

COST-EFFECTIVENESS OF RISK-BASED LOW-DOSE CT SCREENING FOR LUNG CANCER IN SWITZERLAND

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Context

- Screening may decrease LC mortality by 20%(NLST) to 24%(NELSON)
- Risk-model-based selection into screening may be more efficient
- USPSTF-2013: 30 packyears, max 15 years since cessation, ages 55-80
- USPSTF-2021: 20 packyears, max 15 years since cessation, ages 50-80
- UK TLHC: 55-77, 1.51% PLCOm risk
 - Risk model accounting for smoking duration, intensity, status, age, sex, education and other risk factors.
- Our study: compare 1512 strategies (both packyear and risk) and see how they compare in cost per QALY

Context



**cancer
screening
committee**

**EVIDENCE FOR DECISION
MAKING IN HEALTH CARE**

BASEL INSTITUTE FOR CLINICAL EPIDEMIOLOGY AND BIOSTATISTICS



Low-dose CT screening for lung cancer

Final report

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1.2

*Lungenkrebs-Screening: Das
Expertengremium Krebsfrüherkennung
publiziert Empfehlungen für die Schweiz*

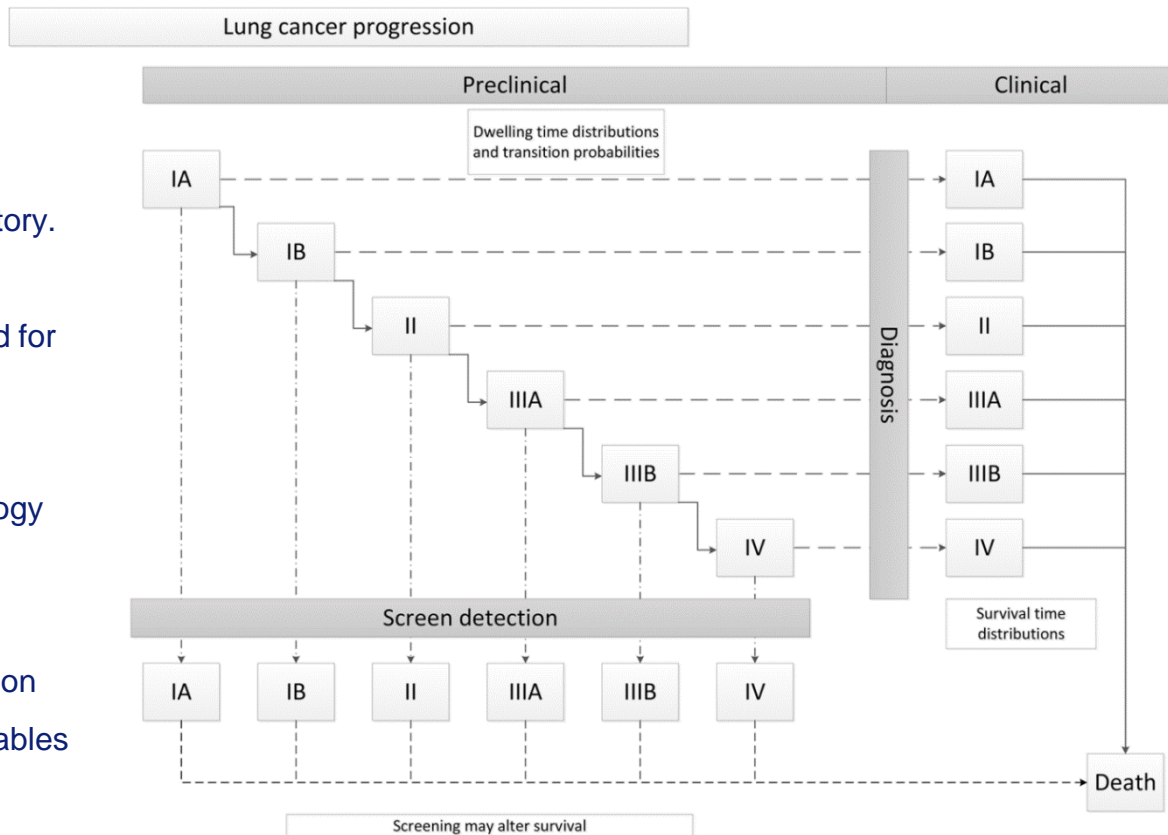
- Biennial Screening (considering capacity)
- Preferably younger ages (55-80)
- Moderate smokers

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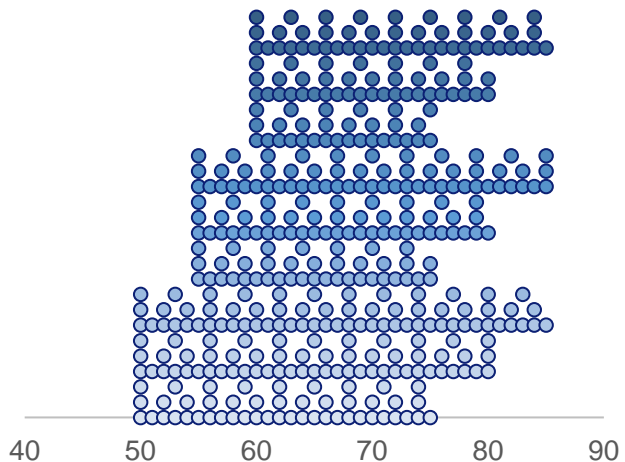


Methods

- MISCAN-Lung model of Lung Carcinogenesis and Natural History.
- Calibrated to NLST, but adjusted for NELSON outcomes.
- Swiss LC survival and LC histology distribution
- Swiss smoking initiation, cessation and intensity. Swiss cohort life tables adjusted for smoking-related mortality.



Strategies studied



Starting age

50, 55, 60

Stopping age

75, 80, 85

Interval

Annual, Biennial, Triennial

NLST-like

Smoking Criteria

10, 20, 30, 40 pack-years,
With 10, 15, 20, 25 years
smoking cessation

NELSON-like

(25y 10 CPD or 30y 5 CPD),
(20y 15 CPD or 25y 10 CPD),
(25y 15 CPD or 30y 10 CPD),
(30y 15 CPD or 35y 10 CPD)

PLCOm2012 risk
threshold

1.00% to 3.20% in 0.10%
increments

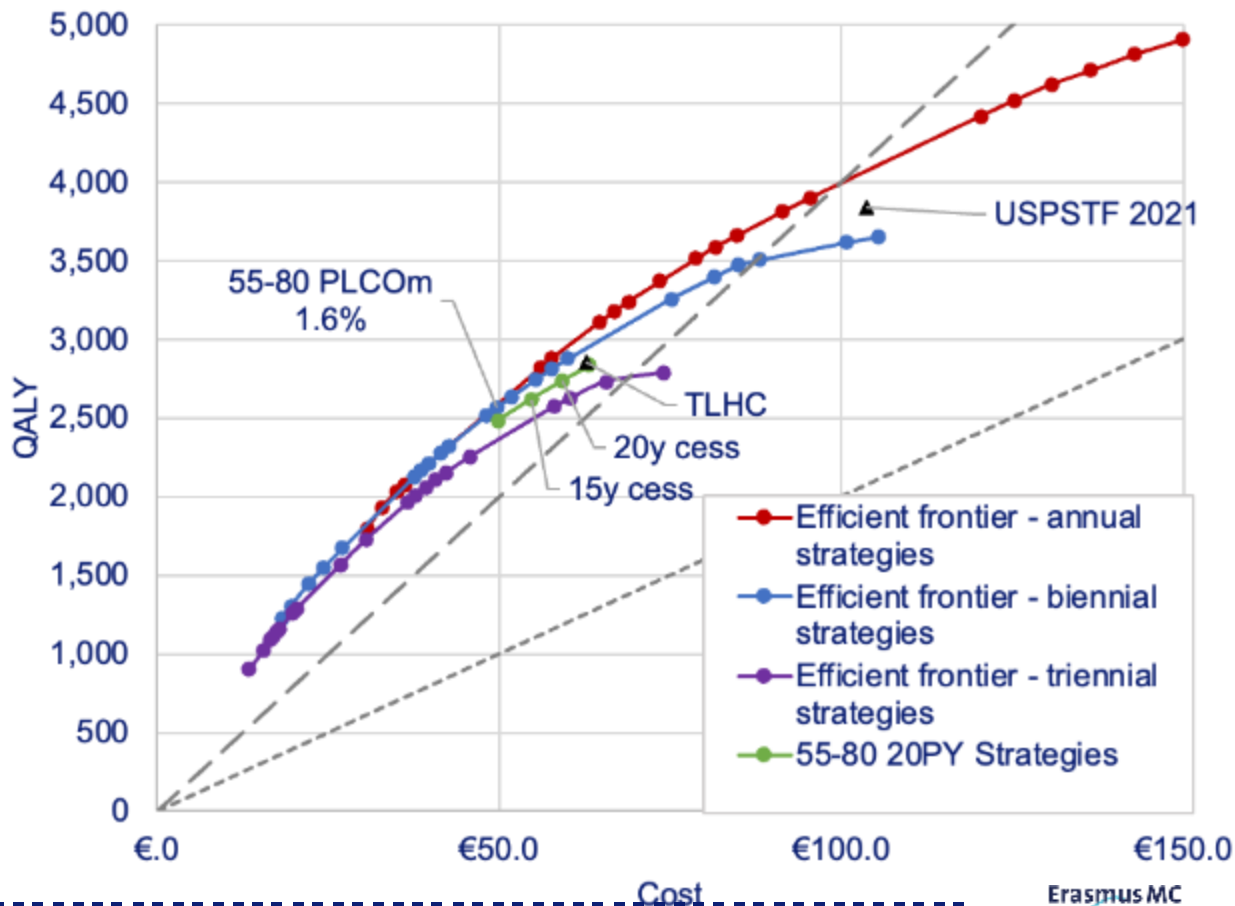
Costs and QALYs

		Costs in EUR
Risk-assessment		81.60
Invitation costs		25.50
LC Care	Initial	16,884.06
	Continuing	578.34
	Terminal	18,242.70
CT Scan		420.24
Biopsy		1,111.80

Utility weights from 0 to 1	
Terminal LC	0.59
Stage 1A-2 LC	0.78
Stage 3A-4 LC	0.69
Swiss norm utilities by age and sex	0.90 to 0.74

Results

- Biennial screening as efficient as annual alternatives.
- Risk-based screening 7.9% lower cost per QALY (1.6% PLCOm vs 20PY, 15y cess)
- RISK11: €19,341/QALY relative to no screening, ICER of €29,852.

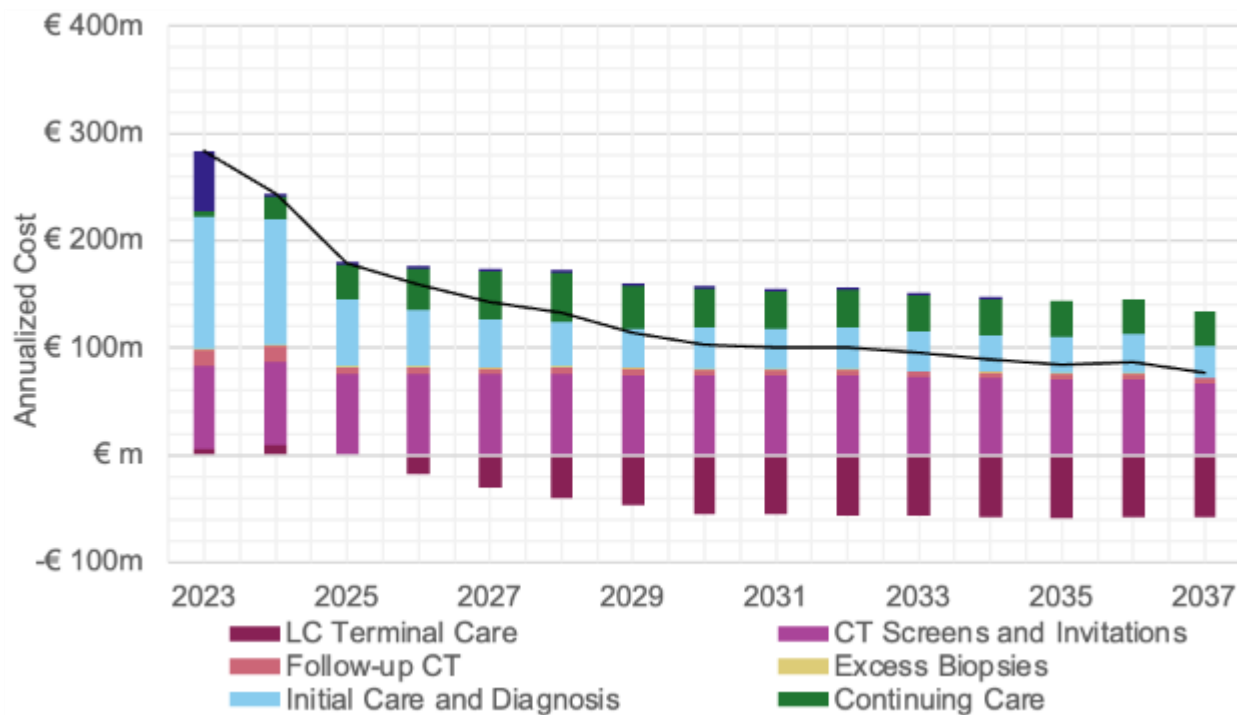


Results

	No screening	RISK11 (55-80 1.6% Risk), biennial	CSC2 (55-80, 20PY), biennial	USPSTF2021 (50-80 20PY), annual
Eligibility		17.5%	16.5%	17.1%
CT Scans	-	101,323	113,576	244,536
Over- diagnosis [§]	-	4.90%	4.70%	5.30%
LC Deaths	4,757	4,235	4,255	4,027
Prevented		522 (11.0%)	502 (10.5%)	730 (15.4%)
NNS/ Death Prev	-	33	33	23
LYG/ Death Prev.	-	12.8	13.6	13.5
LY Gain	-	6,678	6,810	9,887
QALY Gain	-	5,151	5,254	7,655

Results – Budget Impact

- Terminal care savings in the long term
- Total cost of €1990m for the first 15 years
- CT costs and terminal care costs major cost contributors



Take-home message

- When CT capacity is an issue, biennial screening can be just as effective
 - *USPSTF2021 would require +45% CT volume, RISK11 just +15%*
- CT Screening very cost-effective for Switzerland
 - *RISK11: 95% CI of ACER €10,545 to €28,609*
- Budget impact is high, but may be mitigated by terminal care costs
 - *Increased relevance of trend in (expensive) targeted therapies*
- Future research: Screening-induced smoking cessation, personalized screening intervals, impact of high late-stage treatment costs.