IB Lung Cancers [*n* (%)]	Stage IIIB + IV Lung Cancers [*n* (%)]
NLST (8)	26,722	3	1	59.0:41.0	649	400 (61.6)	130 (20.0)
NELSON	7,915	4	1, 2, and 2.5	83.5:16.5	209	148 (70.8)	17 (8.1)
DLST (36)	2,052	5	1	54.6:45.4	69	47 (68.1)*	11 (15.9)†
ITALUNG (7)	1,613	4	1	64.2:35.8	22	11 (50.0)‡	5 (22.7)
DANTE (37)	1,276	4	1	100.0:0.0	58	41 (70.7)	4 (6.9)
MILD (38)	1,190	10	1	68.4:31.6	29	18 (62.1)	4 (20.0)
	1,186	5	2	68.5:31.5	20	14 (70.0)	5 (17.2)
LUSI (39)	2,029	4	1	64.8:35.2	22	18 (81.8)	0 (0)
Total	43,983	3 to 10	1 to 2.5	65.4:34.6	1,078	697 (64.7)§	118 (10.9)*

WCLC Toronto 23 sept 2018

Consensus statements

- Low Dose Computed Tomography 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.

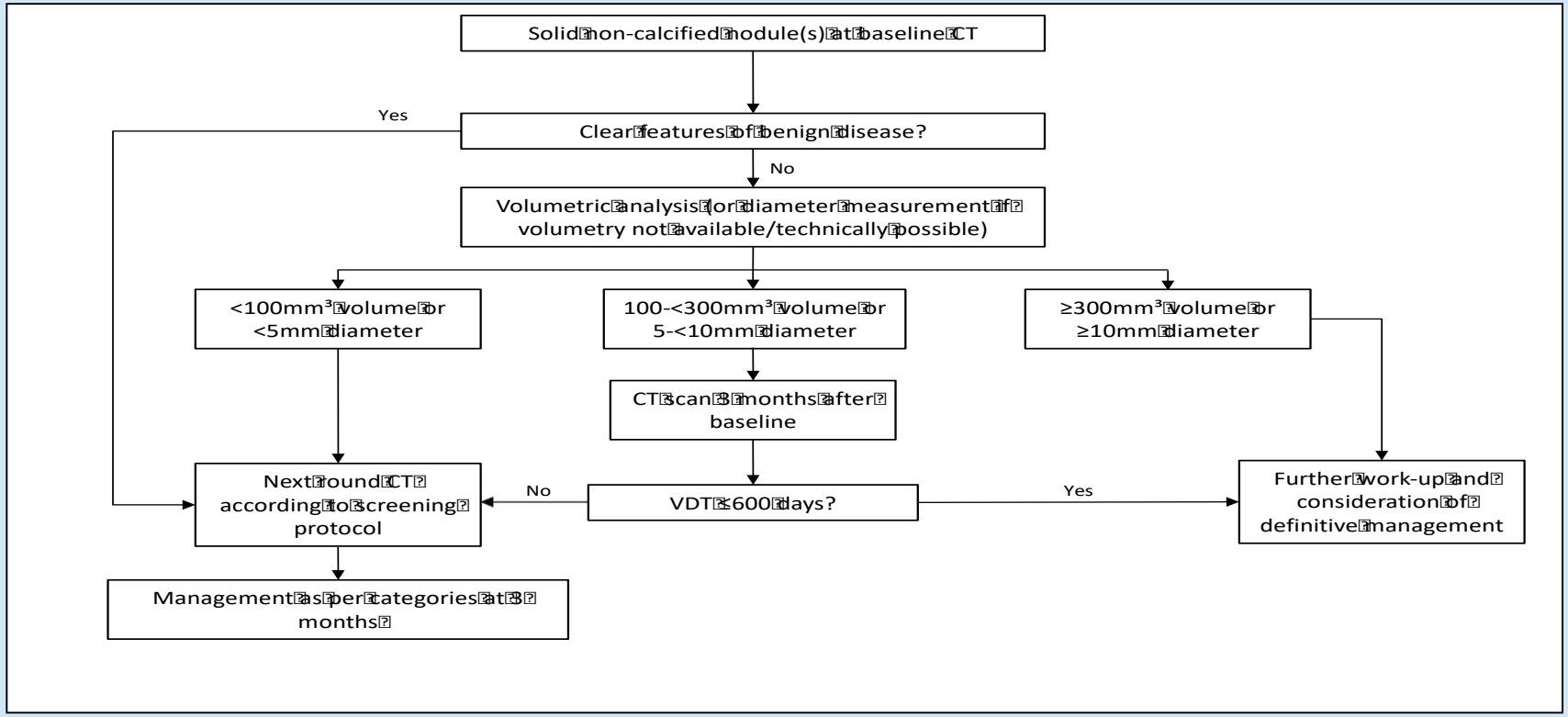
Consensus statements

- 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.

Consensus statements

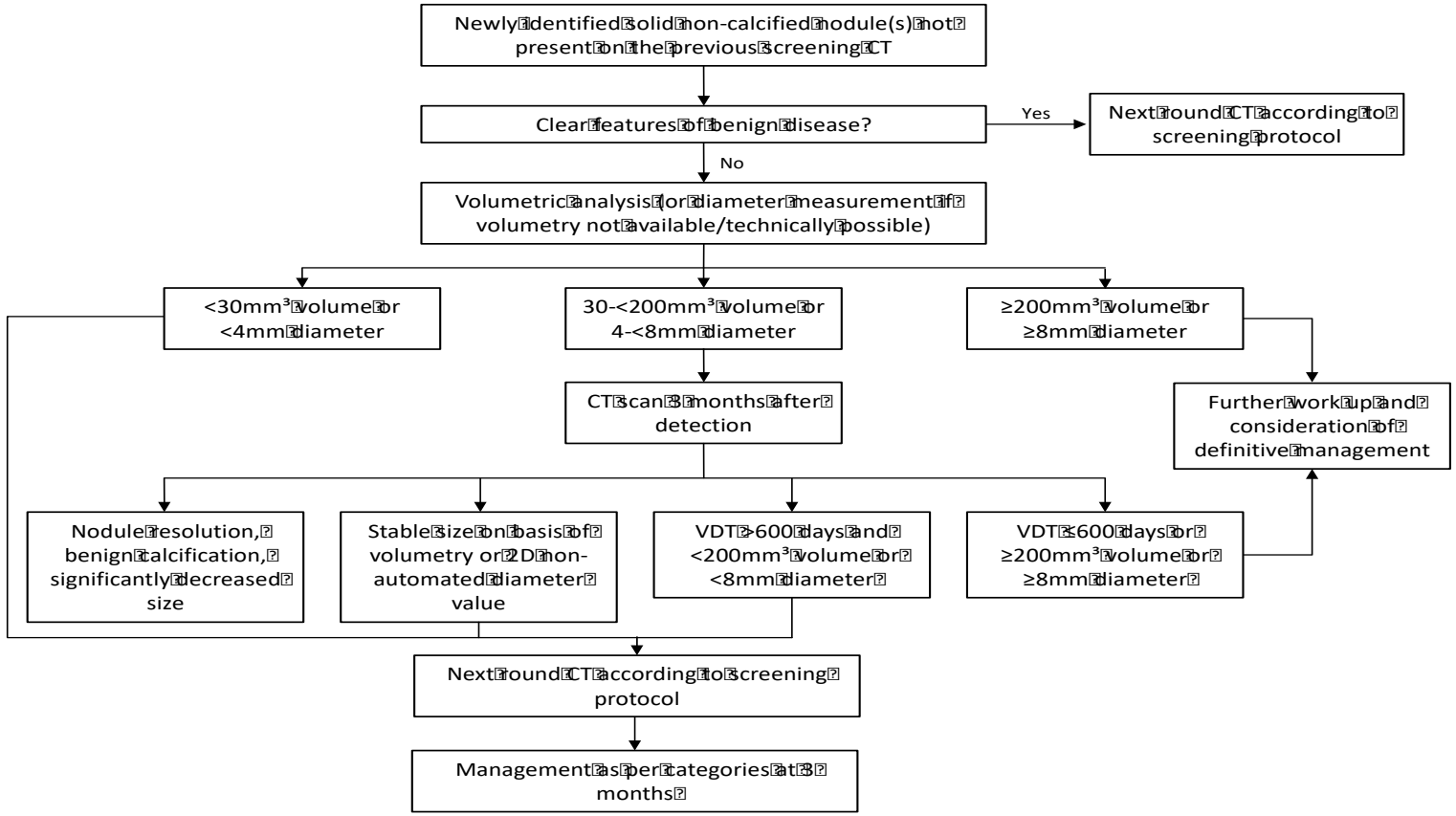
- To date we only have evidence for annual LDCT lung cancer screening, however.. ..
- Management of lung nodules by the lung cancer MDTs should be according to the EUPS recommendations.
- The EUPS Expert Group recommends planning for implementation of LDCT screening should be started throughout Europe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

EU Baseline screen protocol



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.

EU Incident screen protocol

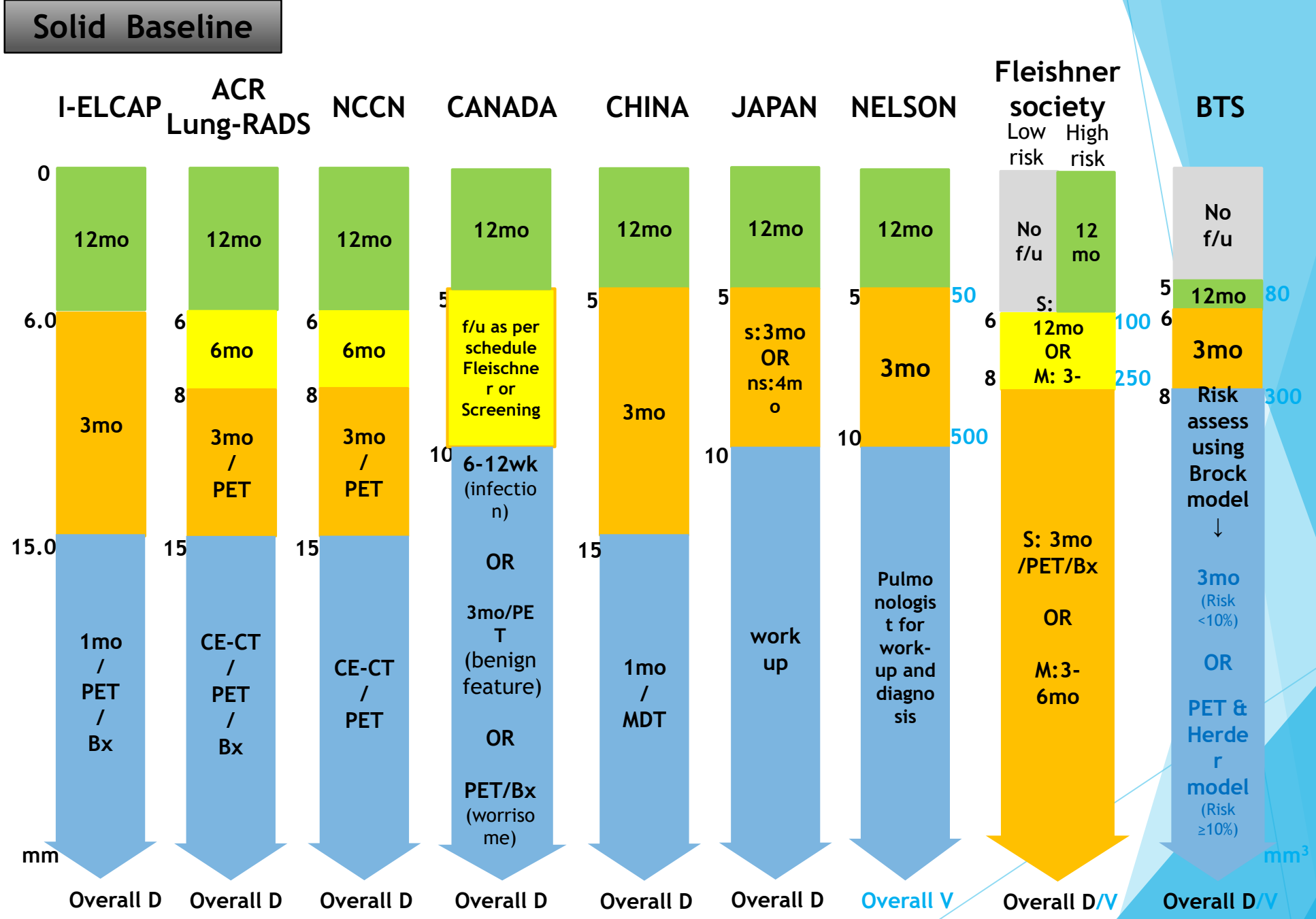


Nodule management protocol for screen detected incidental solid nodules at follow-up.

Management of new nodules

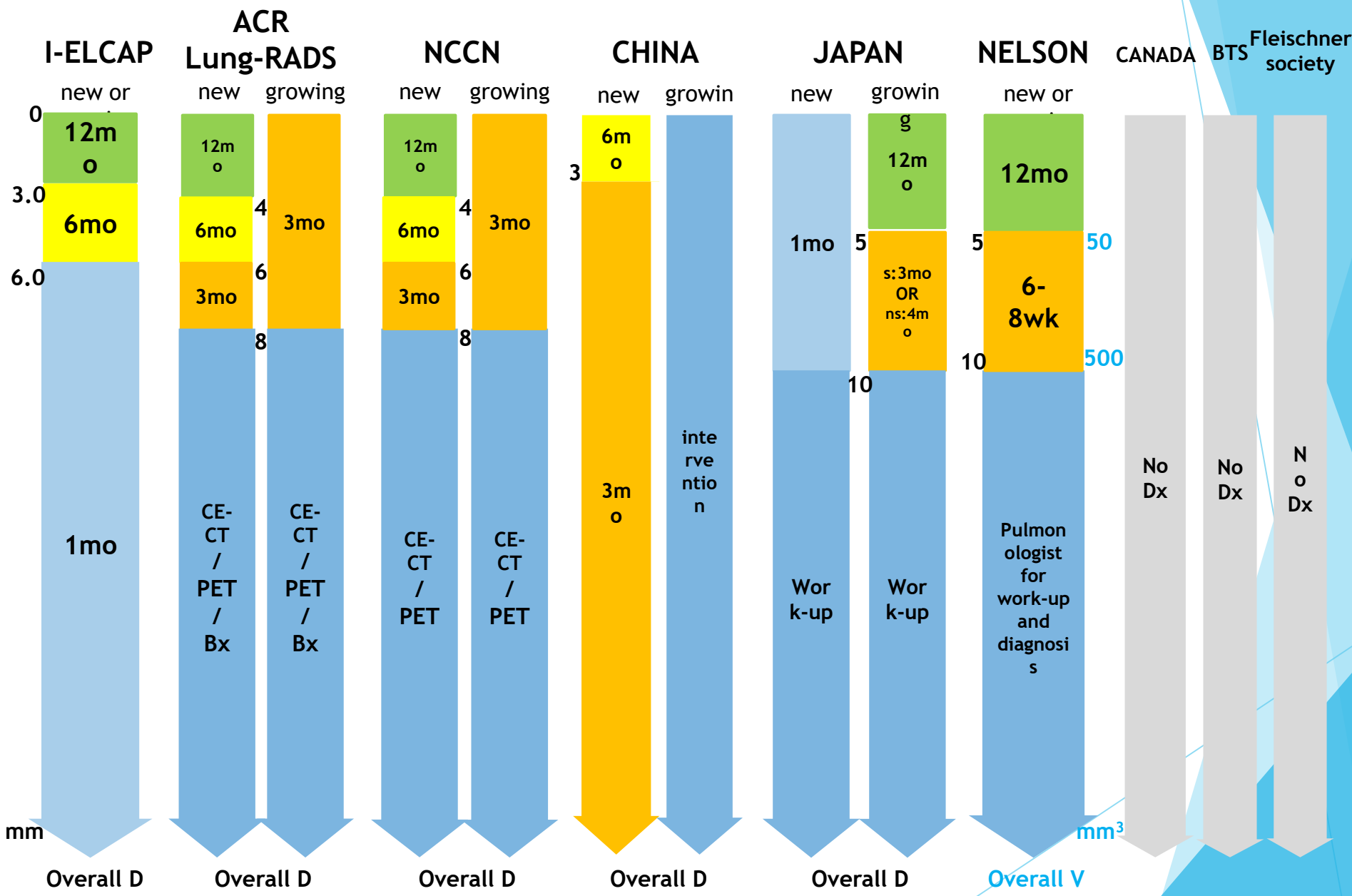
- ***New nodules*** are common (3-13% screenings) and comprise a significantly ***higher lung cancer probability***, already at smaller size
- ***More stringent cutoff values*** are mandatory:
  - Negative screen result: <30mm^3 (LC probability <1%)
  - Indeterminate screen result: 30-200mm^3 (LC prob ~3%)
  - Positive screen result: >200mm^3 (LC prob ~17%)

Walter et al. Lancet Oncology. 2016



mo = month; wk = week; Bx = biopsy; PET = positron emission tomography; CE-CT = contrast CT; s = smoker; ns = non-smoker; S = single; M = multiple; f/u = follow up;

Solid Annual



mo = month; wk = week; Bx = biopsy; PET = positron emission tomography; CE-CT = contrast CT; s = smoker; ns = non-smoker; Dx = details

Optimal screening intervals

- USA: annual CT screenings for up to 25 years
- NELSON: 2-yr LC probability of a person with largest nodule <100 mm^3 was 0.4% (comparable to persons without lung nodules[1]) → biannual screening?
- Optimal screen intervals: ***use of previous screen results*** to estimate lung cancer risk [2,3]
- Future decisions regarding the screen interval timing should be based on ***risk***, ***psychosocial impact***, ***cost-effectiveness*** and the ***feasibility of implementation***

[1]Horeweg et al. Lancet Oncology 2014
[2]Yousaf-Khan et al. Thorax. 2017
[3]Patz et al. Lancet Oncol 2016

Optimal screening intervals

Screening Round	Stage I	Stage II	Stage III	Stage IV	
First	64.9%	9.5%	18.9%	6.8%	
Second	75.8%	6.9%	13.7%	3.4%	Interval 1 year
Third	72.7%	3.9%	19.5%	3.9%	Interval 2 years
Fourth	62.2%	13.3%	11.1%	13.3%	Interval 2.5 years

Horeweg N, et al. Characteristics of Lung Cancers Detected by Computer Tomography Screening in the randomized NELSON Trial. *Am J Respir Crit Care Med. April 15 2013.*

Gender personalized CT lungcancer screening

Lung Cancer and Overall Mortality Rates by Major Covariates, with Interaction Analysis

	Arm	# Lung Cancer Deaths | Death Rate [1]	Risk Ratio [2]	p-value for interaction [3]	# Total Deaths | Death Rate [1]	Risk Ratio [2]	p-value for interaction [3]
Subset							
All	LDCT	469 | 280	0.84		1912 | 1141	0.931	
All	CXR	552 | 332	Referent		2039 |1225	Referent	
Women	LDCT	158 | 228	0.73		574 |828	0.921	
Women	CXR	215 | 312	Referent		619 |899	Referent	
Men	LDCT	311 | 316	0.92		1338 |1361	0.936	
Men	CXR	337 | 345	Referent	0.08	1420 | 1454	Referent	0.84
Age < 65	LDCT	253 | 205	0.82		1059 | 856	0.942	
Age < 65	CXR	307 | 250	Referent		1117 | 909	Referent	
Age >=65	LDCT	216 | 491	0.87		853 | 1943	0.918	
Age >=65	CXR	245 | 562	Referent	0.60	922 | 2116	Referent	0.67
Current Smoker	LDCT	294 | 369	0.81		1146 |1437	0.944	
Current Smoker	CXR	360 | 455	Referent		1206 | 1523	Referent	
Former Smoker	LDCT	175 | 199	0.91		766 | 872	0.914	
Former Smoker	CXR	192 | 220	Referent	0.40	833 | 954	Referent	0.61

Key figures NLST

- Ratio men / women : 59 / 41
- Mortality impact men : - 8%
- Mortality impact women: - 27%
- Overall mortality impact: - 16%

Source:
The National Lung Screening Trial: Results Stratified by Demographics, Smoking History and Lung Cancer Histology
Paul F. Pinsky, Ph.D.,1 Timothy R. Church, Ph.D.,2 Grant Izmirlian, Ph.D.,1 and Barnett S. Kramer, M.D., M.P.H.1
Cancer. 2013 Nov 15; 119(22): 3976–3983.

Lung cancer screening saves lives > Europe should start planning implementation

Points of actions:

1. Annual low-dose CT only evidence based screening method
2. Identification of eligible screening participants by a lung cancer risk model
3. Semi-automated nodule volume strongly preferred over manual nodule diameter
4. Nodule management based on nodule volume and growth (volume-doubling time)
5. More stringent cutoffs for proven new nodules at incidence screening
6. Optimal screen intervals: use of previous screen results to estimate lung cancer risk?
7. European registry for collection of screening data

Take Home Message:

- Two large randomized controlled trials with adequate follow-up show a 20% to ≥26% mortality reduction benefit with low dose CT screening
- Women may benefit more from screening than men
- Time for worldwide implementation of lung cancer screening
- Importance of regular re-evaluation of screening eligibility criteria – race, air pollution etc.

While progress has been made in terms of gaining acceptance of screening by governments and healthcare organizations, rates of screening are currently low.

It will be important to deliver a consistent and clinically meaningful message describing the benefit to help change this situation.

LUNG CANCER SCREENING CAN SAVE LIVES

Thank you!