

# PLUS

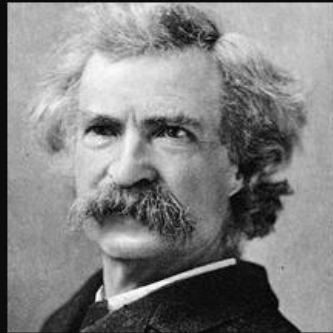
PROJEKT  
LUNGEKRÆFTSCREENING  
I SYDDANMARK

*DLCG årsmøde den 26. november 2024*

## PROJEKT LUNGEKRÆFTSCREENING I SYDDANMARK - Status

Projektleder Michael Stenger, overlæge, ph.d., klinisk lektor





Quitting smoking is easy, I've done it hundreds of times.

~ Mark Twain

AZ QUOTES

Quitting smoking was hard.

**Screening for lung cancer is easy.**



If you smoked, you may still be at risk, but early detection could save your life.

Get **SavedByTheScan.org**

American Lung Association.

ad COUNCIL

# Evidens

Reduktion i dødelighed

Lungekræft-relateret: 21%

Samlet (all cause): 5%



Cochrane  
Library

Trusted evidence.  
Informed decisions.  
Better health.

Cochrane Database of Systematic Reviews

[Intervention Review]

## Impact of low-dose computed tomography (LDCT) screening on lung cancer-related mortality

Asha Bonney<sup>1,2</sup>, Reem Malouf<sup>3</sup>, Corynne Marchal<sup>4</sup>, David Manners<sup>5</sup>, Kwun M Fong<sup>6,7</sup>, Henry M Marshall<sup>8</sup>, Louis B Irving<sup>1</sup>, Renée Manser<sup>1,9</sup>

<sup>1</sup>Department of Respiratory and Sleep Medicine, Royal Melbourne Hospital, Parkville, Australia. <sup>2</sup>Department of Medicine, University of Melbourne, Melbourne, Australia. <sup>3</sup>National Perinatal Epidemiology Unit (NPEU), University of Oxford, Oxford, UK. <sup>4</sup>University of Franche-Comte, Besançon, France. <sup>5</sup>Respiratory Medicine, Midland St John of God Public and Private Hospital, Midland, Australia. <sup>6</sup>Thoracic Medicine Program, The Prince Charles Hospital, Brisbane, Australia. <sup>7</sup>UQ Thoracic Research Centre, School of Medicine, The University of Queensland, Brisbane, Australia. <sup>8</sup>School of Medicine, The University of Queensland, Brisbane, Australia. <sup>9</sup>Department of Haematology and Medical Oncology, Peter MacCallum Cancer Centre, Melbourne, Australia

### Authors' conclusions

The current evidence supports a reduction in lung cancer-related mortality with the use of LDCT for lung cancer screening in high-risk populations (those over the age of 40 with a significant smoking exposure). However, there are limited data on harms and further trials are required to determine participant selection and optimal frequency and duration of screening, with potential for significant overdiagnosis of lung cancer. Trials are ongoing for lung cancer screening in non-smokers.

# Dansk Lung Cancer Gruppe (screeningsgruppe)

## Dansk Lunge Cancer Gruppe

Behandling af lungekræftpatienter i Danmark

DLCG ▾ DLCR ▾ Arbejdsgrupper ▾ Rapporter ▾ Retningslinjer/TNM ▾ Forskningscenter Forskning og udtræk ▾ Q

### Danske Lunge Cancer Gruppe

Dansk Lunge Cancer Gruppe (DLCG) arbejder på at forbedre den danske behandling af lungekræft og på at styrke forskningen i lungekræft. DLCG udarbejder retningslinjer for udredning og behandling af lungekræft og har oprettet Dansk Lunge Cancer Register (DLCR). DLCR er en database, der samler oplysninger om alle danske lungekræft patienter. Retningslinjerne og årsrapporterne fra DLCR kan blandt andet læses her på hjemmesiden.



DLCG har gennem de seneste 25 år stået for kvalitetsmonitorering og -udvikling indenfor diagnostik, behandling og opfølgning af patienter med lungekræft, og har herigennem kontakt til et bredt netværk af klinikere over hele Danmark. Med etableringen af **Dansk Forskningscenter for Lungekræft** videreudvikles dette netværk og samarbejde ved at skabe en national platform for hele spektret af forskning fra tidlig diagnose til forbedret kirurgi og onkologisk behandling til rehabilitering og palliativ indsats.



### Seneste nyt

- Pilotstudie vedr. screening for lungekræft
- Rapport vedr. ulighed i den somatiske behandling af patienter med psykiske lidelser
- Vejledning i cancerregistrering
- Rapport fra Visionsprojekt Lungecancer 2023
- Kursus i lungekræftudredning 20.03.24
- Temadag om håndtering af bivirkninger til immunterapi 19.01.24
- Årsmøde torsdag 21.09.23
- Årsrapport 2022
- Optaget webinar om MDT, afholdt 24.05.23
- Omtale om screening
- Tidligere nyheder

SUNDHEDSSTYRELSEN	
FORSLAG OM NYT NATIONALT SCREENINGSPROGRAM	
<b>Introduktion</b>	<p>Nationale screeningsprogrammer har til formål at reducere sygelighed og dødelighed i befolkningen. Befolkningsrettet screening medfører, at der tilbydes undersøgelser af store befolkningsgrupper, der som udgangspunkt er raske.</p> <p>Når nationale screeningsprogrammer overvejes indført eller ændret, må det vurderes, om fordelene opvejer ulemperne. Det grundlæggende i en sådan afvejning bliver, om de gavnlige virkninger af screening opvejer de mulige fysiske og psykosociale skadevirkninger for de berørte, såvel som økonomiske og sociale konsekvenser for samfundet som helhed.</p> <p>Spørgsmålene i dette skema tager udgangspunkt i de 10 kriterier, der skal være opfyldt, førend et nationalt screeningsprogram indføres og som præsenteres i rapporten Sundhedsstyrelsens anbefalinger til nationale screeningsprogrammer.</p> <p>Læs mere om de 10 kriterier i rapporten på Sundhedsstyrelsens hjemmeside: <a href="http://www.sst.dk">www.sst.dk</a></p>
<b>Hvordan udfyldes skemaet?</b>	<p>Forslagsstiller bedes besvare alle spørgsmål, som stilles i venstre kolonne. Skriv svarene i højre kolonne og slet derefter instruktionerne skrevet med rødt.</p> <p>Sundhedsstyrelsen forventer ikke, at alle spørgsmål nødvendigvis kan besvares. Såfremt det ikke er muligt for forslagsstilleren at besvare et spørgsmål, så angiv venligst årsagen hertil i skemaet. Det kan fx anføres, at oplysningerne ikke findes, at man ikke ved om oplysningerne findes eller at oplysningerne ikke er relevante for det foreslåede screeningsprogram.</p> <p>Såfremt forslagsstiller har andre relevante oplysninger end de oplysninger, der spørges til i skemaet, så tilføj disse, hvor det findes relevant.</p> <p>Det udfyldte skema fremsendes til Sundhedsstyrelsen inden tidsfristen den <u>1. februar 2019</u> per mail til <a href="mailto:eub@sst.dk">eub@sst.dk</a></p>



# SST tilskudsopslag

- Pilotstudie
- Screening af 1000 personer
- 25 mio kr. over 3 år
- Ansøgning på Regionsniveau



SUNDHEDSSTYRELSEN

## Tilskudsopslag – Pilotstudie vedr. screening for lungekræft

Sundhedsstyrelsen inviterer hermed landets regioner til at indsende forslag til gennemførelse af Pilotstudie vedrørende screening for lungekræft. Pilotstudiet skal gennemføres i en region i en treårig periode 2024-2026. Minimum 1000 personer i særlig risiko for at udvikle lungekræft (nuværende eller tidligere storrygere) skal screenes for lungekræft med lavdosis CT-skanning en gang om året i de tre år.

Der afsættes i alt 25 mio. kr. til at gennemføre pilotstudie vedr. screening for lungekræft. Midlerne tildeles i årlige tilsagn med forbehold for bevillingens optagelse på de årlige finanslove. Fordelingen forventes at være:

2024: 8,9 mio. kr.

2025: 8,1 mio. kr.

2026: 8,0 mio. kr.

Det er kun regioner, der kan indsende forslag til gennemførelse af pilotstudiet. Den enkelte region kan dog indgå samarbejde med andre offentlige eller private aktører i forbindelse med indsendelse af forslaget.



# Studie design

<b>Pilot:</b>	Feasibility – National implementering
<b>Periode:</b>	2024-2026
<b>Deltagere:</b>	1000
<b>Screening:</b>	Årlig lav-dosis CT-skanning i 3 år
<b>Lungefunktionstest:</b>	Ved første fremmøde
<b>Rygestopstilbud:</b>	Alle aktive rygere



Research

# Kriterier for deltagelse

**Alder:** 60- 74 år

**Geografi:** Fyn og øerne

**Tobak:** Aktiv eller tidligere ryger (rygestop  $\leq 10$  år)

1)  $\geq 30$  pakkeår

og/eller

2) 6-års risiko for lungekræft på  $> 2\%$  (PLCOm2012)



SUNDHEDSSTYRELSEN



# Formål

1. Identifikation, udvælgelse og deltagelse
2. Påvirkning af sundhedsvæsenet
  - a) Organisation
  - b) Ressourcer
3. Teknologiske muligheder / støtte fra kunstig intelligens (AI)





# Identification - Cohort

Residents aged 60-74 on Funen  
(n=90.926)

Data Unit, Odense University Hospital  
(n=76.206)

- Dataset on missing residents requested for attrition analysis (n=14.720)

Exclusion (n= 19.097):

- Cancer diagnosis/follow-up past 12 months
- CT-scan (thorax) past 12 months

**TOTAL COHORT n=57.109**

Stratified randomisation:  
residence, age group and sex

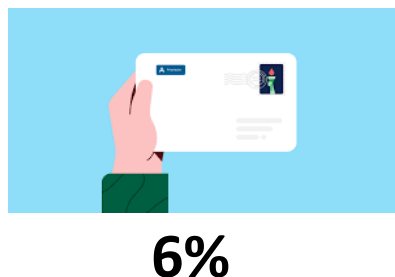


# Identifikation af høj-risiko personer

## Spørgeskema – 12 spørgsmål

- Kontrol for eksklusionskriterier
- Tidligere kræftsygdom og tobaksforbrug (jf. PLCOm2012)
- Interesse tilkendegivelse

Blokke af 1000 borgere → >1000 deltagere



**Spørgeskema**

Invitation status: Survey options

Editing existing Deltager ID 2. (CPR 0202020102)

**Under udvikling, indtast kun testdata!**

Deltager ID: 2

**Spørgsmål 1:**  
Har du tidligere haft en kræftsygdom?

**2. Spørgsmål:**  
Har du inden for de seneste 12 måneder modtaget behandling eller kontrol for en kræftsygdom?

**3. Spørgsmål:**  
Har nogen i din nærmeste familie aktuelt eller tidligere haft lungekræft?

**4. Spørgsmål:**  
Har du inden for de seneste 12 måneder fået foretaget en CT-scanning af brystkassen/thorax (lunger og hjerte)?

**Spørgsmål 5:**  
Angiv venligst din højde og vægt:

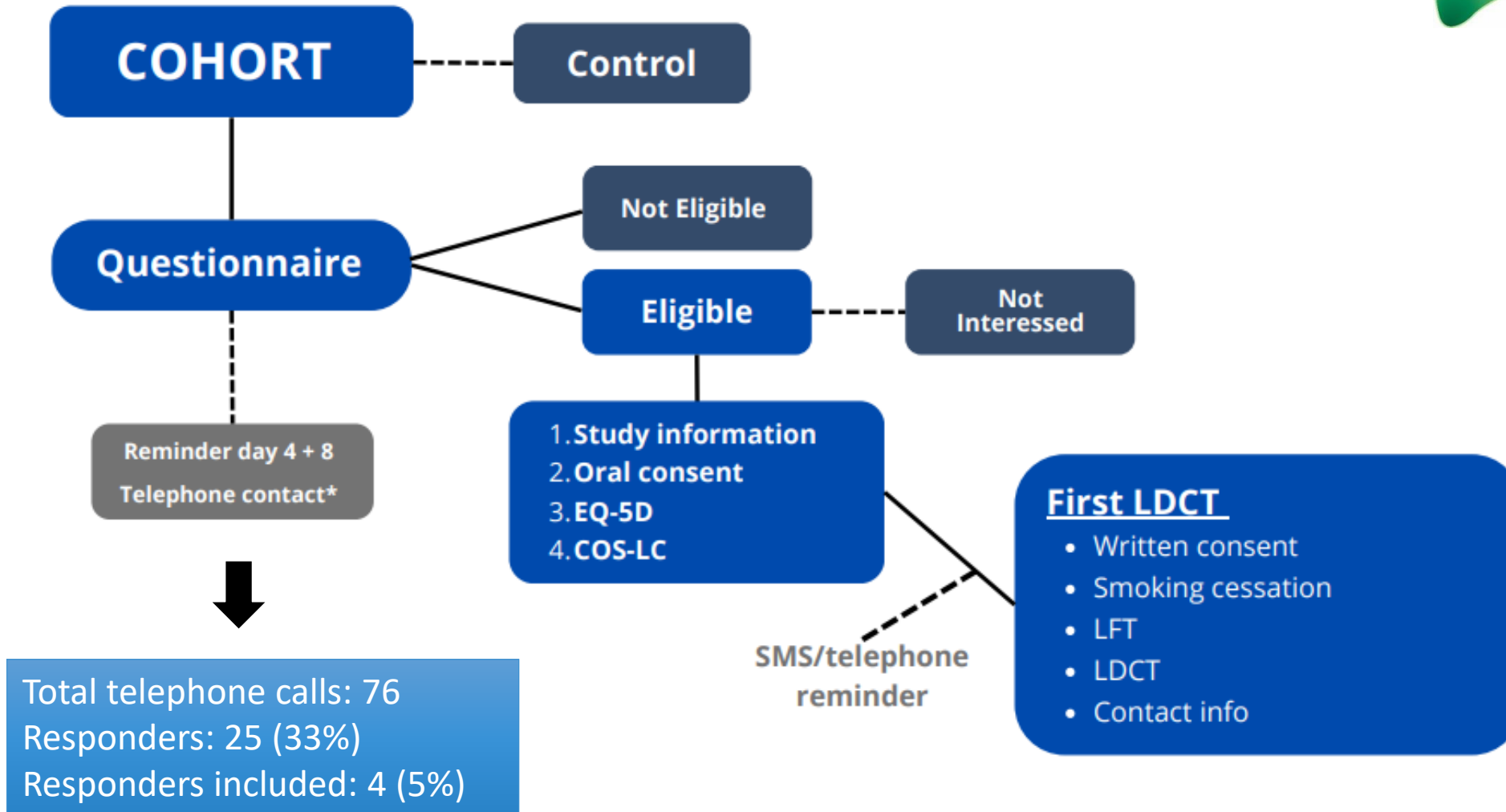
Højde i hele cm	<input type="text"/>	cm
Vægt i hele kg	<input type="text"/>	kg

**Spørgsmål 6:**  
Har du KOL (kronisk obstruktiv lungesygdom)?

Folkeskolen eller tilsvarende  
 Gymnasial uddannelse eller tilsvarende  
 Erhvervsfaglig uddannelse eller tilsvarende  
 Kortere/mellemlang videregående uddannelse eller tilsvarende (eks. Bachelor grad)  
 Lang videregående uddannelse eller tilsvarende (eks. Master eller kandidatgrad)  
 Forsker uddannelse eller tilsvarende (ph.d. grad el. lign)

**Spørgsmål 7:**  
Angiv venligst højeste fuldførte uddannelse:

# Workflow



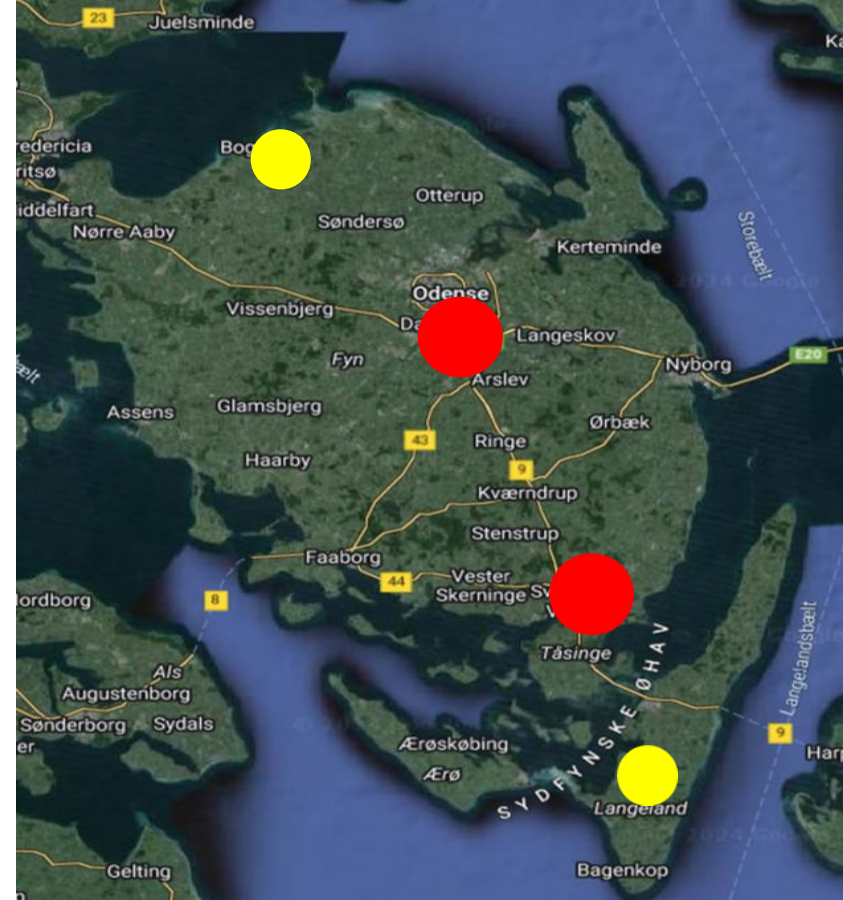
# 14. September – Første screeningsdag!



## 4 placeringer på Fyn:

- 2 stationære (OUH + Svendborg)
- 1 mobil – 2 placeringer (Rudkøbing og Bogense)
- Lungefunktionstest

	OUH	Svendborg	Rudkøbing	Bogense
Bookinger	575 (57%)	257 (26%)	74 (7%)	100 (10%)





# CT-scanning



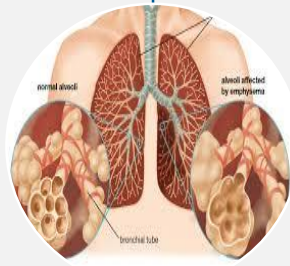
Vurdering af  
Radiolog 1 + 2



Mistanke til  
lungekræft



Pakkeforløb



Andre ikke  
lungekræft-  
relaterede fund



Henvisning til  
relevant speciale  
eller praktiserende  
læge



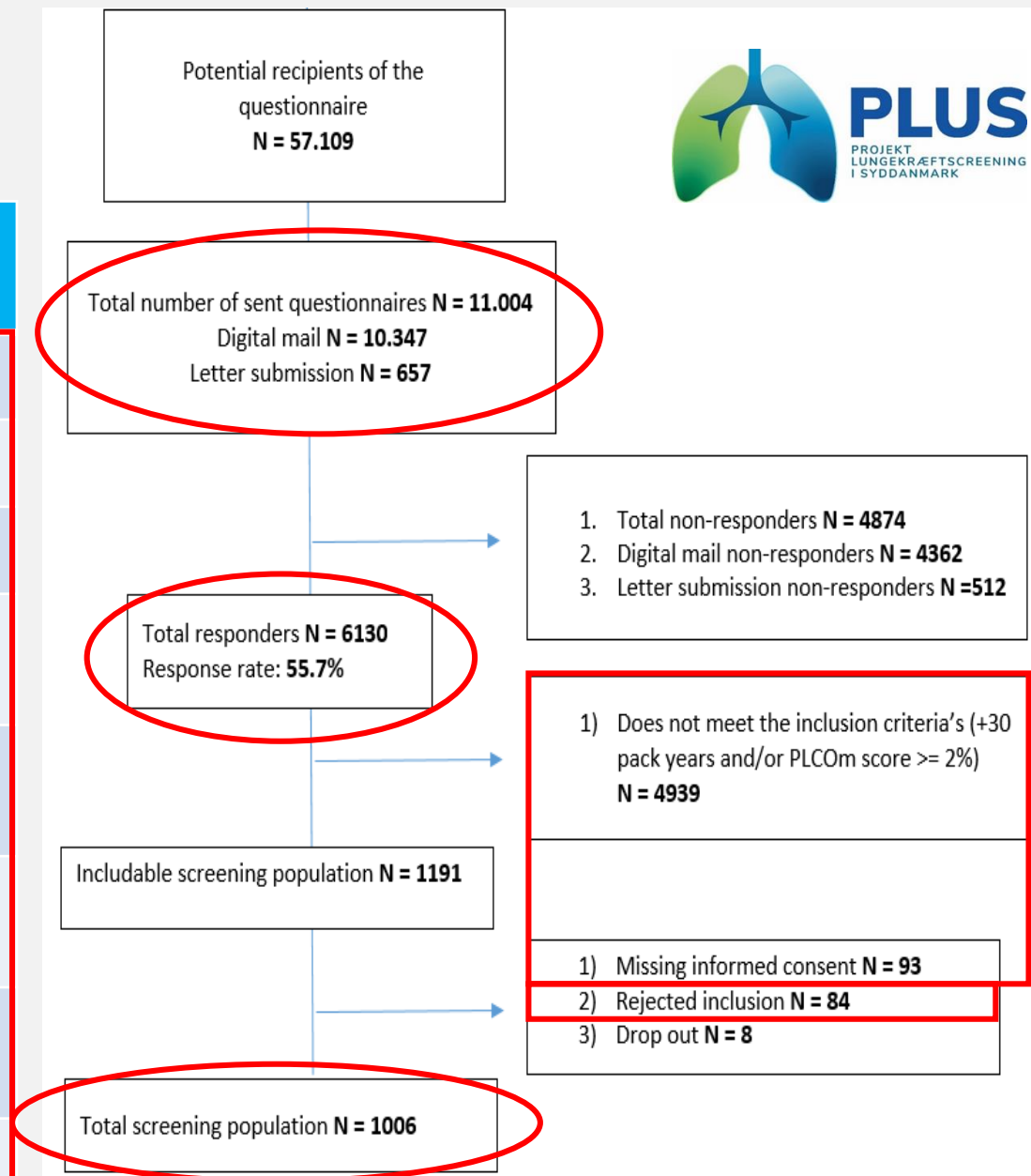
Normal  
CT-scanning



# Selection and inclusion



	Responders Not included	Responders Included	Responders Consent No
<b>Total N</b>	5032	1006	84
<b>Age (years)</b>	66	66	67
<b>Female N (%)</b>	3139 (62%)	466 (46%)	53 (63%)
<b>Previous Cancer N (%)</b>	467 (9%)	82 (8.1%)	7 (9.1%)
<b>Family Lung Cancer N (%)</b>	1061 (21%)	305 (30.3%)	22 (26.2%)
<b>Smoking Status (current/former/never)</b>	342/2124/2563	397/609/0	37/47/0
<b>Pack Years (years)</b>	15	43	41
<b>PLCOm2012 (%)</b>	0.90	4.00	4.52



# Uddannelsesniveau



	All Responders	Eligible Responders
Female (%)	59%	47%
Educational level		
Less than high school graduate (%)	17%	25%
High school graduate (%)	4%	5%
Some training after high school (%)	39%	41%
Some college (%)	31%	24%
College graduate (%)	8%	4.5%
Postgraduate or professional degree (%)	1%	0.5%

# Not interested!

Total N	915
Female N(%)	602(65.8)
5-year age categories N(%)	
60-64 N(%)	270(29.5)
65-65 N(%)	242(26.4)
70-74 N(%)	403(44.0)
Reason for not participating N(%)	
Not relevant to me N(%)	359(43.1)
Due to busyness N(%)	82(9.8)
Receiving many questionnaires N(%)	104(12.5)
Other reason N(%)	0(0.0)



# CT-scanning – præliminære tal\*

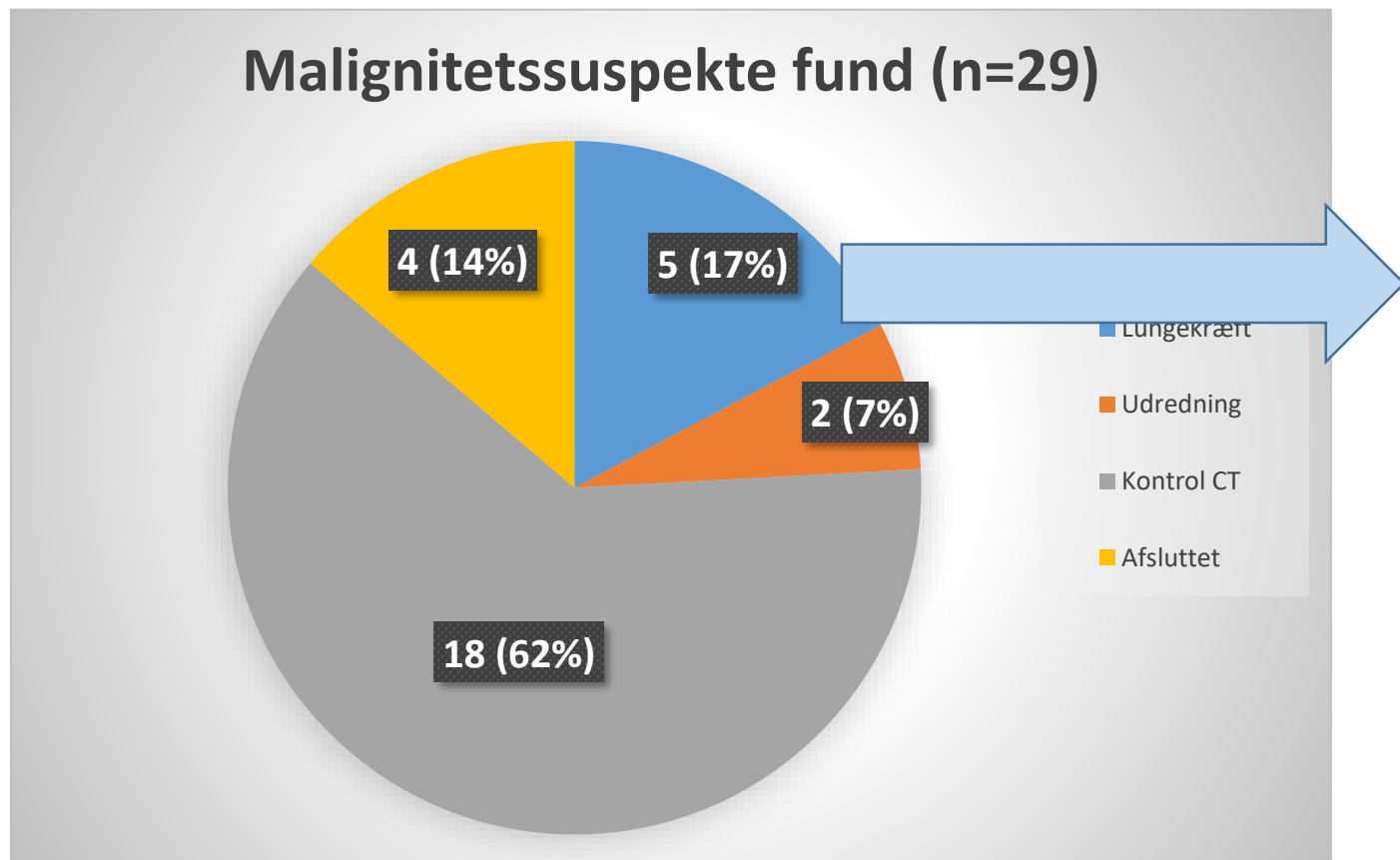
Dobbelt-gransket CT-scanninger (n): 776

- Normal: ~ 40%
- Mistanke til lungekræft: ~ 3-4%
- Forandringer til kontrol forløb: ~ 4-5%
- ILA mistanke ~ 4%
- Emfysem ~ 43%
  - Mild: ~ 50%
  - Moderat: ~ 27%
  - Svær: ~ 22%
- Forandringer udenfor lungerne ~ 15%
- Forandringer udenfor thorax ~ 8%



\*Per 20. november 2024

# Henvisninger til pakkeforløb



## pTNM / Stadium:

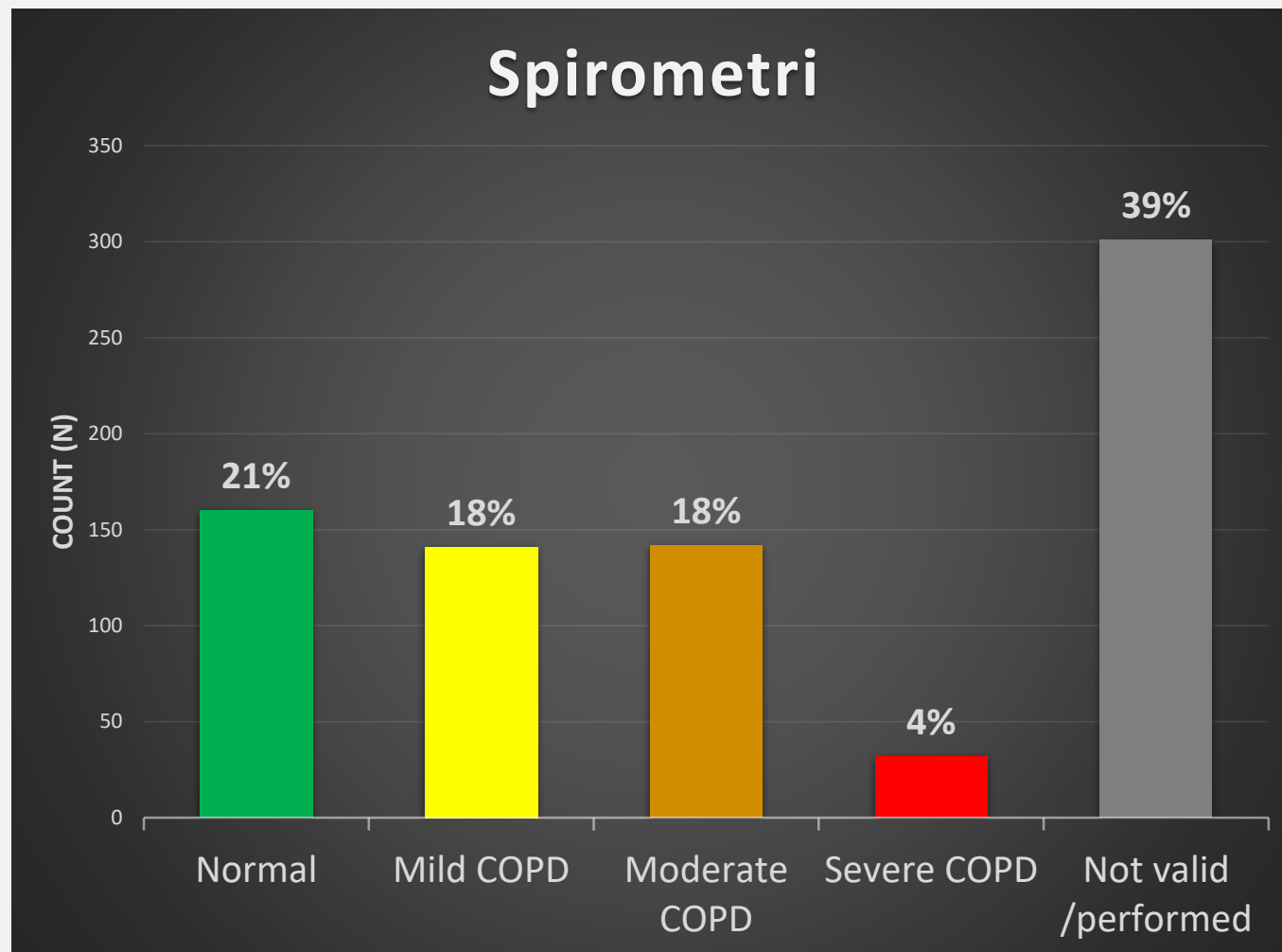
- T2aN0M0 / IA (80%)
- T2bN2M0 / IIIA (20%)



# Lungefunktionstest – præliminære tal\*



\*Per 20. november 2024



# National Lung Cancer screening program

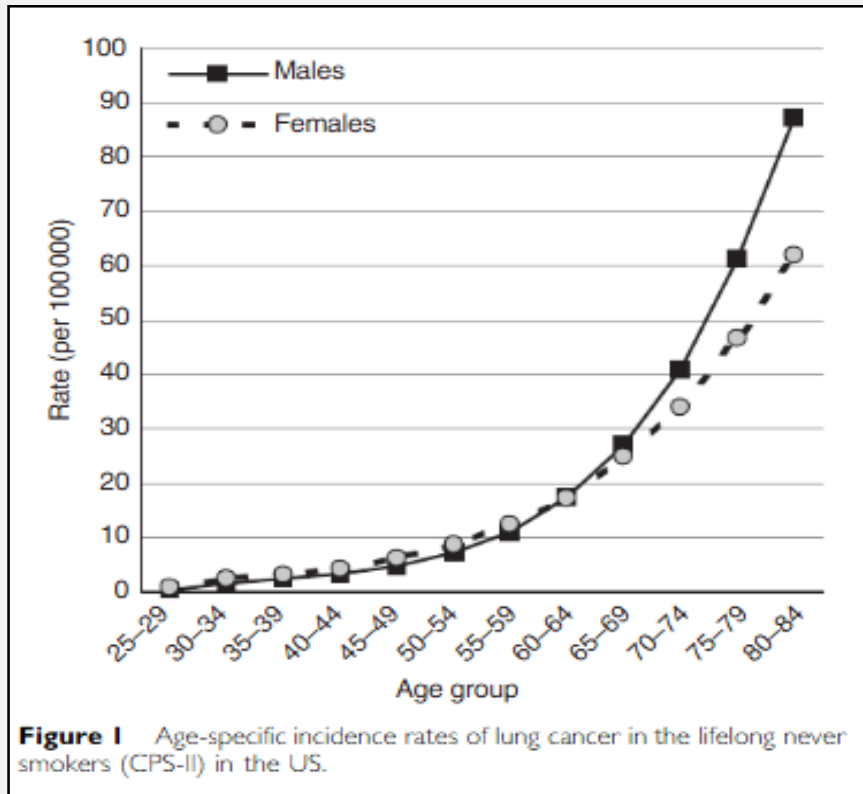
## Key points:

- Validated and individualized risk models
- Cost-effectiveness
- Implementation and support by AI
- Engage radiologists



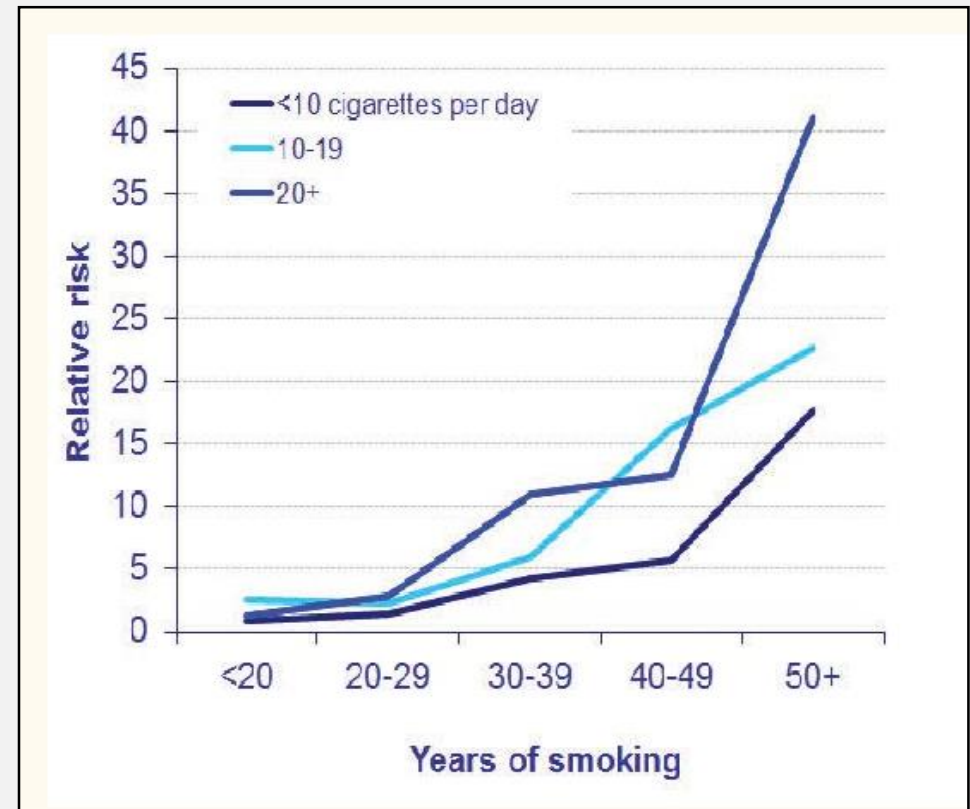
# Two strongest predictors of lung cancer

## Age



DOI: 10.1038/bjc.2011.475

## Smoking history



DOI: [10.12816/0003255](https://doi.org/10.12816/0003255)

# Selection in lung cancer screening

1. Identifying High-Risk Individuals

2

3

4

5

6

## Solution

Use validated and individualized **risk models**

7. Optimizing cost-effectiveness

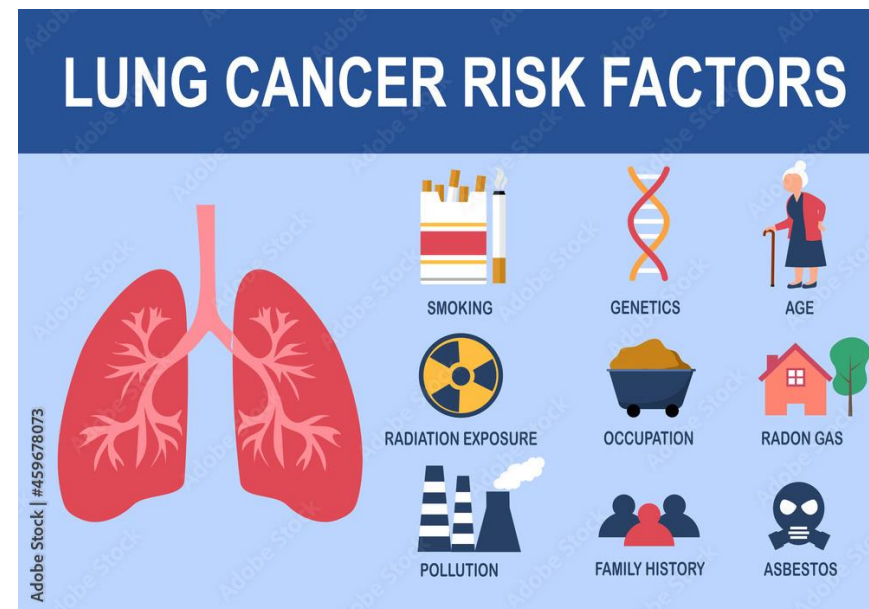
# Selection criteria – previous studies

Study	Recruitment Period	Age Criteria	Smoking Criteria	Risk Models
National Lung Screening Trial (NLST)	2002-2004	55-74	≥30 pack-years; current or former smokers (quit ≤15 years)	None
NELSON Trial (Netherlands and Belgium)	2004-2006	50-74	15+ cigarettes/day for 25+ years or 10+ cigarettes/day for 30+ years; current or former smokers	None
UK Lung Cancer Screening Trial (UKLS)	2011-2013	50-75	Based on smoking history and other factors	Liverpool Lung Project (LLP) Risk Model
Danish Lung Cancer Screening Trial (DLCST)	2004-2006	50-70	≥20 pack-years; current or former smokers who quit within the last 10 years	None
German Lung Cancer Screening Intervention Trial (LUSI)	2007-2011	50-69	≥25 pack-years; current or former smokers who quit within the last 10 years	None
Italian Lung Cancer Screening Trial (ITALUNG)	2004-2006	55-69	≥20 pack-years; current or former smokers who quit within the last 10 years	None
DANTE Trial (Italy, Milan)	2001-2006	60-75	≥20 pack-years; current or former smokers who quit within the last 10 years	PLCOm2012 Model
MILD Trial (Italy)	2005-2012	49-75	≥20 pack-years; current or former smokers who quit within the last 10 years	None



# Selected risk models

1. PLCOm2012 Model
2. Liverpool Lung Project (LLP<sub>v2+v3</sub>) Risk Model
3. Bach Model
4. Hoggart Model
5. HUNT Lung Cancer Risk Model
6. LCRAT (Lung Cancer Risk Assessment Tool)
7. LCDRAT (Lung Cancer Death Risk Assessment Tool)
8. PanCan Model (Tammemägi Model)
9. NLST Risk Model
10. Korean Lung Cancer Risk Score (KLCRS)



# PLCO<sub>m2012</sub> and LLP<sub>v2+v3</sub>

## PLCO<sub>m2012</sub> – 11 variables

**Table 2.** Modified Logistic-Regression Prediction Model (PLCO<sub>M2012</sub>) of Cancer Risk for 36,286 Control Participants Who Had Ever Smoked.\*

Variable	Odds Ratio (95% CI)	P Value	Beta Coefficient
Age, per 1-yr increase†	1.081 (1.057–1.105)	<0.001	0.0778868
Race or ethnic group‡			
White	1.000		Reference group
Black	1.484 (1.083–2.033)	0.01	0.3944778
Hispanic	0.475 (0.195–1.160)	0.10	–0.7434744

## LLP<sub>v2+v3</sub> – 6 variables

### Lung Cancer Risk Model LLP Version3

This is an easy to use lung cancer risk prediction questionnaire which can calculate your risk of developing lung cancer over the next five years. The risk model has been developed for use by individuals aged 50 to 79 years and is based on age, gender, smoking duration, family history of lung cancer, previous history of pneumonia, previous diagnosis of cancer and exposure to asbestos. The questionnaire can be completed by non-smokers, former smokers and current smokers. The study was developed with Caucasian data only.

The risk model is based on the Liverpool Lung Project (LLP) risk model, which has been tested and shown to be of value in two international studies and a large UK study and updated to LLPv2 - <http://www.liverpoollungproject.co.uk/risk-model>

This updated, more accurate version 3 of the LLP risk model is the NOT the same as used in the UKLS lung cancer screening trial and the UK NHS Targeted Lung Health Checks (which can be found at <http://www.mylungrisk.org> ) Targeted Lung Health Checks will use LLP Version 2 (which will give a higher lung risk) and version 3 on this web-page should be treated as for research purposes only.

**Good discrimination of lung cancer cases in 5 and 6 years, respectively**

Discovery and Validation AUC 0.78-0,81\*

**Validated in several populations - used in the UK (the TLHC programme)**

Model constant

–4.532506

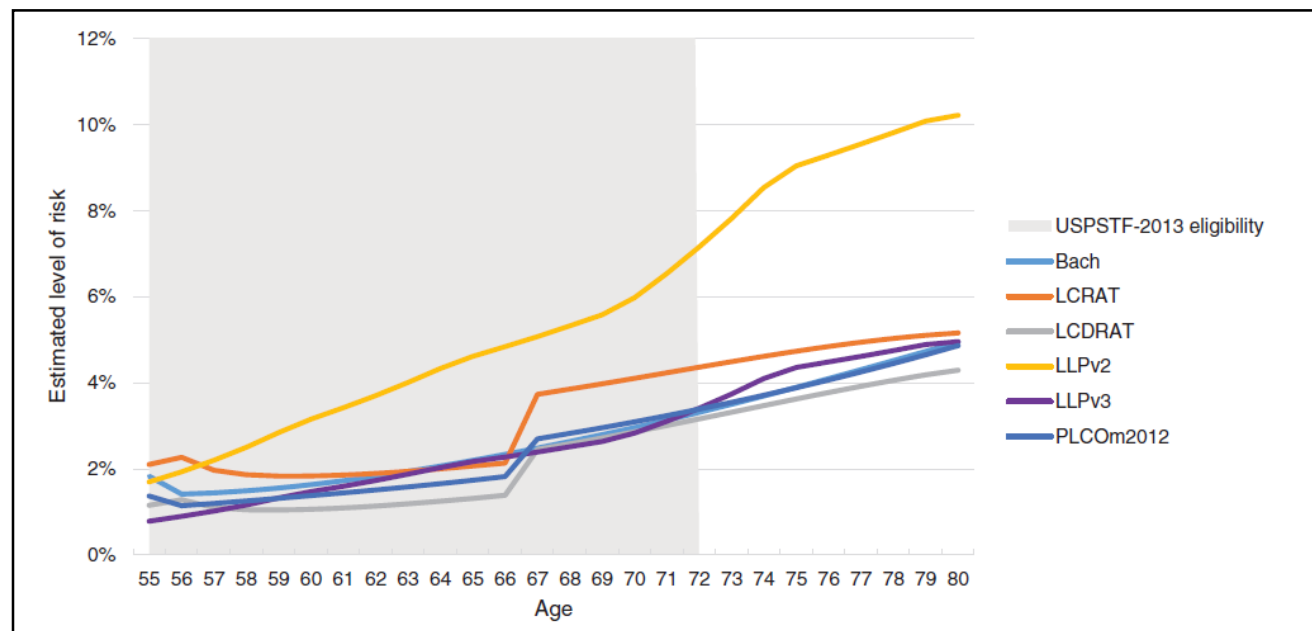
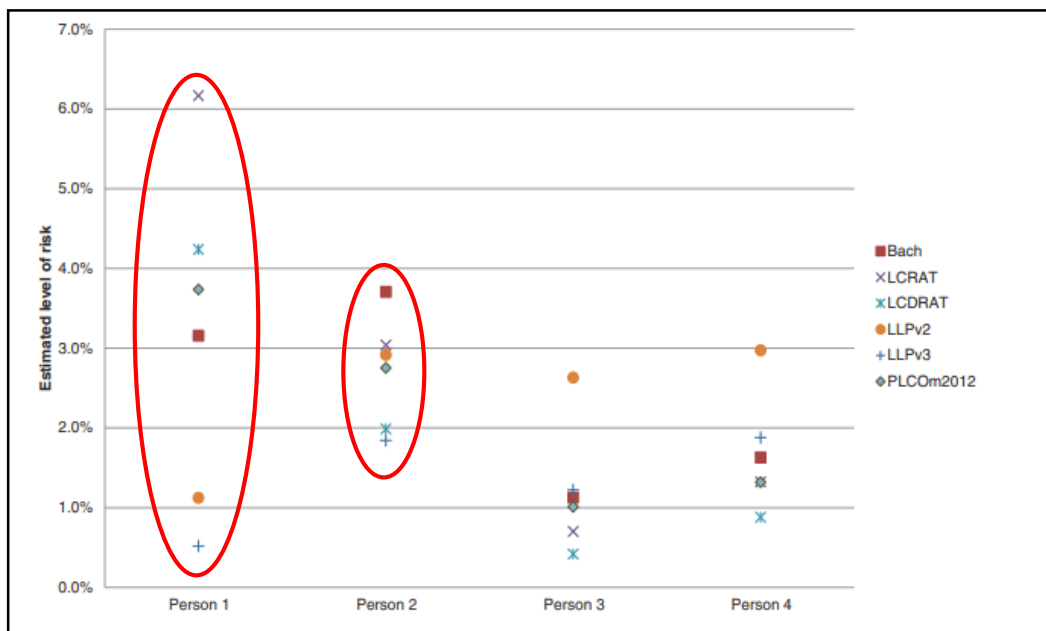
\*<https://doi.org/10.1371/journal.pmed.1002277>; [10.1002/ijc.30673](https://doi.org/10.1002/ijc.30673); <https://doi.org/10.1136/thoraxjnl-2020-215158>

## INVITED REVIEW SERIES ON PERSONALIZED PREVENTION

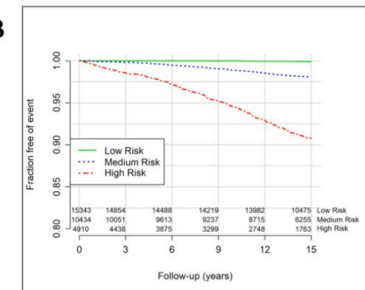
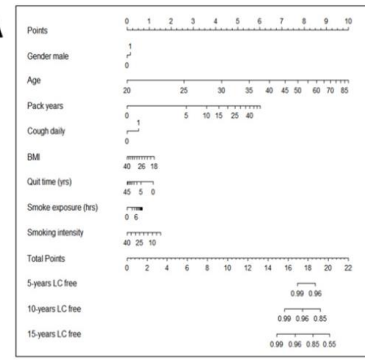
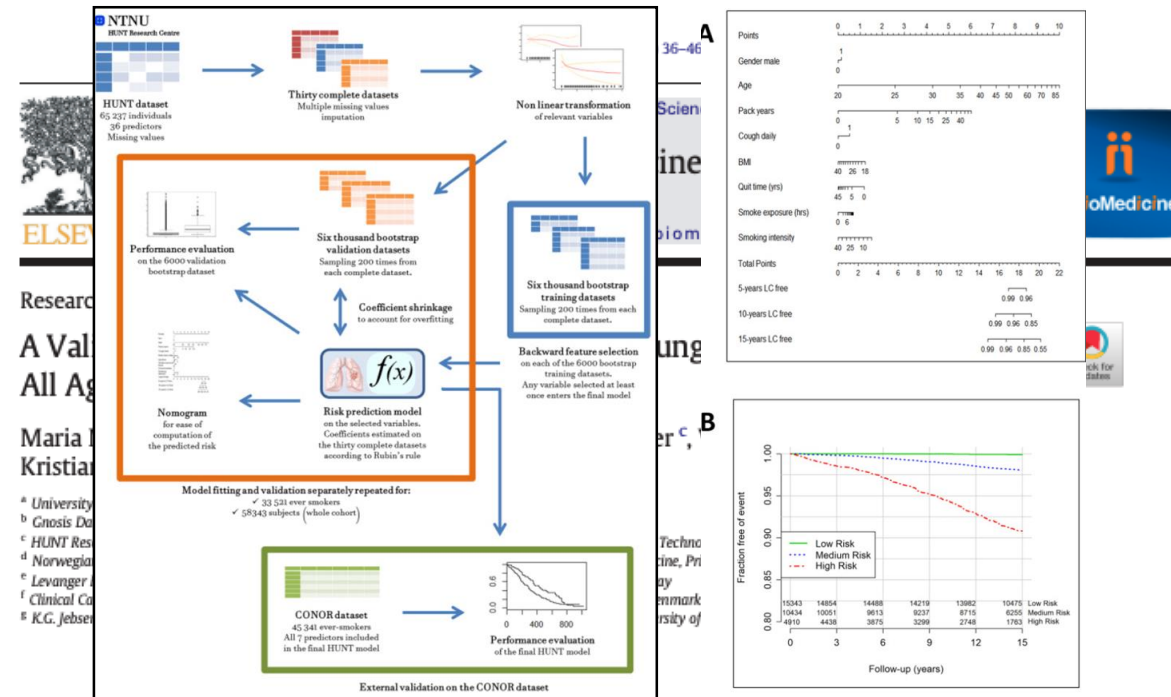


# Personalising lung cancer screening: An overview of risk-stratification opportunities and challenges

Kevin ten Haaf<sup>1</sup> | Carlijn M. van der Aalst<sup>1</sup> | Harry J. de Koning<sup>1</sup> | Rudolf Kaaks<sup>2,3</sup> | Martin C. Tammemägi<sup>4</sup>



# The HUNT Lung Cancer Risk Model, Norway (2018)



## HUNT Lung Cancer model

- 1. Age in years
- 2. Weight in kilograms
- 3. Height in meters
- 4. Smoking status, current or former
- 5. Average number of cigarettes smoked per day
- 6. Smoking duration in years
- 7. Time since quit smoking in years.
- 8. How long are you usually in a smoky room each day? Number of hours? (0-24 hours)
- 9. Do you cough daily during periods of the year? Yes/No

- Older risk models (e.g. PLCOm2012 and LLPv2+v3) → Standard logistic regression
- HUNT Model → Machine learning (AI) on 36 candidate risk predictors
- Validated in the CONOR population (>44 000 ever-smokers, Follow-up >10 years) - AUC 0.87

# Evaluation of risk prediction models to select lung cancer screening participants in Europe: a prospective cohort consortium analysis



*Xiaoshuang Feng, Patrick Goodley, Karine Alcala, Florence Guida, Rudolf Kaaks, Roel Vermeulen, George S Downward, Catalina Bonet, Sandra M Colorado-Yohar, Demetrius Albanes, Stephanie J Weinstein, Marcel Goldberg, Marie Zins, Caroline Relton, Arnulf Langhammer, Anne Heidi Skogholt, Mattias Johansson, Hilary A Robbins*



**Lancet Digit Health 2024;  
6: e614-24**

## Comparison of:

- **10 lung cancer risk models**
- in
- **4 prospective cohorts**
- from
- **9 European countries**

Most models showed **good calibration and performance** in European countries

The **HUNT and OWL model** slightly **outperformed** the other models

The **LLPv2 + v3 model** overpredicted the risk in 8/9 countries and performed **consistently worst**



	Threshold to screen the same number of participants as categorical criteria	Age, years (median [IQR])	Population selected	Lung cancer cases eligible for screening over 5 years	Lung cancer deaths eligible for screening over 5 years
Total	..	55 (50–60)	216 387	1585 (100.0%)	957 (100.0%)
USPSTF-2021 (aged 50–80 years, ≥20 pack-years, quit ≤15 years)					
USPSTF-2021	..	57 (53–61)	73 313 (33.9%)	1185 (74.8%)	730 (76.3%)
OWL	0.57%	58 (54–62)	73 312	1254 (79.1%)	767 (80.1%)
HUNT	0.71% (6-year time horizon)	58 (54–62)	73 313	1252 (79.0%)	774 (80.9%)
LCDRAT	0.45%	59 (55–63)	73 312	1250 (78.9%)	762 (79.6%)
LCRAT	0.85%	59 (55–63)	73 313	1241 (78.3%)	769 (80.4%)
UCLI	0.69%	59 (56–63)	73 316	1240 (78.2%)	757 (79.1%)
Bach	0.68%	59 (55–63)	73 340	1237 (78.0%)	757 (79.1%)
UCLD	0.45%	59 (55–63)	73 320	1233 (77.8%)	752 (78.6%)
PLCO <sub>m2012</sub>	0.75% (6-year time horizon)	58 (54–62)	73 313	1230 (77.6%)	751 (78.5%)
LLP version 2	0.86%	61 (59–64)	73 882	1126 (71.0%)	683 (71.4%)
LLP version 3	0.46%	61 (59–64)	73 288	1115 (70.3%)	674 (70.4%)

NELSON (aged 50–74 years, >15 cigarettes per day for >25 years or >10 cigarettes per day for >30 years, quit ≤10 years)					
NELSON	..	56 (52–60)	64 851 (30.0%)	1082 (68.3%)	674 (70.4%)
HUNT	0.80% (6-year time horizon)	58 (54–62)	64 851	1205 (76.0%)	746 (78.0%)
OWL	0.66%	59 (54–63)	64 851	1195 (75.4%)	736 (76.9%)
LCDRAT	0.52%	60 (56–63)	64 850	1191 (75.1%)	737 (77.0%)
LCRAT	0.98%	59 (55–63)	64 851	1185 (74.8%)	738 (77.1%)
Bach	0.80%	59 (56–63)	64 851	1185 (74.8%)	723 (75.5%)
PLCO <sub>m2012</sub>	0.88% (6-year time horizon)	58 (54–62)	64 851	1177 (74.3%)	723 (75.5%)
UCLD	0.51%	59 (55–63)	64 850	1175 (74.1%)	714 (74.6%)
UCLI	0.79%	60 (56–63)	64 851	1167 (73.6%)	717 (74.9%)
LLP version 2	0.98%	62 (59–64)	65 090	1090 (68.8%)	662 (69.2%)
LLP version 3	0.52%	62 (59–64)	64 311	1056 (66.6%)	636 (66.5%)



# Risk Model-Based Lung Cancer Screening

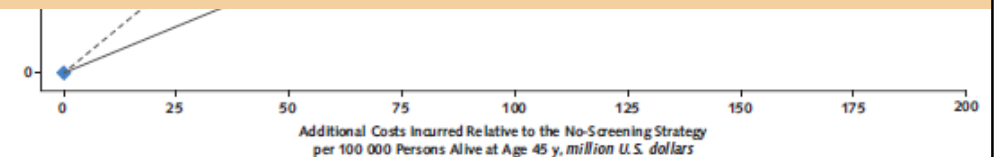
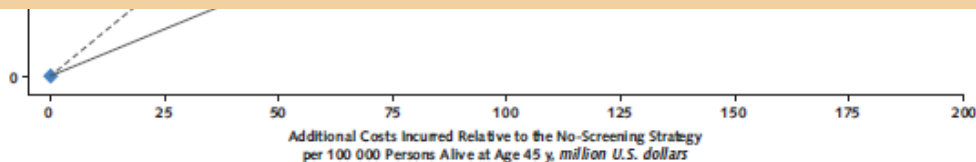
## A Cost-Effectiveness Analysis

Iakovos Toumazis, PhD; Pianpian Cao, PhD\*; Koen de Nijs, MSc\*; Mehrad Bastani, PhD\*; Vidit Munshi, PhD; Mehdi Hemmati, PhD; Kevin ten Haaf, PhD; Jihyoun Jeon, PhD; Martin Tammemägi, PhD; G. Scott Gazelle, MD, MPH, PhD; Eric J. Feuer, PhD; Chung Yin Kong, PhD; Rafael Meza, PhD; Harry J. de Koning, MD; Sylvia K. Plevritis, PhD; and Summer S. Han, PhD

Ann Intern Med. 2023;176:320-332. doi:10.7326/M22-2216

### Conclusion:

*“Risk model–based screening is more cost-effective than the USPSTF recommendation, thus warranting further consideration”*



# Inclusion by PLUS criteria

Criteria	Match N (%)	Female N (%)	Age (SD)	Pack Years (SD)	PLCOm2012 (SD)
Pack years $\geq$ 30	251 (25%)	105 (41.50%)	64 (3.68)	38.16 (10.45)	1.39 (0.39)
PLCOm2012 $>$ 2%	124 (12%)	86 (69.35%)	68 (3.47)	23.98 (3.51)	3.42 (1.68)
Both	631 (63%)	276 (43.74%)	66.83 (4.19)	49.50 (21.30)	5.17 (3.32)

Inclusion criteria	>= 30 pack years	>2% PLCOm2012	Both
Total N	251	124	631
CT scans performed N(%)	195 (77.7)	89 (71.8)	492 (78.0)
CT scans evaluated N(%)	195 (77.7)	89 (71.8)	492 (78.0)
Normal N(%)	110 (56.4)	35 (39.3)	159 (32.3)
Potential malignancy N(%)	5 (2.5)	4 (4.5)	18 (3.7)
Nodule for follow-up N(%)	5 (2.5)	4 (4.5)	24 (4.9)
Emphysema N(%)	47 (24.1)	40 (44.9)	245 (49.8)
Mild N(%)	25 (53.2)	19 (47.5)	123 (50.2)
Moderat N(%)	16 (34.0)	11 (27.5)	63 (25.7)
Severe N(%)	6 (12.7)	10 (25.5)	58 (23.7)
ILA N(%)	5 (2.5)	4 (4.5)	23 (4.7)
Non-pulmonary N(%)	26 (13.3)	15 (16.9)	76 (15.4)
Extrathoracic N(%)	11 (5.6)	8 (8.9)	42 (8.5)



# Different scenarios



	Potentially includable	Age	Female (%)
PLUS Criteria	1191	67	48
Pack Years $\geq$ 30 & PLCOm2012 $\geq$ 1.51%	1421	66	49

Based on 6130 responders from the PLUS cohort

# Can AI help in Lung Cancer Screening





# Udfordring

## Kriterier fra NE

- Ca. 300.000 potentielle patienter
- Ca. 50% deltagelse
- 10-14% stigende
- Behov for 4-5x mere



3



## Projektleder: Kunstig intelligens skal frigøre kapacitet til at screene for lungekræft

Ti medarbejdere på OUH laver lige nu annoteringer på flere end 15.000 scanninger fra OUH og Dansk Lungecancer Register. Målet er at skabe en AI-algoritme, som kan påvise lungekræft på CT-scanninger. Lykkes det ikke, får screening for lungekræft trænge kår.



Løsning



Kunstig intelligens (AI)



## Artificial intelligence-supported screen reading versus standard double reading in the Mammography Screening with Artificial Intelligence trial (MASAI): a clinical safety analysis of a randomised, controlled, non-inferiority, single-blinded, screening accuracy study

[Kristina Lång, PhD](#)   • [Viktoria Josefsson, MD](#) • [Anna-Maria Larsson, PhD](#) • [Stefan Larsson, PhD](#) • [Charlotte Högberg, MA](#) • [Hanna Sartor, PhD](#) • et al. [Show all authors](#)

Published: August, 2023 • DOI: [https://doi.org/10.1016/S1470-2045\(23\)00298-X](https://doi.org/10.1016/S1470-2045(23)00298-X) •  [Check for updates](#)

## Swedish RCT, 80033 women

### AI-supported screening or double reading without AI

- Similar cancer detection rate
- Screen-reading workload was reduced by 44,3% using AI

DOI: [https://doi.org/10.1016/S1470-2045\(23\)00298-X](https://doi.org/10.1016/S1470-2045(23)00298-X)

# Combining Human Expertise with Artificial Intelligence: Experimental Evidence from Radiology

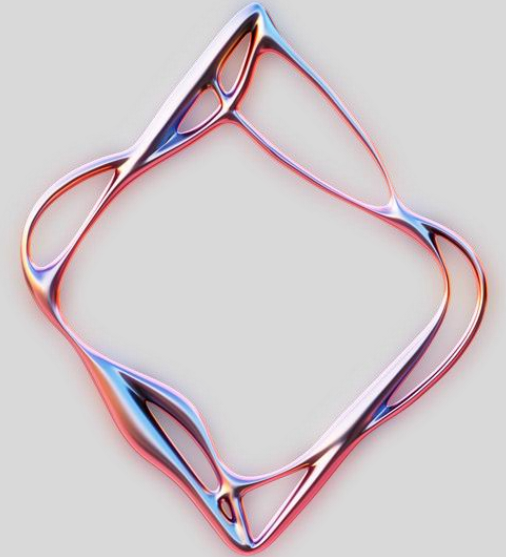
Nikhil Agarwal, Alex Moehring, Pranav Rajpurkar & Tobias Salz

WORKING PAPER 31422

DOI 10.3386/w31422

ISSUE DATE July 2023

REVISION DATE March 2024



***“Results show that providing (i) AI predictions does not always improve performance, whereas (ii) contextual information does.”***

DOI: 10.3386/w31422

# Engaging radiologists

**PERFECTS EQA – PERFormance Evaluation for CT Screening**

[CONTACT US](#)

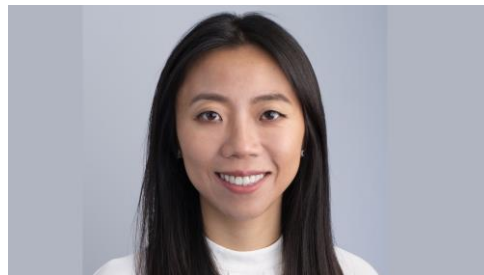

### How does it work?

The PERFECTS EQA scheme (PERformance Evaluation for CT Screening) is a self-assessment and training platform aims to ensure appropriate interpretation of CT scans, to benefit patient outcome, streamline clinician workload and optimise resource allocation.

All participants report a randomised series of collated test sets of cases and automatically receive immediate detailed multimedia interactive feedback comparing their case decisions anonymously to the experts and all other users.

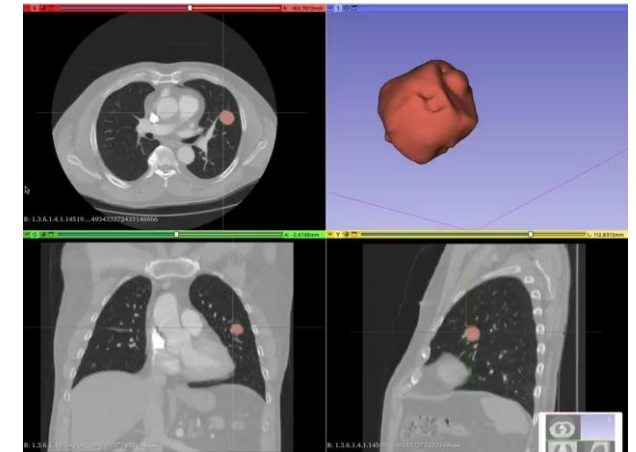
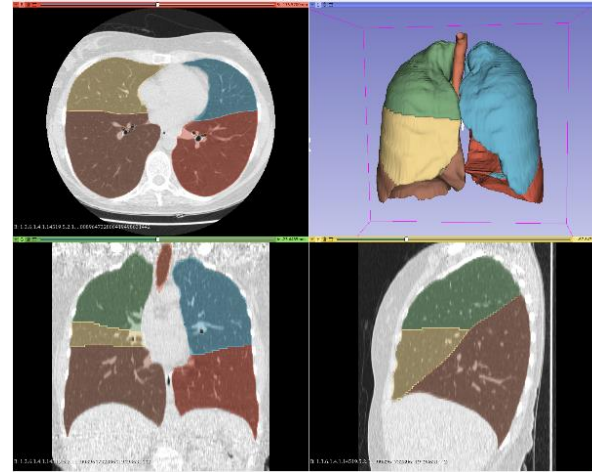
### What to expect?

The Targeted Lung Health Checks (TLHC) programme is a new and ground-breaking programme of work in England which aims to diagnose people who have lung cancer at an earlier stage, whilst also correctly identifying those who do not have the disease. The reading of low-dose thoracic CT scans for the TLHC programme is a highly specialised skill that requires clinical experience and judgement, alongside a high perceptive ability.

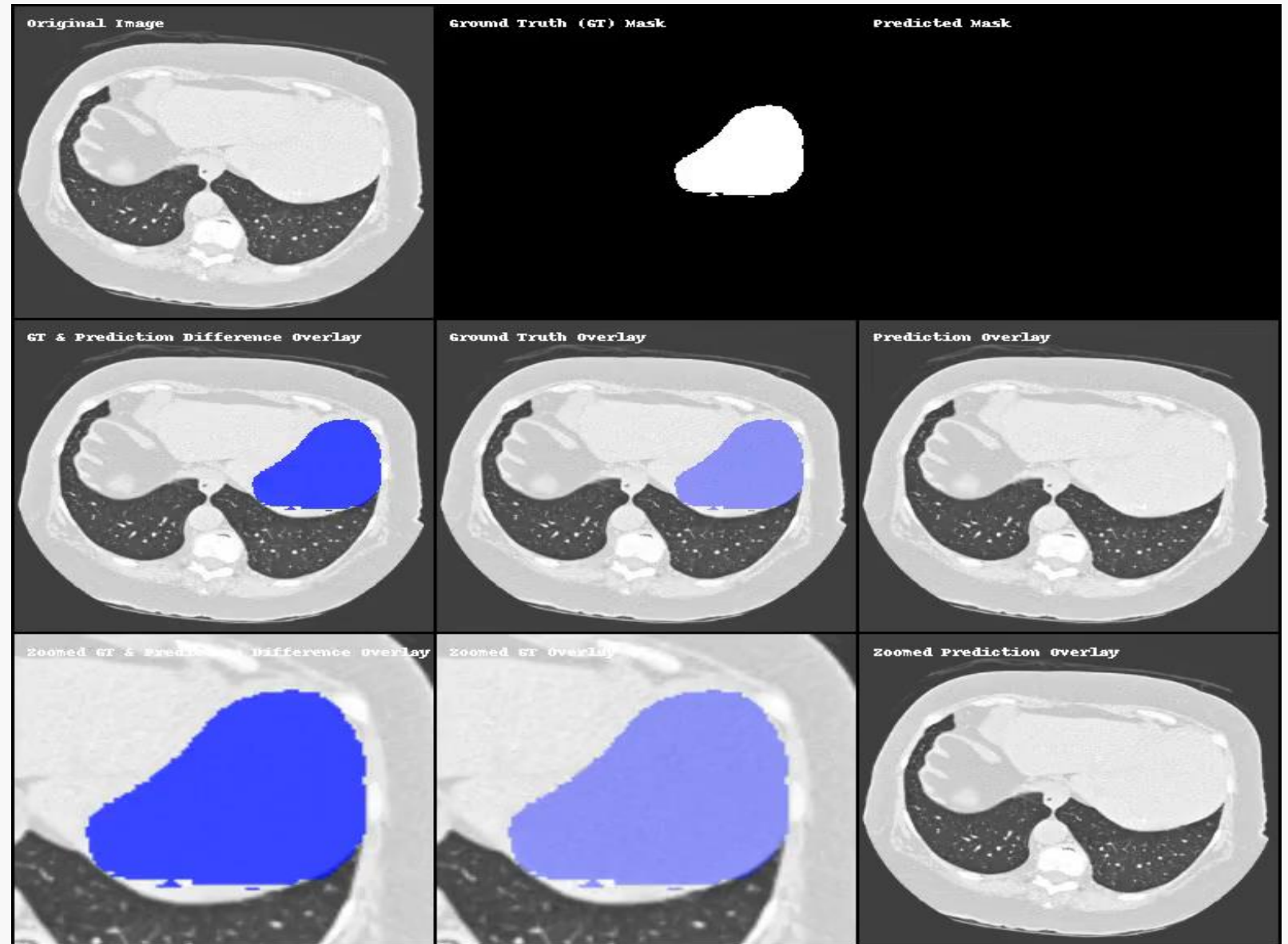


# Teknologisk muligheder (AI)

- **AI-RAPTOR**
- Data: > 20.000 CT-scanninger
  - ✓ DLCR (~ 60%)
  - ✓ Godartede knuder (~ 35%)
  - ✓ Open Source (~ 5%)
- Annotering (20 stud. medarbejdere)
- Multi-disciplinært team







# Andre forskningsprojekter



Livskvalitet / Deltager og familieperspektiv



PLUS:Hjerte – forkalkninger i kranspulsårene



Biobank



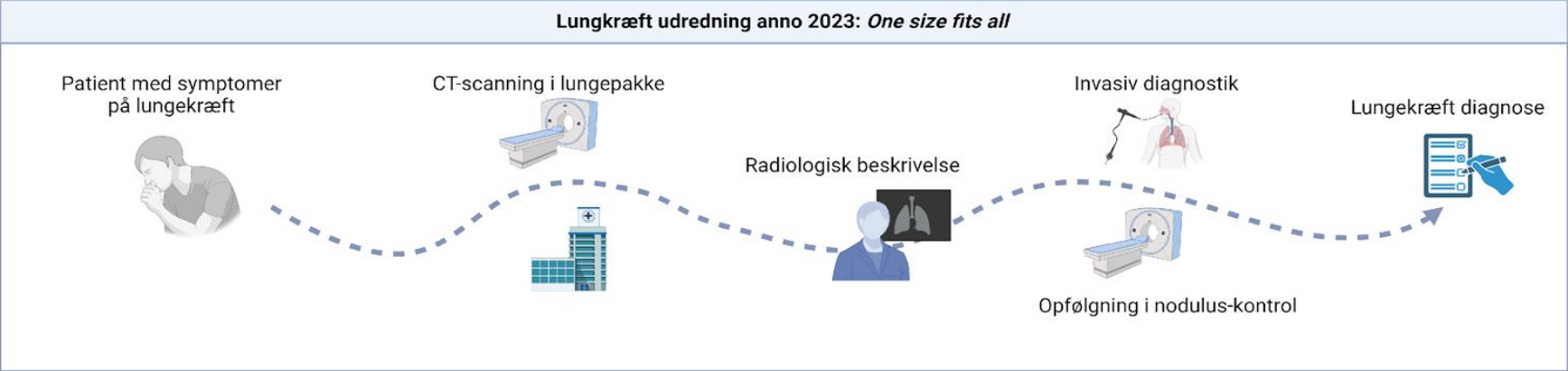
Sundhedsøkonomiske analyser og kosteffektivitet

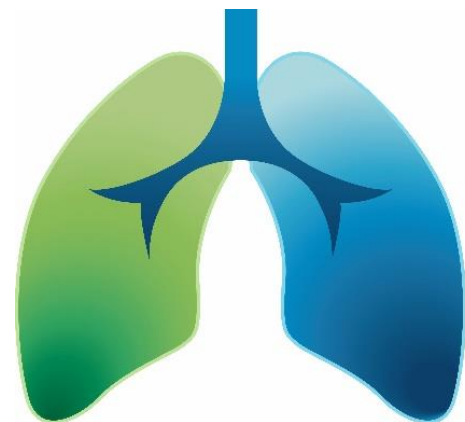


Interstitiel lungesygdom i screeningskontekst



# Drømmen lever....





# PLUS

PROJEKT  
LUNGEKRÆFTSCREENING  
I SYDDANMARK

Region of  
Southern Denmark  
OUH  
Odense  
University Hospital



# OPEN

Open Patient data Explorative Network

**Tak for opmærksomheden**