Le cancer bronchique en 2025 : dépistage, santé publique et nouveaux traitements

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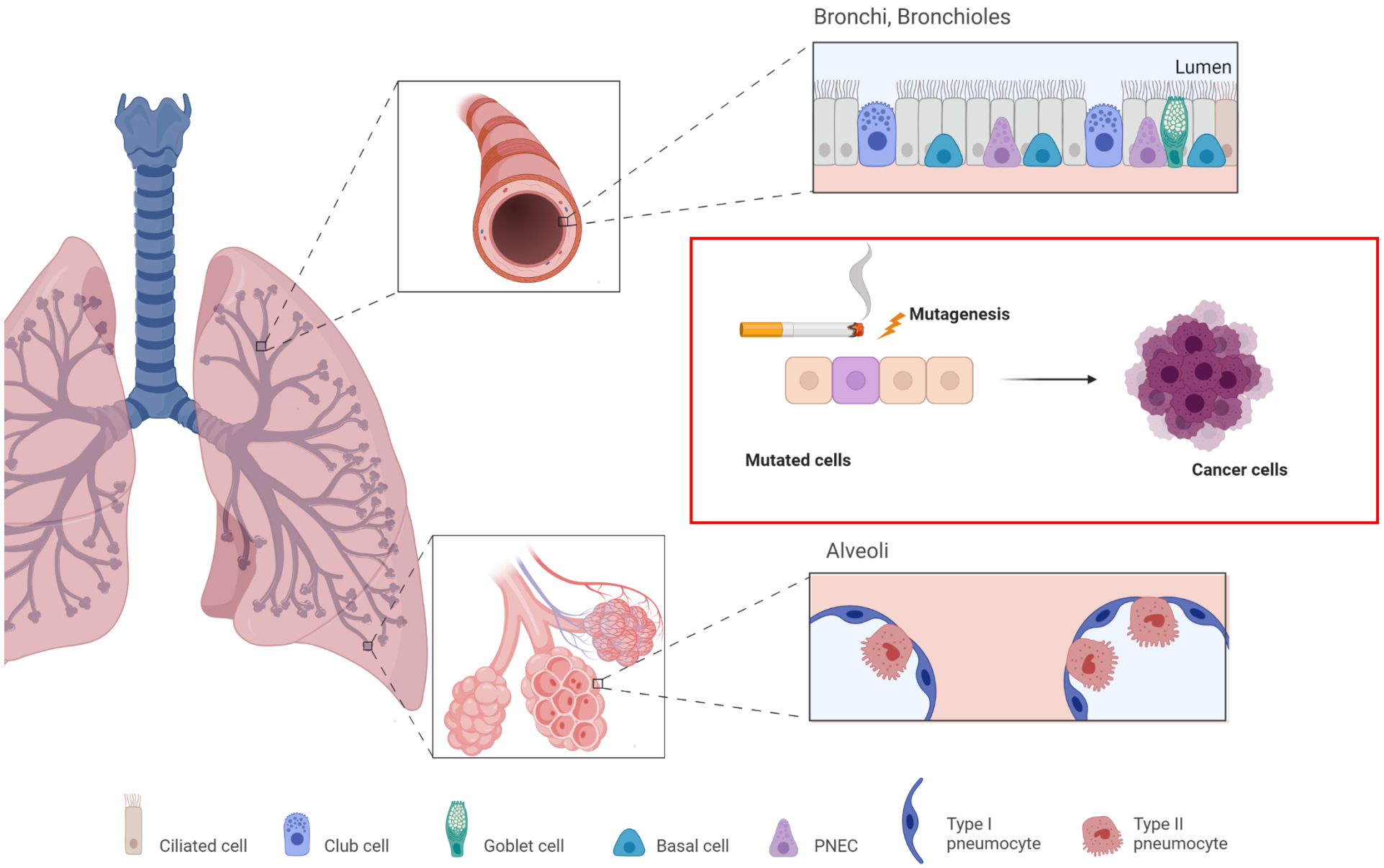
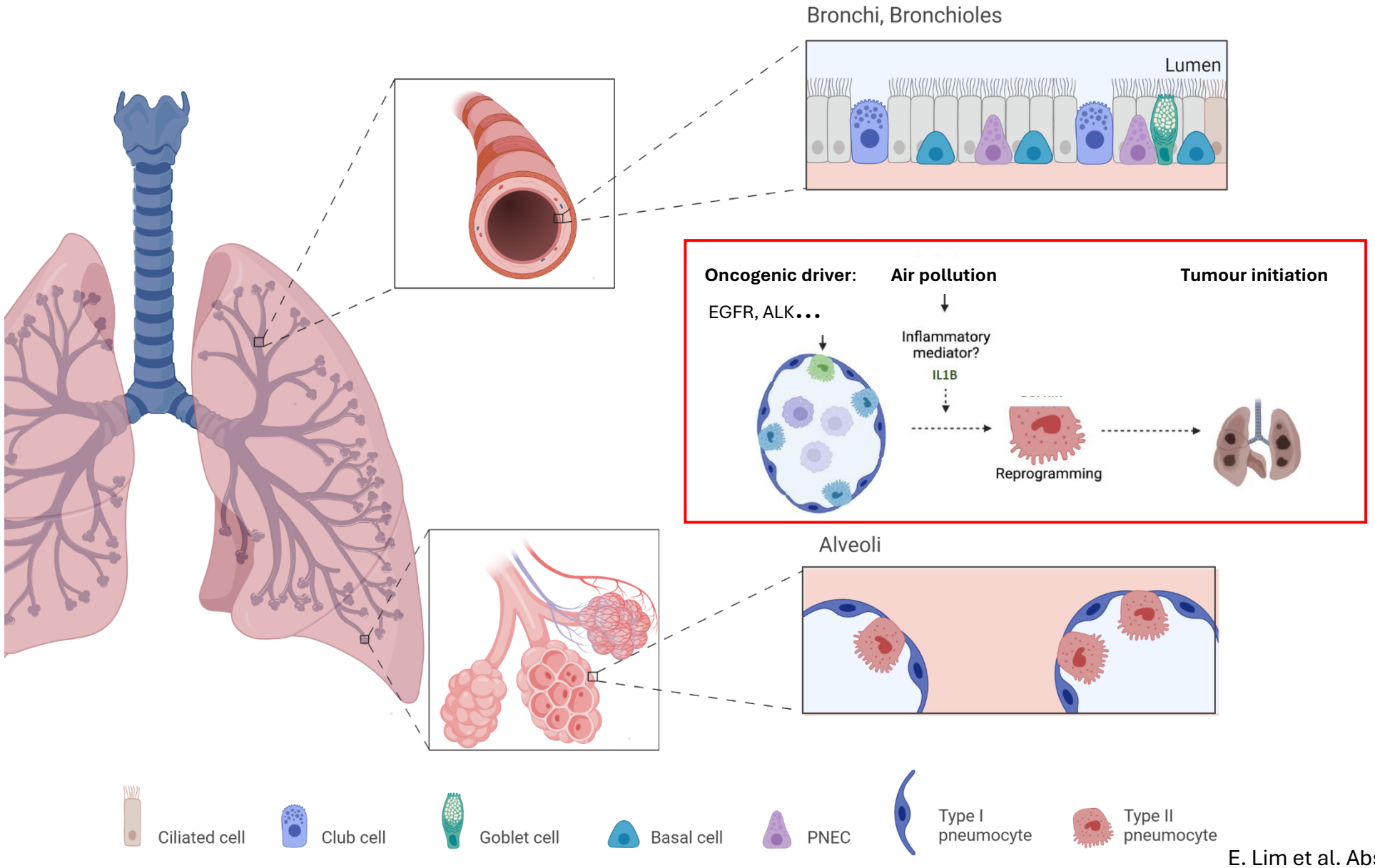
Etiology of Lung Cancer: Tobacco



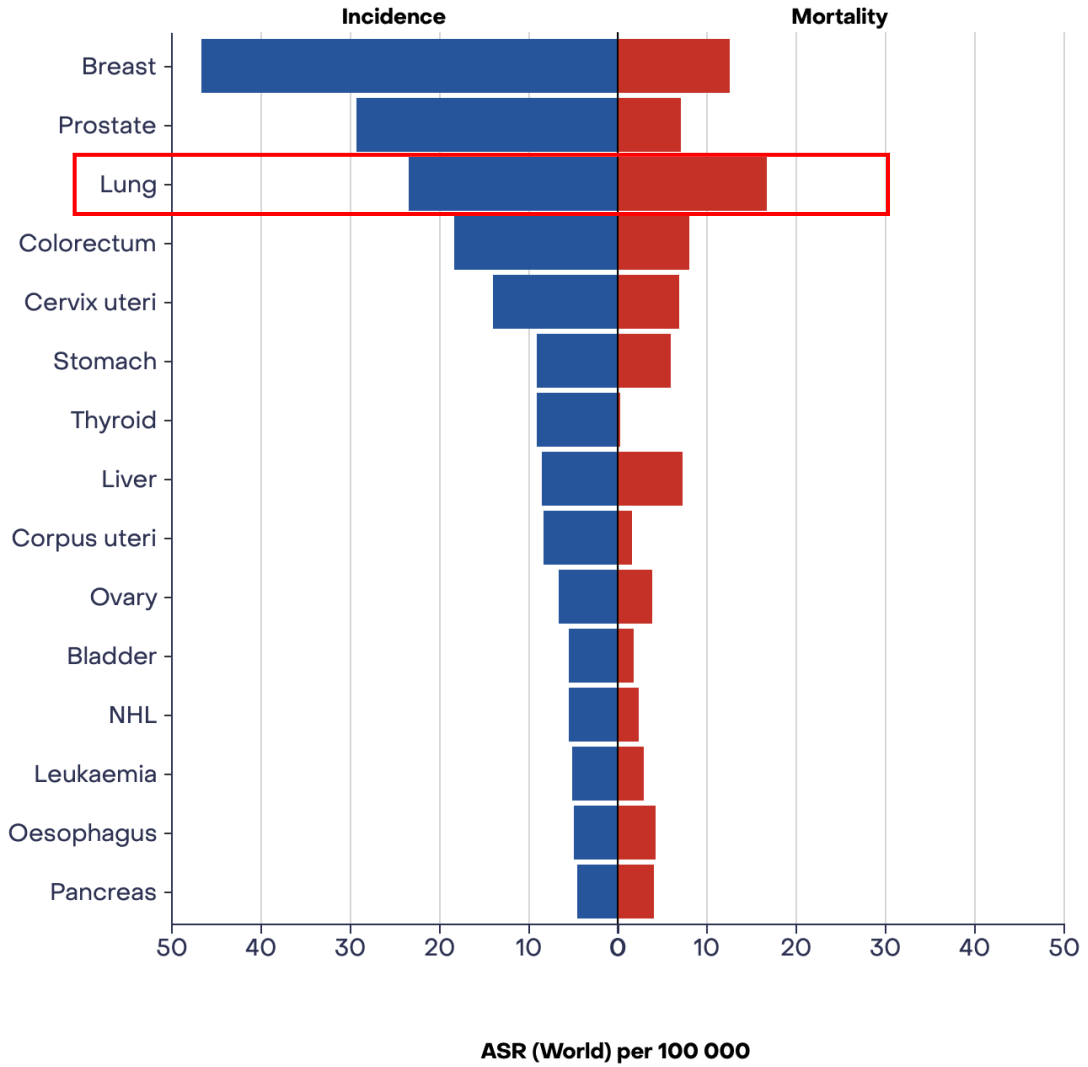
Etiology of Lung Cancer: Air Pollution



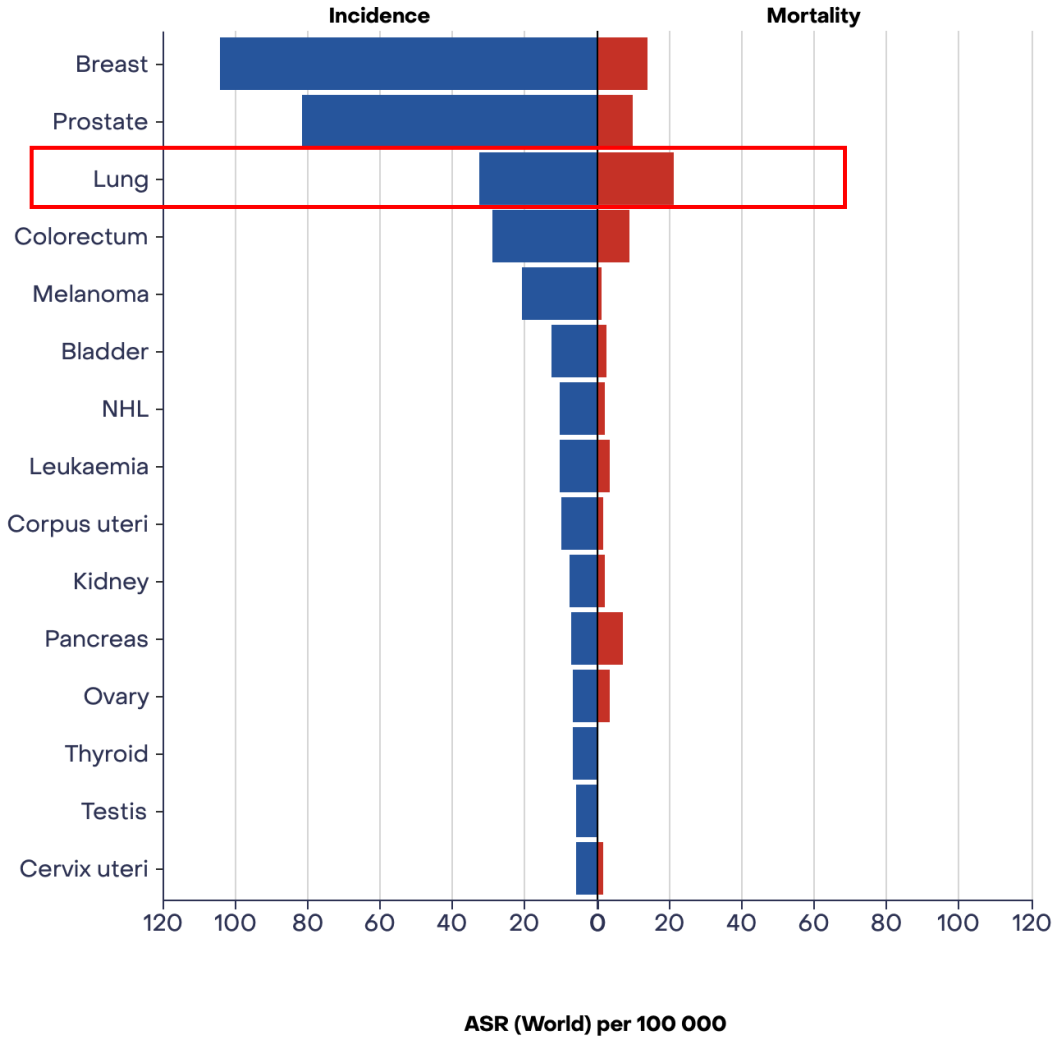
E. Lim et al. Abstract 1MO ESMO 2022
W. Hill et al., Nature 2023

Lung cancer incidence and mortality

Worldwide



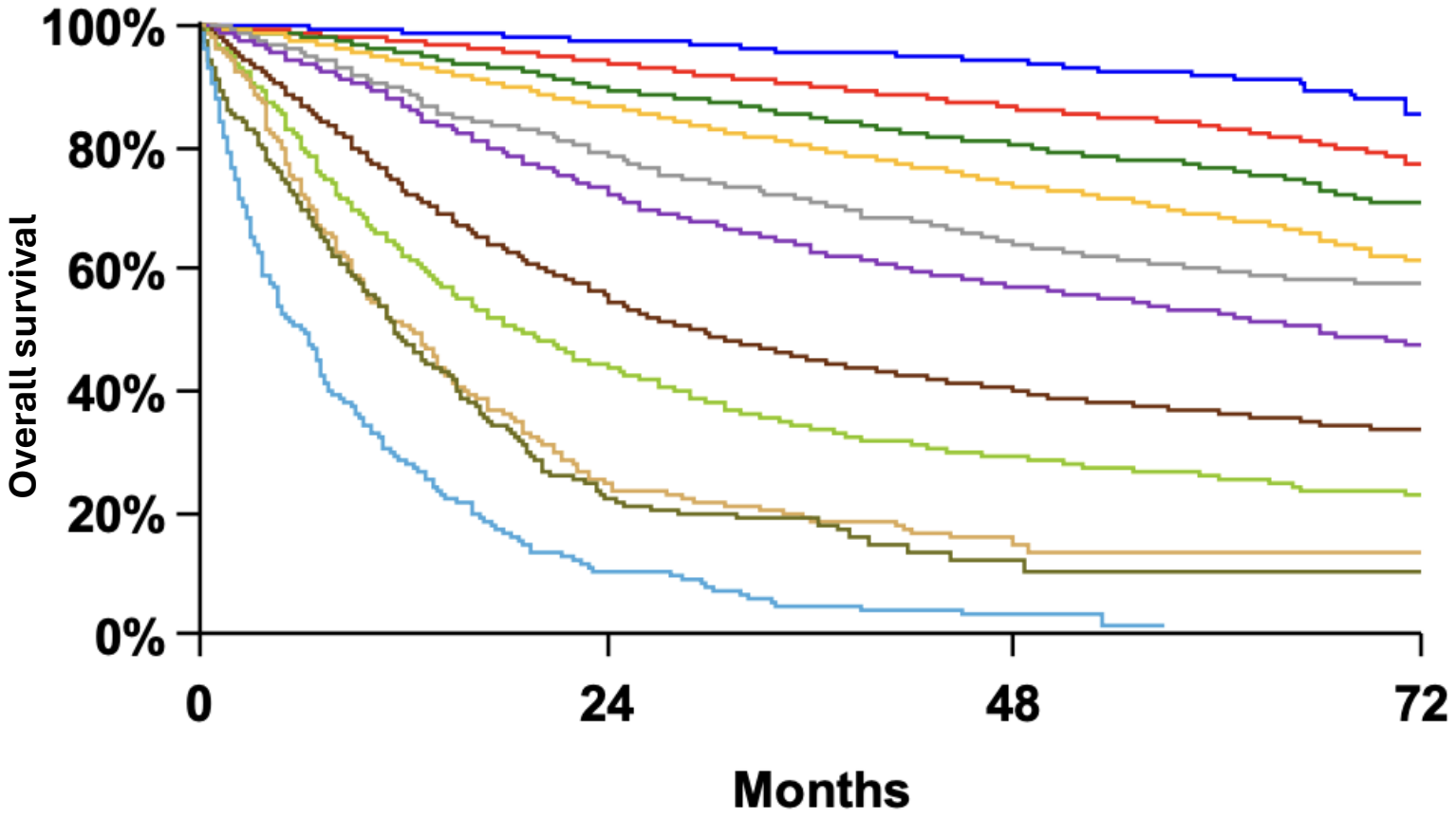
Belgium



ASR= Age-Standardized Rate

https://gco.iarc.who.int
Data version: Globocan 2022 (version 1.1) - 08.02.2024

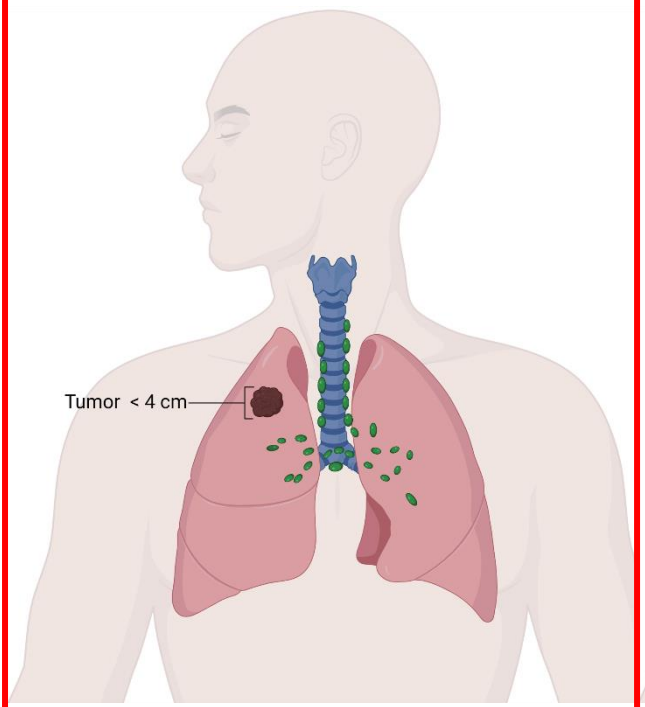
Lung cancer prognosis: overall survival according stage disease



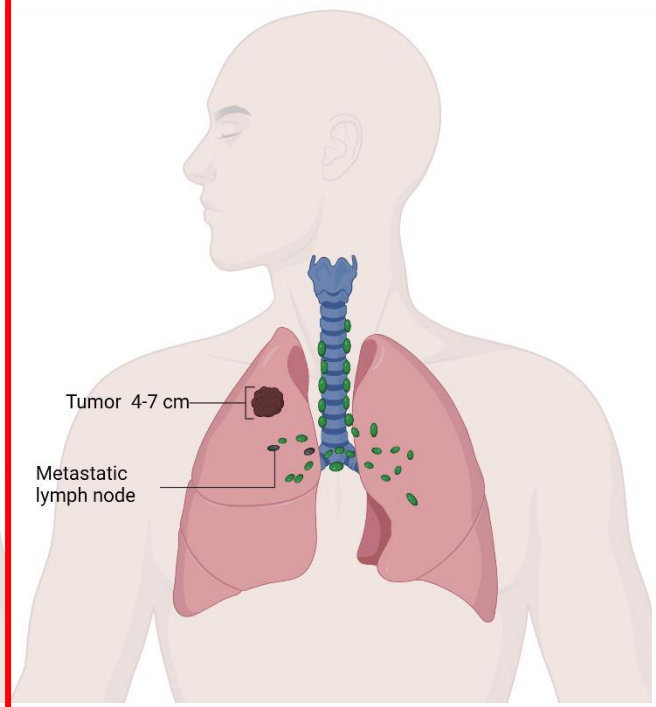
Proposed	Events / N	MST	24 Month	60 Month
IA1	68 / 781	NR	97%	92%
IA2	505 / 3105	NR	94%	83%
IA3	546 / 2417	NR	90%	77%
IB	560 / 1928	NR	87%	68%
IIA	215 / 585	NR	79%	60%
IIB	605 / 1453	66.0	72%	53%
IIIA	2052 / 3200	29.3	55%	36%
IIIB	1551 / 2140	19.0	44%	26%
IIIC	831 / 986	12.6	24%	13%
IVA	336 / 484	11.5	23%	10%
IVB	328 / 398	6.0	10%	0%

P. Goldstraw et al. Jtho 2015

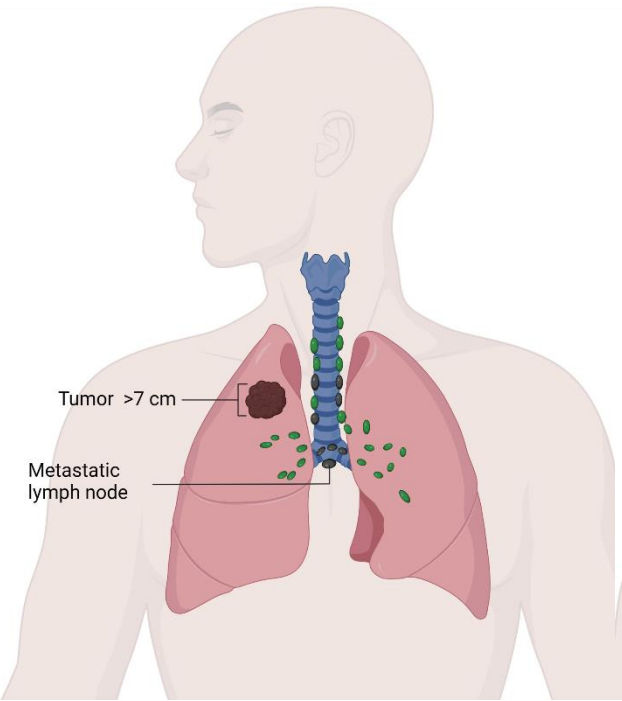
Treatment of lung cancer depends on the disease stage at diagnosis



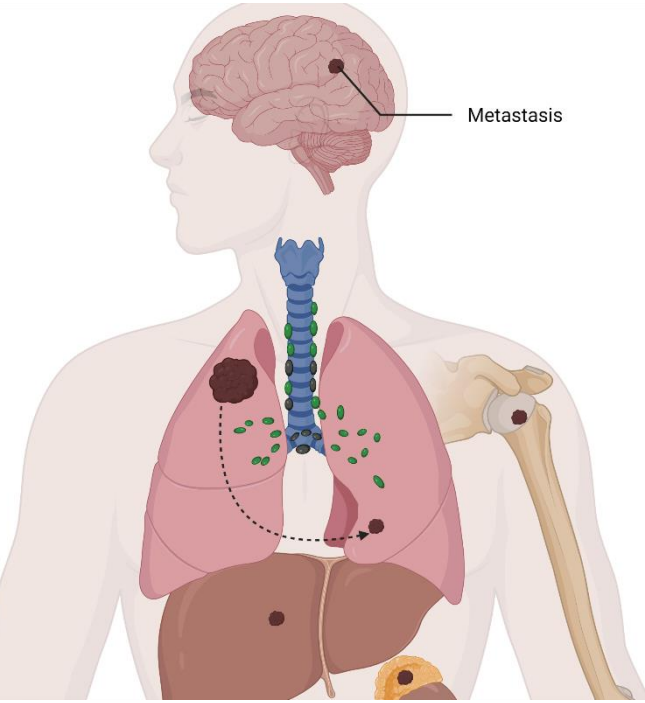
Stage 1
26%



Stage 2
8%



Stage 3
27%



Stage 4
39%

Metastatic

Surgery (or radiation)

Systemic treatment(chemo, immuno or targeted therapy)

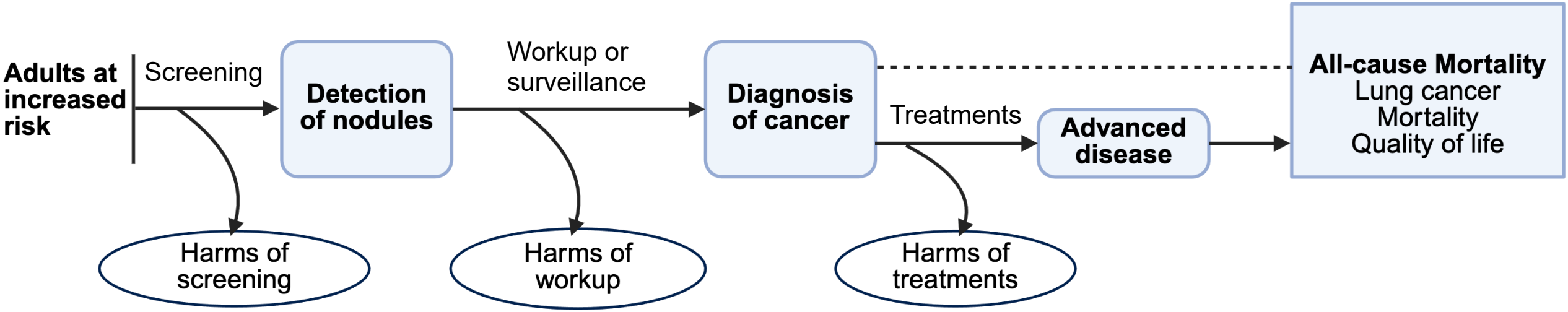
Dépistage: médecine préventive, régionale

Patient de 55 ans , fumeur actif, depuis l'âge de 20 ans , 35 AUP

Docteur est ce que vous pouvez me réaliser des examens de dépistage du cancer cancer poumon ?

1- OUI
2-NON
3-Eventuellement

Screening workflow, outcome and pitfalls



Daniel E. Jonas et al . JAMA. 2021

Desai and Prasad:

J Gen Intern Med . 2020

Low-Dose Computed Tomographic Screening for Lung clinical trials

Table 1 Clinical Trials for Lung Cancer Screening with LDCT

Clinical trial (year), country	Comparison/control group	Eligible subjects	Rate of adherence	Rate of positive screening LDCT	Lung cancer incidence	Lung cancer mortality	All-cause mortality
NLST (2011),[1] United States	3 annual screenings with LDCT vs single-view posteroanterior chest radiography	I. 55–74 years II. Male or female III. 30 pack-years IV. Quit within 15 years	>90%	24.2%	645 vs 572 (per 100,000 person-years) (RR: 1.13, [1.03–1.23])	247 vs 309 (RRR:20%, [6.8 to 26.7]; p= 0.004)	6.7% (95% CI, 1.2 to 13.6; p = 0.02)
DANTE (2015),[3] Italy	4 annual screenings with LDCT vs no screening	I. 60–74 years old II. Male smokers or former smokers III. 20 pack-years IV. Quit less than 10 years	N/A	37%	8.23% vs 6.07% (p=–.0418)	543 vs 544 (HR: 0.993; 95% CI, 0.688–1.433) [Not significant]	1655 vs 1742 per 100,000 person-years (HR: 0.947; 95% CI, 0.769–1.165) [Not Significant]
ITALUNG (2017),[4] Italy	4 annual screenings with LDCT vs no screening	I. 55–69 years old II. Male or female III. 20 pack-years IV. Quit less than 10 years	81%	N/A	67 vs 71 ((RR)=0.93; 95% CI 0.67 to 1.30)	30% reduction (RR=0.70; 95% CI 0.47 to 1.03) [Not significant]	17% reduction (RR=0.83; 95% CI 0.67 to 1.03) [Not significant]
LUSI (2019),[5] Germany	5 annual screenings with LDCT vs no screening	I. 50–69 years old II. Male or female III. >15 cigarettes a day for >25 years or >10 cigarettes a day for >30 years IV. Quit less	>90%	4–22%	85 vs 67 (p=0.16)	HR: 0.74 (95% CI: 0.46–1.19; p = 0.21) [Not significant]	HR = 0.99 [95% CI: 0.79–1.25], p =0.95 [Not significant]
NELSON (2020),[6] Netherlands	4 annual screenings with LDCT vs no screening	I. 50–74 years old II. Male III. >15 cigarettes a day for >25 years or >10 cigarettes a day for >30 years IV. Quit less than 10 years	90%	2.1%	5.58 vs 4.91 cases per 1000 person-years	2.50 deaths vs 3.30 deaths per 1000 person-years CR: 0.76 (M) (0.61 to 0.94; P = 0.01)	13.93 vs 13.76 deaths per 1000 person-years, RR: 1.01 (0.92–1.11)

n= 53 454 participants

n= 15 792 participants

Is lung cancer screening the way forward?

1000 individuals

Screening

1000 individuals

No Screening

132 ← Deaths at 10 years → **130**

24

Lung cancer deaths

108

Other causes of death

32

Lung cancer deaths

98

Other causes of death

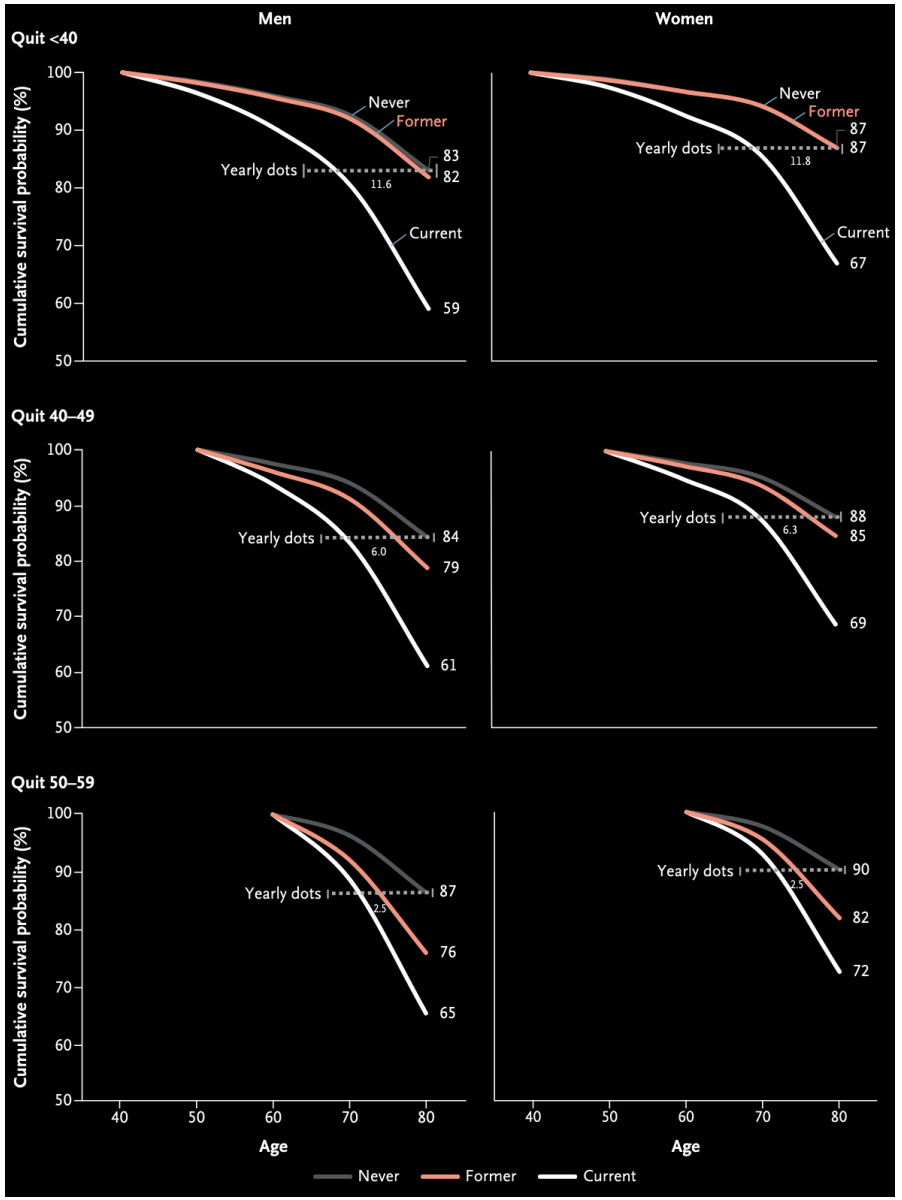
De Koning et al. NEJM 2020
C. Heneghan et al. BMJ 2020

Impact of Smoking Cessation Age on Long-Term Survival: It's Never Too Late to Quit — But the Sooner, the Better

Arréter de fumer avant 40 ans
+11,5 ans de survie globale

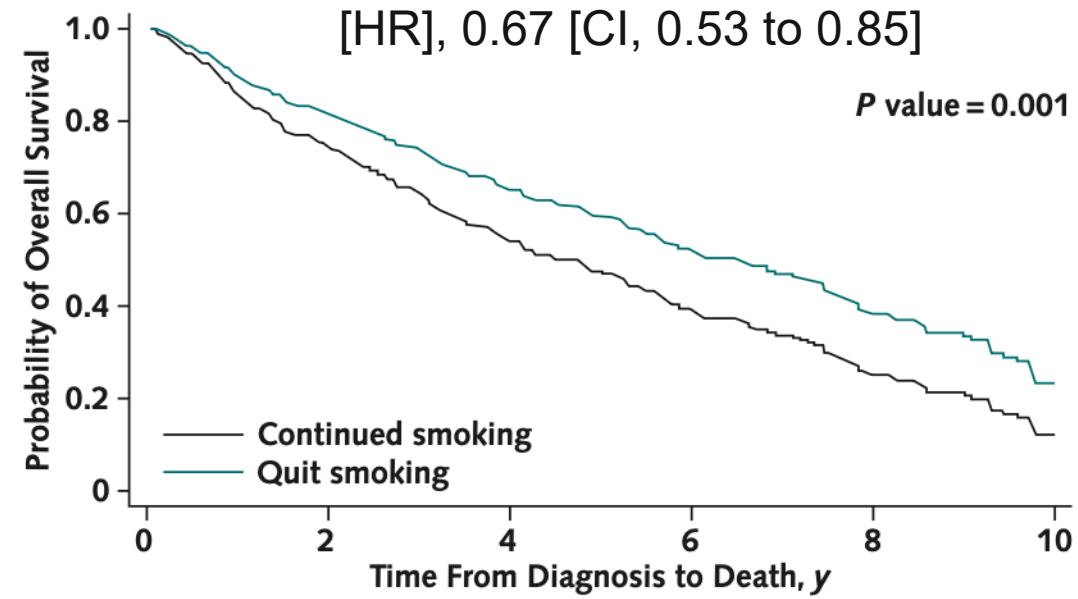
Arréter de fumer entre 40-49 ans
+6 ans de survie globale

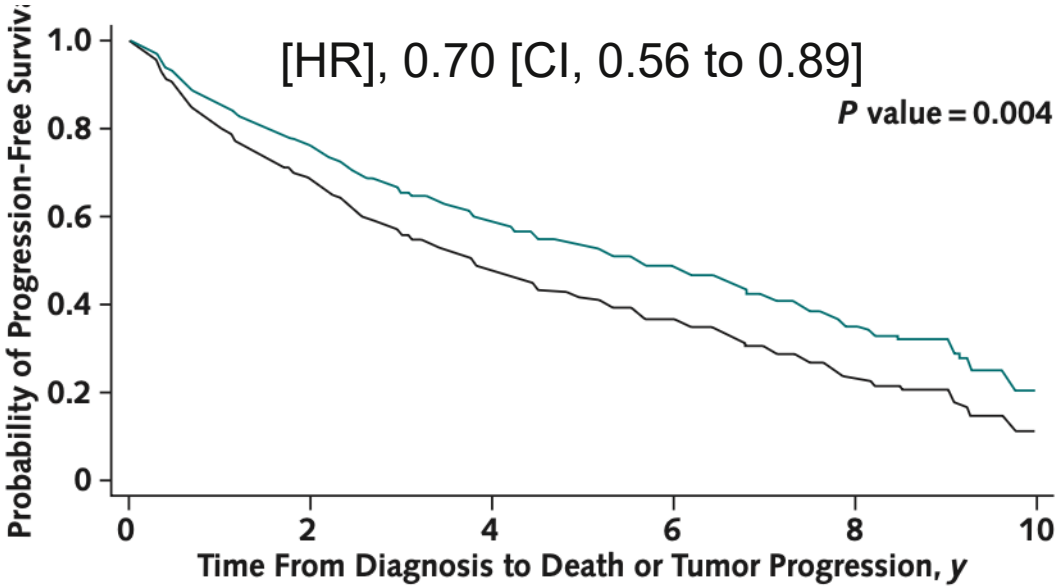
Arréter de fumer entre 50-59 ans
+2,5 ans de survie globale

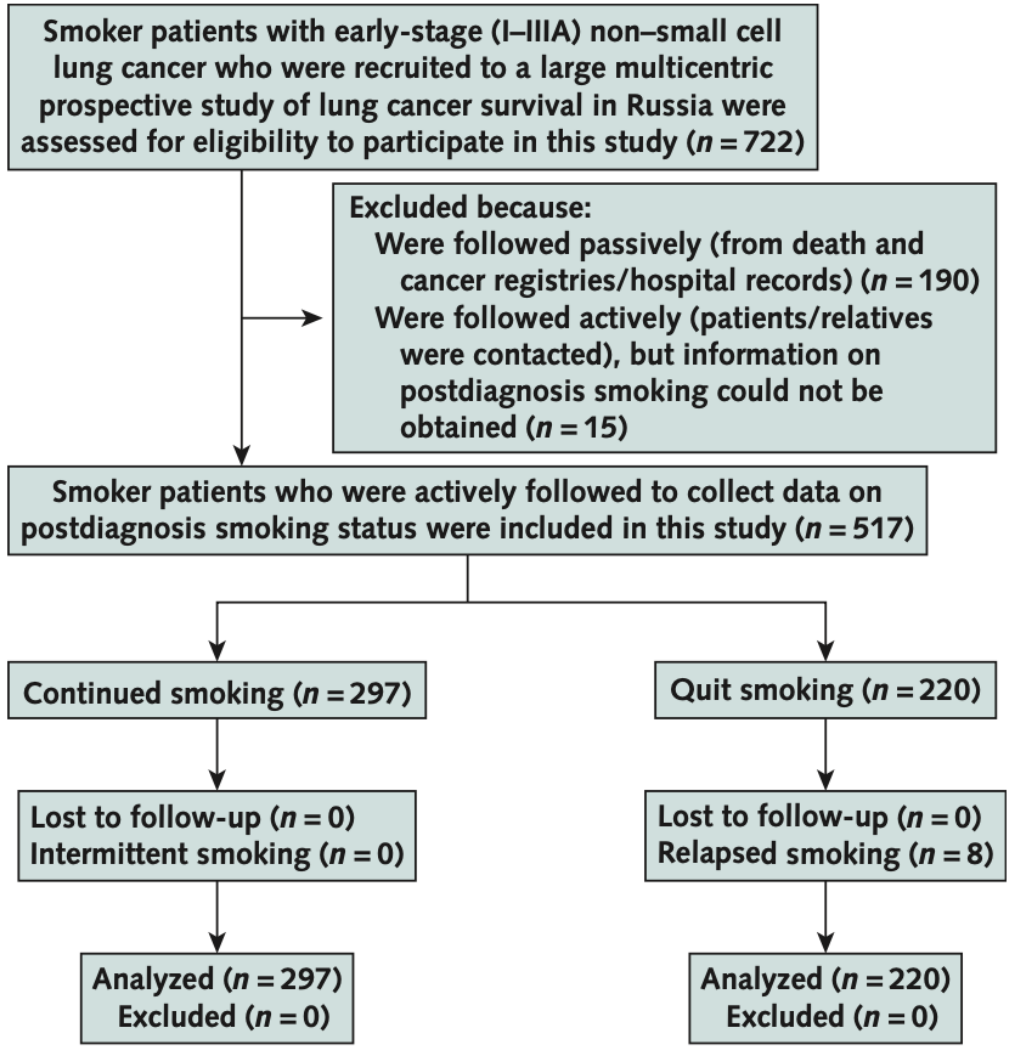


Eo Rin Cho et al. NEJM Evid 2024

Stopping Smoking After Lung Cancer Diagnosis Saves More Lives Than Chemotherapy

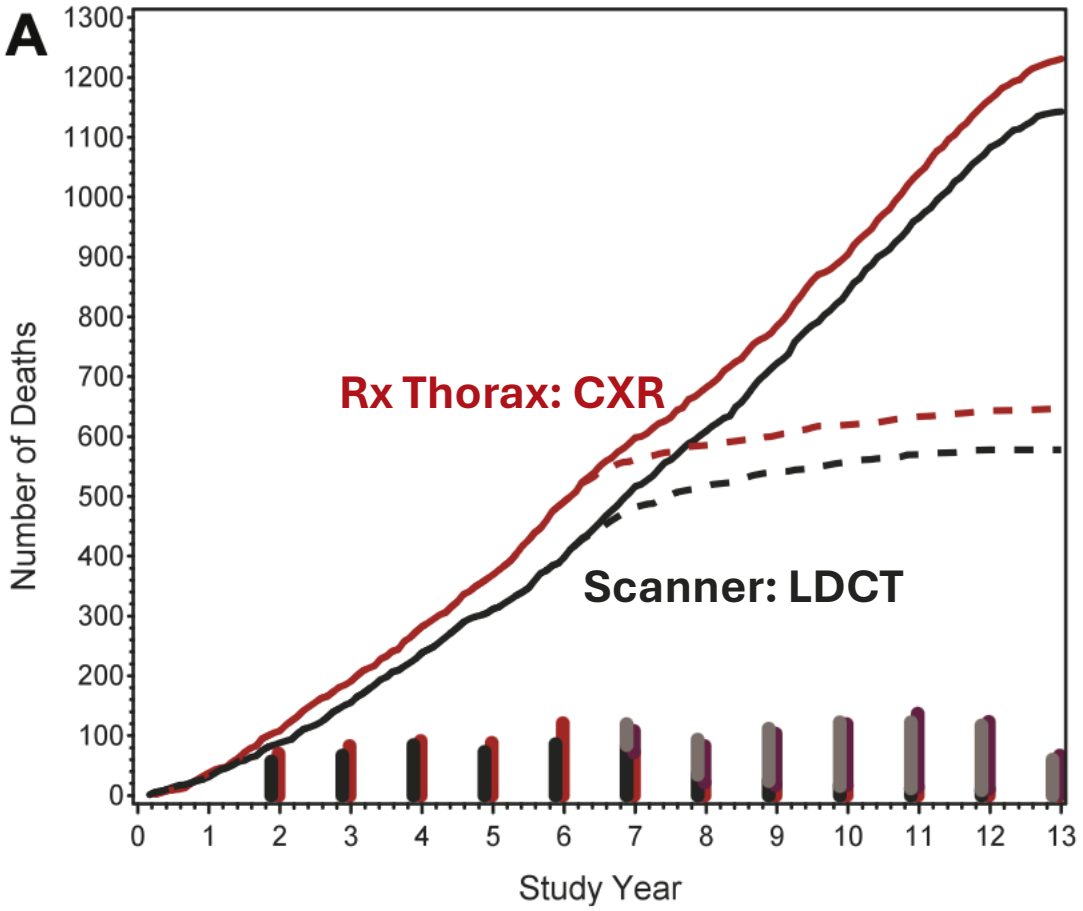






Mahdi Sheikh et al. Ann Intern Med. 2021

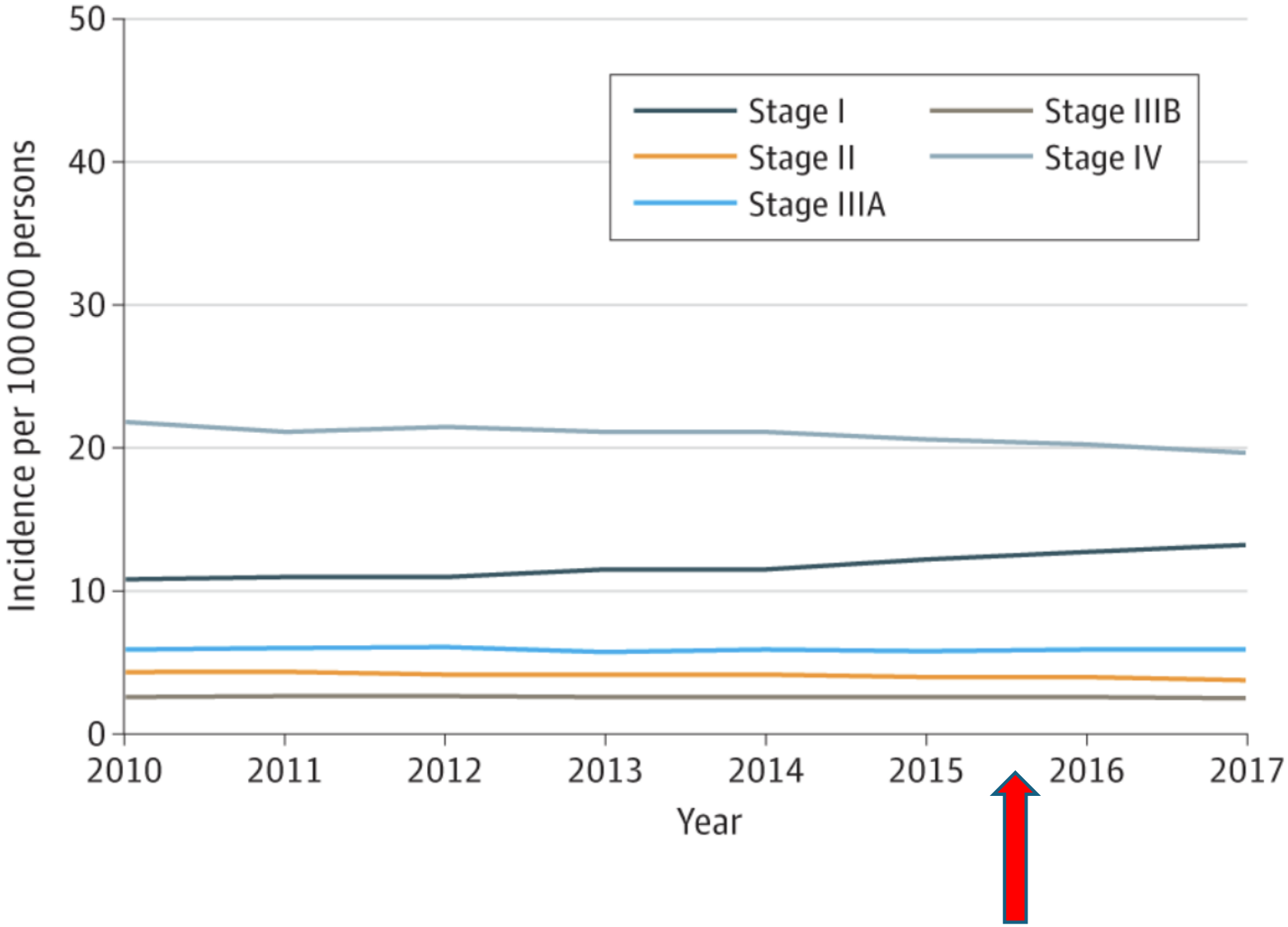
Is lung cancer screening the way forward?



Outcome	LDCT, n (per 1000 subjects)	CXR, n (per 1000 subjects)	Difference across Arms per 1000 Subjects (95% CI) (CXR Minus LDCT)	RR (95% CI)	*p* Value Interaction[a]
All lung cancer deaths					
All subjects	1147 (42.9)	1236 (46.2)	3.3 (-0.2 to 6.8)	0.92 (0.85-1.00)	
Men	733 (46.5)	755 (47.9)	1.4 (-3.3 to 6.1)	0.97 (0.87-1.07)	0.17
Women	414 (37.8)	481 (43.9)	6.1 (0.8-11.3)	0.86 (0.75-0.98)	
Current smoker	724 (56.3)	818 (63.4)	7.1 (1.3-12.9)	0.88 (0.80-0.97)	0.12
Former smoker	423 (30.5)	418 (30.2)	-0.3 (-4.3 to 3.8)	1.01 (0.88-1.15)	
Age 55-64 y at randomization	641 (32.7)	739 (37.7)	5.0 (1.3-8.6)	0.86 (0.78-0.96)	0.051
Age 65-74 y at randomization	506 (71.2)	497 (69.9)	-1.3 (-9.7 to 7.2)	1.01 (0.90-1.15)	
Overall mortality (all subjects)	5253 (196.6)	5366 (200.7)	4.2 (-2.6 to 10.9)	0.97 (0.94-1.01)	
Overall mortality excluding lung cancer deaths (all subjects)	4106 (153.7)	4130 (154.5)	0.9 (-5.3 to 7.0)	0.99 (0.95-1.03)	

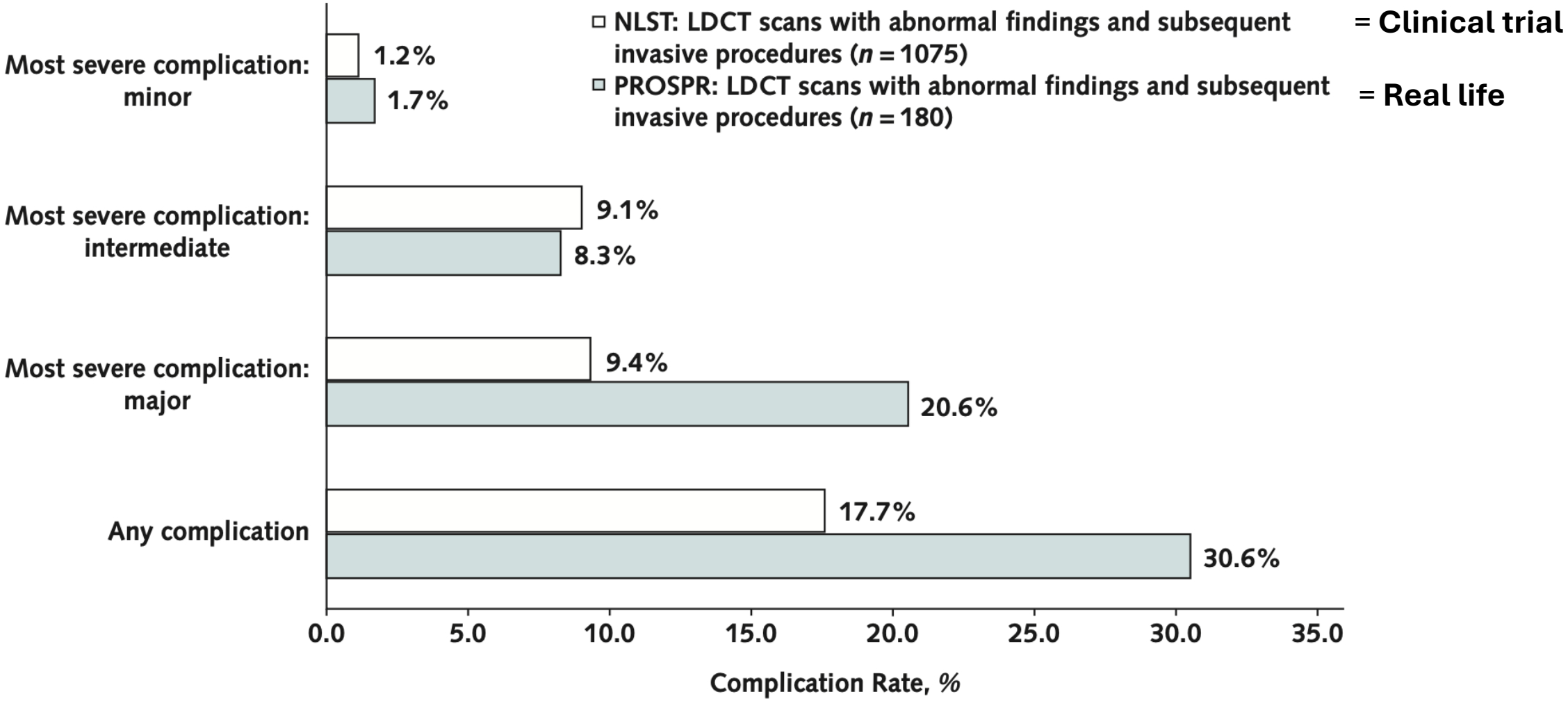
NLST research team. J thorac Oncol 2019

Is lung cancer screening the way forward?



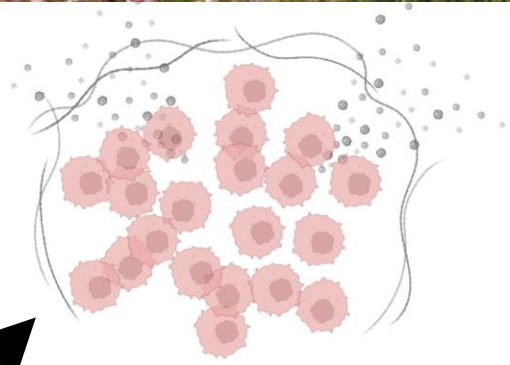
Ganti AK et al. *JAMA Oncol.* 2021

Rates of complications after subsequent invasive procedures in PROSPR (real life) vs. NLST (clinical trial) patients

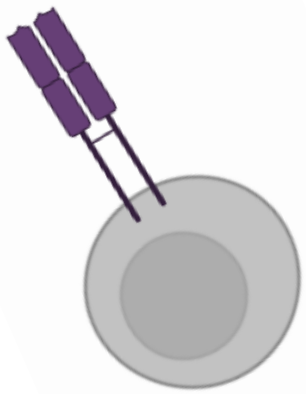


K.A. Rendle et al. Ann Intern Med. 2024

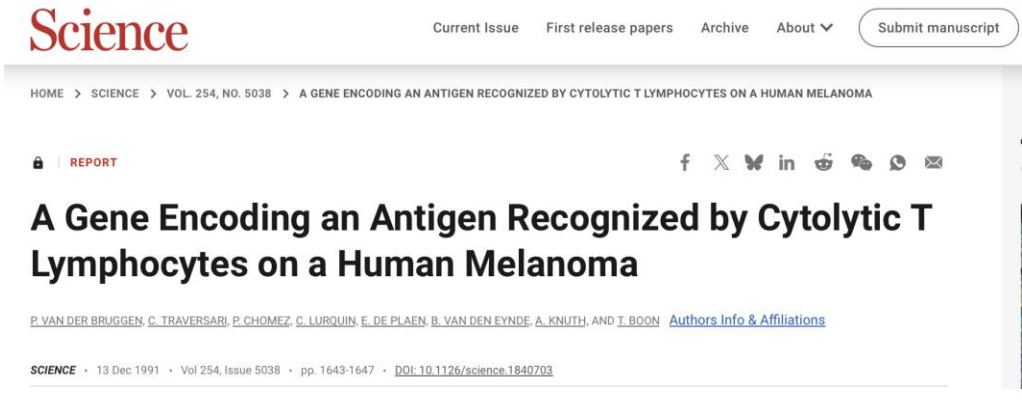
1988



Human tumor cells
melanoma

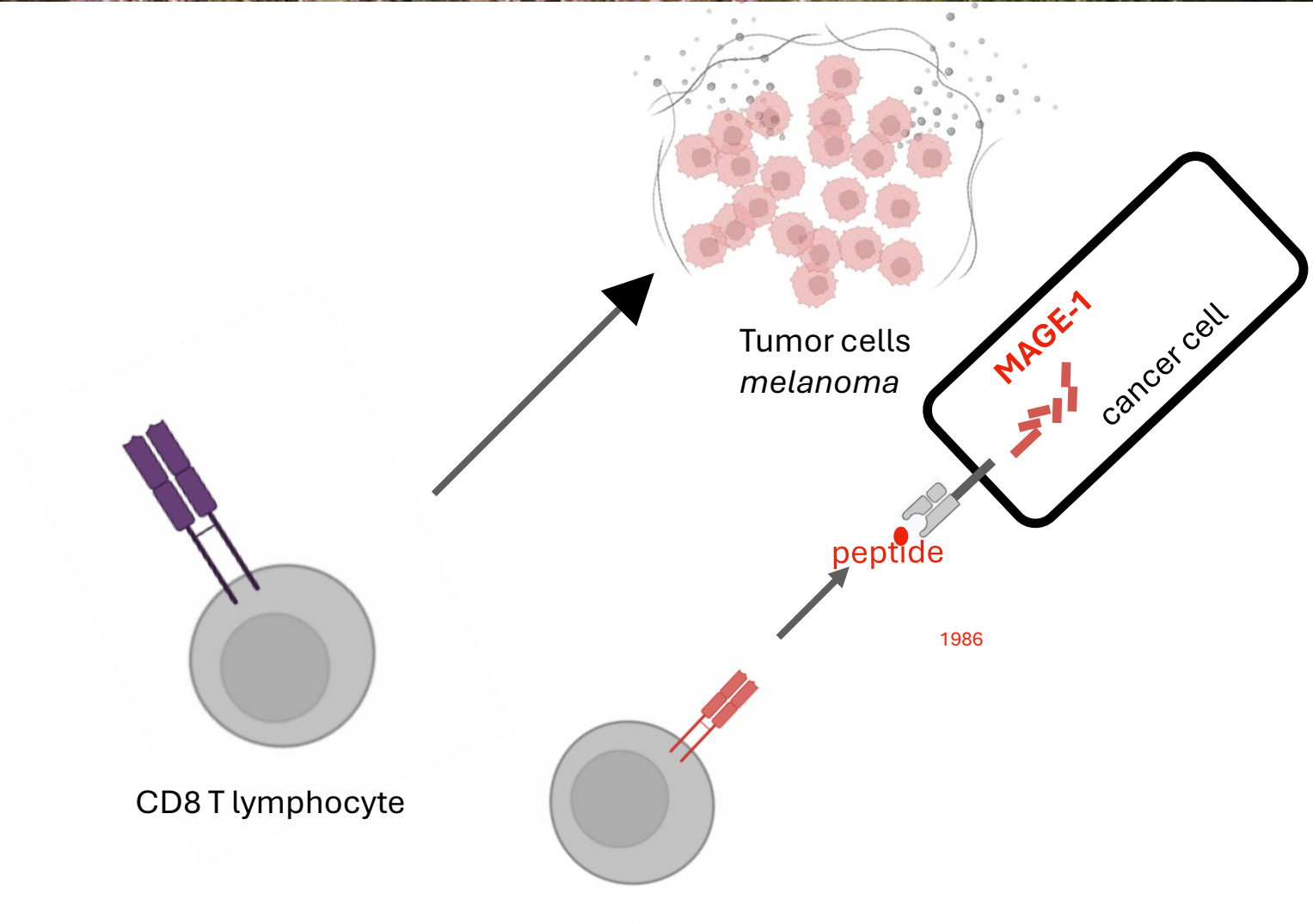


CD8 T lymphocyte

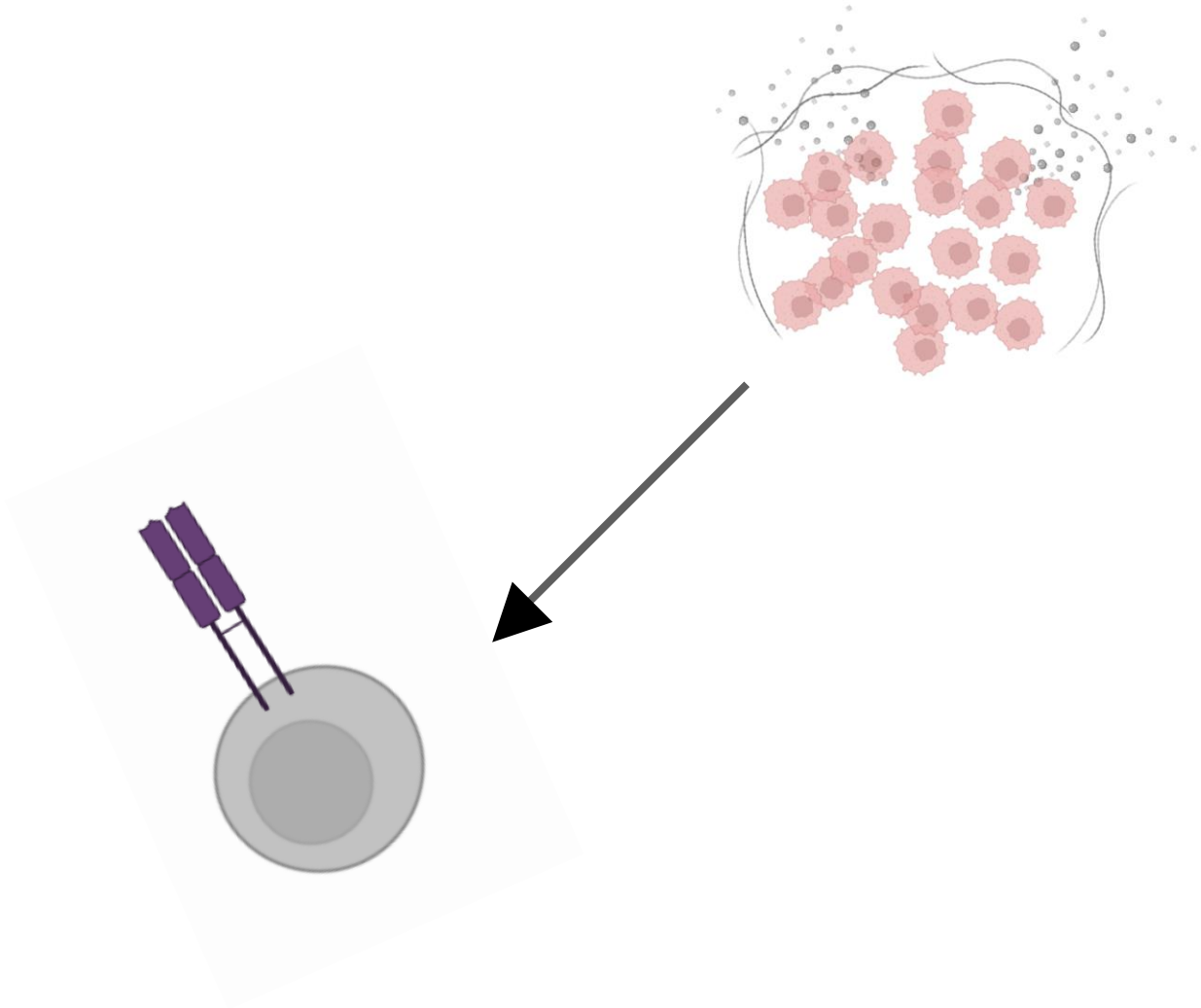



WELCOME TO THE
de DUVE INSTITUTE

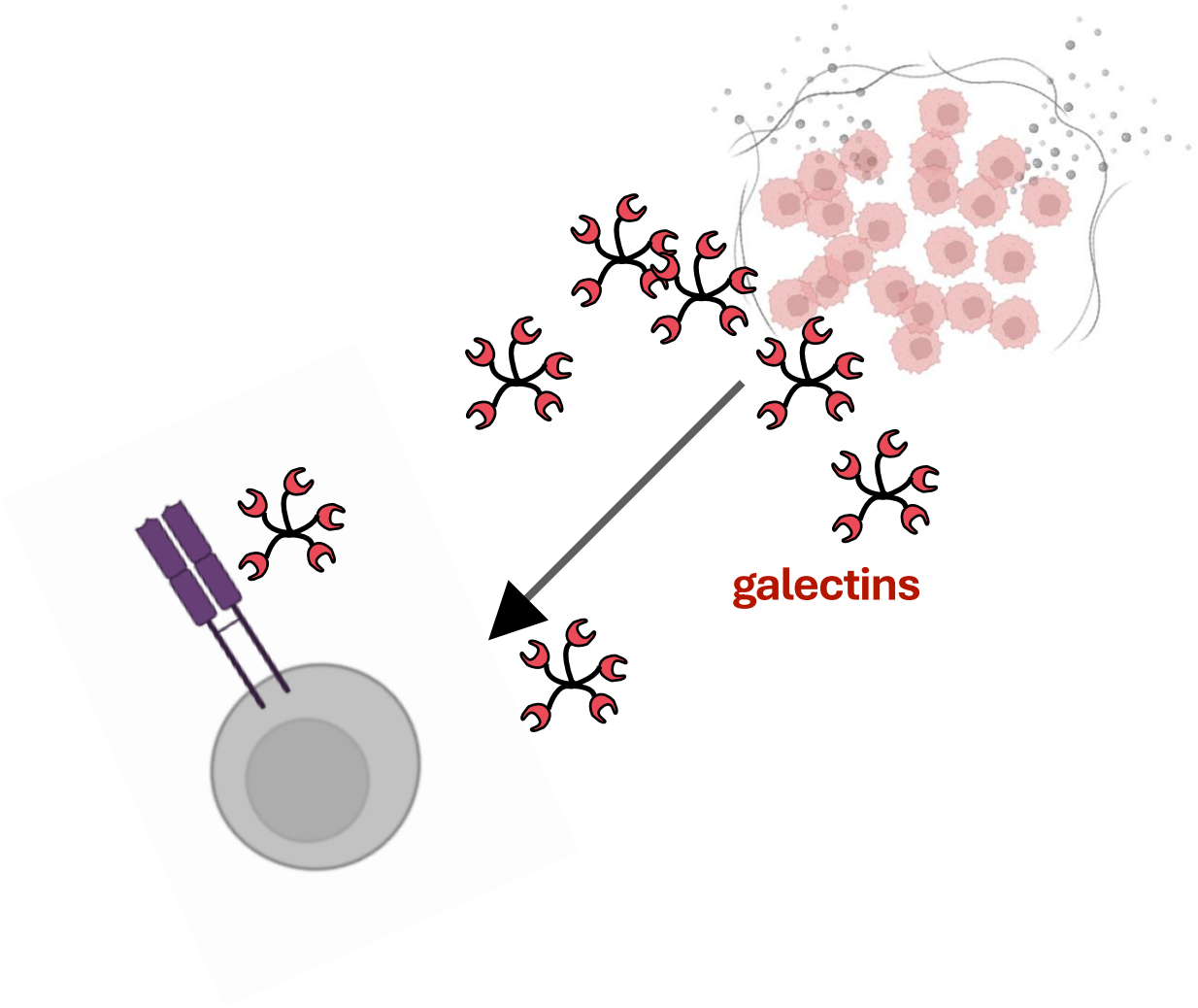
1988


Tumor cells
melanoma
MAGE-1
cancer cell
peptide
1986
CD8 T lymphocyte

How do tumor cells resist T-cells?



How do tumor cells resist T-cells?
.....possibly by secreting galectins



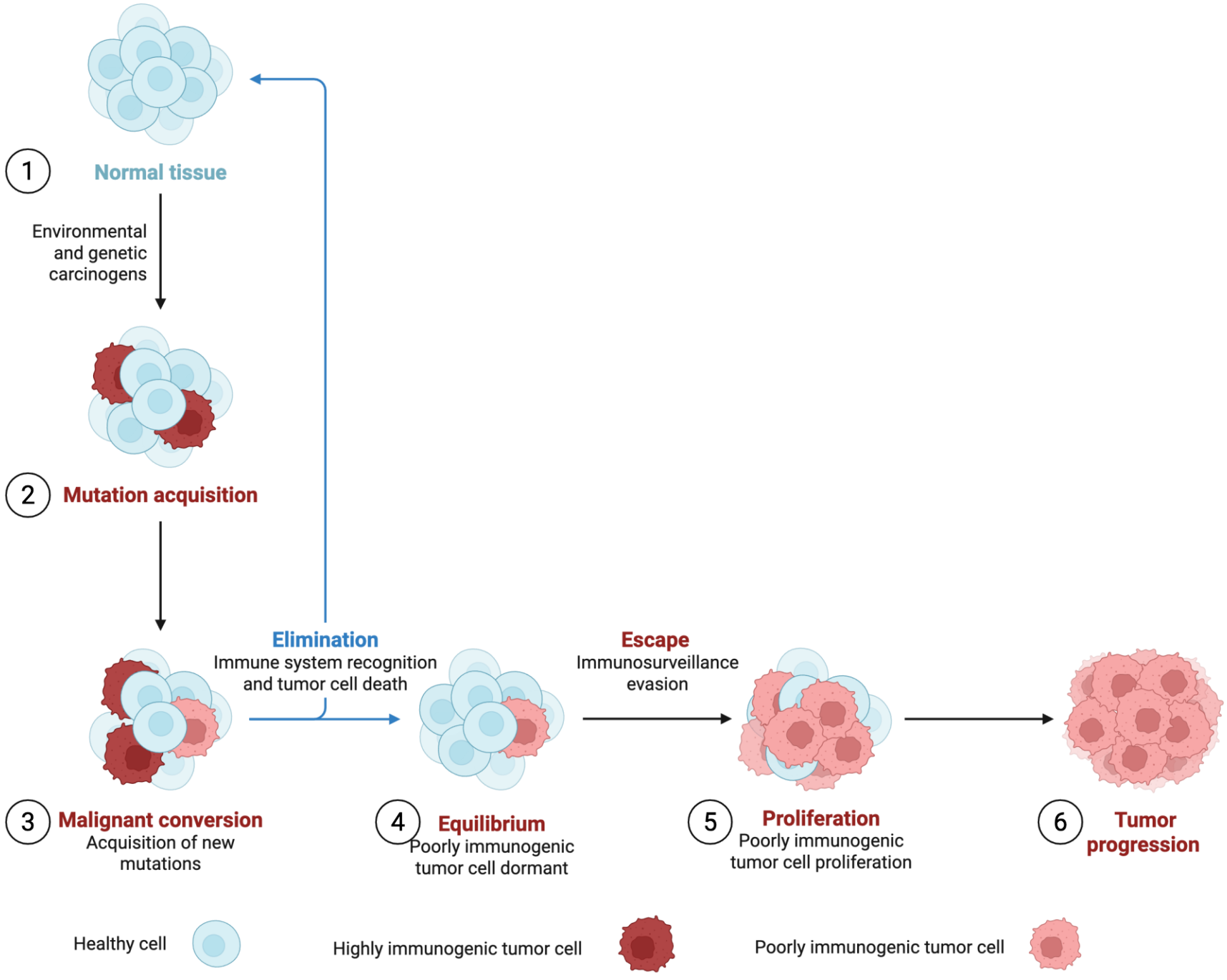
nature COMMUNICATIONS

ARTICLE

DOI: 10.1038/s41467-017-00925-6 OPEN

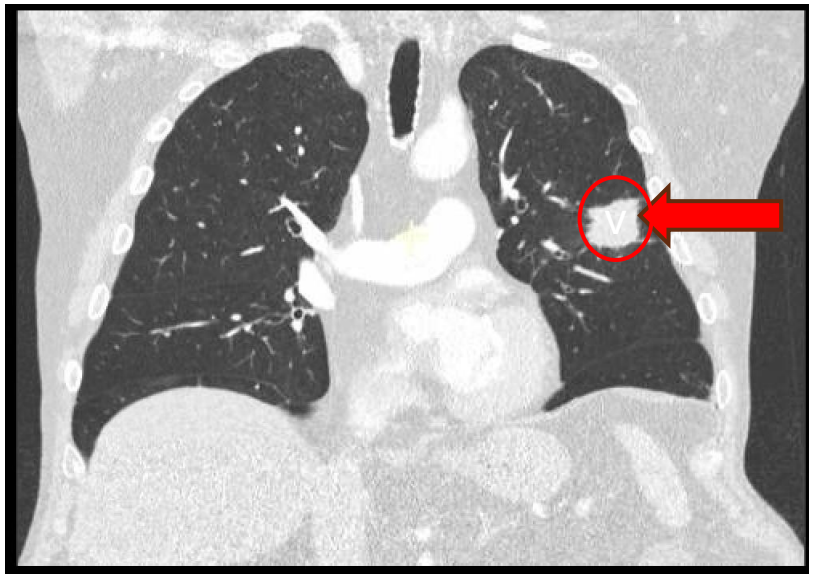
Galectin-3 captures interferon-gamma in the tumor matrix reducing chemokine gradient production and T-cell tumor infiltration

Monica Gordon-Alonso[1,2], Thibault Hirsch[1], Claude Wildmann[1,2] & Pierre van der Bruggen[1,2]

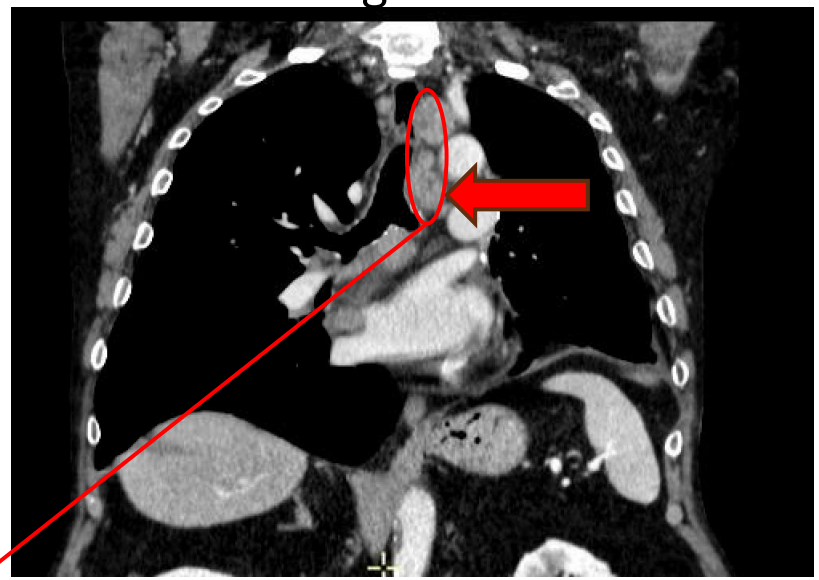

1
Normal tissue
Environmental and genetic carcinogens
2
Mutation acquisition
3
Malignant conversion
Acquisition of new mutations
Elimination
Immune system recognition and tumor cell death
4
Equilibrium
Poorly immunogenic tumor cell dormant
Escape
Immunosurveillance evasion
5
Proliferation
Poorly immunogenic tumor cell proliferation
6
Tumor progression
Healthy cell
Highly immunogenic tumor cell
Poorly immunogenic tumor cell

Unusual clinical history

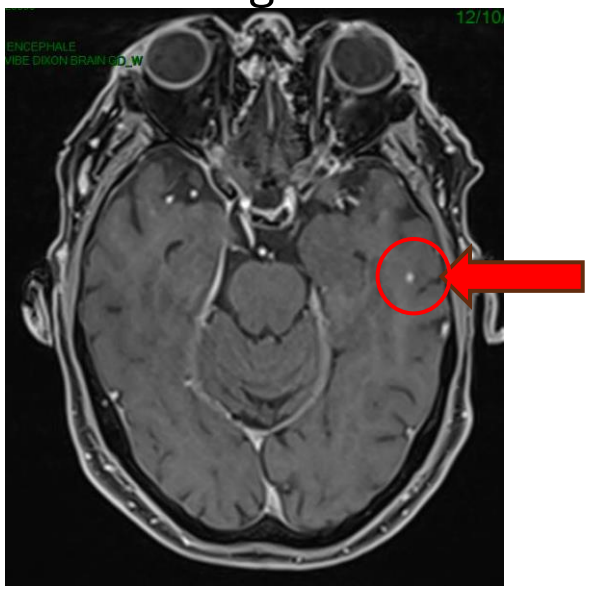
Oct 2022

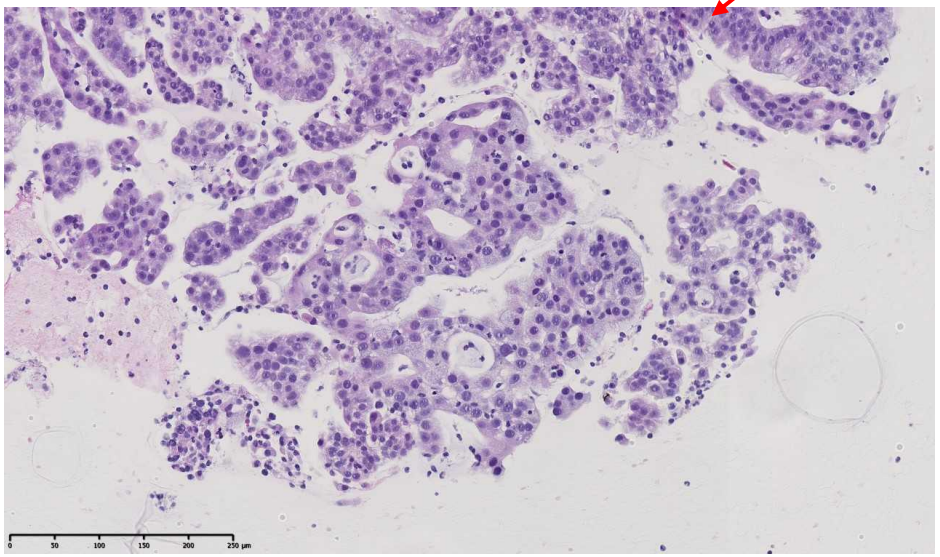


Aug 2024

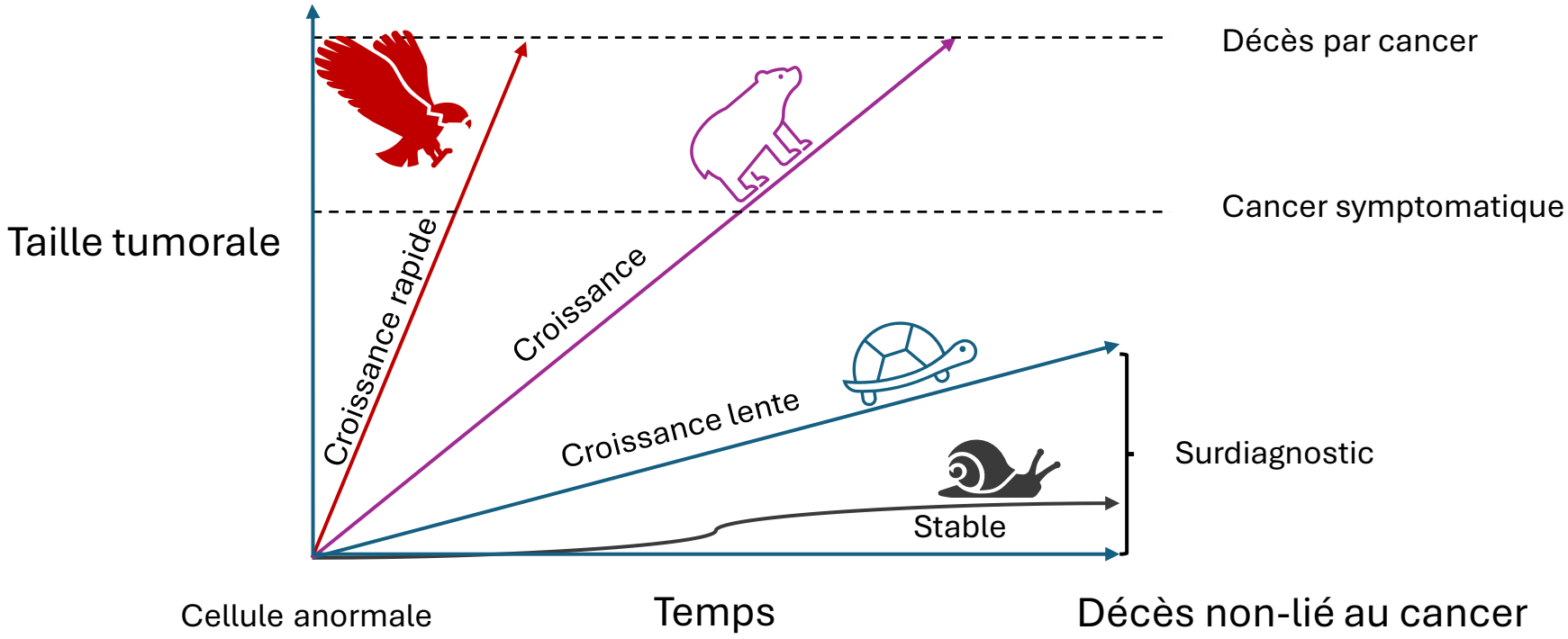


Aug 2024





Techniques de Détection et de Diagnostic: Le surdiagnostic



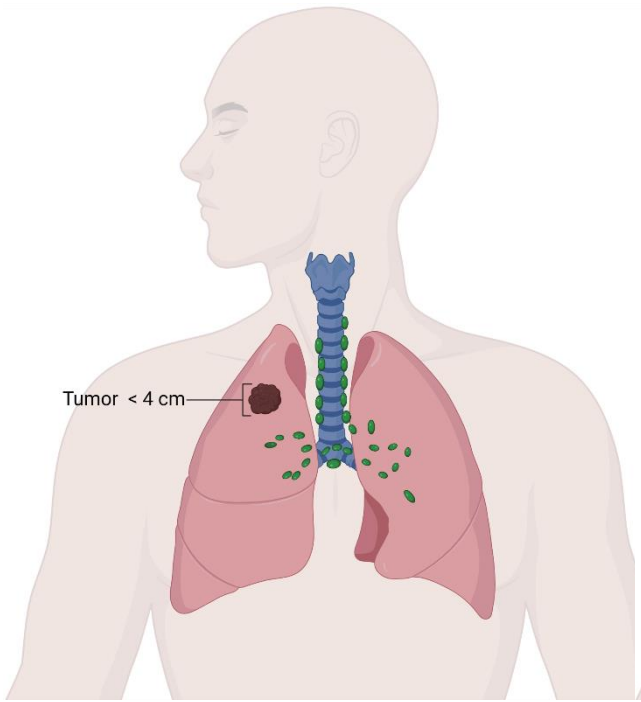
Adaptée de la presentation de Prasad Vinay K 11 Mai 2023

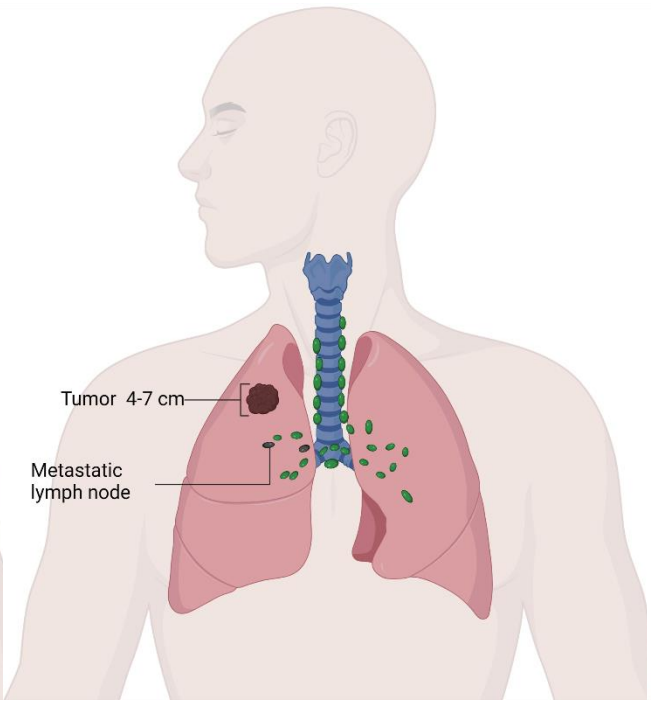
Patient de 55 ans , fumeur actif, depuis l'âge de 20 ans , 35 AUP

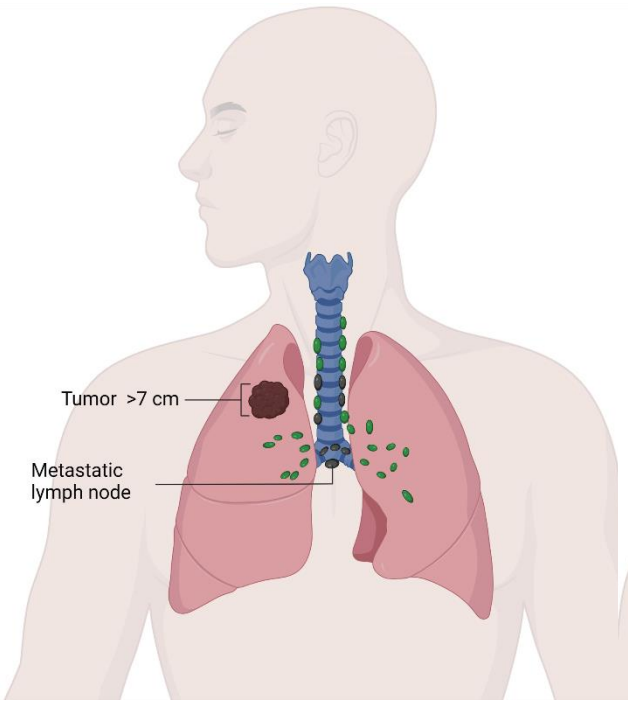
Docteur est ce que vous pouvez me réaliser des examens de dépistage du cancer cancer poumon ?

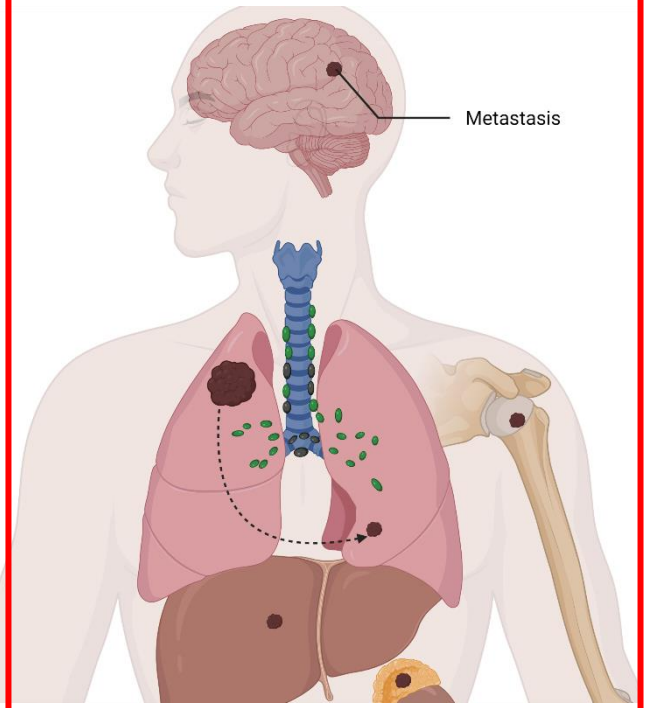
1- OUI
2-NON
3-Eventuellement

Treatment of lung cancer depends on the disease stage at diagnosis









Stage 1
26%

Stage 2
8%

Stage 3
27%

Stage 4
39%

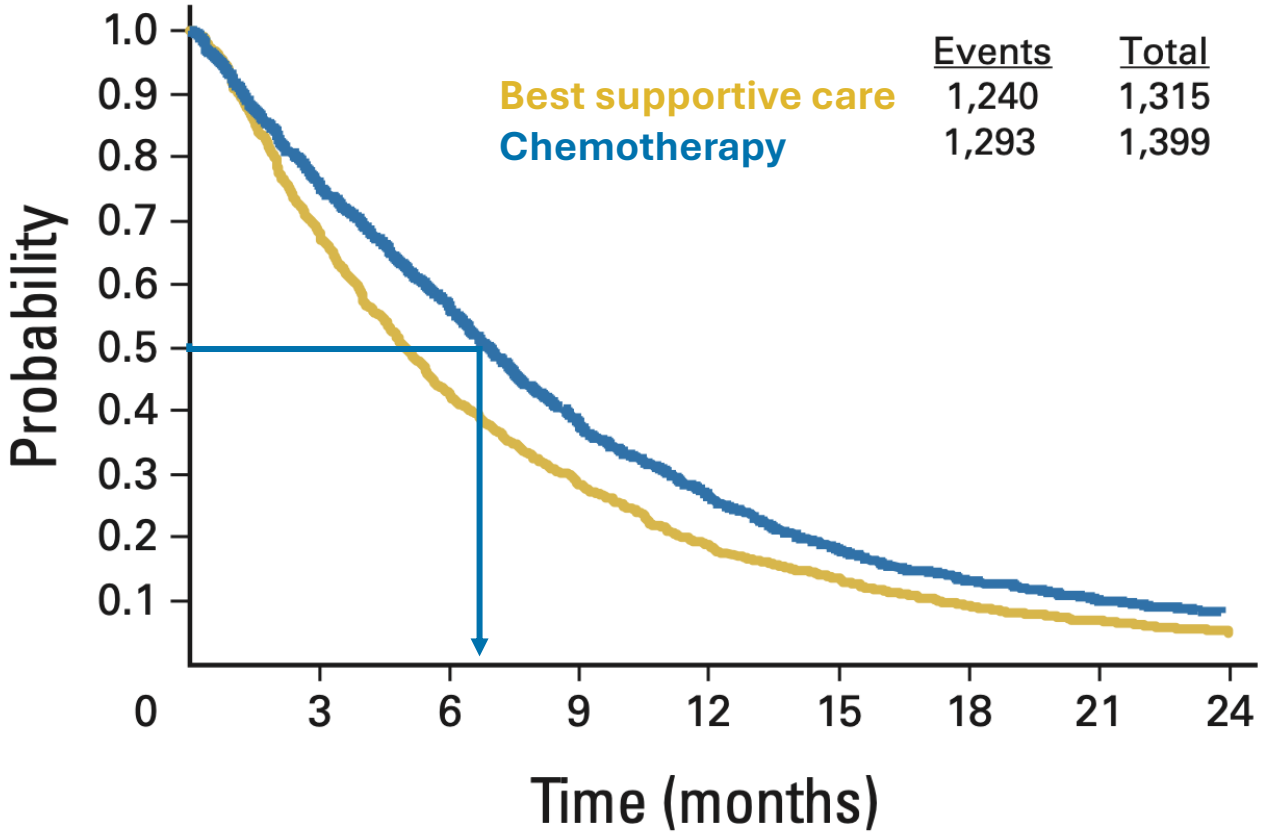
Metastatic

Surgery (or radiation)

Systemic treatment(chemo, immuno or targeted therapy)

Chemotherapy improves survival in metastatic NSCLC — But does not offer a cure

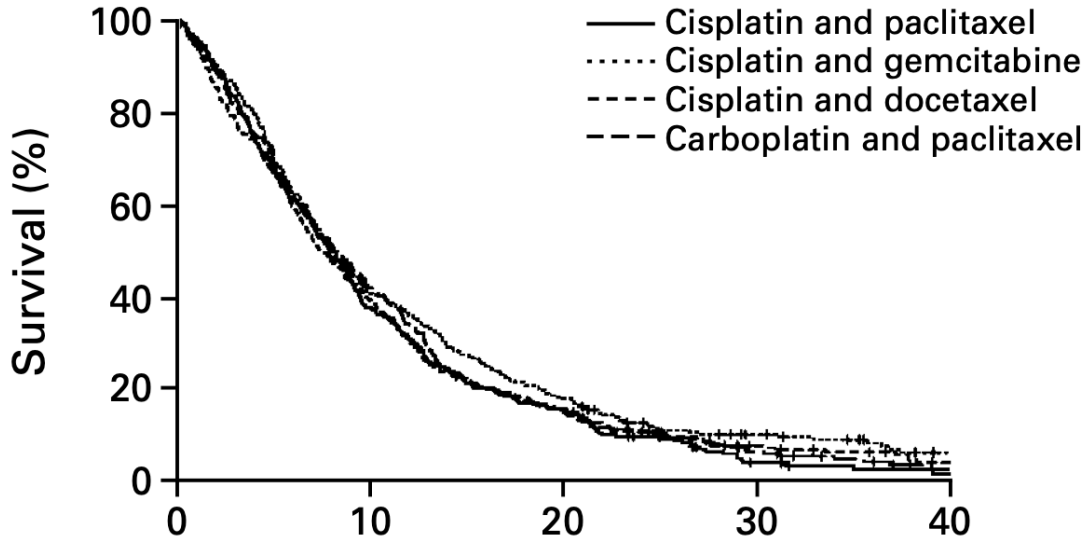
Median overall survival of 6 months (+ 1,5 months)

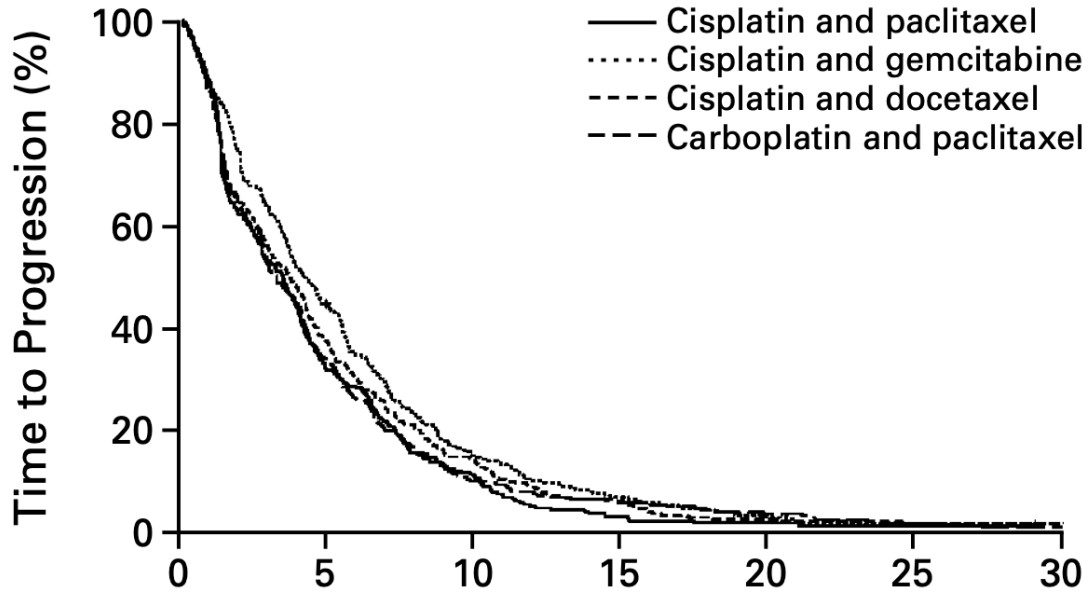


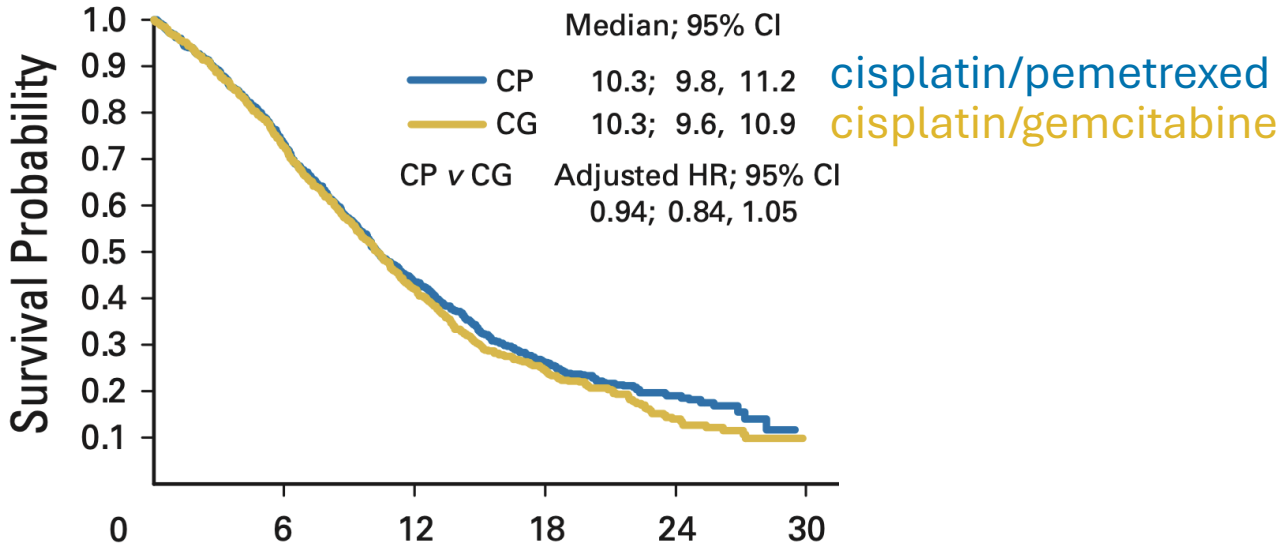
Patients at risk									
Best supportive care	1,315	884	552	363	231	161	107	77	55
Chemotherapy	1,399	1,052	779	519	349	233	165	115	91

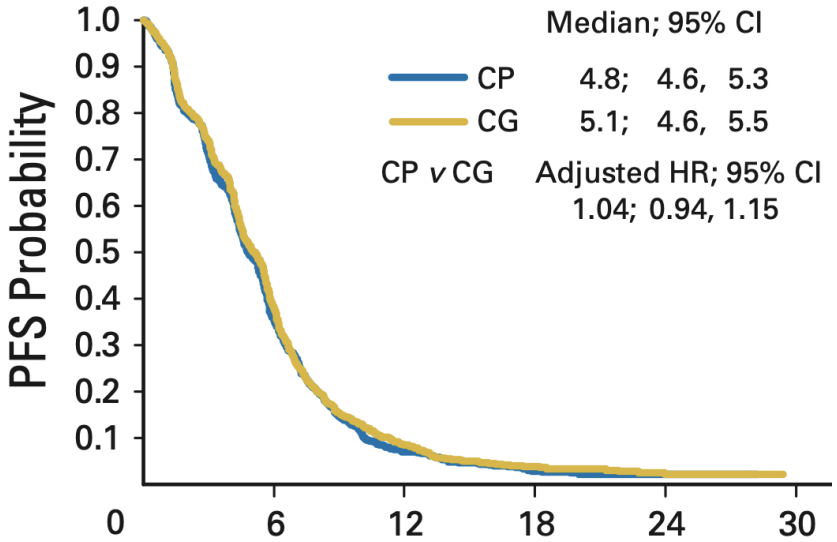
Burdett et al et al. JCO 2008

All roads lead to Platinum doublets in NSCLC : similar survival, choice driven by tolerance







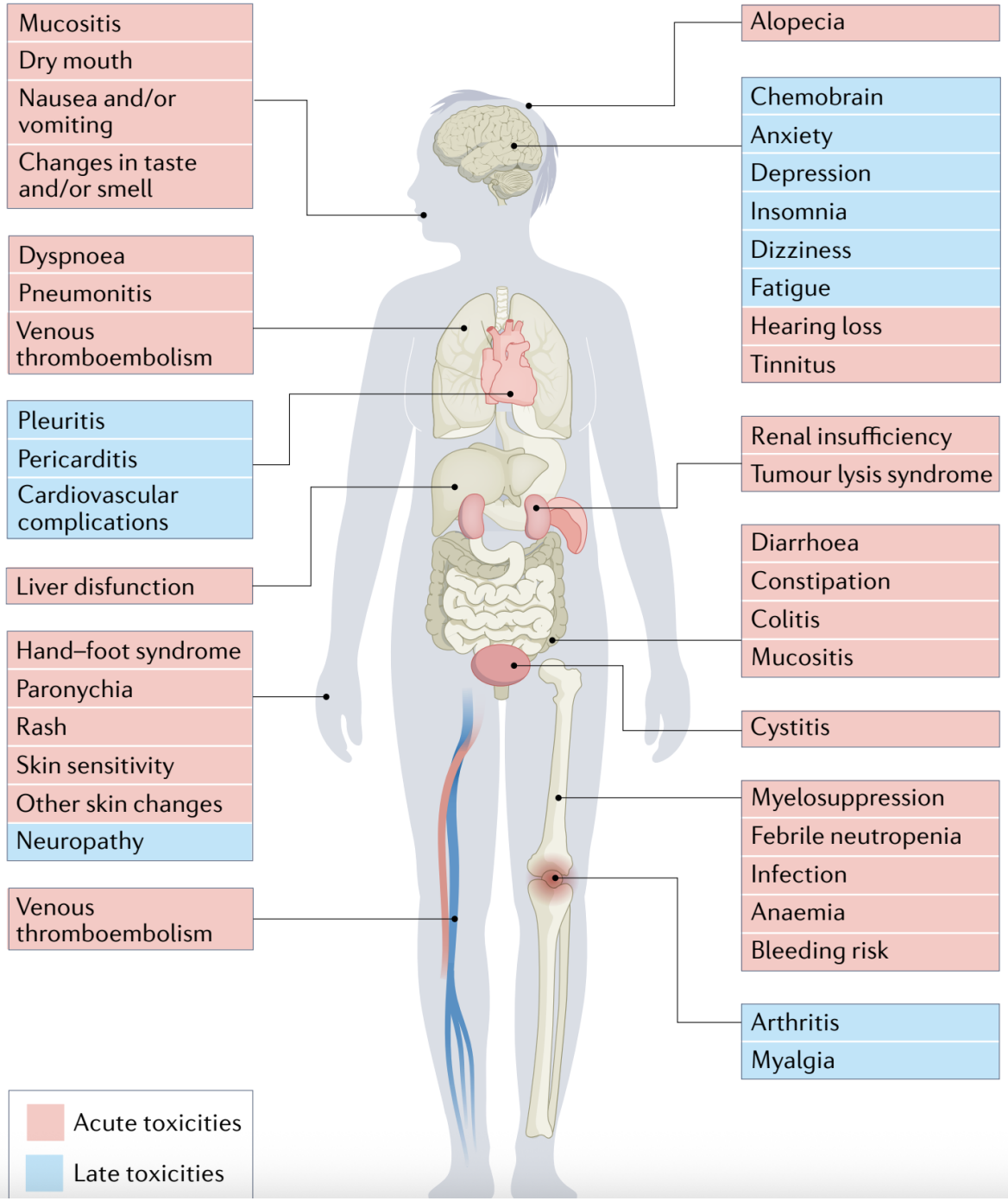


Schiller et al. – NEJM 2002
Scagliotti et al. – JCO 2008

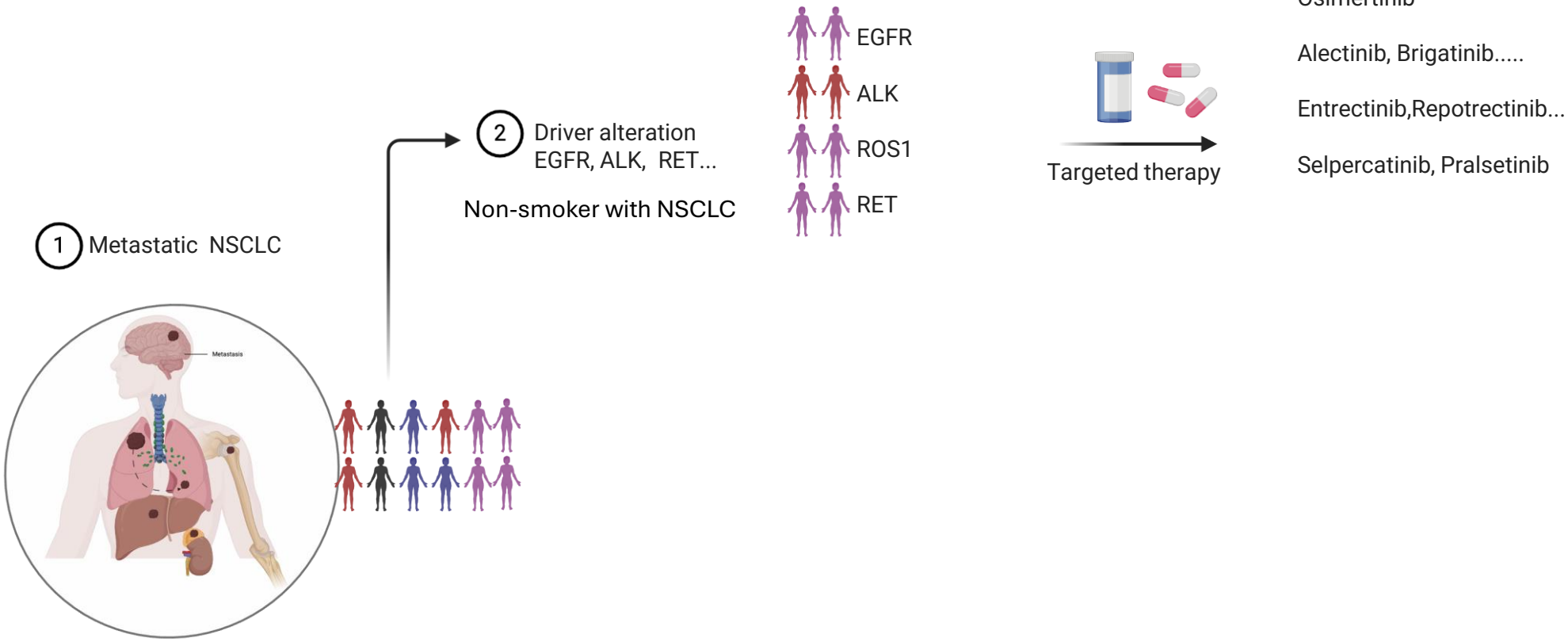
Acute and long-term chemotherapy associated adverse events in patients with cancer

M.B. Lustberg et al. nature reviews clinical oncology 2023

M. Kuderer et al. nature reviews clinical oncology 2023



Immunotherapy is not effective in NSCLC with actionable driver alterations

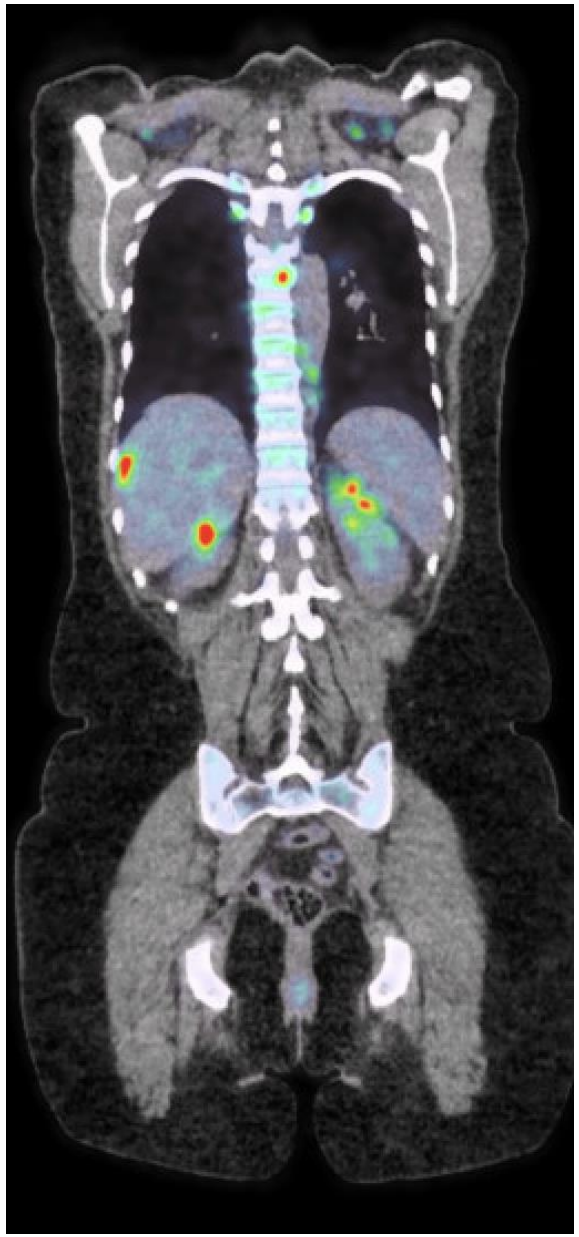


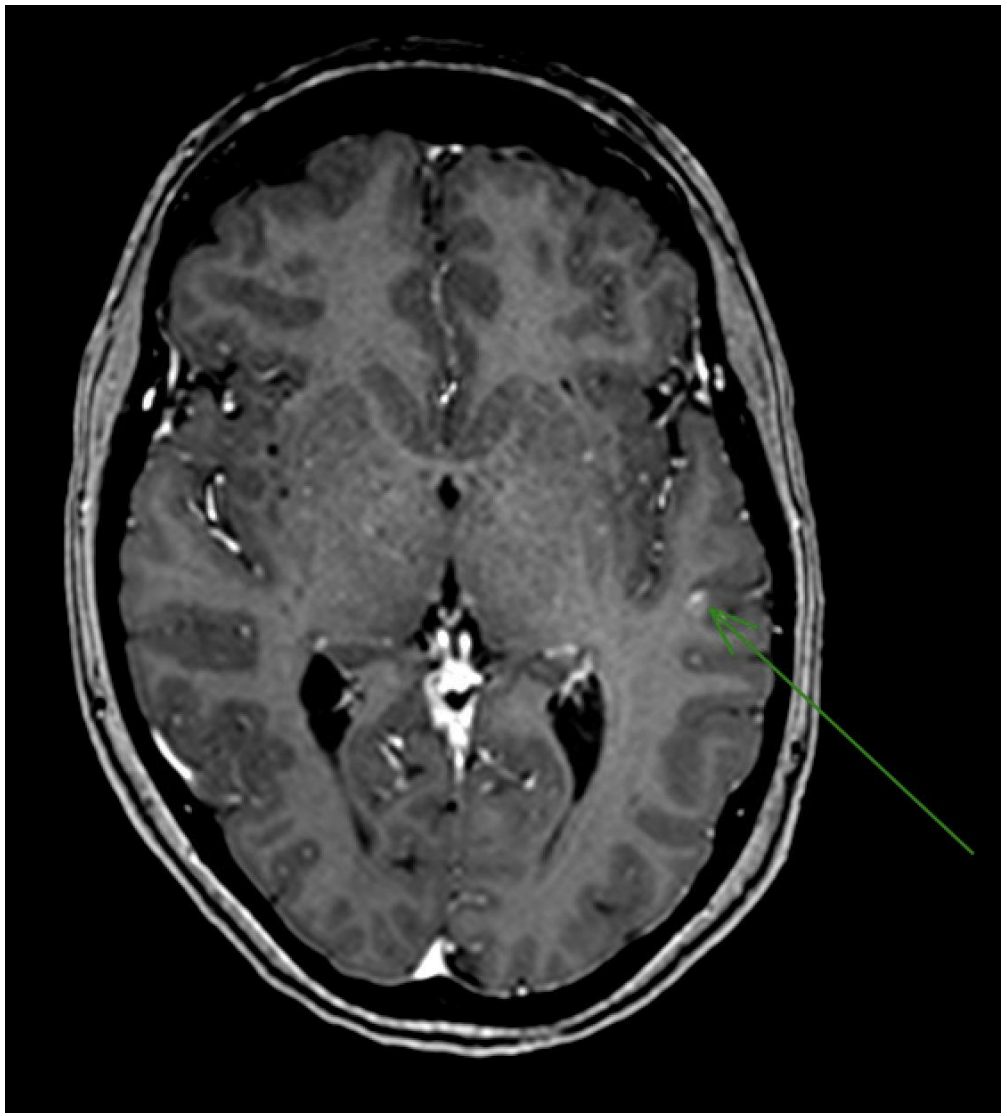
Mazieres, J. et al. Annals of Oncology 2019
Hendriks, L.E. et al. Annals of Oncology 2023

7/2/2019: Patiente 49 ans, institutrice, 1 fille de 6,5 ans

Dyspnée présente depuis 3 semaines, d'apparition brutale. Dyspnée d'effort ainsi que d'une fatigue. Pas de douleur thoracique.
Oedème du visage apparaissant le matin depuis 3 semaines ayant débuté avec les paupières et s'étendant par la suite à l'ensemble du visage.
Présence d'une toux sèche, sans expectorations pouvant être associé à son RGO d'après la patiente
Perte de poids de 4 kg en 2-3 mois, dans le cadre d'un diagnostic d'ulcère gastrique.

7/2/2019: Patiente 49 ans, institutrice, 1 fille de 6,5 ans

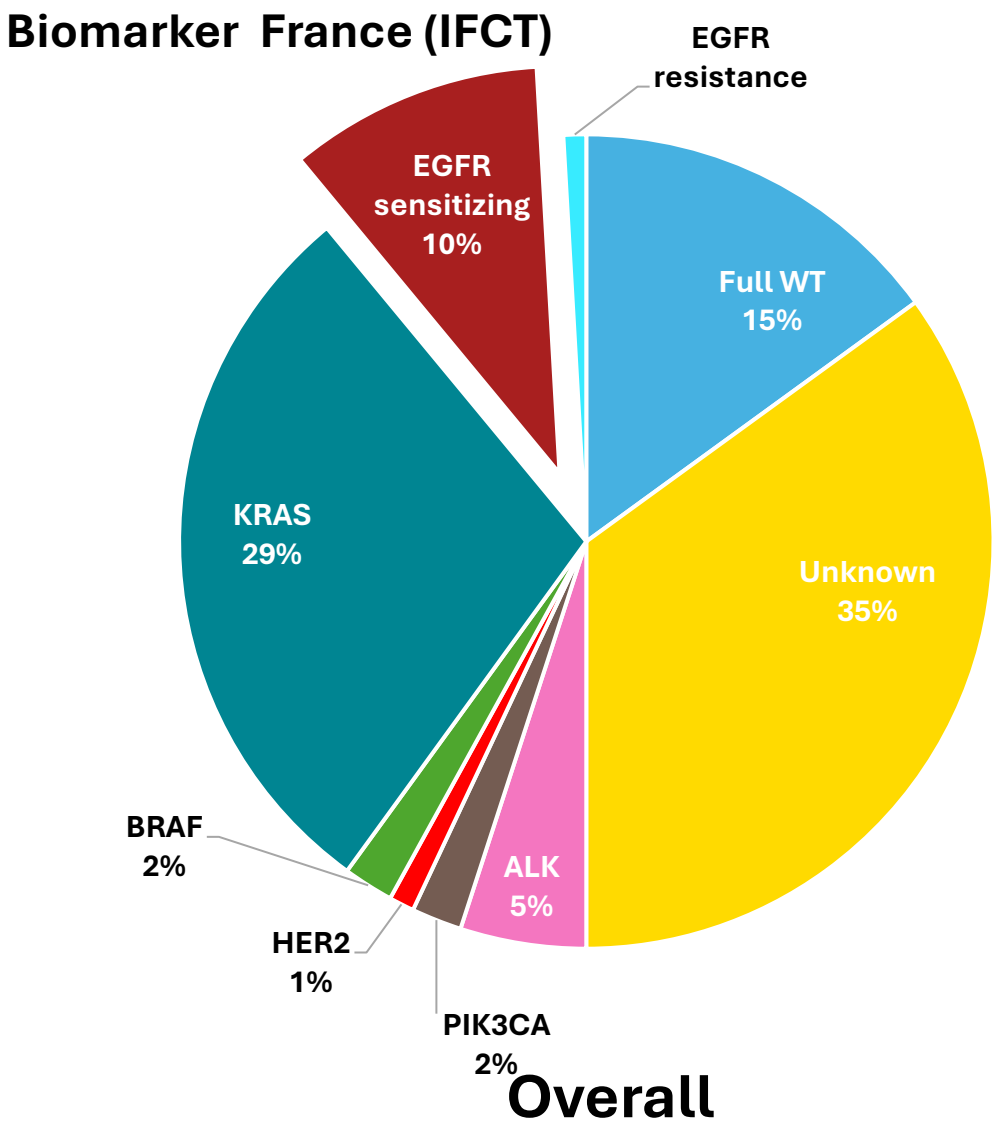




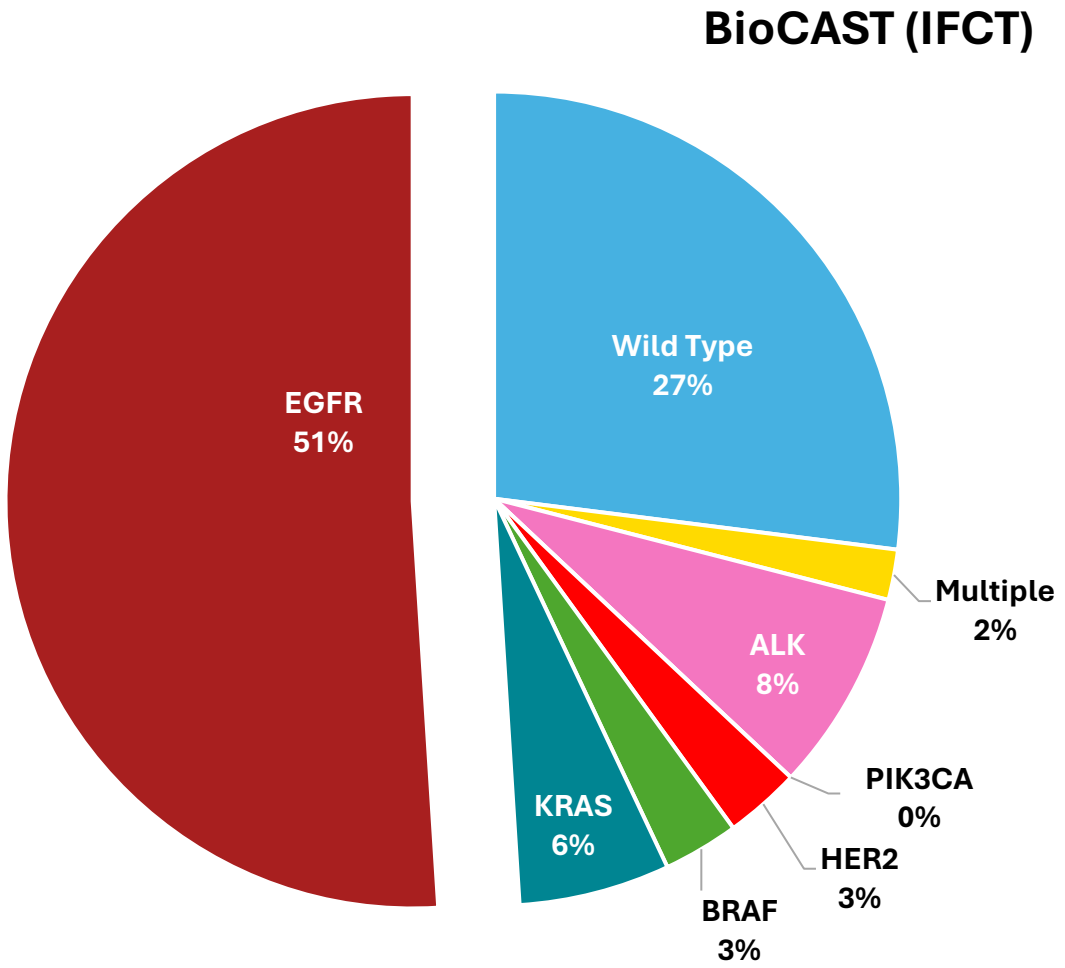
7/2/2019: Patiente 49 ans, institutrice, 1 fille de 6,5 ans

Quel élément simple dans l’anamnèse peut déjà orienter le type de cancer du poumon dont souffre le patient ?

Genetic alterations in NSCLC



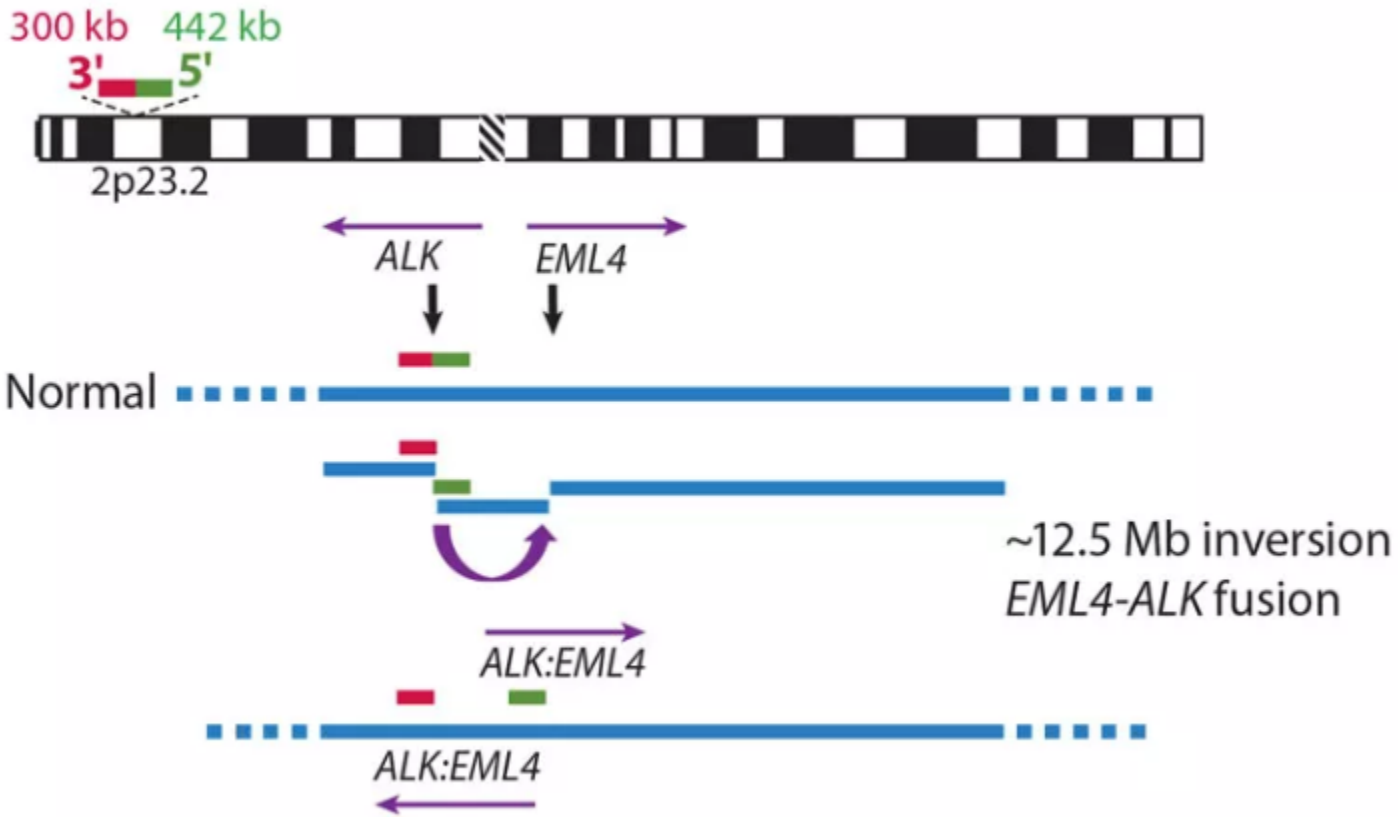
Overall



Never-smokers

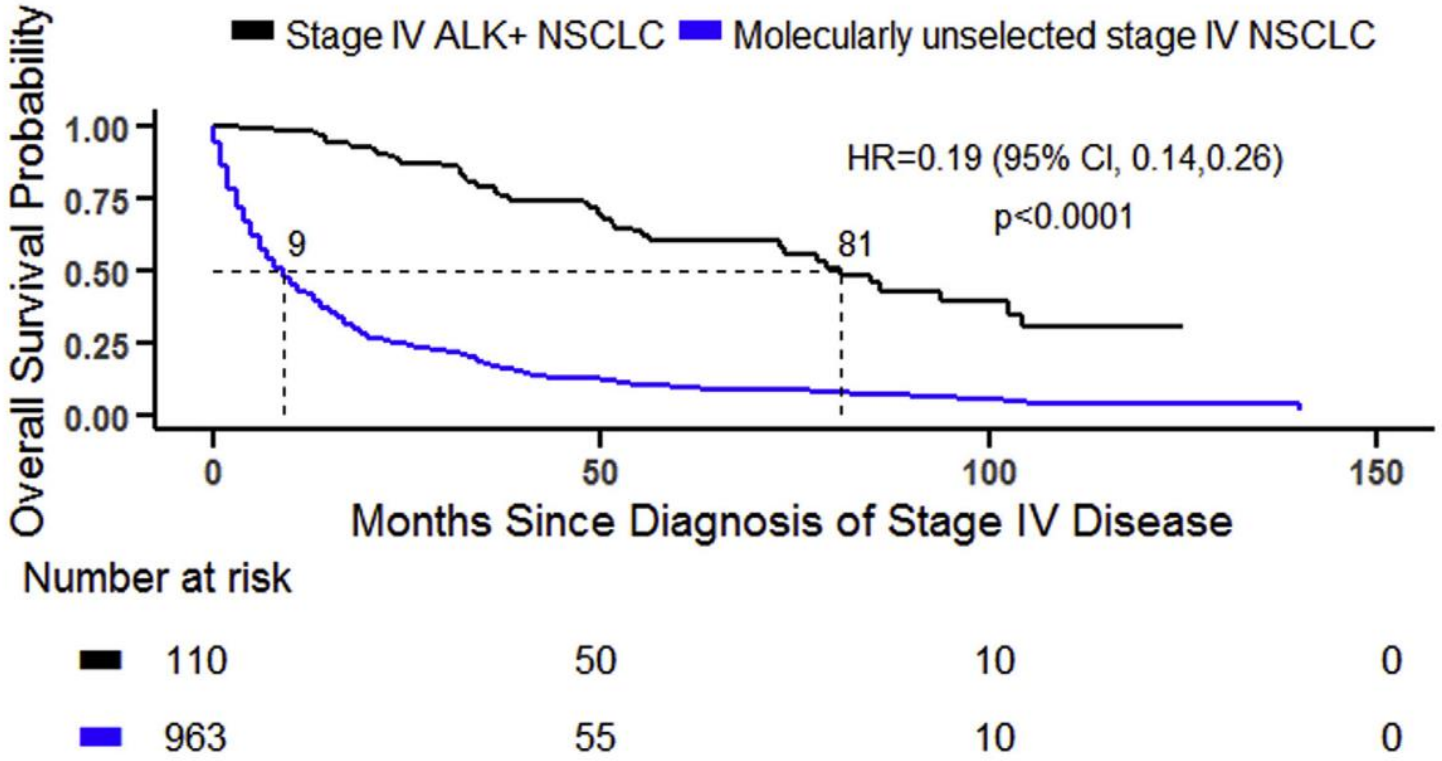
Sun S. Nature rev. Ca. 2007
Barlesi F, Lancet 2016
Couraud S, ERJ 2015

ALK Fusion


300 kb
442 kb
3'
5'
2p23.2
ALK
EML4
Normal
~12.5 Mb inversion
EML4-ALK fusion
ALK:EML4
ALK:EML4

Targeted therapy with ALK TKIs is improving outcomes of patients with ALK+ NSCLC

The historical 5 years OS rate for molecularly unselected stage IV NSCLC is 6%



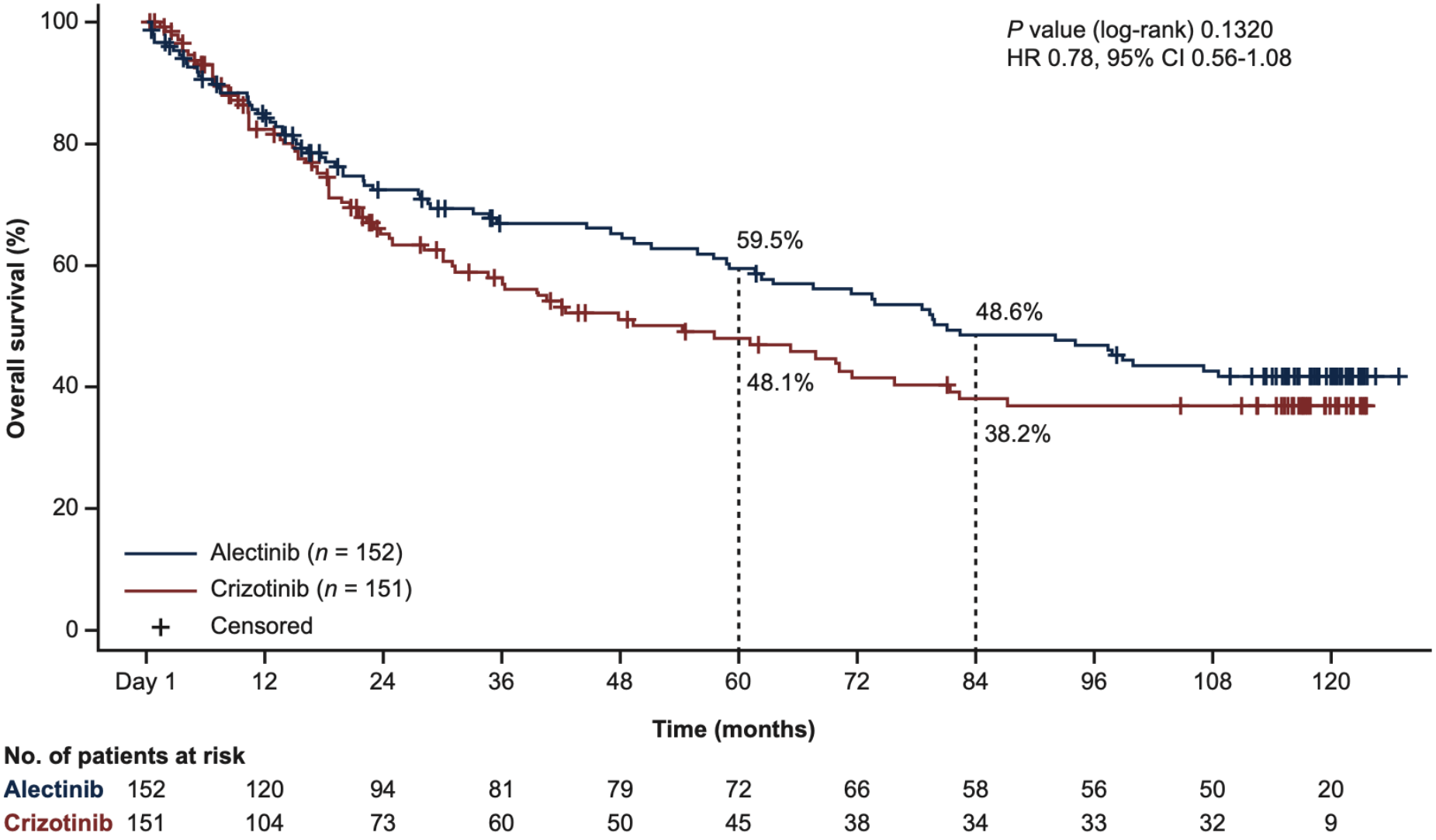
Patients treated with ALK TKIs:

- 5 years OS of 60%
- Median OS of 6,8 years (81 months) from diagnosis of stage IV disease

Goldstraw P. et al. JTO 2016
Pacheco JM *et al.* Journal of Thoracic Oncology **2019**

Targeted therapy with ALK TKIs is improving outcomes of patients with ALK+ NSCLC

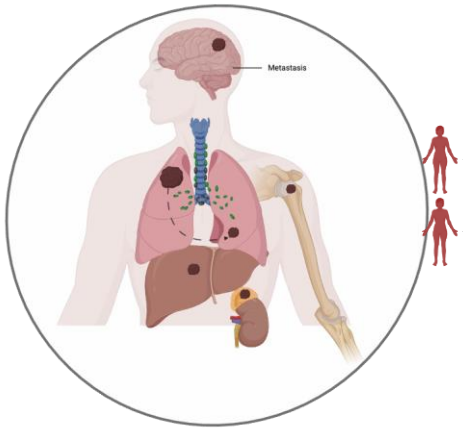
7-years OS rate : 48,6% with alectinib



S. Peters et al. Annals of Oncology 2025

Complications following novel therapies for non-small cell lung cancer

1 Metastatic NSCLC



2 Driver alteration
EGFR, ALK, RET...

Non-smoker with NSCLC

EGFR
ALK
ROS1
RET

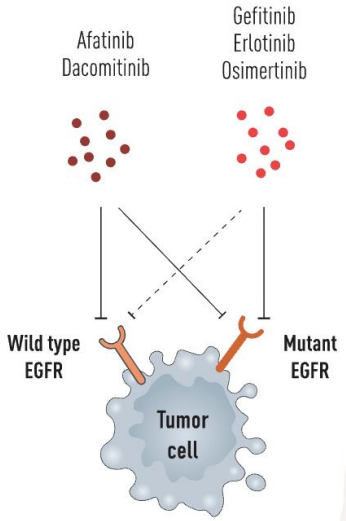
Targeted therapy

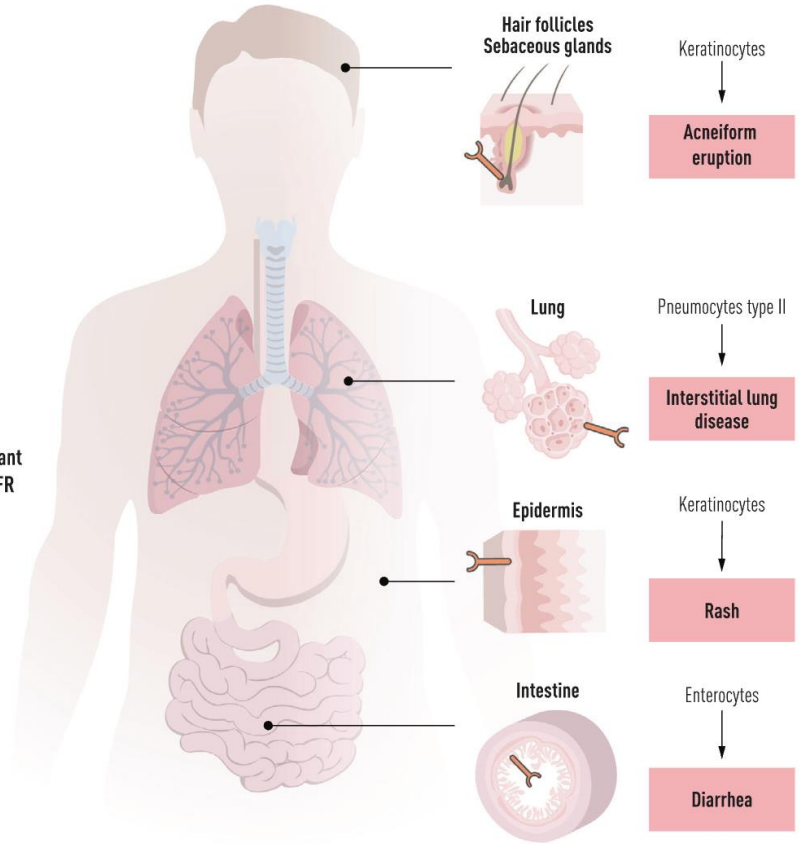
Osimertinib

Alectinib, Brigatinib.....

Entrectinib,Repotrectinib...

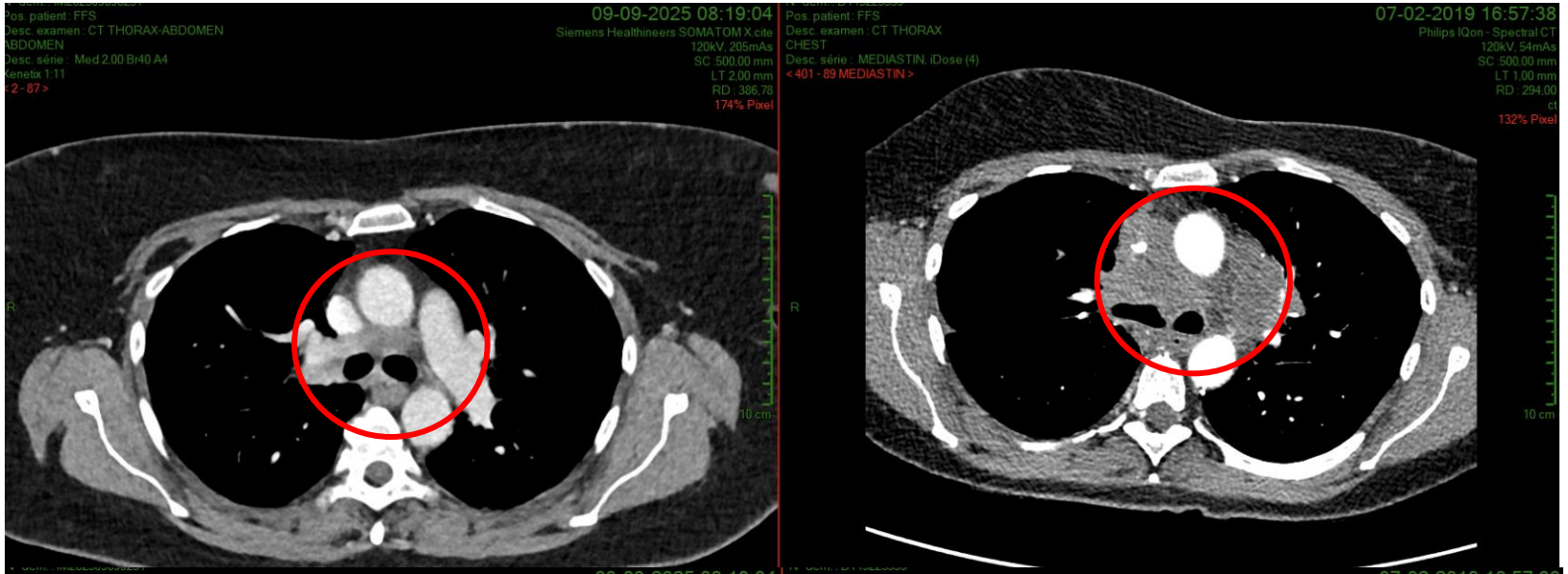
Selpercatinib, Pralsetinib



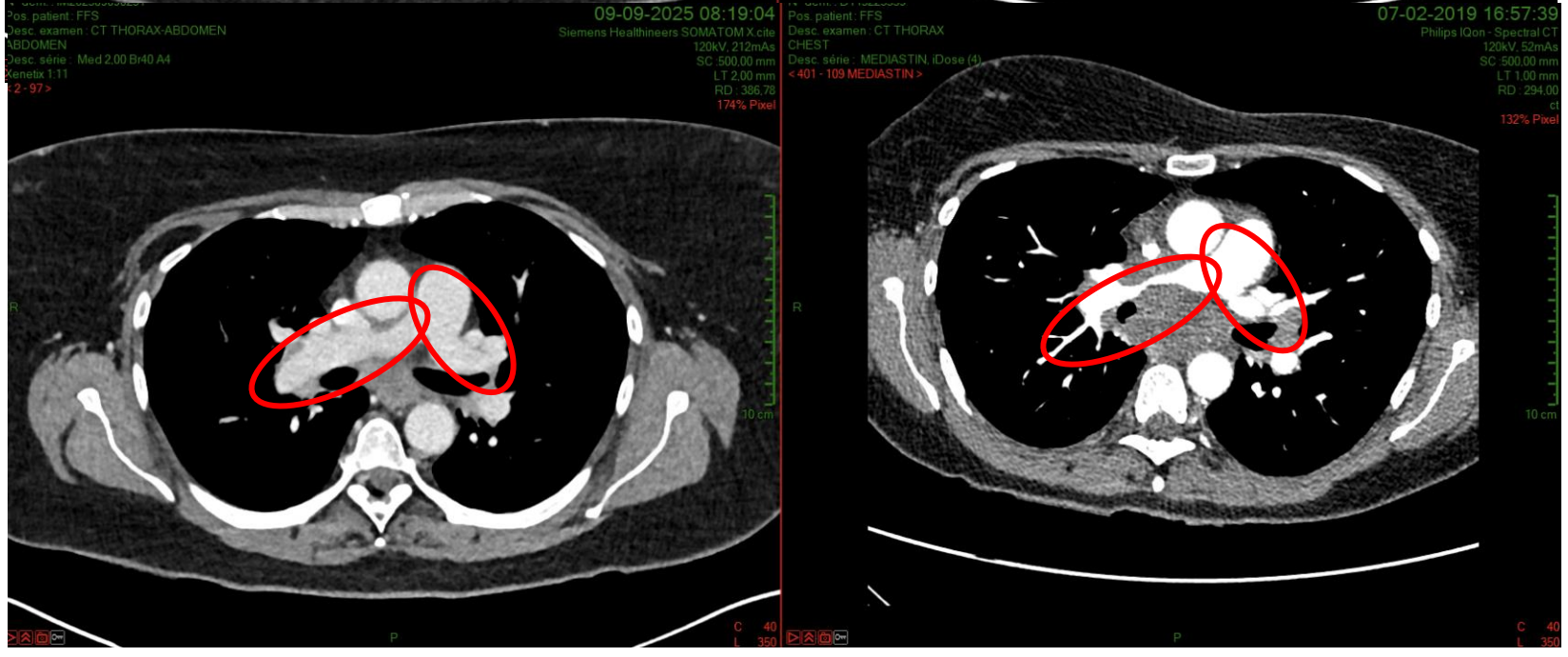


M. Skribek et al. Journal of Internal Medicine 2022

7/2/2019: Patiente 49 ans, institutrice, 1 fille de 6,5 ans



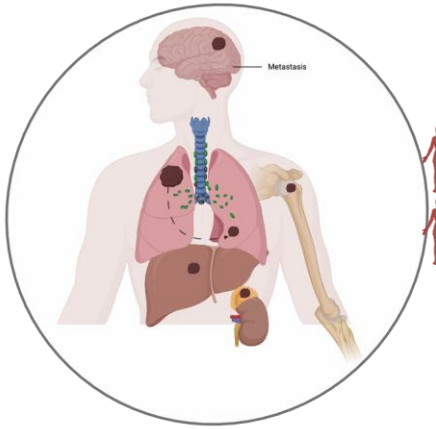
Syndrome cave



Dyspnée

Immunotherapy is not effective in NSCLC with actionable driver alterations

1 Metastatic NSCLC



2 Driver alteration
EGFR, ALK, RET...

Non-smoker with NSCLC

Targeted therapy

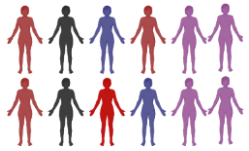
Osimertinib

Alectinib, Brigatinib.....

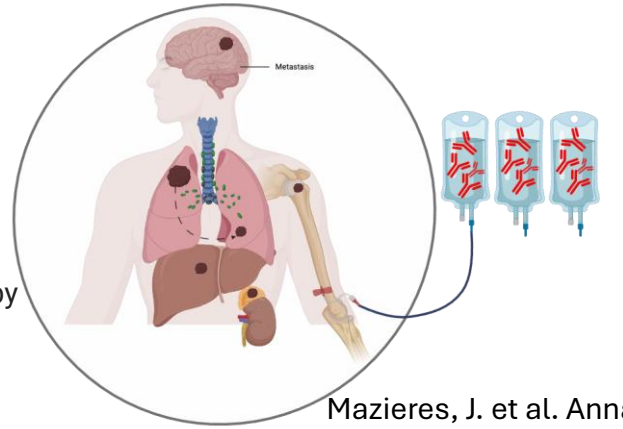
Entrectinib,Repotrectinib...

Selpercatinib, Pralsetinib

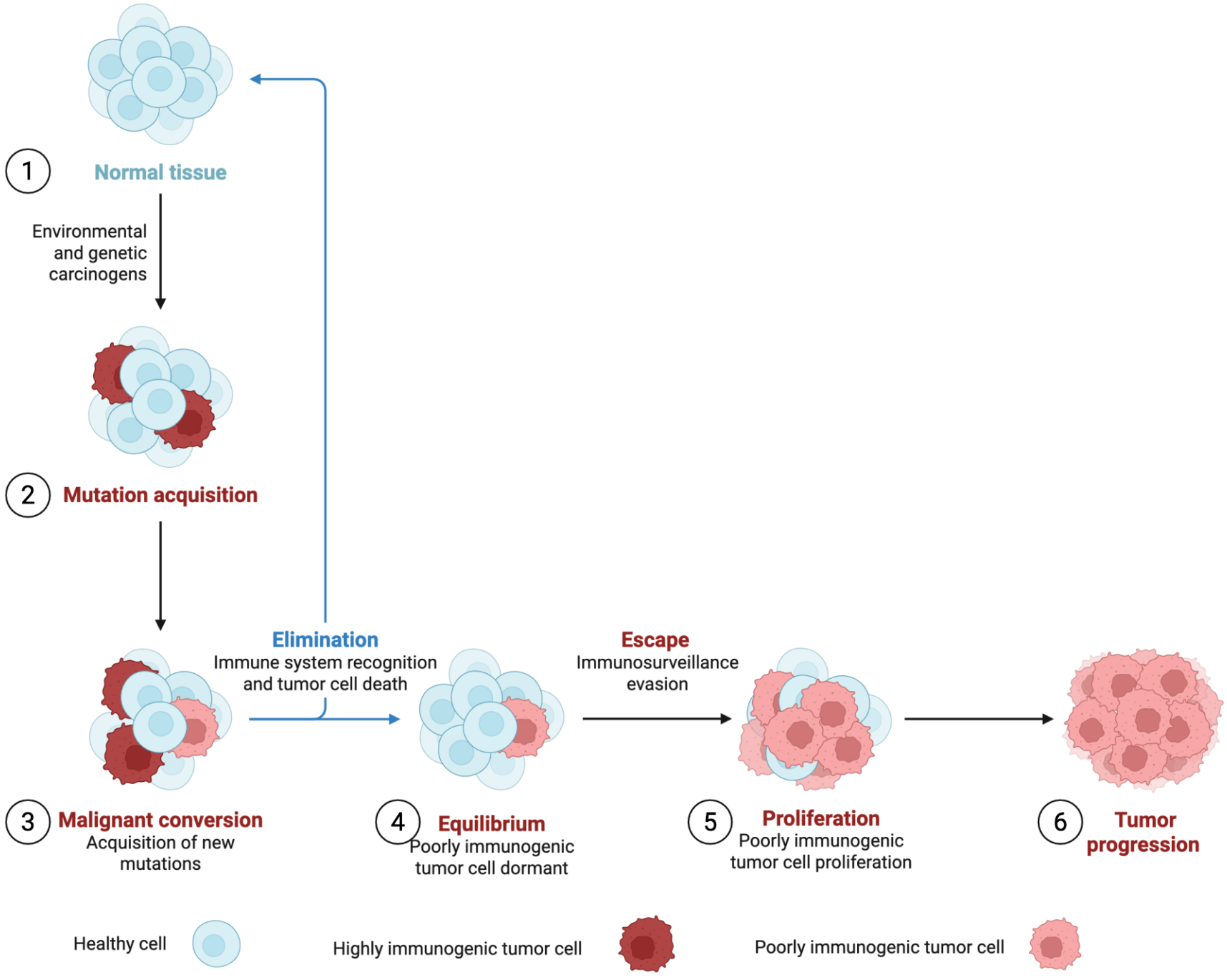
3 No driver alteration
Driver alteration

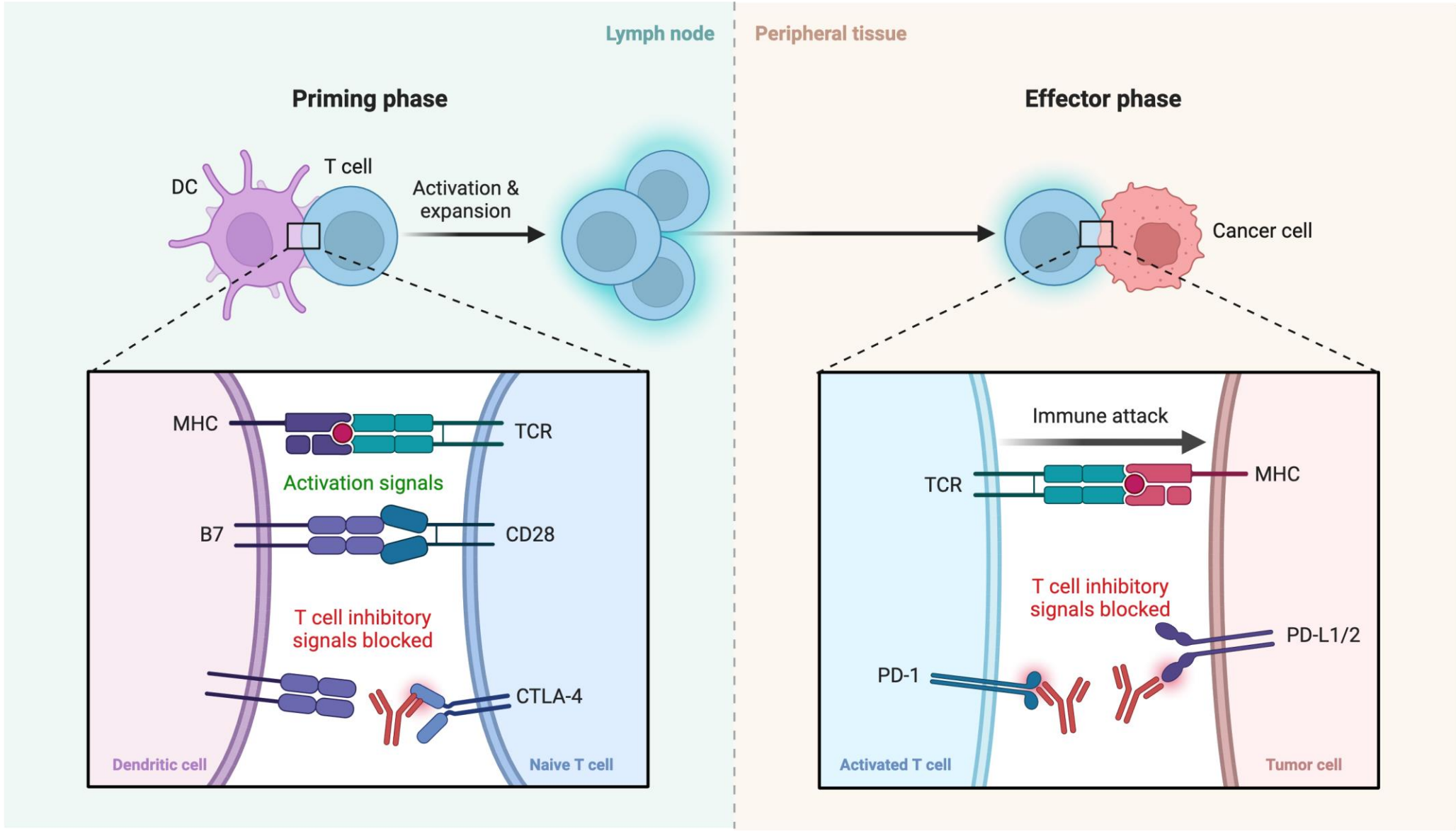


Immunotherapy +/-Chemotherapy



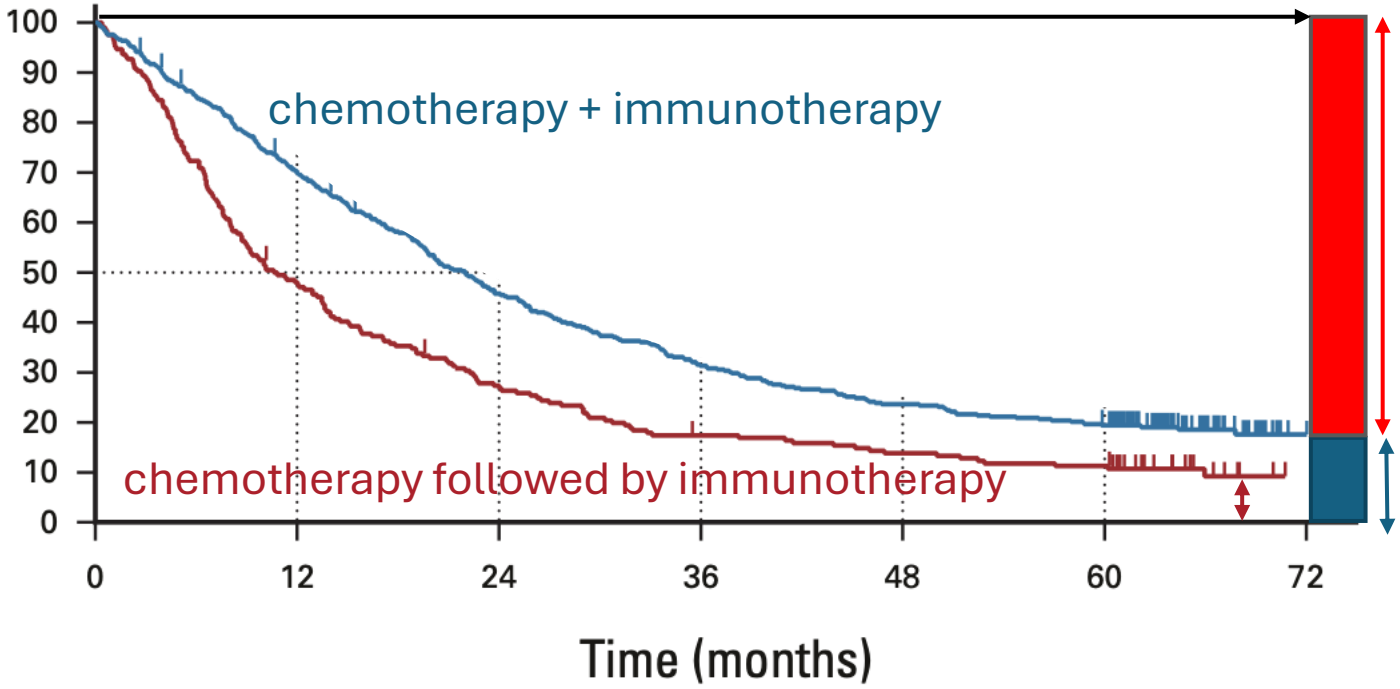
Mazieres, J. et al. Annals of Oncology 2019
Hendriks, L.E. et al. Annals of Oncology 2023


1
Normal tissue
Environmental and genetic carcinogens
2
Mutation acquisition
3
Malignant conversion
Acquisition of new mutations
Elimination
Immune system recognition and tumor cell death
4
Equilibrium
Poorly immunogenic tumor cell dormant
Escape
Immunosurveillance evasion
5
Proliferation
Poorly immunogenic tumor cell proliferation
6
Tumor progression
Healthy cell
Highly immunogenic tumor cell
Poorly immunogenic tumor cell


Lymph node
Peripheral tissue
Priming phase
Effector phase
DC
T cell
Activation &
expansion
Cancer cell
MHC
TCR
Activation signals
B7
CD28
T cell inhibitory
signals blocked
CTLA-4
Dendritic cell
Naive T cell
Immune attack
TCR
MHC
T cell inhibitory
signals blocked
PD-L1/2
PD-1
Activated T cell
Tumor cell

Metastatic NSCLC : Efficacy of Immunotherapy based backbone

Overall survival



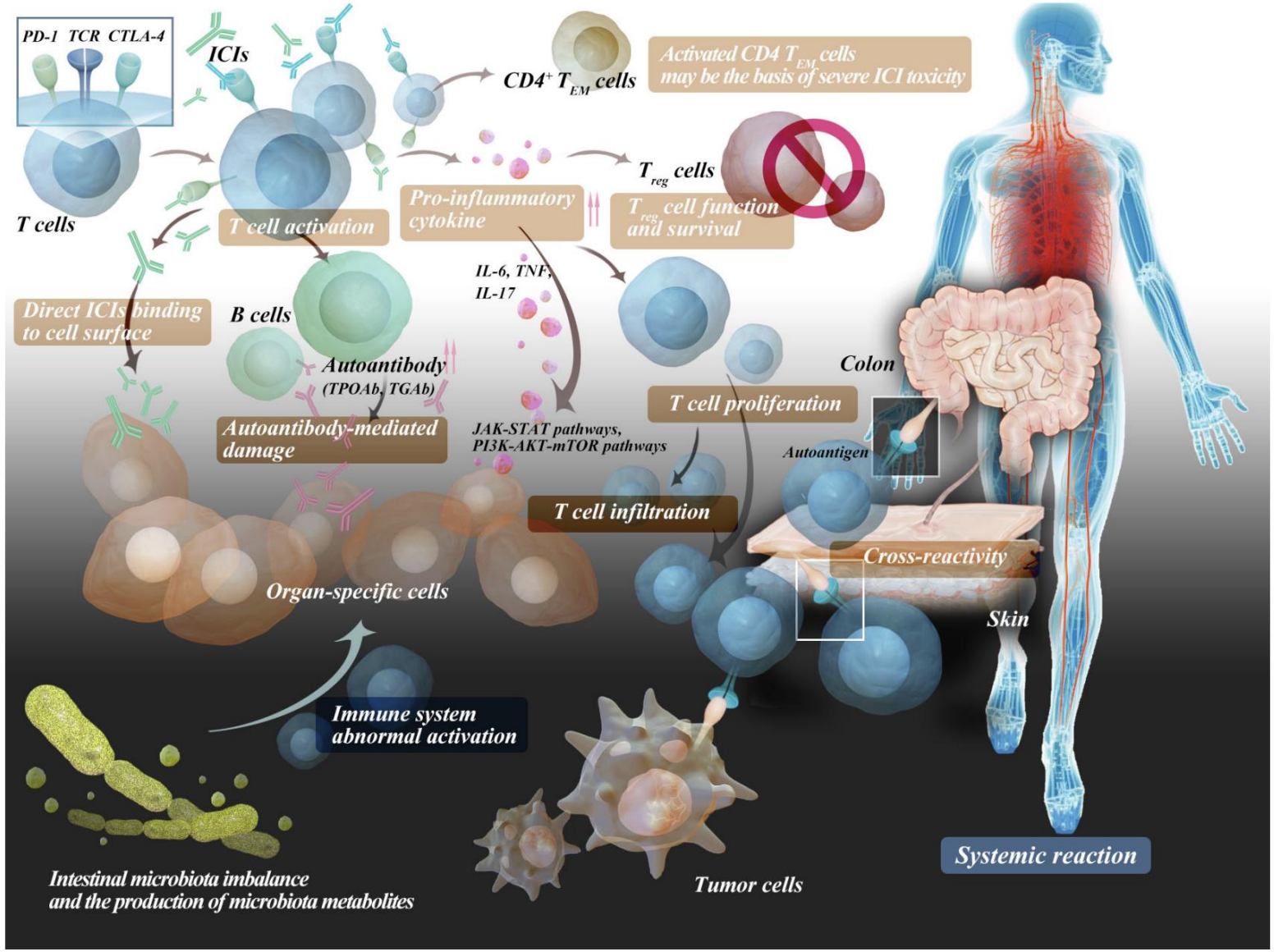
80% Death Rate :
1-Treatment Failure,
2-Toxicity,
3-Comorbidities (Cardiovascular Diseases, ...)

20% Cure Rate

10% Cure Rate

Garassino et al. JCO 2023
Novello et al . JCO 2023

immune checkpoint inhibitors related adverses events

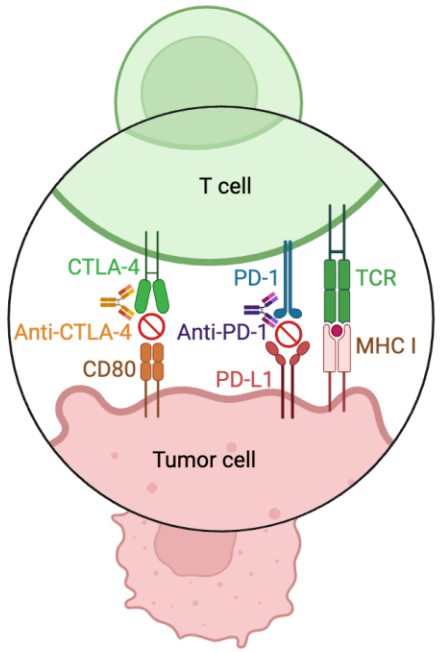


Qinan Yin et al. Front. Immunol 2023

Adverse Events Associated With Immune Checkpoint Inhibitors

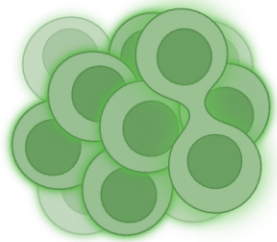
Tumor cells upregulate PD-L1 and CD80 to evade immune surveillance

PD-1 and **CTLA-4** are immune checkpoints expressed by T cells that inhibit immune responses; their interaction with tumor cells by its ligands causes immune evasion

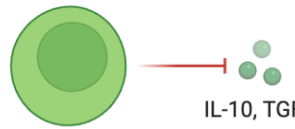


Immune checkpoint inhibitors like **anti-CTLA-4** and **anti-PD1** reverse this, activating immune response against tumor cells

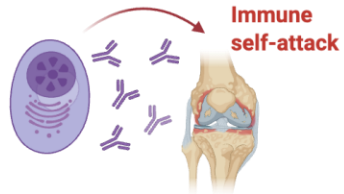
Immune checkpoint inhibitors can also excessively enhance the immune system



T cell
upregulation of proliferation and activation

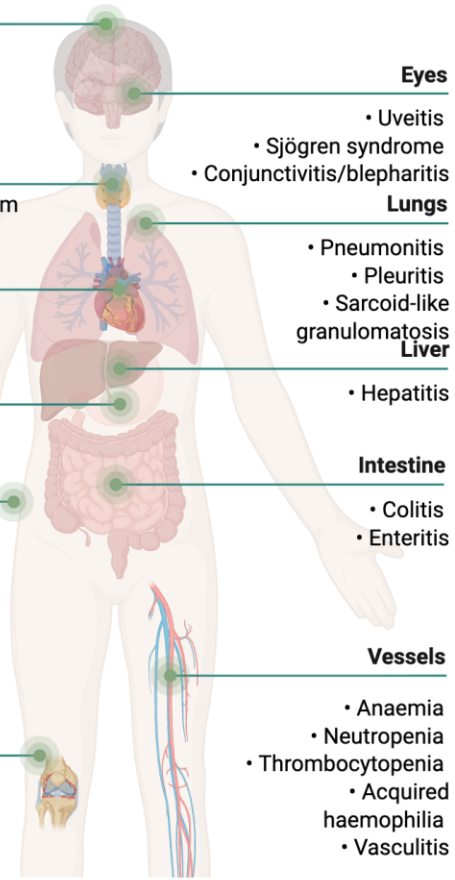


T reg cell
downregulation and abrogates its functions



Plasma cell
humoral autoimmunity reaction

Due to this upregulation, immune cells widely infiltrate different organs, leading to diverse immune-related adverse events



Brain
- Encephalitis
- Meningitis
- Polyneuropathy

Thyroid
- Hypo/hyperthyroidism
- Thyroiditis

Heart
- Myocarditis
- Pericarditis

Stomach
- Gastritis

Skin
- Skin rash
- Pruritus
- Vitiligo
- Psoriasis
- Stevens–Johnson syndrome

Joints
- Arthralgia
- Arthritis
- Myositis
- Dermatomyositis

Eyes
- Uveitis
- Sjögren syndrome
- Conjunctivitis/blepharitis

Lungs
- Pneumonitis
- Pleuritis
- Sarcoid-like granulomatosis

Liver
- Hepatitis

Intestine
- Colitis
- Enteritis

Vessels
- Anaemia
- Neutropenia
- Thrombocytopenia
- Acquired haemophilia
- Vasculitis

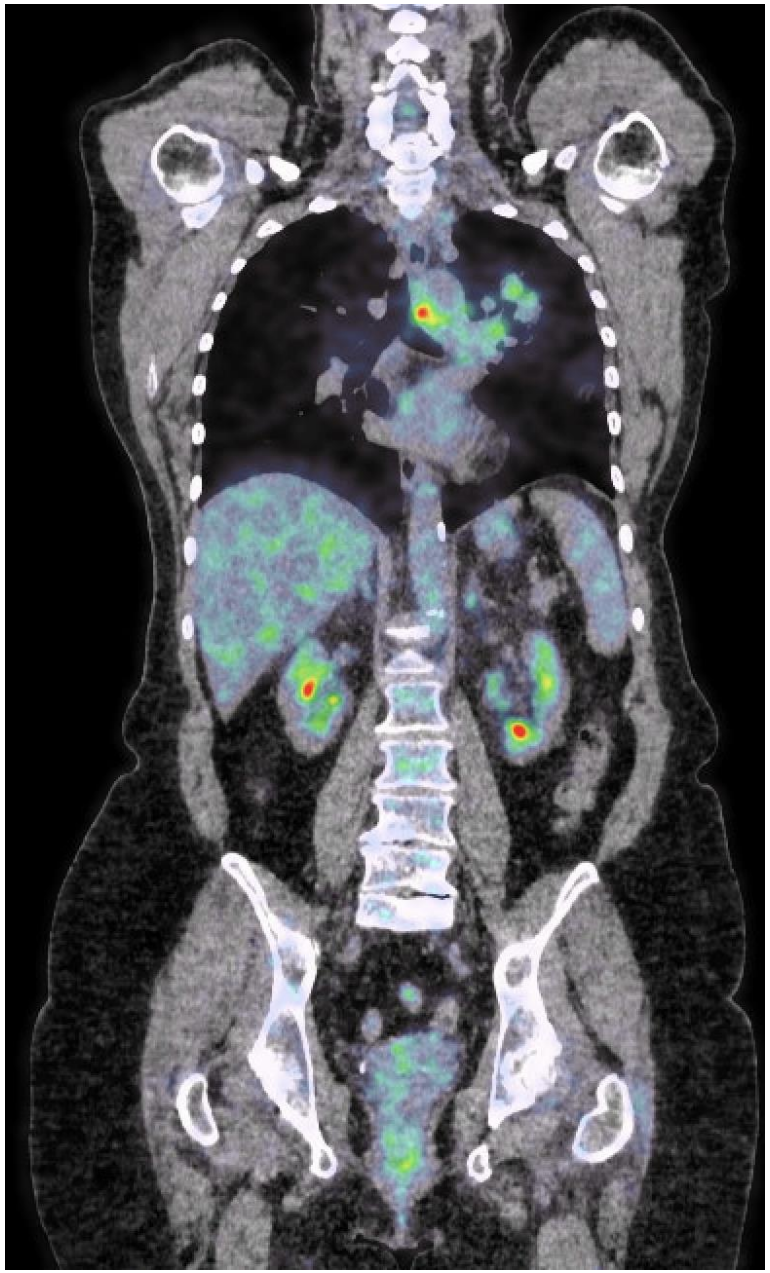

TRENDHIM

6/2025: Patiente 65 ans

avec atcd d'asthme allergique.
Consultation récente pour reprise de dossier et tableau de bronchite asthmatiforme il y a quelques semaines avec sibilances base droite traitée symptomatiquement.
Actuellement symptômes résolus, patiente revue sans aucun symptome respiratoire ni général (pas d'hémoptysie ni dyspnée ni AEG ni symptomes B) mais réalisation d'une Rx de principe avec lésion LSG puis mise au point par CT ce 18/06:

Quel élément simple dans l'anamnèse peut déjà orienter le type de cancer du poumon dont souffre le patient ?

6/2025: Patiente 65 ans



6/2025: Patiente 65 ans

II/ Méthodologie

- *Extraction : d'ADN à partir de lames FFPE (Formalin-Fixed, Paraffin-Embedded) après macrodissection des zones tumorales*
- ***Panel : Capture Custom Panel TE-98036185_hg38 (Twist).***

ABL1	*BRCA1*	*CTNNB1*	*FLI1*	*KIT*	*NTRK2*	*PTEN*	*SDHD*
AKT1	*BRCA2*	*EGFR (HER1-ERBB1)*	*FLT3*	*KRAS*	*NTRK3*	*RAC1*	*SMARCA4*
AKT2	*BRIP1*	*ERBB2 (HER2-NEU)*	*FOXL2*	*MAP2K1 (MEK1)*	*PALB2*	*RAD51B*	*SMARCB1*
AKT3	*CCND1*	*ERBB3 (HER3)*	*GATA3*	*MAP2K2*	*PBRM1*	*RAD51C*	*SMO*
ALK	*CCNE1*	*ERBB4*	*GNA11*	*MAP3K3*	*PDGFB*	*RAD51D*	*STK11 (LKB1)*
APC	*CD274*	*ERCC2*	*GNA14*	*MDM2*	*PDGFRA*	*RAD54L*	*SUFU*
AR	*CDH1*	*ESR1*	*GNAQ*	*MET*	*PDGFRB*	*RAF1*	*TEK*
ARAF	*CDK12*	*EZH2*	*GNAS*	*MRE11A*	*PIK3CA*	*RB1*	*TERT promoter*
ARID1A	*CDK4*	*FANCA*	*H3F3A*	*MTOR*	*PIK3R1*	*RET*	*TP53*
ATM	*CDK6*	*FANCL*	*HIST1H3B*	*MYC*	*PIK3R2*	*RICTOR*	*TSC1*
ATR	*CDKN2A*	*FBXW7*	*HIST1H3C*	*NF1*	*POLD1*	*RNF43*	*TSC2*
ATRX	*CHEK1*	*FGFR1*	*HRAS*	*NOTCH1*	*POLE*	*ROS1*	*VHL*
BARD1	*CHEK2*	*FGFR2*	*IDH1*	*NRAS*	*PPP2R2A*	*SDHA*	*/*
BCOR	*CIC*	*FGFR3*	*IDH2*	*NRG1*	*PRDM6*	*SDHB*	*/*
BRAF	*CSF1R*	*FGFR4*	*KDM6A*	*NTRK1*	*PTCH1*	*SDHC*	*/*

Appareil NGS : MiSeq

IV/ Conclusion

- Présence de cellules porteuses du variant p.(Gly12Asp) (p.(G12D)) dans le gène *KRAS*.

Ce variant est classé biologiquement comme pathogénique et est de signification clinique pronostique avérée dans cette pathologie.

Pour information : D'autres variants ont été identifiés dans d'autres gènes.
Les détails de ces variants sont repris dans le tableau des résultats et le point annexe.

II/ Méthodologie

- *Extraction : d'ARN à partir de lames FFPE (Formalin-Fixed, Paraffin-Embedded) après macrodissection des zones tumorales, ou au d*
- ***Panel : FusionPlex® Lung (Archer®).***

Gène	Exons testés	Transcript	Gène	Exons testés	Transcript
ALK	2,4,6,10,16,17,18, 19,20,21,22,23,26	NM_004304	***NRG1***	1,8	NM_013957
BRAF	1,3,7,8,10,13	NM_004333	***NRG1***	1,2,3,4,6	NM_004495
EGFR	1,7,8,9,16,19,20,24,25	NM_005228	***NTRK1***	2,4,6,8,10,11,12,13	NM_002529
EGFR	Exon 2-7 Skipping (EGFRvIII)	NM_005228	***NTRK2***	5,7,9,11,12,13,14,15,16,17	NM_006180
FGFR1	2,3,4,5,6,7,8,9,10, 11,12,17	NM_015850	***NTRK3***	4,7,10,12,13,14,15,16	NM_002530
FGFR2	2,5,7,8,9,10,16,17	NM_000141	***NTRK3***	15	NM_001007156
FGFR3	3,5,8,9,10,16,17,18	NM_000142	***RET***	2,4,6,8,9,10,11,12,13,14	NM_020630
MET	2,4,5,6,13,14,15,16,17,21	NM_000245	***ROS1***	2,4,7,31,32,33,34,35,36,37	NM_002944
MET	Exon 14 Skipping	NM_000245			

Appareil NGS : MiSeq

III/ Résultats

Evaluation de l'échantillon :
- Quantité de matériel / ARN : Adéquate
- Qualité du séquençage : Optimale

Fusion identifiée :

Fusion Gene	Gene A Gene B	Transcript ID A Transcript ID B	Exon A Exon B	Breakpoint A Breakpoint B	Classification Biologique*
/					

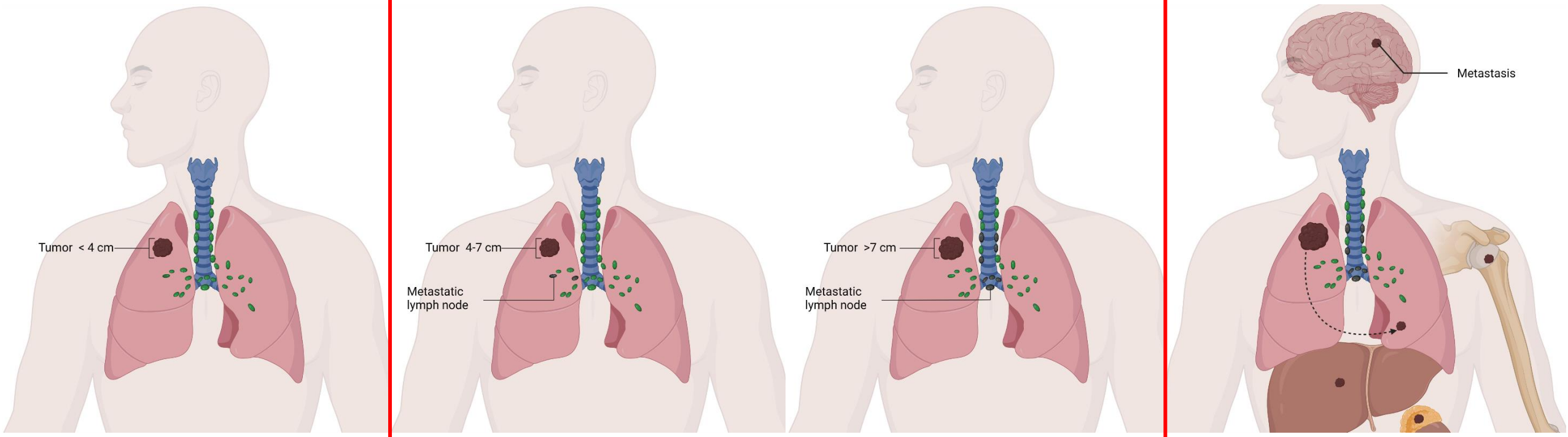
** selon le principe de classification recommandé par Sciensano et Belac*

IV/ Conclusion

Absence de transcrit de fusion détecté pour les gènes analysés.

Pour information : la mutation identifiée précédemment dans le gène KRAS p.(Gly12Asp) a été retrouvée via ce panel FusionPlex Lung (Archer).

Treatment of lung cancer depends on the disease stage at diagnosis



Stage 1
26%

Stage 2
8%

Stage 3
27%

Stage 4
39%

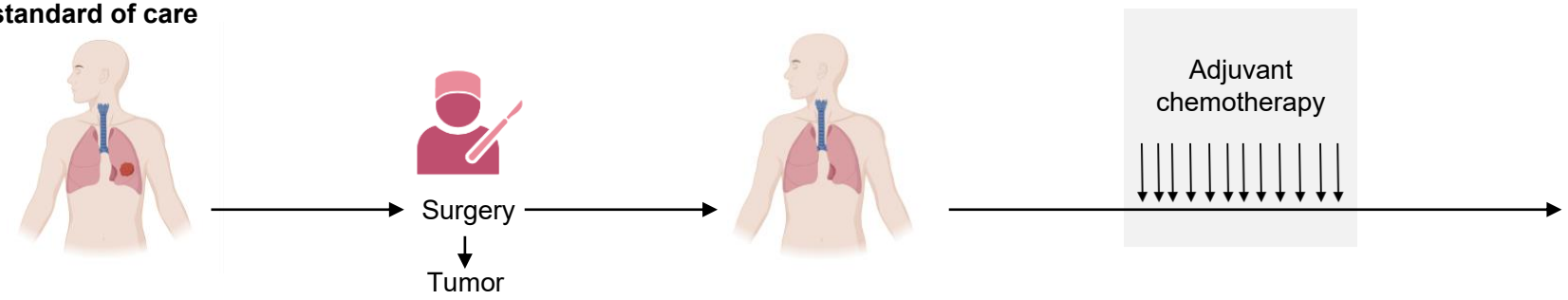
Metastatic

Surgery (or radiation)

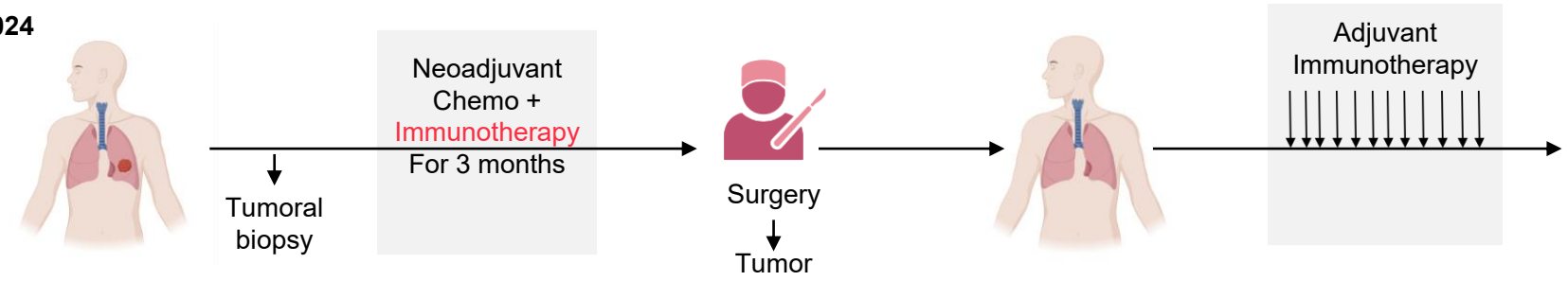
Systemic treatment(chemo, immuno or targeted therapy)

Neoadjuvant chemoimmunotherapy for stage II-III NSCLC patients

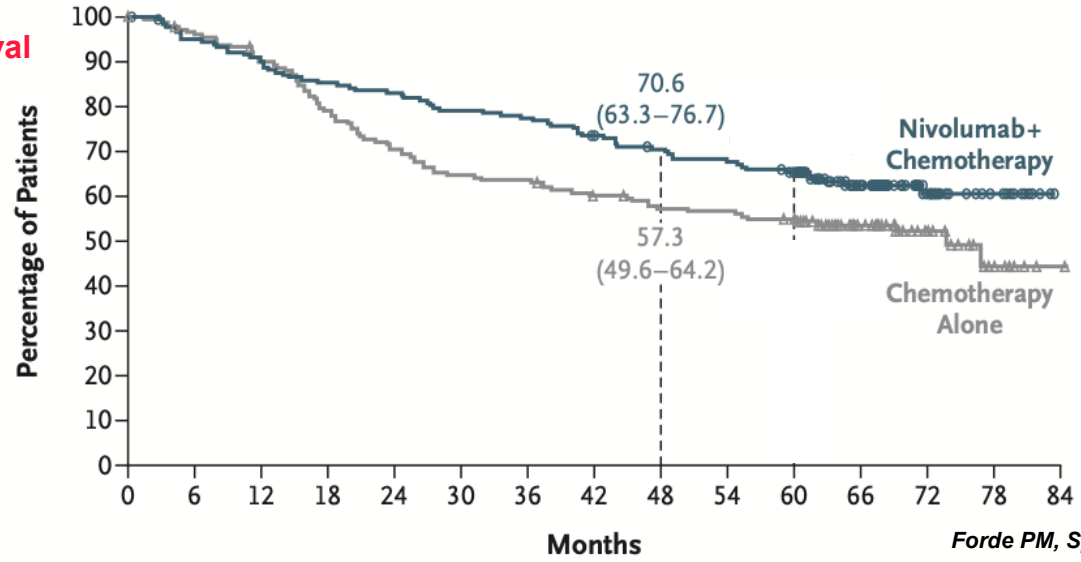
Former standard of care



Since 2024

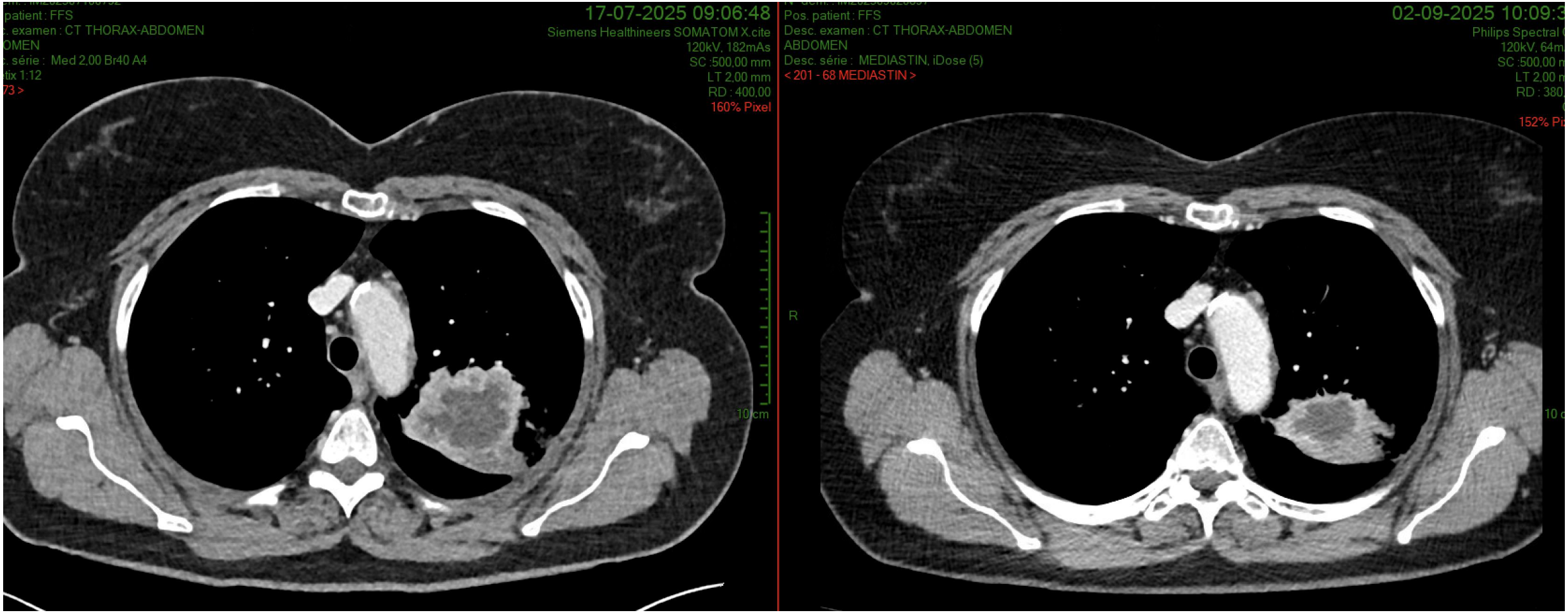


Overall survival

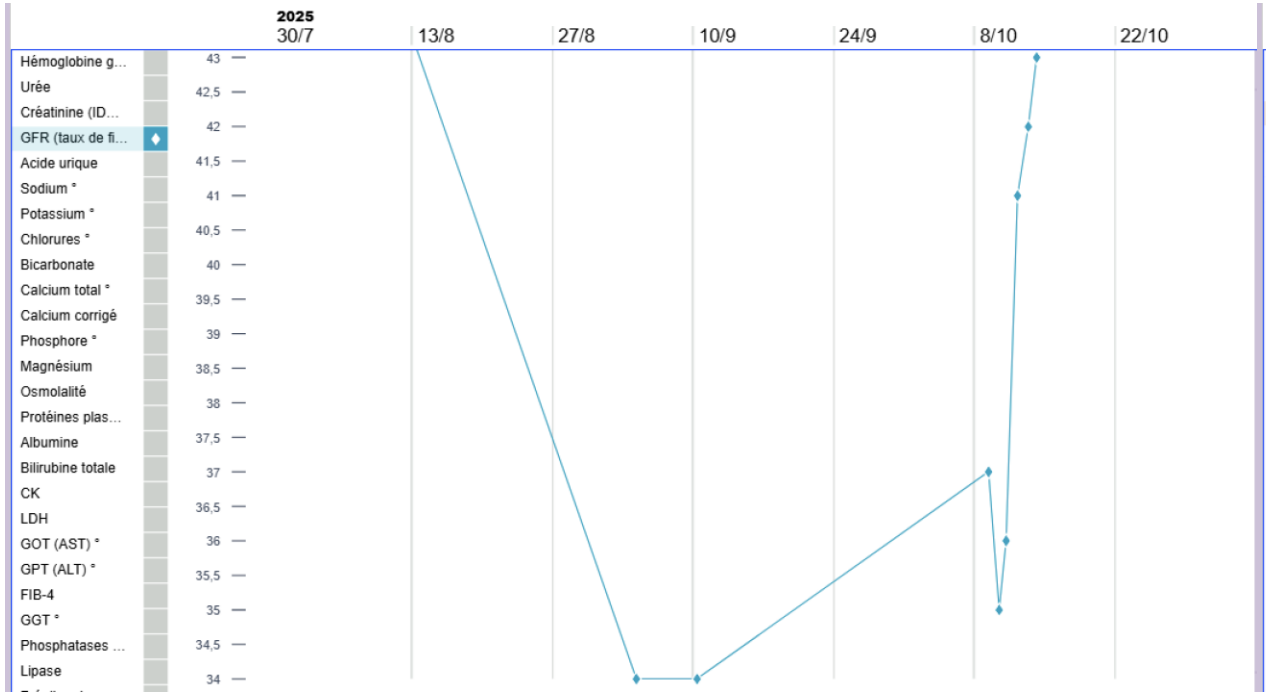


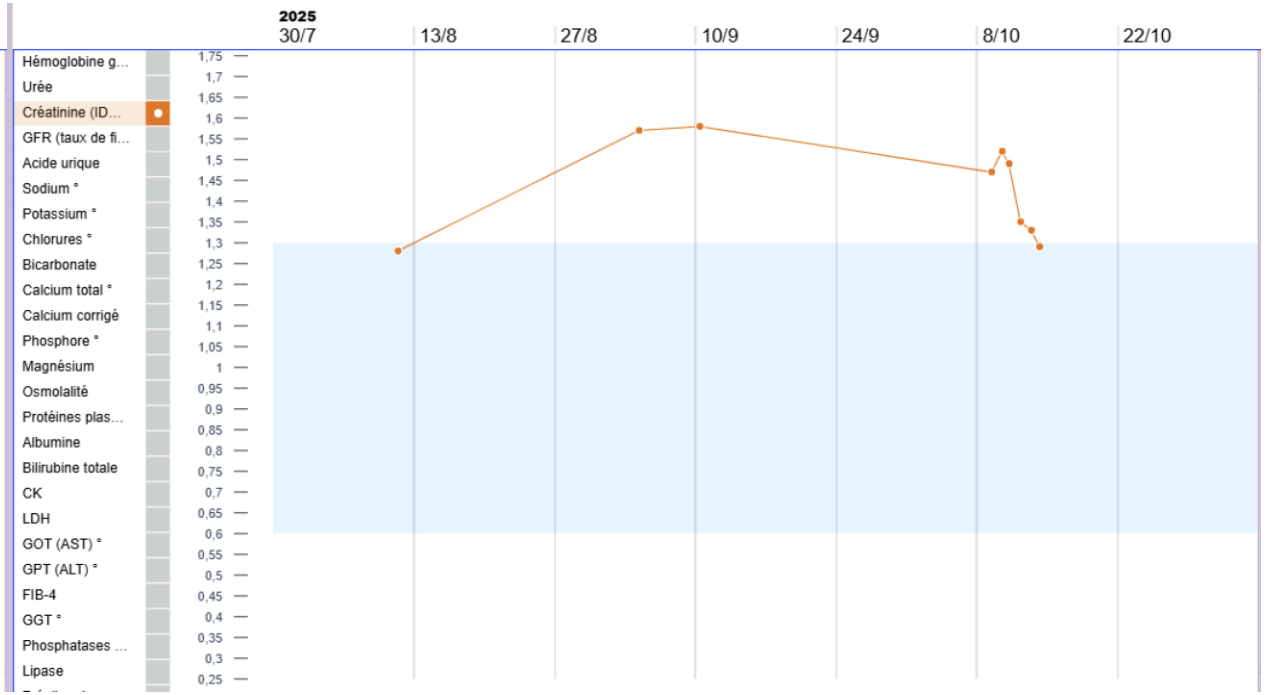
Forde PM, Spicer J, et al., NEJM, 2025

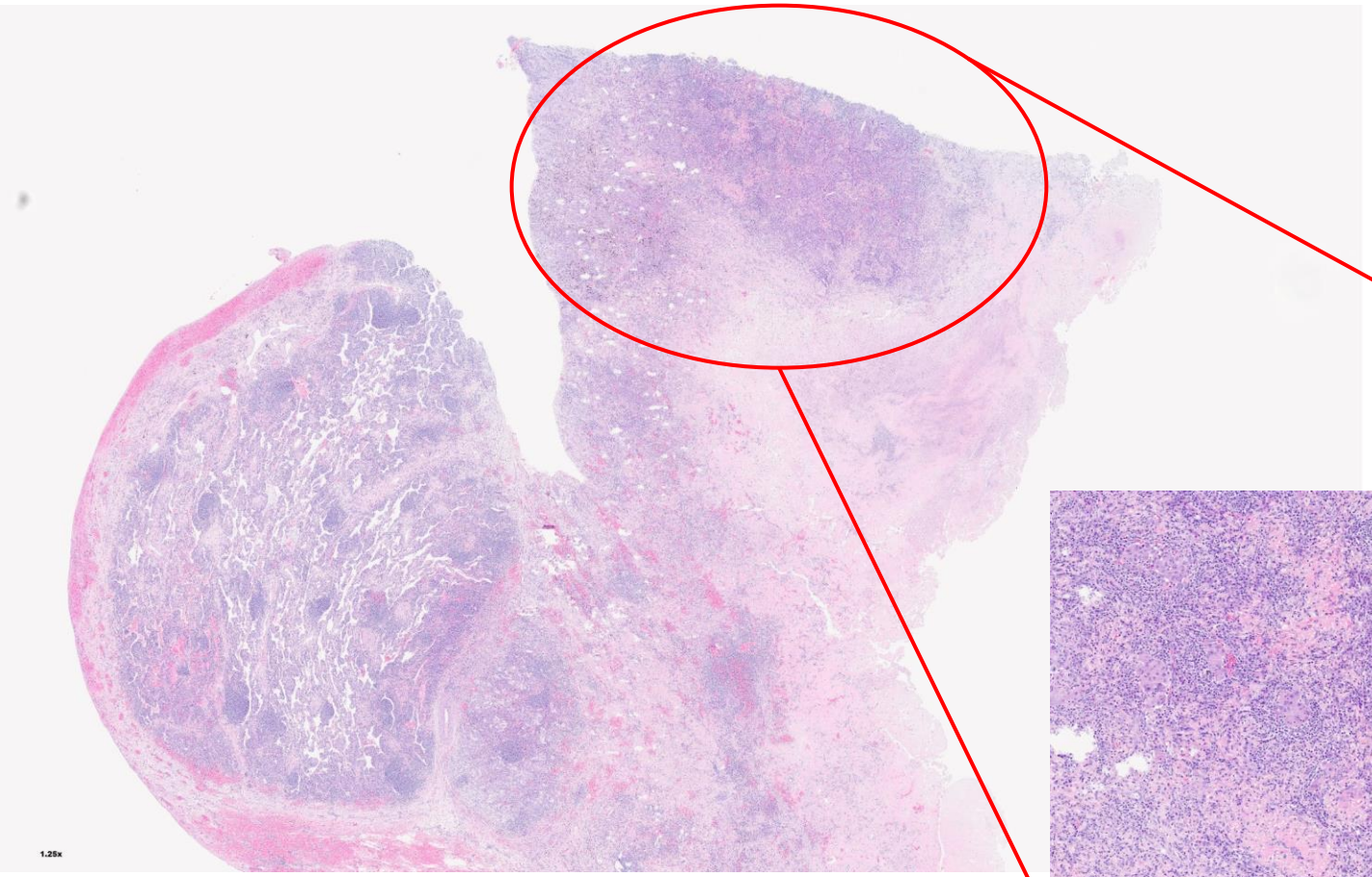
6/2025: Patiente 65 ans

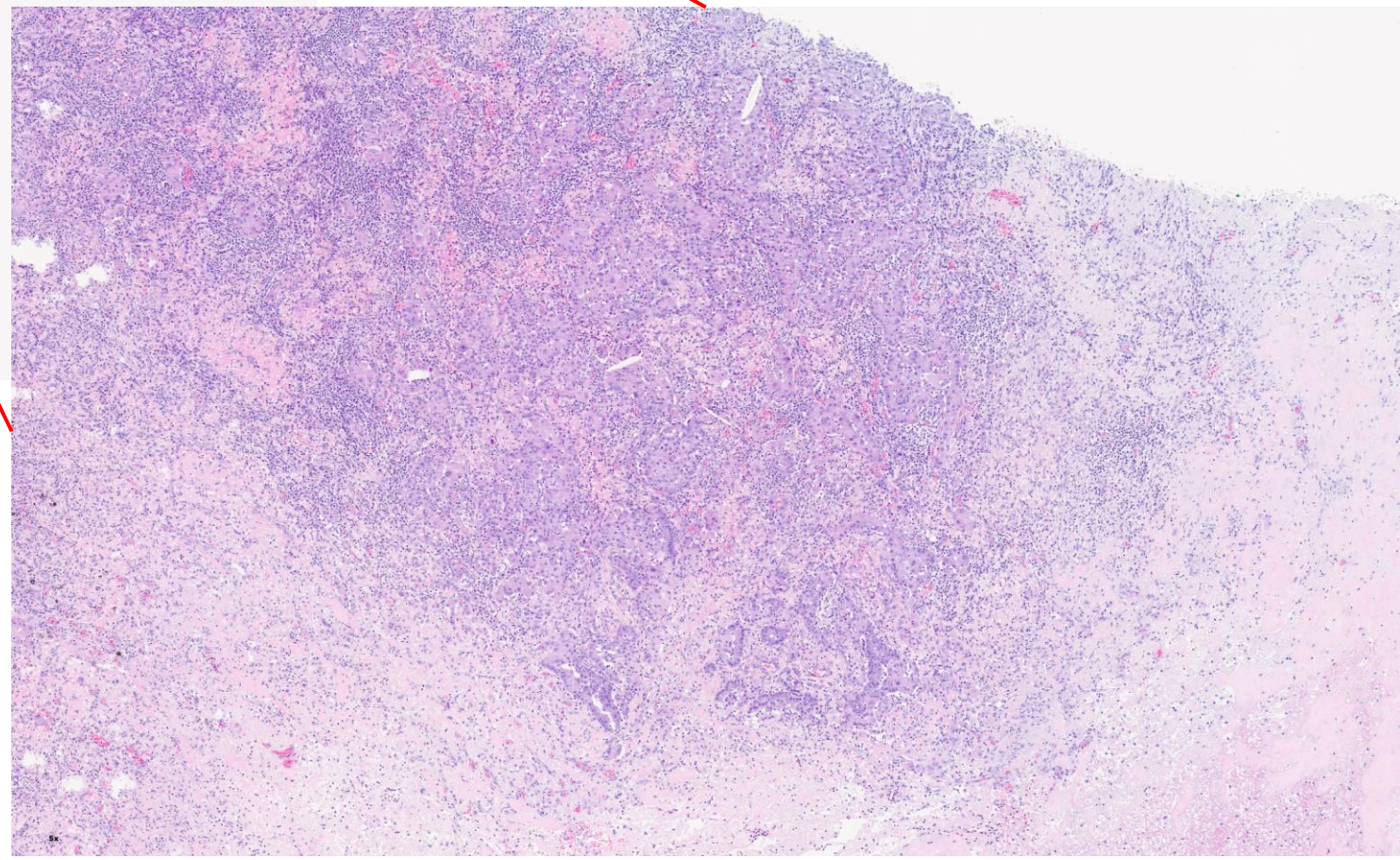


6/2025: Patiente 65 ans






1.25x


5x

Acknowledgment

Thibault Hirsch

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Rose Roland

Céline Duhamel

Alexandre Bayard

Nicolas Delhez

Kim Henquin

Vanessa Erculisse

Baptiste Abbar

David Haney

Annika Bruger

Christophe Vanhaver

Pierre van der Bruggen

Claude Wildmann

Mathieu Luyckx

Charlotte Maillard

Nicolas Dauguet

Davide Brusa

Gérald Hames

Axelle Loriot

Didier Vertommen

Gaëtan Herinckx

Damya Laoui (VIB)

Caroline Bouzin (IREC)

The patients!

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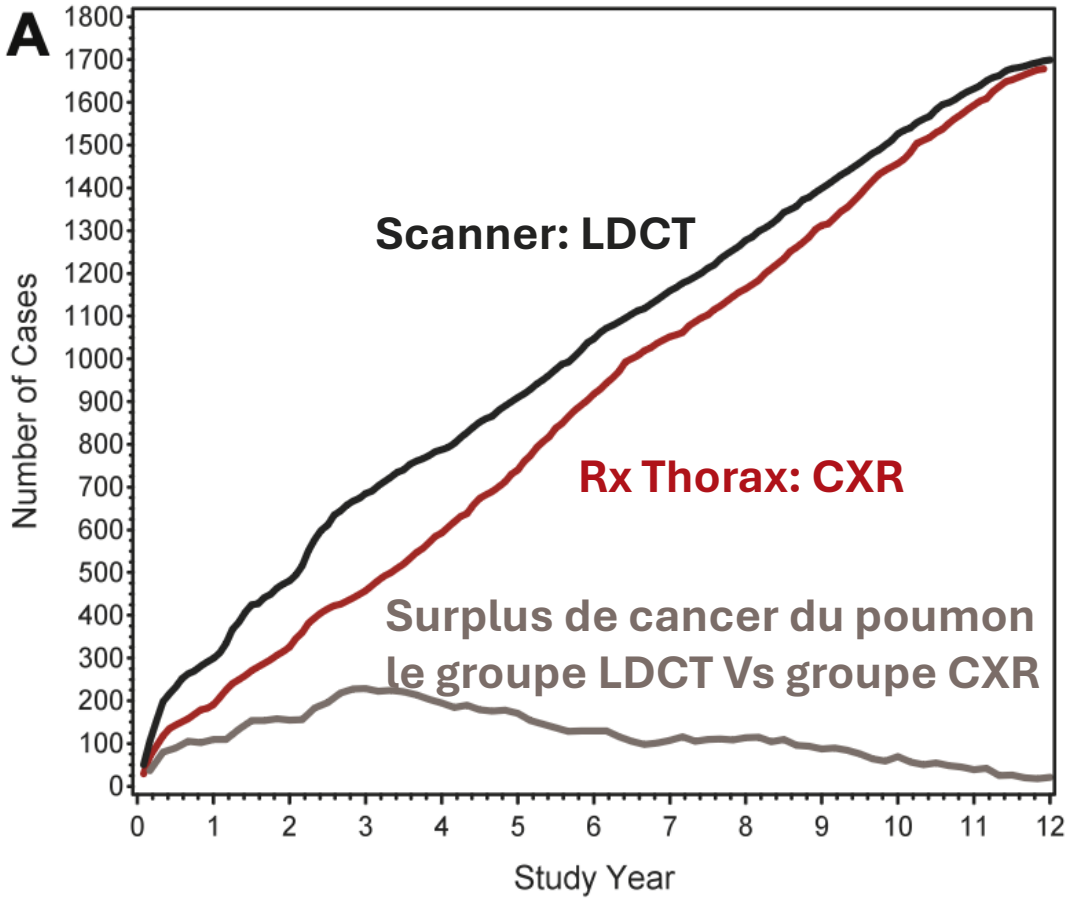
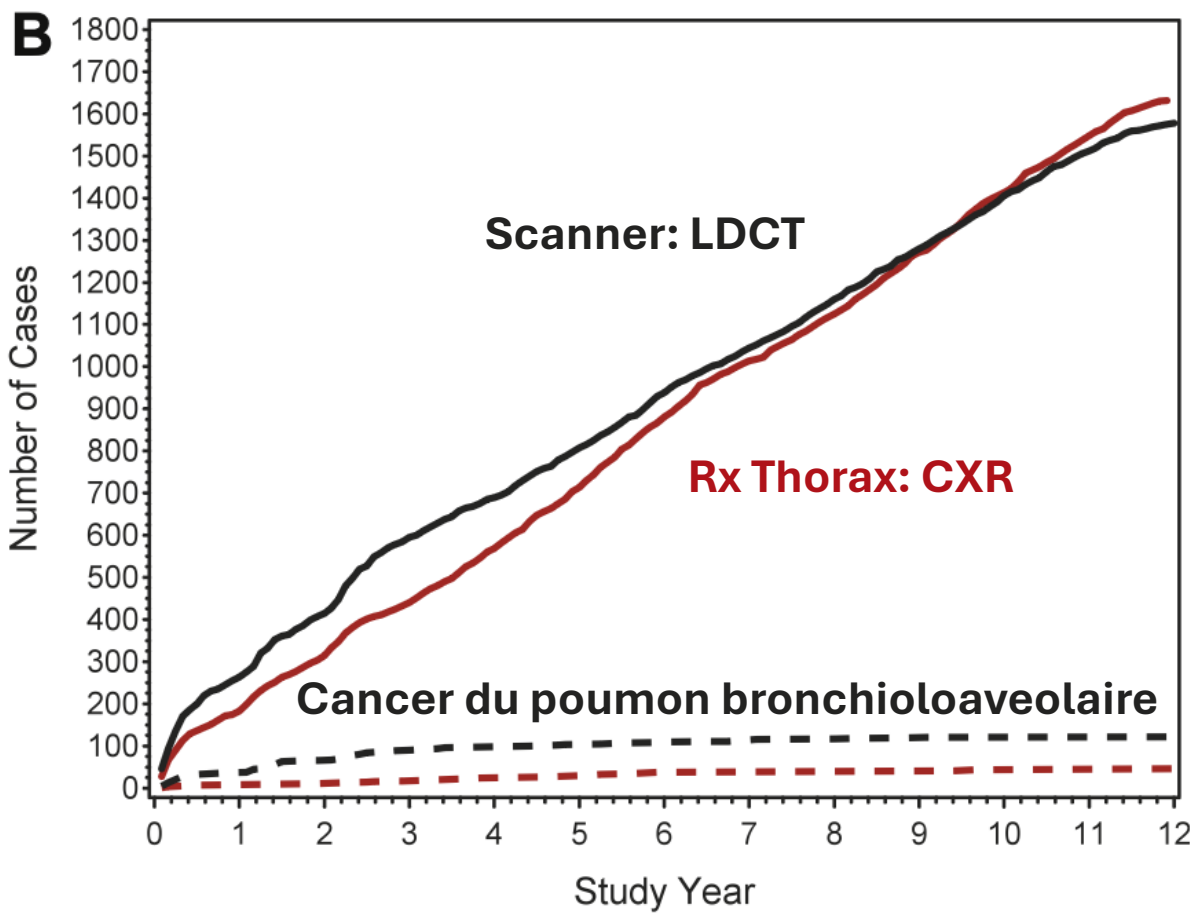
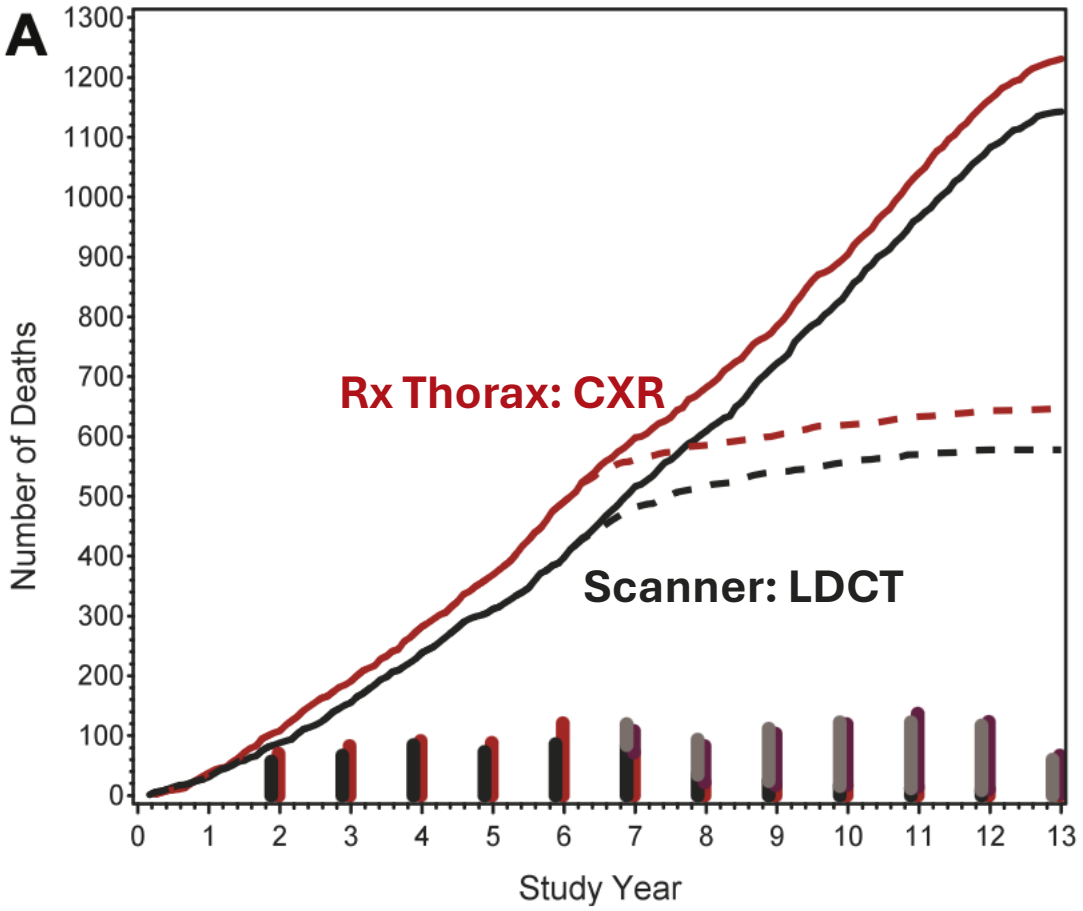
Is lung cancer screening the way forward?





NLST research team. J thorac Oncol 2019

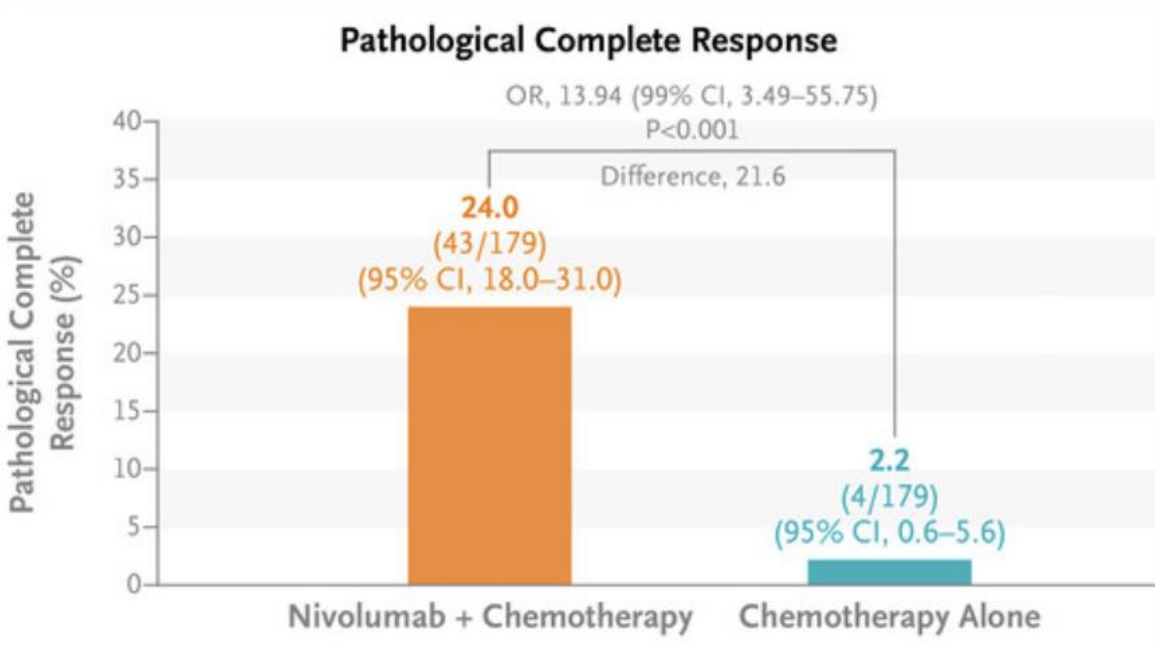
Is lung cancer screening the way forward?

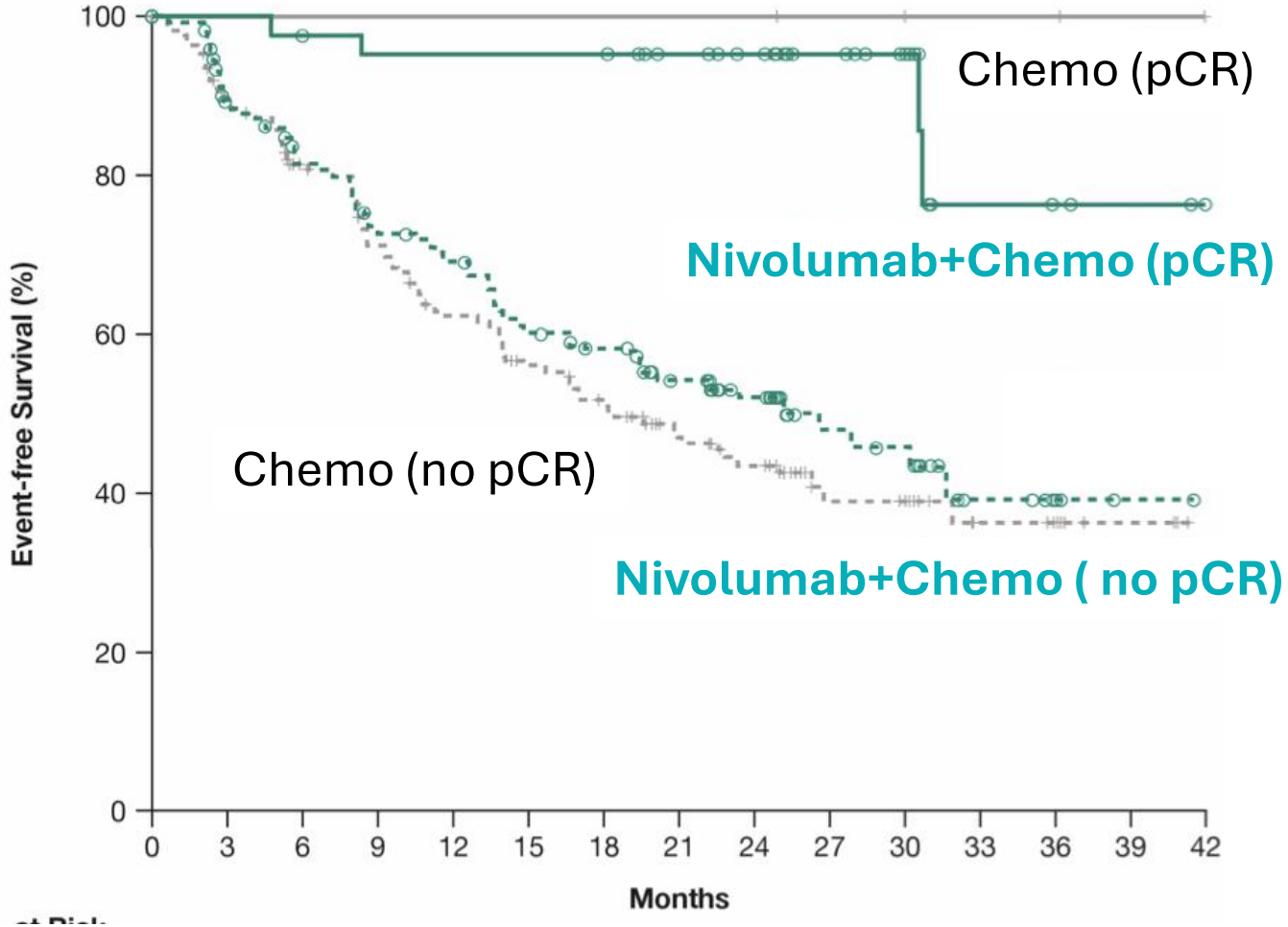


Outcome	LDCT, n (per 1000 subjects)	CXR, n (per 1000 subjects)	Difference across Arms per 1000 Subjects (95% CI) (CXR Minus LDCT)	RR (95% CI)	*p* Value Interaction[a]
All lung cancer deaths					
All subjects	1147 (42.9)	1236 (46.2)	3.3 (-0.2 to 6.8)	0.92 (0.85-1.00)	
Men	733 (46.5)	755 (47.9)	1.4 (-3.3 to 6.1)	0.97 (0.87-1.07)	0.17
Women	414 (37.8)	481 (43.9)	6.1 (0.8-11.3)	0.86 (0.75-0.98)	
Current smoker	724 (56.3)	818 (63.4)	7.1 (1.3-12.9)	0.88 (0.80-0.97)	0.12
Former smoker	423 (30.5)	418 (30.2)	-0.3 (-4.3 to 3.8)	1.01 (0.88-1.15)	
Age 55-64 y at randomization	641 (32.7)	739 (37.7)	5.0 (1.3-8.6)	0.86 (0.78-0.96)	0.051
Age 65-74 y at randomization	506 (71.2)	497 (69.9)	-1.3 (-9.7 to 7.2)	1.01 (0.90-1.15)	
Overall mortality (all subjects)	5253 (196.6)	5366 (200.7)	4.2 (-2.6 to 10.9)	0.97 (0.94-1.01)	
Overall mortality excluding lung cancer deaths (all subjects)	4106 (153.7)	4130 (154.5)	0.9 (-5.3 to 7.0)	0.99 (0.95-1.03)	

NLST research team. J thorac Oncol 2019

Immunotherapy in resectable advanced (stage 2-3) NSCLC





M. Forde et al, NEJM 2022

Niveaux de preuve /recommandations

Levels of evidence in research

There are 5 levels of evidence in the hierarchy of evidence – being 1 (or in some cases A) for strong and high-quality evidence and 5 (or E) for evidence with effectiveness not established.

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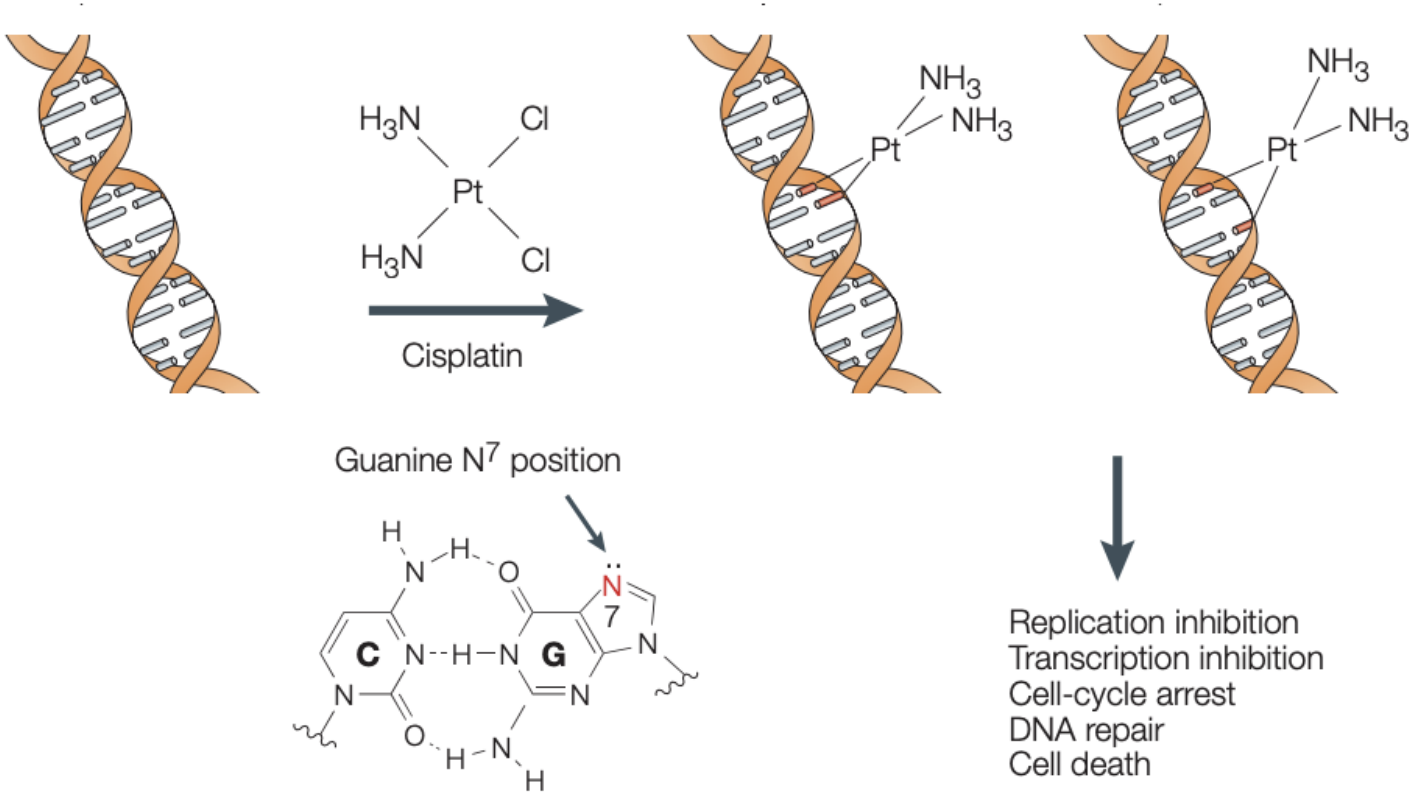
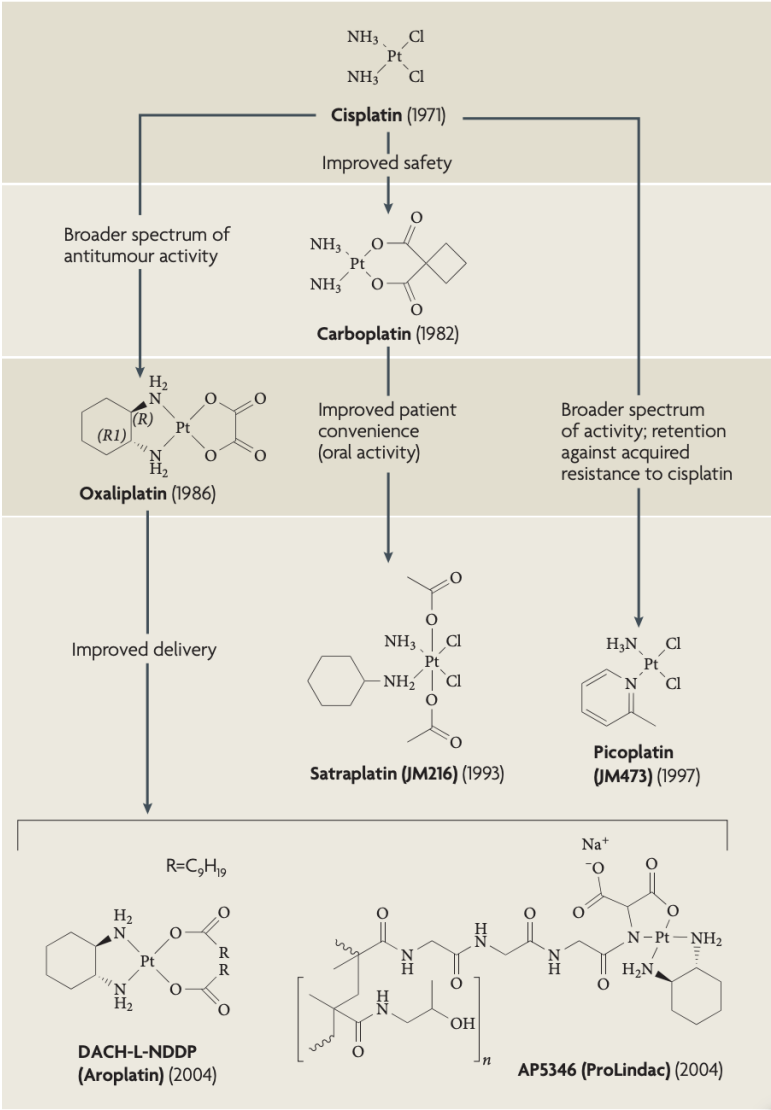
LEVEL 1 (higher quality of evidence)	High quality randomized trial or prospective study; testing of previously developed diagnostic criteria on consecutive patients; sensible costs and alternatives; values obtained from many studies with multiway sensitivity analyses; systematic review of Level I RCTs and Level I studies.
LEVEL 2	Lesser quality RCT; prospective comparative study; retrospective study; untreated controls from an RCT; lesser quality prospective study; development of diagnostic criteria on consecutive patients; sensible costs and alternatives; values obtained from limited stud- ies; with multiway sensitivity analyses; systematic review of Level II studies or Level I studies with inconsistent results.
LEVEL 3	Case control study (therapeutic and prognostic studies); retro- spective comparative study; study of nonconsecutive patients without consistently applied reference “gold” standard; analyses based on limited alternatives and costs and poor estimates; sys- tematic review of Level III studies.
LEVEL 4	Case series; case control study (diagnostic studies); poor refer- ence standard; analyses with no sensitivity analyses.
LEVEL 5 (lower quality of evidence)	Expert opinion.

All roads lead to Platinum doublets in NSCLC : similar survival, choice driven by tolerance





Dong Wang et al. – Nature review 2005
Kelland, L et al. – Nature reviews cancer 2007