DLCG årsmøde 2026

Overvejelser ved indføring af lungekræftscreening i Danmark

PLUS

PROJEKT LUNGEKRÆFTSCREENING I SYDDANMARK

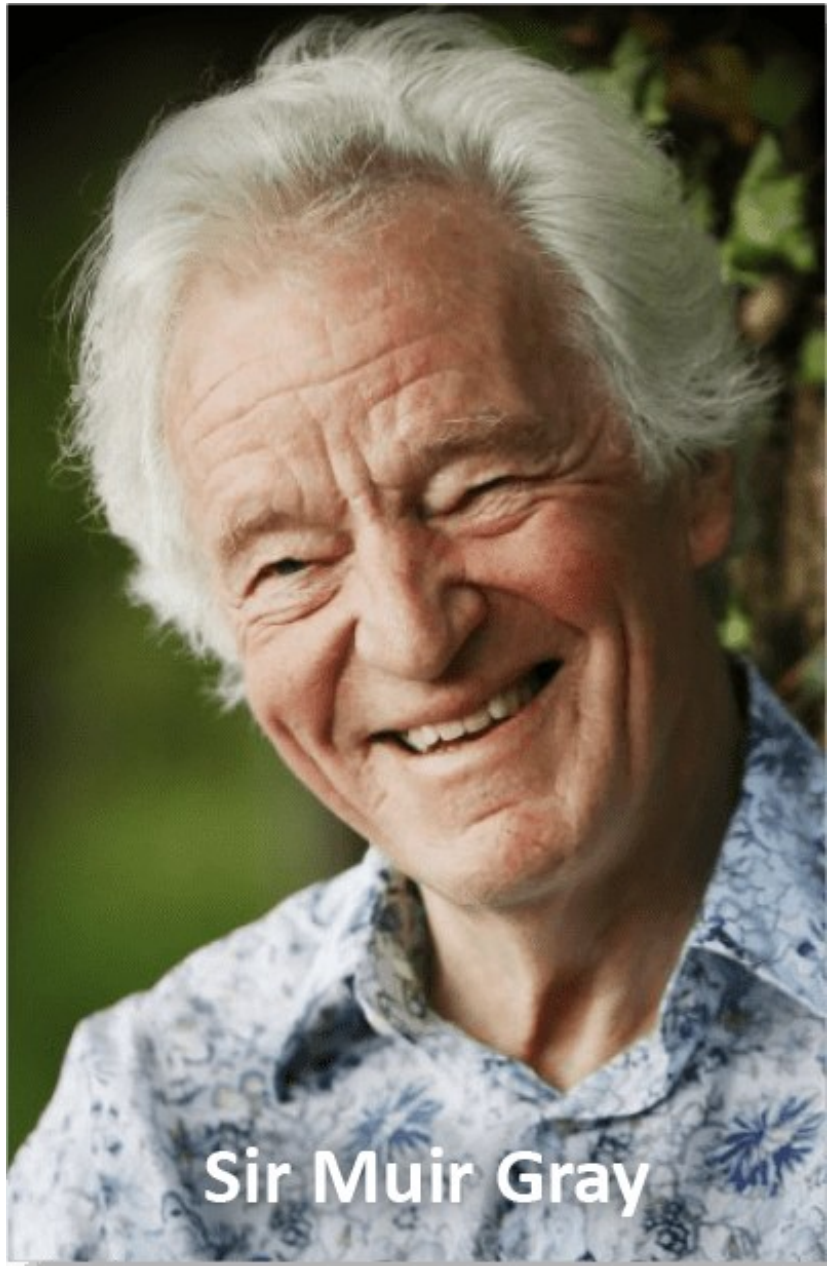
Region of Southern Denmark

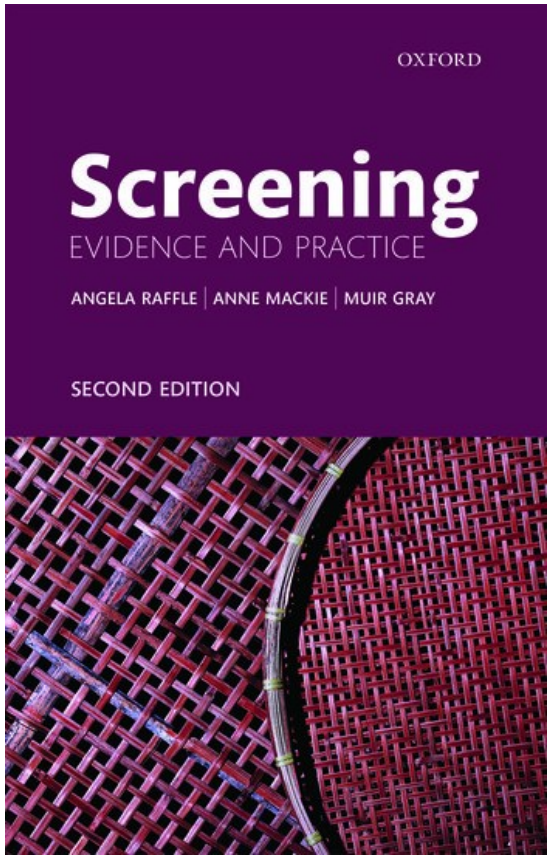
OPEN

Open Patient data Explorative Network

OUH
Odense Universitetshospital
Svendborg Sygehus

Michael Stenger, Ass. Prof., MD, PhD (michael.stenger@rsyd.dk)





"All screening programmes do harm, some do good as well, and of those some do more good than harm at reasonable cost."

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First Screening Round
N=1332

Exclusion (N=129) :
- Cancer diagnosis
- Nodule follow-up
- Other CT-based follow-ups

Second Screening Round
N=1203

Non-attendace / dropout (N=74):
- Actively cancelled (n=7)
- No contact (n=34)
- Chest CT performed for other reason (n=33)

LDCT completed in the second round
N=1129 (94%)

Smoking status (n=1129)

Current smokers (n=453, 40%)

- ✓ 27 currently enrolled in a smoking cessation program
- ✓ 49 request referral to smoking cessation program

Former smokers (n=676, 60%)

- ✓ 34 quit in connection with participation in PLUS
- ✓ Of these, 20 quit through a municipal smoking cessation program

PLUS
PROJEKT LUNGEKRÆFTSCREENING I SYDDANMARK

New findings / changes – 2024 vs. 2025

	2024
LDCTs	
Normal	
Lung ca	
Pulmon	
ILA (%)	
Emphys	
Non-pu	
Extra-th	
Regression of previous finding (%)	-

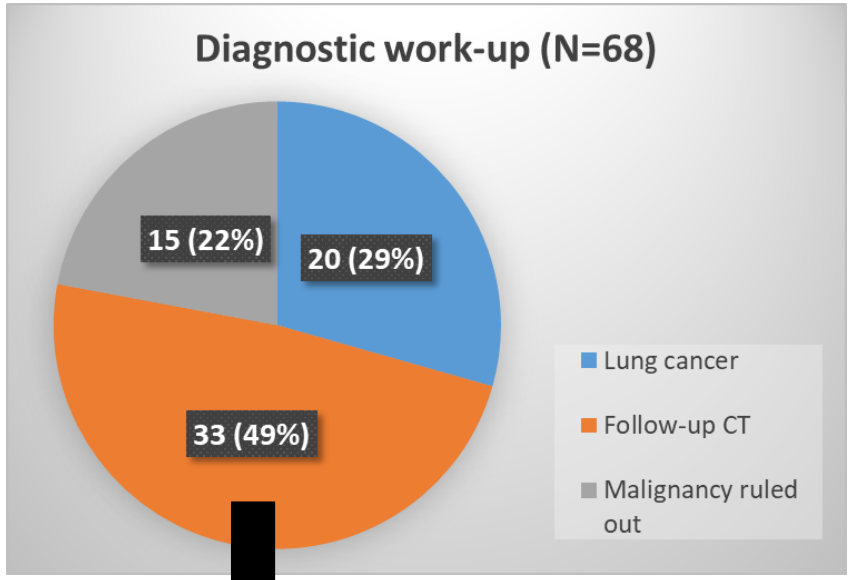
Referral Rate

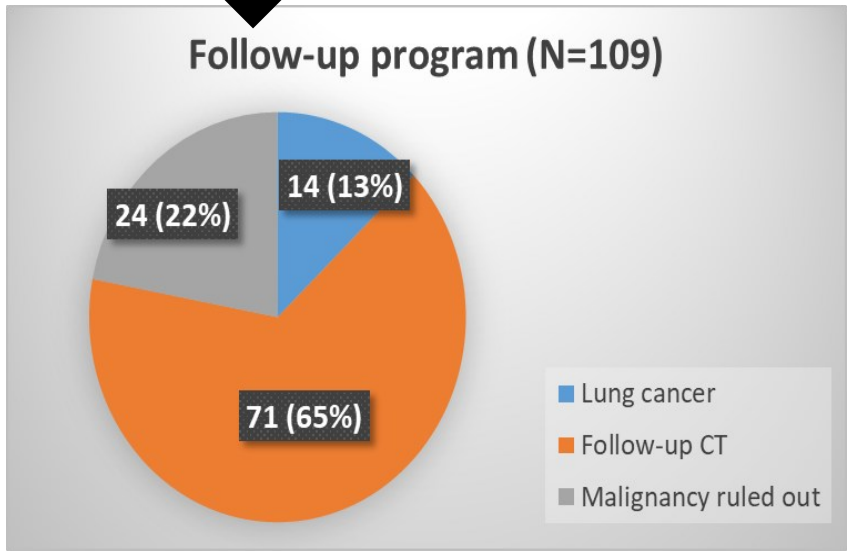
2024 versus 2025

16.4% **3.8%**

(26.5%)

Diagnostic work-up and follow-up (total)





STAGE	N (%)
I	20 (59%)
II	7 (20%)
III	4 (12%)
IV	3 (9%)
NSCLC	**29 (85%)**
SCLC	5 (15%)

Treatment

Participants (N)	1332
	n (%)
Lung Cancer Diagnosis	34 (2.6%)
Female	23 (68%)
Smoking cessation > 10 years	7 (21%)*
TREATMENT	
Surgery	22 (65%)
Wedge	3 (14%)
Segmentectomy	2 (9%)
Lobectomy	17 (77%)
Oncology	11 (32%)
No treatment	1 (3%)
Deaths	1 (3%)

*P-value (Chi2-test): 0.58

Number Needed to Screen (NNS)

Kræfttype	NNS Danske estimater	NNS i Europa / RCT-data
Lungekræft	**PLUS baseline LDCT:** 1.332 baseline-screenede **Ca. 78** ved baseline Akkumuleret: **Ca. 58** ved 1-års opfølgning **Ca. 39** ved 2 års opfølgning	**NELSON:** NNS ved baseline 108 NNS per screeningsrunde 92–133

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Elgibility Criteria

USPSTF2013 versus PLCOm2012 lung cancer screening eligibility criteria (International Lung Screening Trial): interim analysis of a prospective cohort study

Risk model–based screening detect more lung cancers and is more cost-effective than fixed categorical criteria.

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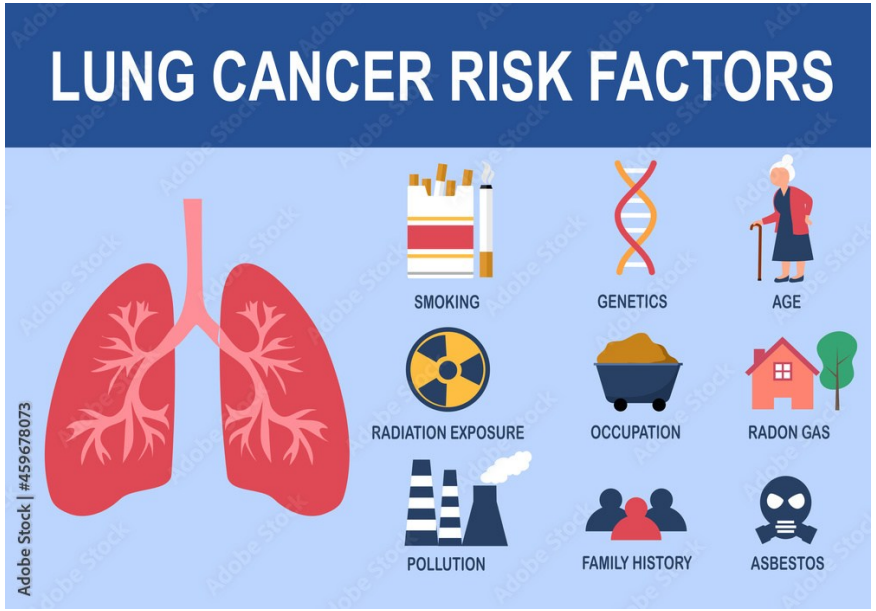
hy screening strategies for lung cancer: a systematic review

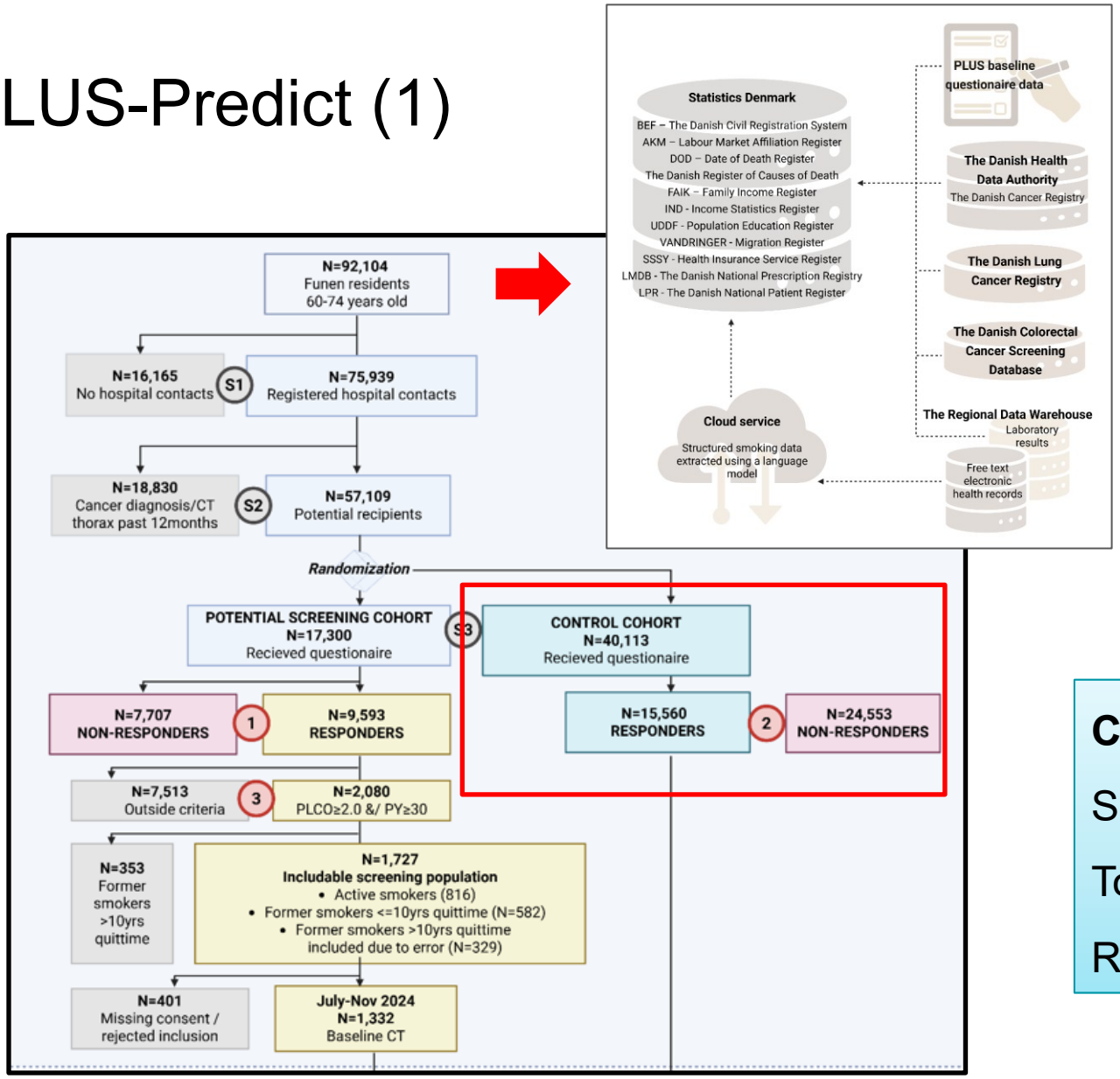
Yin Liu[1†], Qingchao Geng[1†], Xin Lin[1], Chenxi Feng[1], Youlin Qiao[1,2*] and Shaokai Zhang[1*]

Selected risk models

1. PLCOm2012 Model
2. Liverpool Lung Project (LLP_{v2+v3}) Risk Model
3. HUNT Lung Cancer Risk Model
4. OWL Model
5. Bach Model
6. Hoggart Model
7. LCRAT (Lung Cancer Risk Assessment Tool)
8. LCDRAT (Lung Cancer Death Risk Assessment Tool)
9. PanCan Model (Tammemägi Model)
10. NLST Risk Model



PLUS-Predict (1)



Control cohort

Sent questionnaire (N) =40113

Total responders (N) = 15560

Response rate: **38.8%**

PULS-Predict (2)

Registerdata via DST

- Alle borgere på Fyn og øerne i alderen 60-74 år pr. 1. juli 2024

Forskningsplan

1. Responders
   a) Evaluering af internationale risikomodeller (PLCm2012, LLP, HUNT, OWL) og tærskelværdier
2. Non-responders
   a) Karakteristik og beskrivelse (register + kliniske data, lungekræft incidens, socio-demografi etc.)
   b) Udvikling af model / algoritme for at identificere non-responders i høj-risiko
3. Kontrolpopulation
   a) Karakteristik og sammenligning i forhold til PLUS screeningskohorten (register + kliniske data, rygestatus, lungekræft incidens, mortalitetsrate, socio-demografi etc.)
   b) Evaluering og ekstern validering af internationale risikomodeller (PLCOm2012, LLP, HUNT, OWL)

Sex-related differences and potential equity gaps

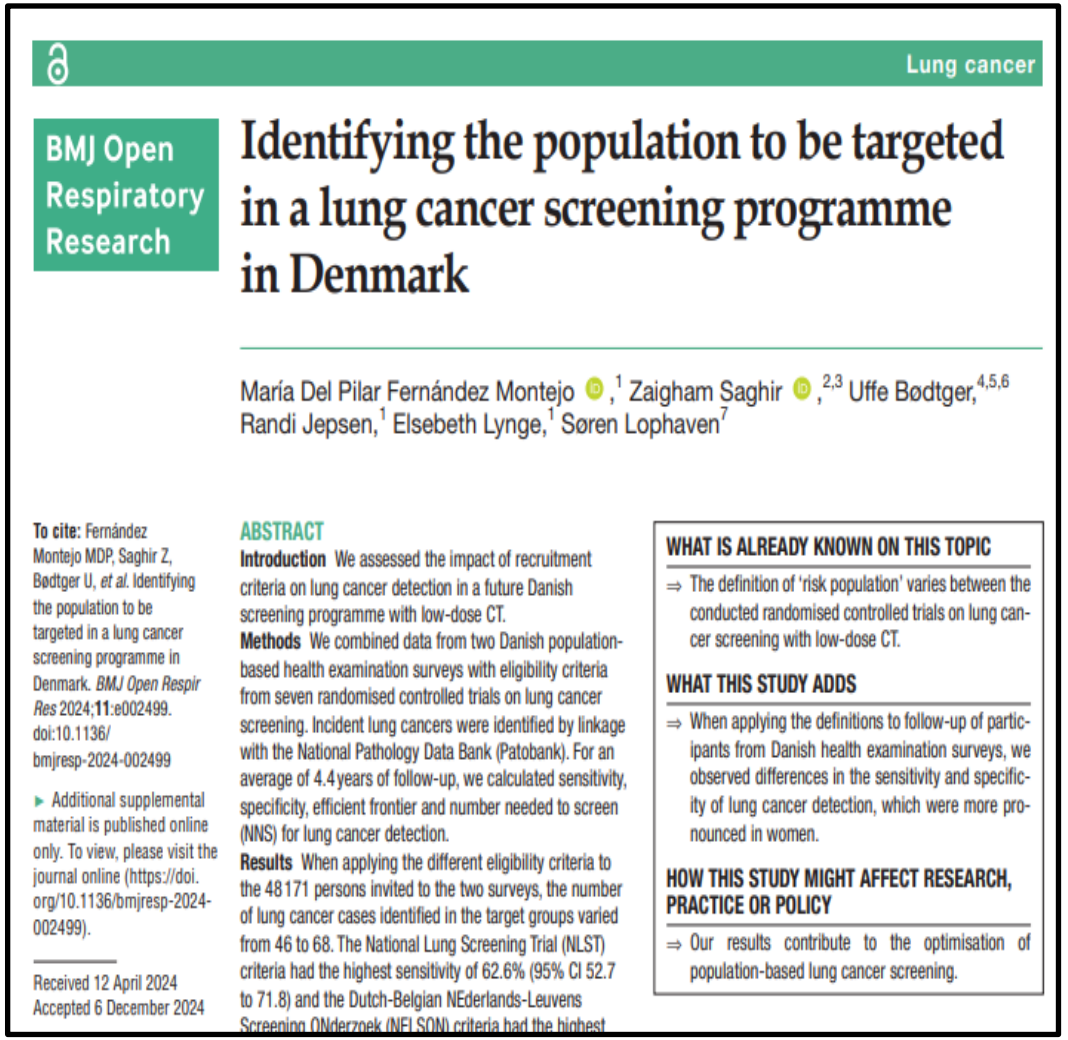
Selection by categorical eligibility criteria:

- Consistent lower sensitivity for women

Risk model with sex-specific thresholds (HUNT):

- Significantly improve early-stage detection for women without compromising specificity*

* Fernández Montejo MDP, Bødtger U, Jepsen R, Fotopoulos I, Røe OD, Saghir Z. Optimising Lung Cancer Screening Eligibility: *Sex and Cancer Stage–Stratified Comparison of the HUNT Lung Cancer Model with NELSON, NLST, DLCST, and USPSTF 2021 Criteria in a Danish Cohort* (unpublished)



Lung cancer

BMJ Open Respiratory Research

Identifying the population to be targeted in a lung cancer screening programme in Denmark

María Del Pilar Fernández Montejo [1], Zaigham Saghir [2,3], Uffe Bødtger [4,5,6], Randi Jepsen [1], Elsebeth Lynge [1], Søren Lophaven [7]

To cite: Fernández Montejo MDP, Saghir Z, Bødtger U, *et al*. Identifying the population to be targeted in a lung cancer screening programme in Denmark. *BMJ Open Respir Res* 2024;**11**:e002499. doi:10.1136/bmjresp-2024-002499

► Additional supplemental material is published online only. To view, please visit the journal online (https://doi.org/10.1136/bmjresp-2024-002499).

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ABSTRACT

Introduction We assessed the impact of recruitment criteria on lung cancer detection in a future Danish screening programme with low-dose CT.

Methods We combined data from two Danish population-based health examination surveys with eligibility criteria from seven randomised controlled trials on lung cancer screening. Incident lung cancers were identified by linkage with the National Pathology Data Bank (Patobank). For an average of 4.4 years of follow-up, we calculated sensitivity, specificity, efficient frontier and number needed to screen (NNS) for lung cancer detection.

Results When applying the different eligibility criteria to the 48 171 persons invited to the two surveys, the number of lung cancer cases identified in the target groups varied from 46 to 68. The National Lung Screening Trial (NLST) criteria had the highest sensitivity of 62.6% (95% CI 52.7 to 71.8) and the Dutch-Belgian NEderlands-Leuvens Screening ONderzoek (NELSON) criteria had the highest

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ The definition of 'risk population' varies between the conducted randomised controlled trials on lung cancer screening with low-dose CT.

WHAT THIS STUDY ADDS

⇒ When applying the definitions to follow-up of participants from Danish health examination surveys, we observed differences in the sensitivity and specificity of lung cancer detection, which were more pronounced in women.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ Our results contribute to the optimisation of population-based lung cancer screening.

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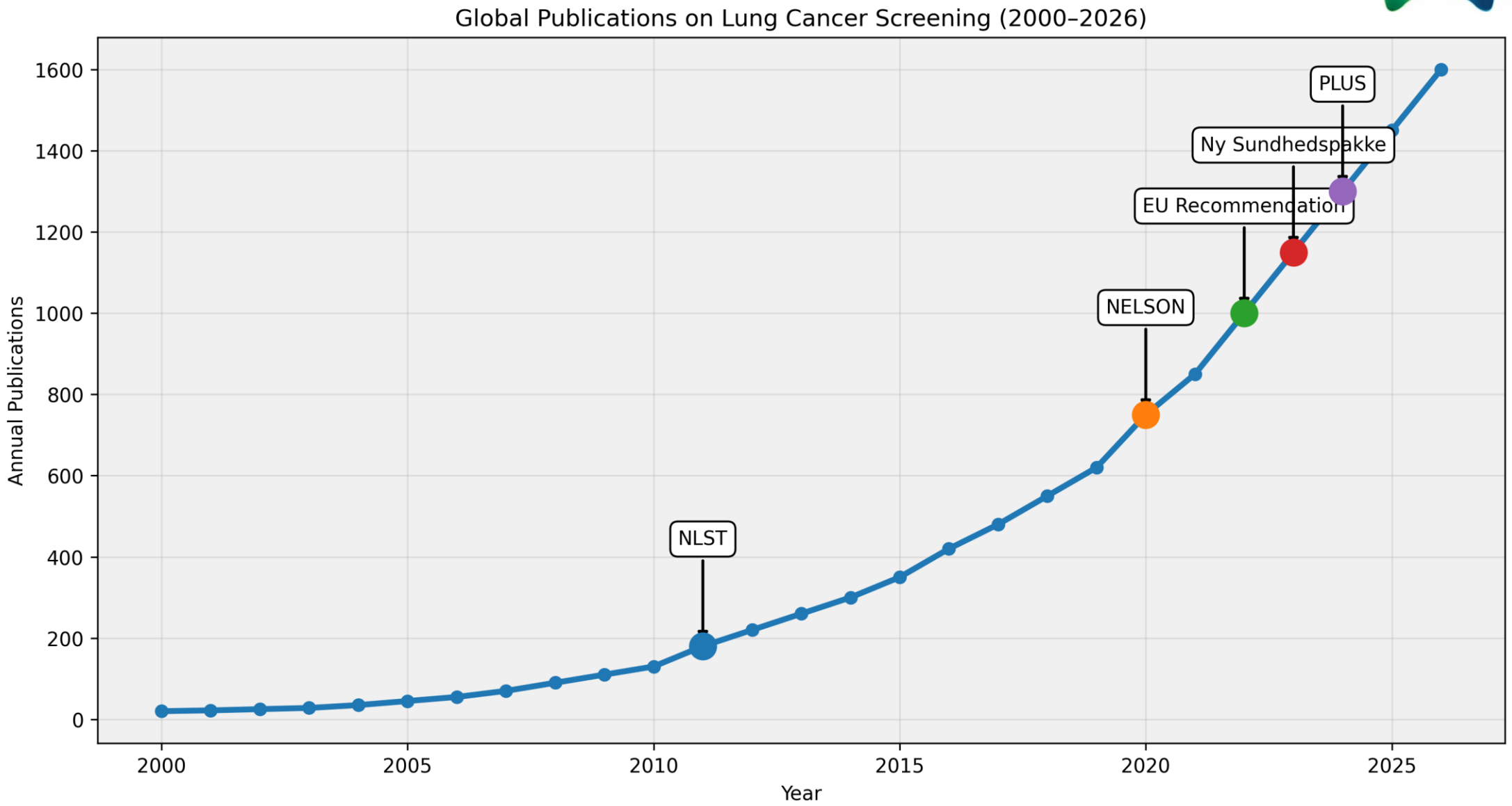
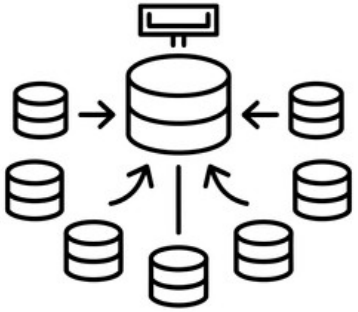

Global Publications on Lung Cancer Screening (2000–2026)
Annual Publications
Year
0
200
400
600
800
1000
1200
1400
1600
2000
2005
2010
2015
2020
2025
NLST
NELSON
EU Recommendation
Ny Sundhedspakke
PLUS

Dynamisk screeningsorganisation

- Regionale / lokale teams
- Central screeningssekretariat og database
- Samkøring med relevante nationale registre
- Monitorering og kvalitetssikring



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Anvendelse af kunstig intelligens (AI)

FØR:

- Risikoestimering og selektion

UNDER:

- Detektion af noduli
- Volumenmål og Volume Doubling Time (VDT)
- Estimering af malignitetsrisiko

EFTER:

- Individualiserede screenings intervaller

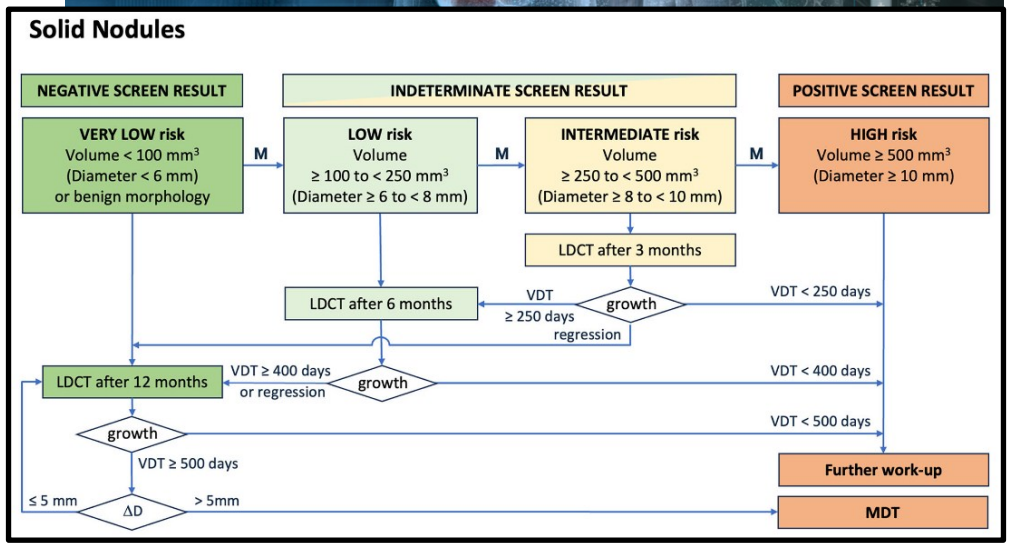
Snoeckx *et al. European Radiology* (2026) 36:135–147
https://doi.org/10.1007/s00330-025-11648-4

European Radiology

REVIEW Open Access

Lung cancer screening with low-dose CT: definition of positive, indeterminate, and negative screen results. A nodule management recommendation from the European Society of Thoracic Imaging

Annemiek Snoeckx[1,2*], Mario Silva[3], Helmut Prosch[4], Jürgen Biederer[5,6,7,8], Thomas Frauenfelder[9], Fergus Gleeson[10], Colin Jacobs[11], Hans-Ulrich Kauczor[5,6], Anagha P. Parkar[12,13], Cornelia Schaefer-Prokop[11,14], Mathias Prokop[11,15*] and Marie-Pierre Revel[16]



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Bifund

”Fra tilfældigt fund til klinisk kategorisk prioritering”

Bifund er et vilkår

LDCT-scanninger 1. runde (n): 1332

Normal: 35.4%

Malignitetssuspekte fund (lunge): 4.0%

Forandringer til kontrol forløb: 5.0%

Interstitial lung abnormalities (ILA): 4.4%

Emfysem: 48.9%

- *Mild: ~ 52%*
- *Moderat: ~ 27%*
- *Svær: ~ 21%*

Forandringer udenfor lungerne: 15.2%

Ekstra-thorakale fund: 9.2%

Ikke-lungekræft relaterede henvisninger: **17,5%**

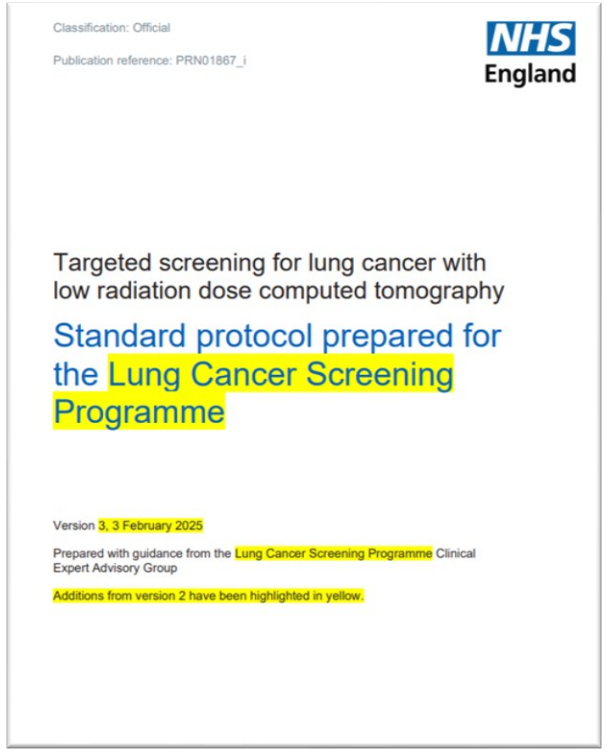
Positive versus negative bifund

Anden kræft konstateret i forbindelse med PLUS scanninger

Type	Antal
Lymfom	2
Lever /galdeveje	2
Nyrer	2
Spiserør/Mave-tarm	1

Inddeling i kategorier – “Den engelske model”

1. **Life-threatening findings** → Immediate hospital admission
2. **Urgent findings** (e.g. large aneurysm) → Urgent specialist referral
3. **Suspicion of non-lung cancer** → Urgent cancer pathway referral
4. **Significant non-cancer (secondary care)** → Specialist referral
5. **Primary care–relevant findings** → GP management advised
6. **Risk-factor findings** (e.g. coronary calcification) → NICE-recommended assessment
7. **Clinically non-significant findings** → No communication, no action



Classification: Official

Publication reference: PRN01867_i

NHS England

Targeted screening for lung cancer with low radiation dose computed tomography

Standard protocol prepared for the Lung Cancer Screening Programme

Version 3, 3 February 2025

Prepared with guidance from the Lung Cancer Screening Programme Clinical Expert Advisory Group

Additions from version 2 have been highlighted in yellow.

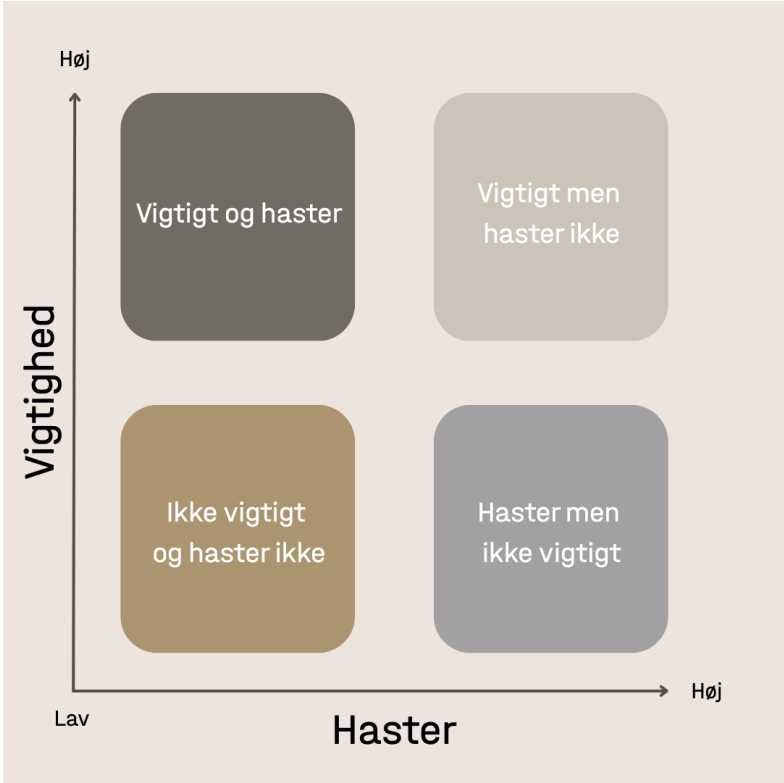
Hvorfor er det vigtigt?

Minimere risiko for:

- Skade / bekymring / overdiagnostisering
- Overbelastning af sundhedsvæsnet

Sikre:

- Ensretning
- Patientsikkerhed
- Effektivitet
- Gennemførlighed



Klare spilleregler

Borger / deltager:

- ✓ Tydelig information og forventningsafstemning
- ✓ Bifund uden klinisk konsekvens rapportes ikke

Fagpersoner:

- ➢ Prædefinerede kriterier
- ➢ Baseret på faglige argumenter og konsensus
- ➢ Strømlinet og effektiv håndtering

Forudsætning – næste skridt

”Den danske model”

Nedsættelse af en gruppe

- Sundhedsstyrelsen
- Relevante faglige selskaber
- Borgerrepræsentanter

Region of Southern Denmark

OUH Odense University Hospital

PLUS

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OPEN

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AI-RAPTOR

SDU

Syddansk Universitet

CAI-X

Centre for Clinical Artificial Intelligence

SUNDHEDSSTYRELSEN

Radboudumc

university medical center

Tak for opmærksomheden