HEIDELBERG UNIVERSITY HOSPITAL

EUROPE'S BEATING CANCER PLAN
LET'S STRIVE FOR MORE
#EUCancerPlan

DIR Diagnostic Interventional Radiology

Lung Cancer Screening Programmes across Europe

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UK HD

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Conflict of interest disclosure

X I have the following real or perceived conflicts of interest that relate to this presentation:

Affiliation / Financial interest	Commercial Company
Grants/research support:	Siemens, Philips, Bayer
Honoraria or consultation fees:	Siemens, Philips, Boehringer Ingelheim, MSD, Astra Zeneca
Participation in a company sponsored bureau:	none
Stock shareholder:	none
Spouse / partner:	
Other support / potential conflict of interest:	none

ESR/ERS: Joint White Paper 2015 and 2020

Eur Radiol
DOI 10.1007/s00330-015-3697-0

SPECIAL REPORT

ESR/ERS white paper on lung cancer screening

Hans-Ulrich Kauczor[1,9] · Lorenzo Bonomo[2] · Mina Gaga[3] · Kristiaan Nackaerts[4] · Nir Peled[5] · Mathias Prokop[6] · Martine Remy-Jardin[7] · Oyunbileg von Stackelberg[1,9] · Jean-Paul Sculier[8] · on behalf of the European Society of Radiology (ESR) and the European Respiratory Society (ERS)

ERS OFFICIAL DOCUMENTS
ESR/ERS STATEMENT

ESR/ERS statement paper on lung cancer screening

Hans-Ulrich Kauczor[1], Anne-Marie Baird[2], Torsten Gerriet Blum[3], Lorenzo Bonomo[4], Clementine Bostantzoglou[5], Otto Burghuber[6], Blanka Čepická[7], Alina Comanescu[8], Sébastien Couraud[9,10], Anand Devaraj[11], Vagn Jespersen[12], Sergey Morozov[13], Inbar Nardi Agmon[14], Nir Peled[15], Pippa Powell[16], Helmut Prosch[17], Sofia Ravara[18,19], Janette Rawlinson[20], Marie-Pierre Revel[21], Mario Silva[22], Annemiek Snoeckx[23], Bram van Ginneken[24,25], Jan P. van Meerbeeck[26], Constantine Vardavas[27,28], Oyunbileg von Stackelberg[29] and Mina Gaga[30], on behalf of the European Society of Radiology (ESR) and the European Respiratory Society (ERS)

Eur Respir J 2019; 0: 1900506 [https://doi.org/10.1183/13993003.00506-2019].

LCS: Evidence and Algorithms established

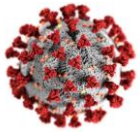
- ✓ Reduction of lung cancer mortality
- ✓ esp. in women
- ✓ Inclusion criteria 55-75 years
- ✓ Low dose CT
- ✓ 3D evaluation of nodules
- ✓ Algorithms for management (LungRads)

NLST

NELSON

=> Ready for implementation

Nationwide LCS Programme: Croatia

- ✓ Official launch in Zagreb on January-14, 2020
- ✓ 16 sites throughout Croatia, central database
- ✓ Interrupted after earthquake on March-22
- ✓ And COVID-19 
- ✓ Started on October-1, 2020

„Lung cancer does not kill if detected early"

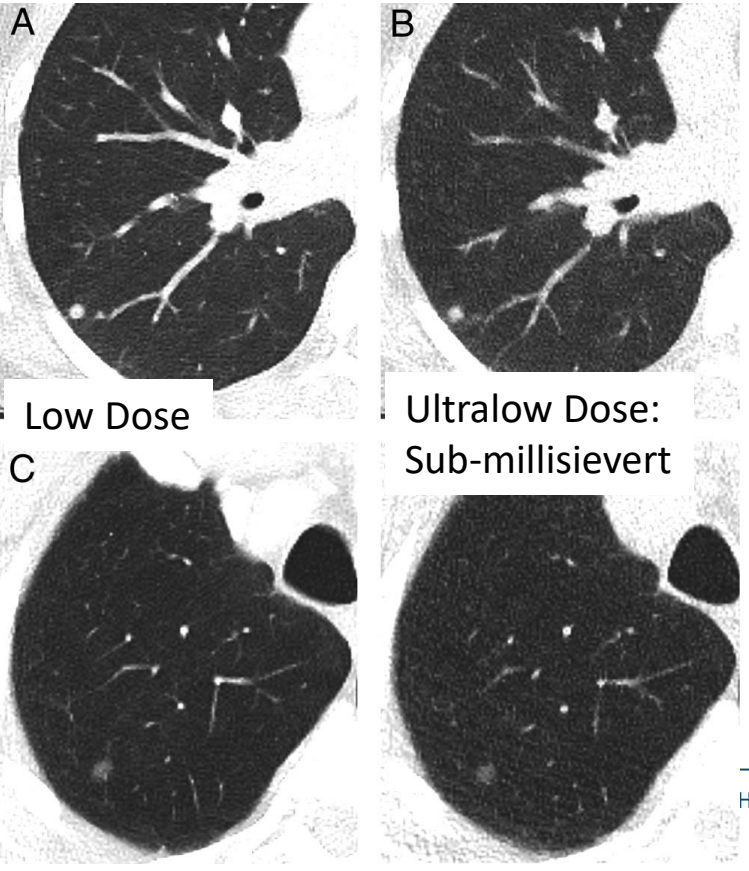
Innovations

increase impact

overcome bottlenecks

tackle inequalities

Ultralow dose CT (Submillisievert)



- Dose negligible
- No long-term adverse effects

	<5 mm	5 - 7 mm	>7 mm
Number of nodules	334	70	21
Nodule type			
solid, *n*	179 (54%)	56 (80%)	19 (90%)
calcified, *n*	97 (29%)	3 (4%)	0 (0%)
subsolid, *n*	58 (17%)	11 (16%)	2 (10%)
True positive, *n*	299	68	21
Sensitivity (95% CI)	89.5% (85.7 - 92.6%)	97.1% (90.0 - 99.6%)	100% (83.9 - 100%)

Messerli-M et al. Eur Radiol 2017; 27: 3290-99

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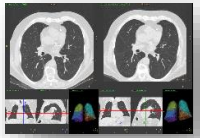
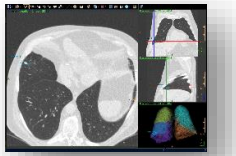
Artificial Intelligence: Images

Nodule detection and characterization, AI as a second reader

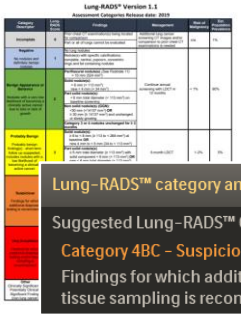
Pre-fetch of relevant priors → Automatic preprocessing of relevant algorithms → Registration between studies from different time points

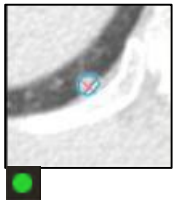


- AI Lung segmentation automatic results
- AI CAD for automatic nodule detection
- AI Semi-automatic nodule segmentation
- Automatic nodules matching between time points

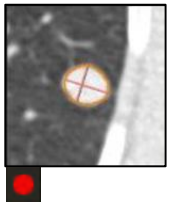


Prefills based on nodules characteristics → Data integration (LungRADS) → Risk Prediction Calculator

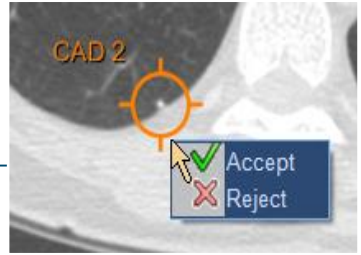




1% probability

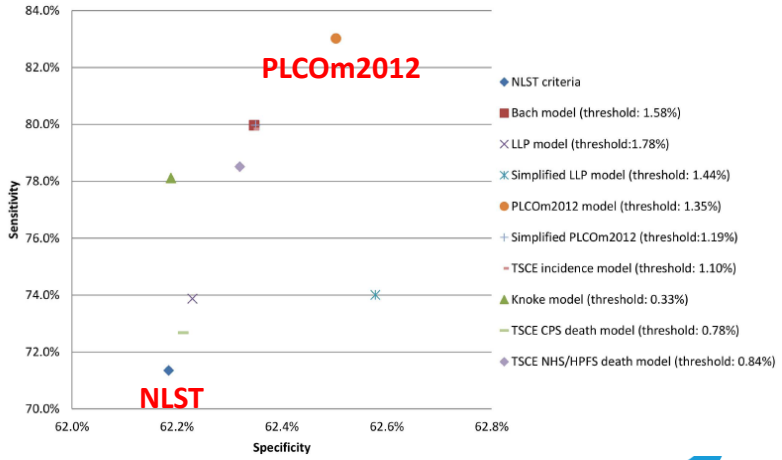


11% probability



Artificial Intelligence: Data-driven Science

- Risk models
- Risk prediction calculator **nodule** and **individual**
- Individualized screening period and intervals
- Less overdignosis
- Register, QA
- liquid and volatile biomarkers



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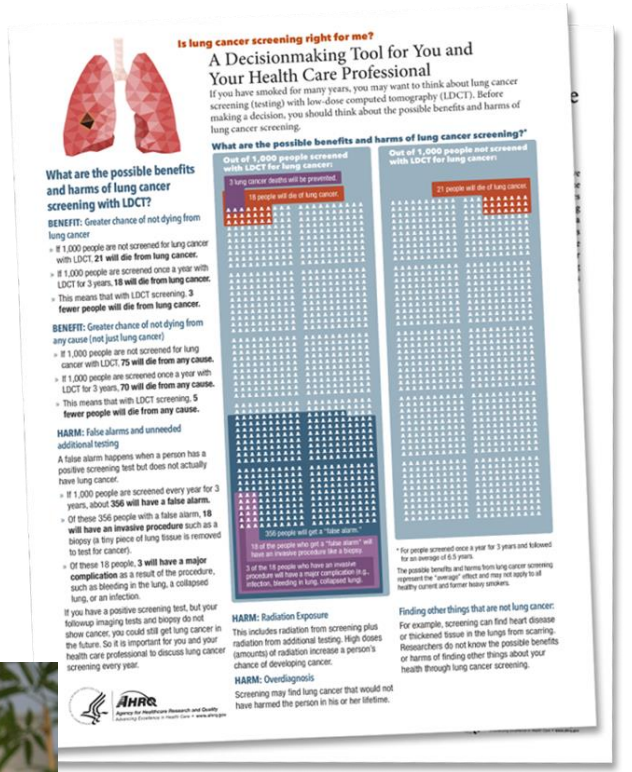
Accessibility & Affordability

- Outreach
- Clear language and terminology
- Minimize stigma
- Shared decision making
- Benefits and harms
- Cost effectiveness


Is lung cancer screening right for me?

A Decisionmaking Tool for You and Your Health Care Professional

If you have smoked for many years, you may want to think about lung cancer screening (testing) with low-dose computed tomography (LDCT). Before making a decision, you should think about the possible benefits and harms of lung cancer screening.

What are the possible benefits and harms of lung cancer screening with LDCT?

What are the possible benefits and harms of lung cancer screening?*

Out of 1,000 people screened with LDCT for lung cancer:

Out of 1,000 people not screened with LDCT for lung cancer:

www.effectivehealthcare.ahrq.gov

UK HD

Downstream Workflow and Treatment Options

- **Integration** of screening and healthcare system (IT)
- **Multidisciplinary** nodule and tumor boards
- Re-evaluation of **treatment** options for stage 1 lung cancer:

  lung sparing surgery, stereotactic radiation, ablation
- **Comorbidities,** incidentals

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Lung Cancer Screening

EUROPE'S BEATING CANCER PLAN
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- **Accomplished**: reduction of lung cancer mortality
- **Unmet need**: longer survival with lung cancer
- **Expected**: Quantum leap in technology: ultra low dose, data, AI
- **Required**: awareness and accessibility
- Data and IT integration