

# New Therapeutic Directions in Lung Cancer

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**UC DAVIS**  
**HEALTH**

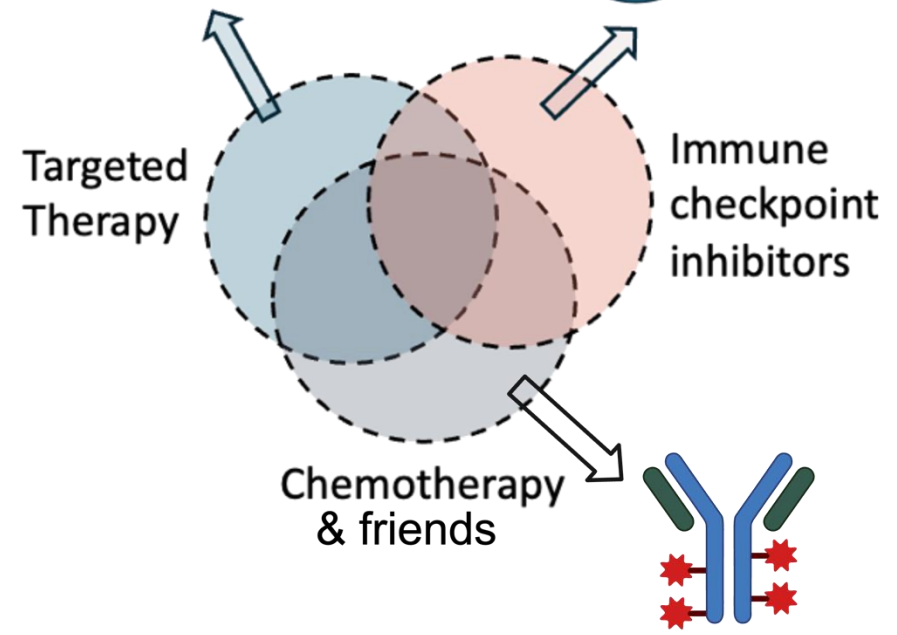
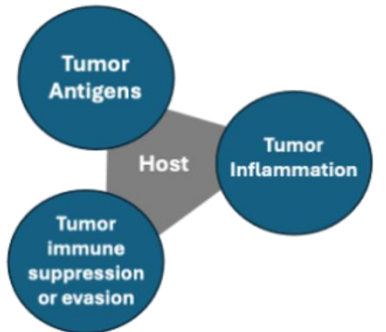
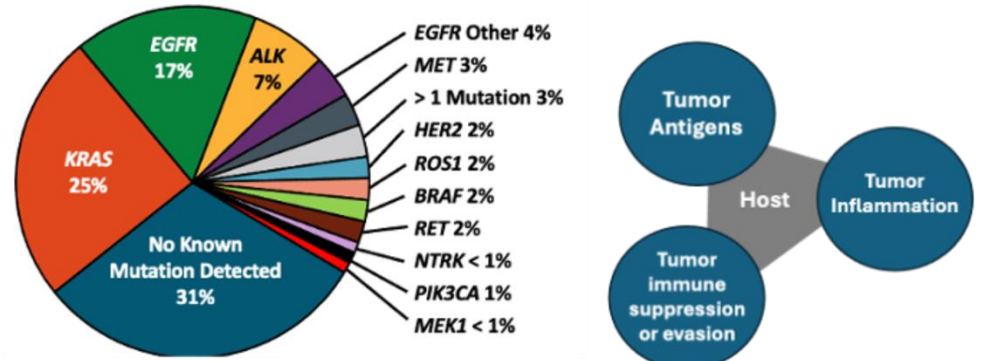
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**COMPREHENSIVE  
CANCER CENTER**

**25<sup>th</sup> Annual**  
**Advances in Oncology**

# Lung Cancer in 2024

Current Era = Precision Medicine



2024 ASCO<sup>®</sup>  
ANNUAL MEETING

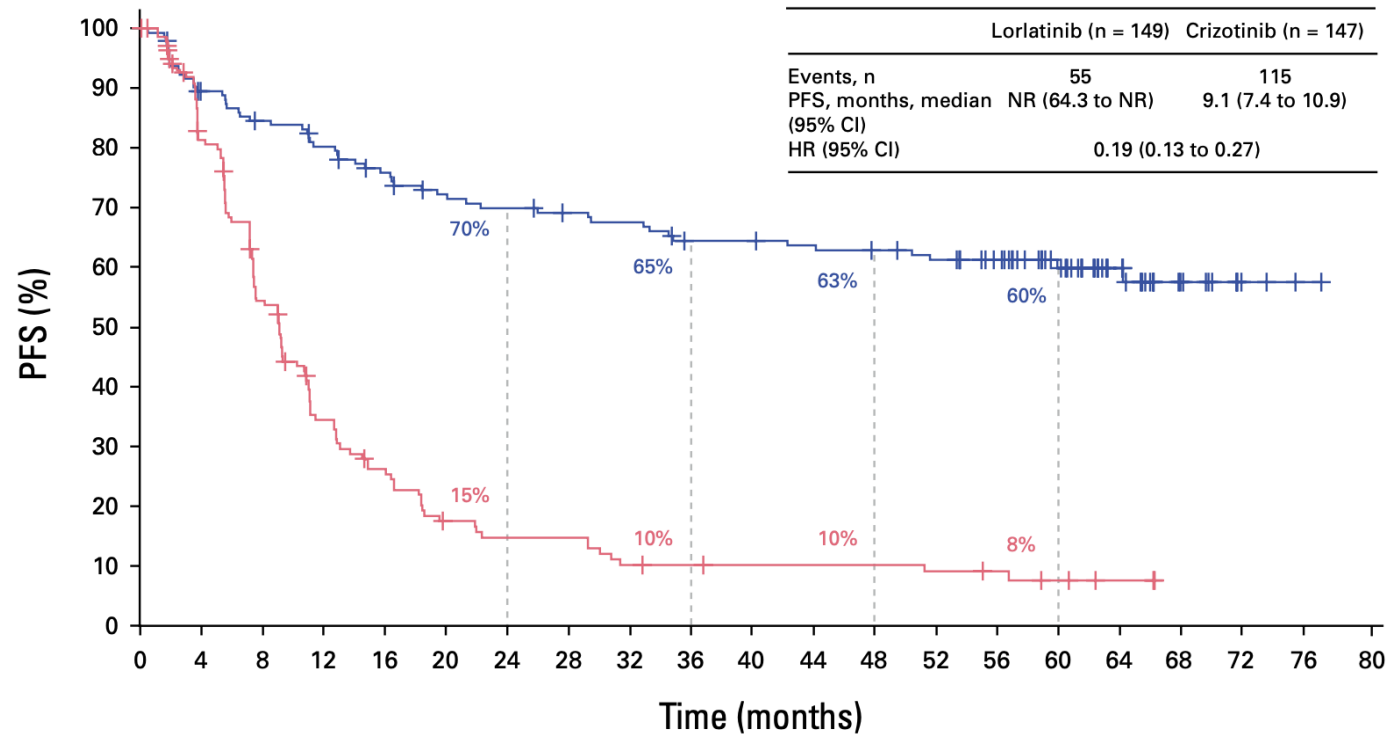
BARCELONA 2024 **ESMO** congress



# Why the CROWN Trial Earned Big Applause

## Patient Power

Very impressive HR of lorlatinib versus crizotinib



## Cumulative Incidence Brain Metastases Progression in Patients with Baseline Brain Mets

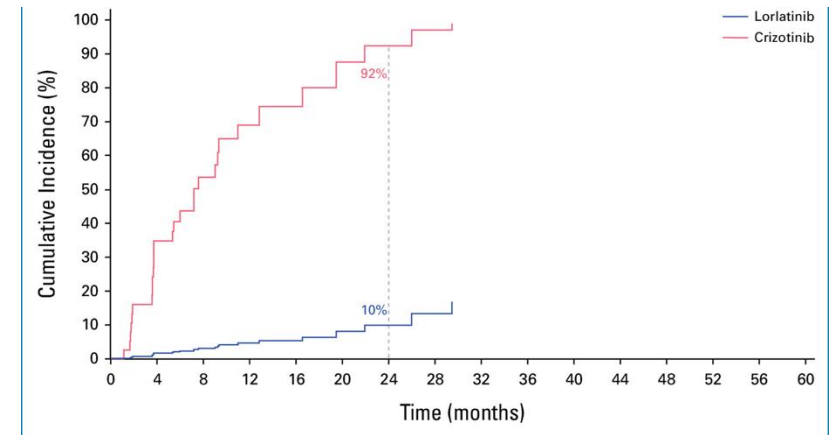
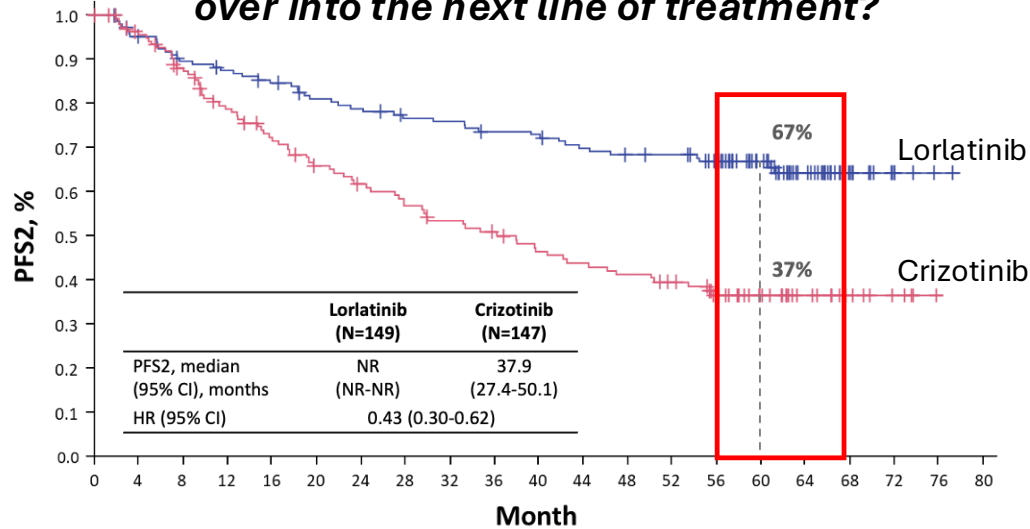


TABLE 2. Summary of AEs

Safety Population	Lorlatinib (n = 149)	Crizotinib (n = 142)
Treatment-related AEs, No. (%)		
Any grade	145 (97)	133 (94)
Grade 3/4	99 (66)	55 (39)
Grade 5	2 (1)	0
Serious	14 (9)	9 (6)
Leading to temporary drug discontinuation	58 (39)	51 (36)
Leading to dose reduction	31 (21)	19 (13)
Leading to permanent drug discontinuation	8 (5)	8 (6)

# The Rich (treated with 1L lorlatinib) Get Richer

**PFS2: Does the benefit of the 1L treatment carry over into the next line of treatment?**



**Most patients with progression on crizotinib received 2L alectinib, not lorlatinib**

First subsequent systemic anticancer therapy, n (%)	Lorlatinib (n=38)	Crizotinib (n=109)
ALK TKI	23 (61)	101 (93)
Alectinib	12 (52)	<b>68 (67)</b>
Crizotinib	4 (17)	5 (5)
Ceritinib	3 (13)	3 (3)
Lorlatinib	3 (13)	4 (4)
Brigatinib	1 (4)	21 (21)
Chemotherapy ± anti-angiogenic	13 (34)	4 (4)

**NVL-655 Is a Selective and Brain-Penetrant Inhibitor of Diverse ALK-Mutant Oncoproteins, Including Lorlatinib-Resistant Compound Mutations**

Any prior ALK TKI +/- chemotherapy: **ORR 38%**  
 ≥3 prior ALK TKI, including 2G and lorlatinib: **ORR 37%**

G1202R ALK mutation: **ORR 76%**  
 Compound (≥ 2 mutations): **ORR 58%**

Treatment-Related Adverse Events (TRAEs) in ≥ 10% of Patients  
 All Treated (N = 133)

Preferred Term	Grade 1 n (%)	Grade 2 n (%)	Grade 3 n (%)	Grade 4 n (%)	Any Grade n (%)
ALT increased	21 (16%)	6 (5%)	17 (13%)	1 (1%)	45 (34%)
AST increased	21 (16%)	7 (5%)	12 (9%)	-	40 (30%)
Constipation	15 (11%)	6 (5%)	-	-	21 (16%)
Dysgeusia	15 (11%)	2 (2%)	-	-	17 (13%)
Nausea	15 (11%)	1 (1%)	-	-	16 (12%)

**2% discontinued due to TRAE**



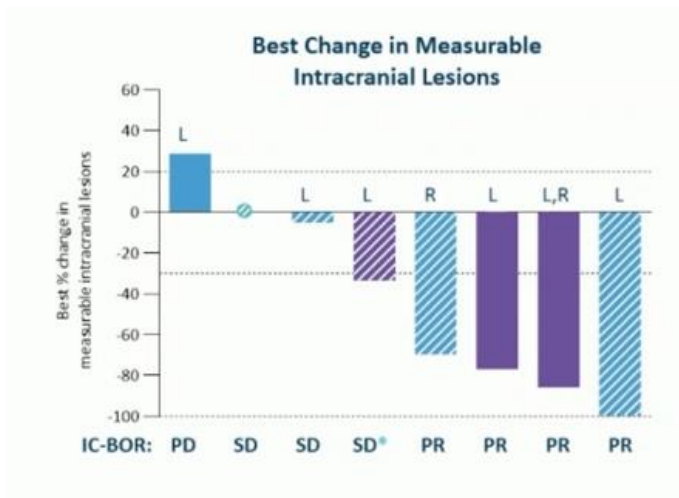
# Phase 1/2 ARROS-1 study of NVL-520

## Preliminary Activity: Radiographic Tumor Response Across Previously Treated Patients with ROS1+ NSCLC

All NSCLC Response Evaluable Patients ± chemotherapy	Any Prior ROS1 TKI (range 1-4)				≥ 2 prior ROS1 TKIs			1 prior ROS1 TKI (crizotinib)
	All	Repotrectinib- naive	ROS1 G2032R Resistance Mutation <sup>b</sup>		All	Prior Lorlatinib	Repotrectinib- naive	
			Prior Repotrectinib	Repotrectinib- naive				
RECIST 1.1 ORR % (n/n) <sup>a</sup>	44% (31/71)	51% (27/53)	38% (3/8)	72% (13/18)	41% (21/51)	44% (17/39)	47% (17/36)	73% (8/11)
CR <sup>*</sup>	2	2	-	2	2	2	2	-

<sup>a</sup> 2 confirmed CRs ongoing with DOR 19.3+ and 26.3+ months. 5 additional CRs observed among patients without measurable disease (2 prior ROS1 TKIs [n=2], 1 prior ROS1 TKI (crizotinib [n=1], entrectinib [n=2])), all ongoing with DOR 3.6+, 3.7+, 13.8+, 13.9+, and 18.5+ months.

NVL-520 induced intracranial responses following prior treatment with brain-penetrant ROS1 TKIs

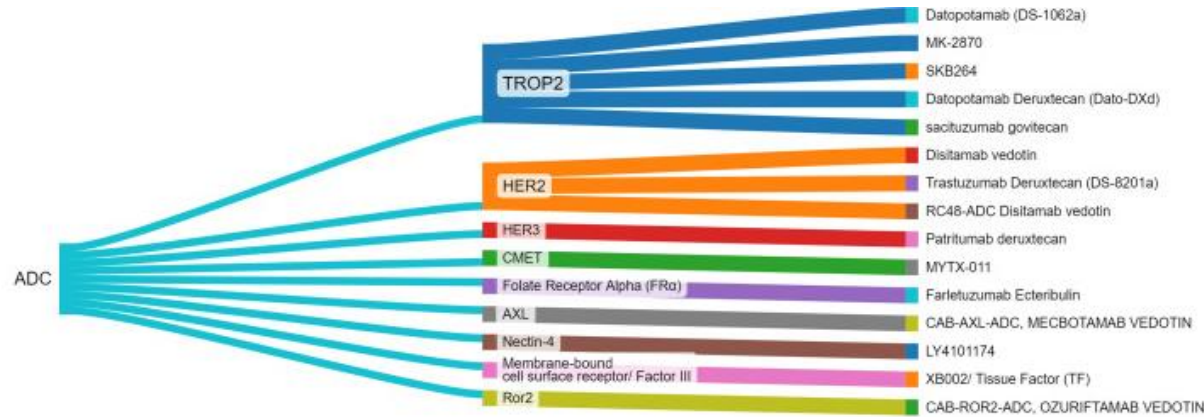


No TRAEs led to discontinuation

### Treatment-Related Adverse Events (TRAEs) in ≥ 10% of Patients All Treated (N = 104)

Preferred Term	Grade 1 n (%)	Grade 2 n (%)	Grade 3 n (%)	Any Grade n (%)
Oedema peripheral	15 (14%)	5 (5%)	-	20 (19%)
ALT increased	11 (11%)	-	-	11 (11%)
AST increased	11 (11%)	-	-	11 (11%)
Weight increased	7 (7%)	3 (3%)	1 (1%)	11 (11%)

# Antibody Drug Conjugates and Bispecific Antibodies



## ADCs:

Trastuzumab deruxetecan: advanced NSCLC with **HER2** driver mutations

Datopotamab deruxetecan: TROP2 ADC

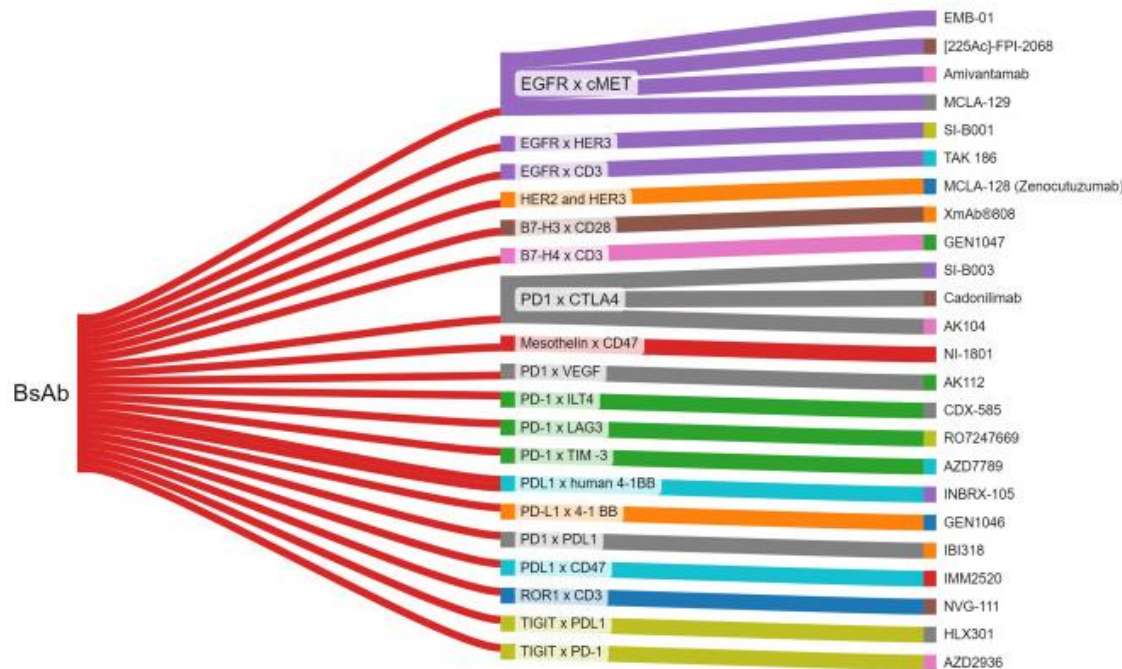
Sacituzumab govitecan: TROP2 ADC

## Bispecifics:

Amivantamab: **EGFR** and MET

Ivonescimab: VEGF and PD-1

... much more to come





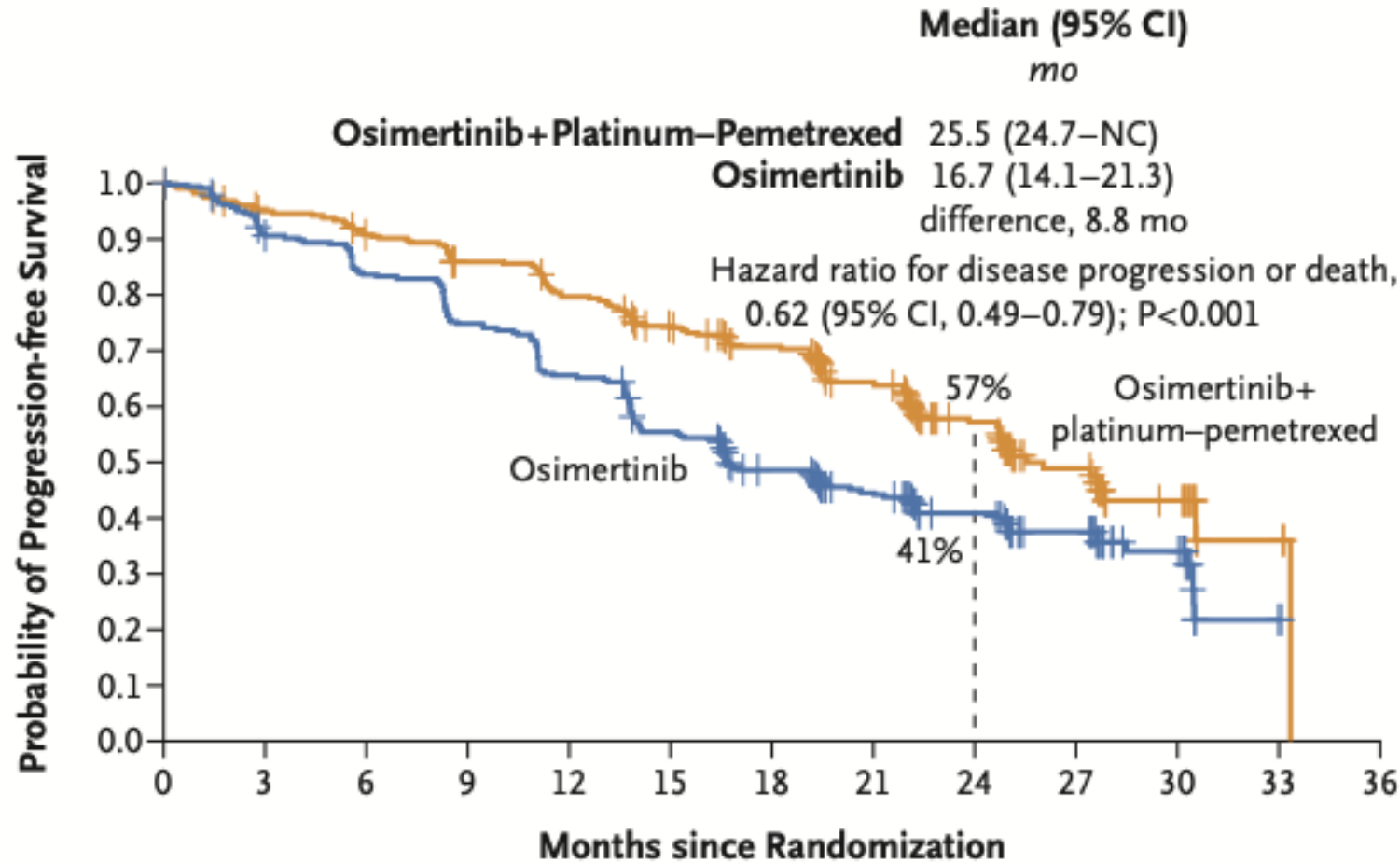
CANCER HISTORY PROJECT

# Discovery of EGFR mutations dramatically changed lung cancer treatment

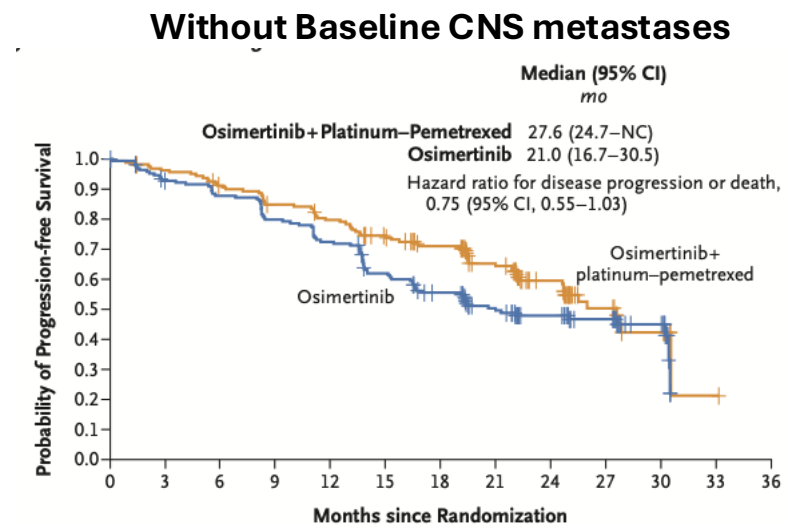
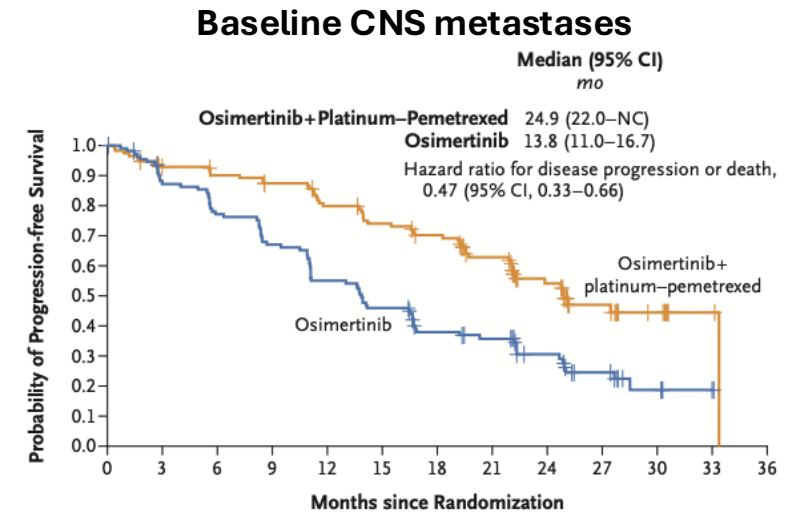
**20TH ANNIVERSARY OF LANDMARK FINDINGS**

# FLAURA2 – 1L Stage IV EGFR

Addition of platinum chemotherapy to osimertinib improves PFS

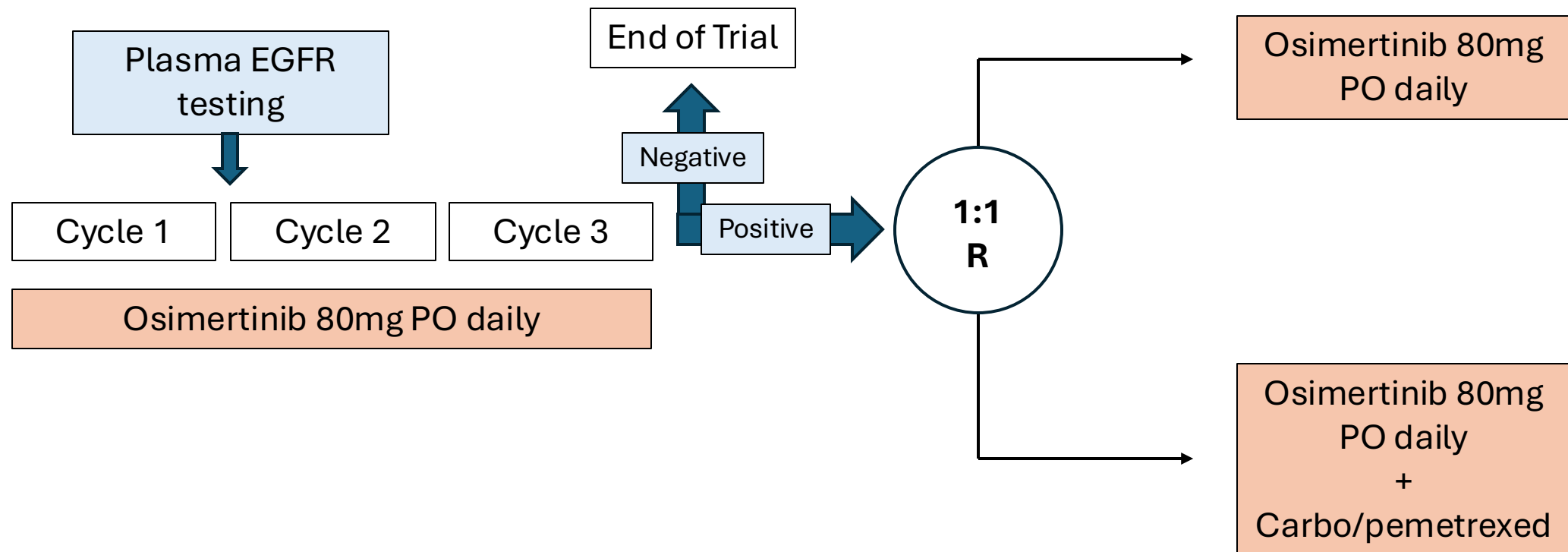


Greatest benefit for those with baseline CNS metastases



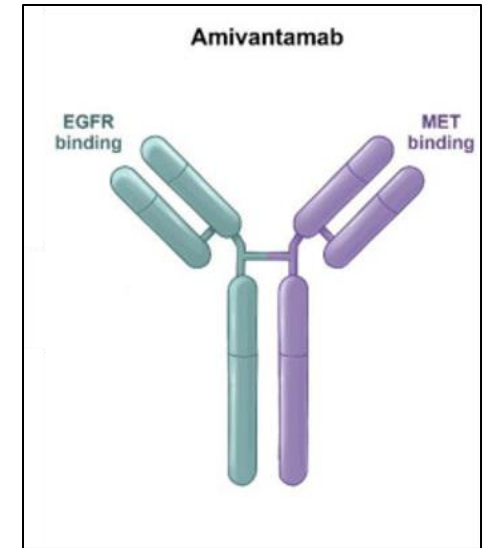
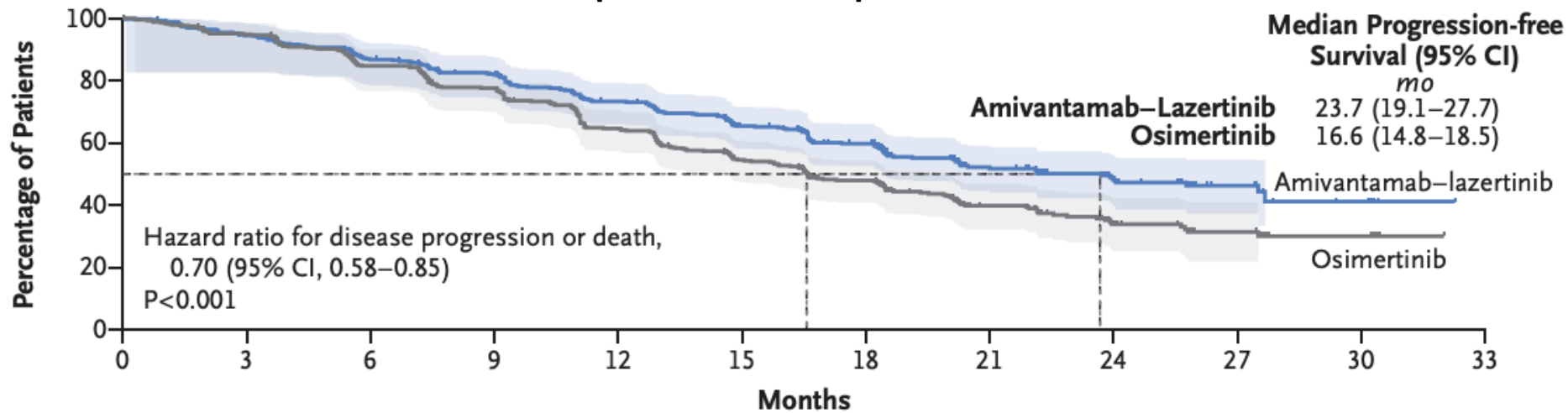


# Can we use cfDNA to identify who would benefit from treatment intensification with chemotherapy?



# MARIPOSA – 1L Stage IV EGFR

## Amivantamab-Lazertinib improves PFS compared to osimertinib



## Overall survival data are immature

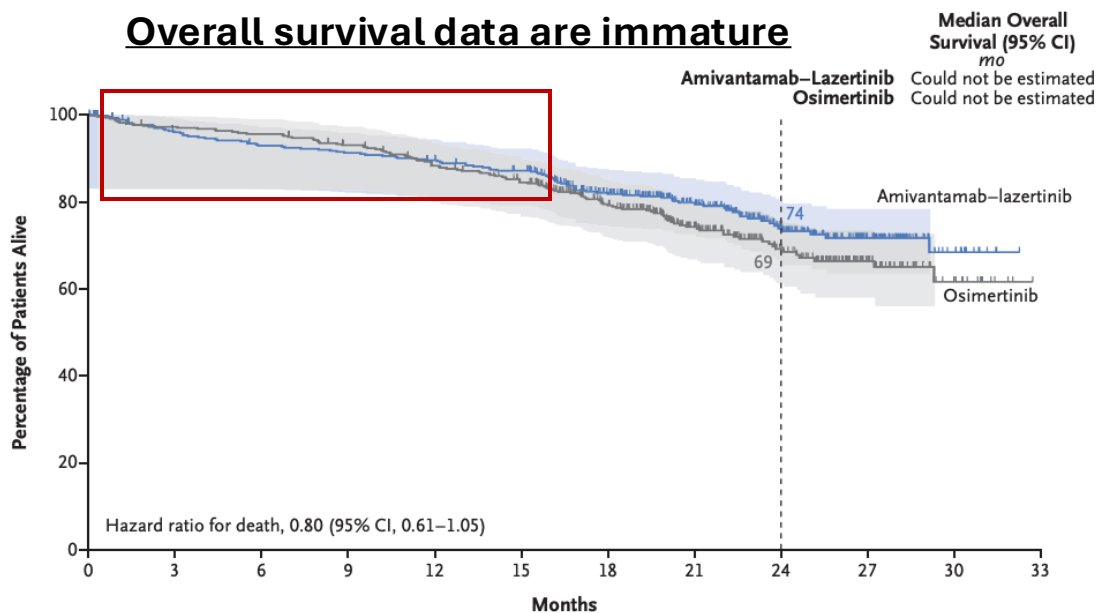
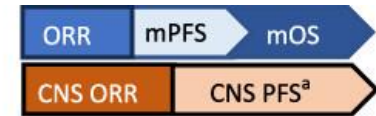


Table 3. Adverse Events.\*

Event	Amivantamab-Lazertinib (N=421)		Osimertinib (N=428)	
	All	Grade ≥3	All	Grade ≥3
Any event	421 (100)	316 (75)	425 (99)	183 (43)
Any serious event	205 (49)		143 (33)	
Any event resulting in death		34 (8)		31 (7)
Event leading to interruption of any trial agent	350 (83)		165 (39)	
Event leading to dose reduction of any trial agent	249 (59)		23 (5)	
Event leading to discontinuation of any trial agent	147 (35)		58 (14)	

# Stage IV Classical EGFR Mutations, 1L

## Efficacy of first-line treatment options in advanced EGFR-mutated NSCLC

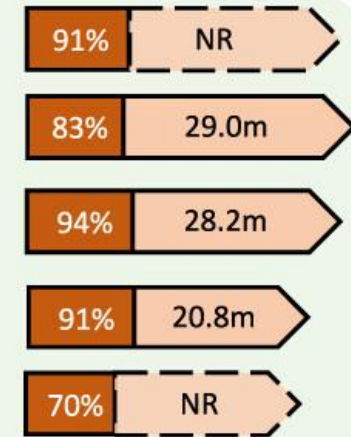
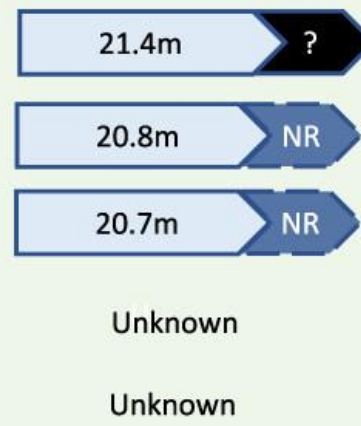
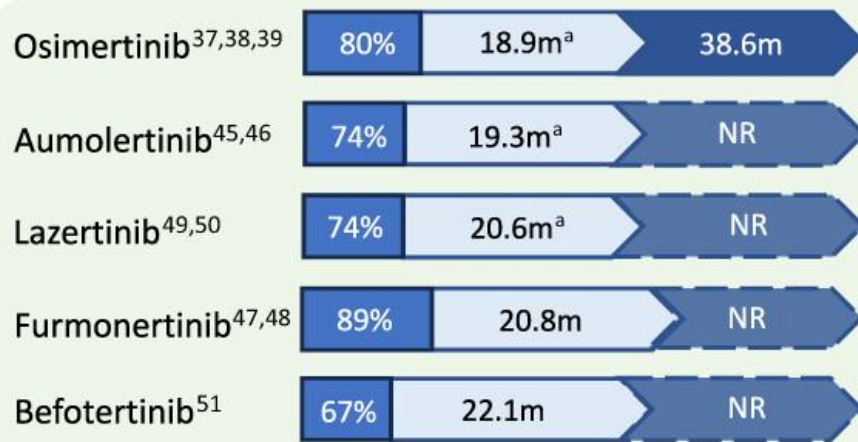


### 3G vs. 1G EGFR TKI

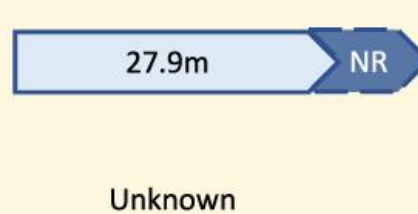
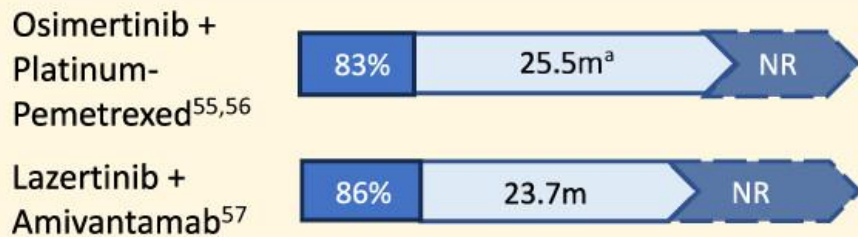
#### Overall

#### EGFR ex19del

#### EGFR L858R

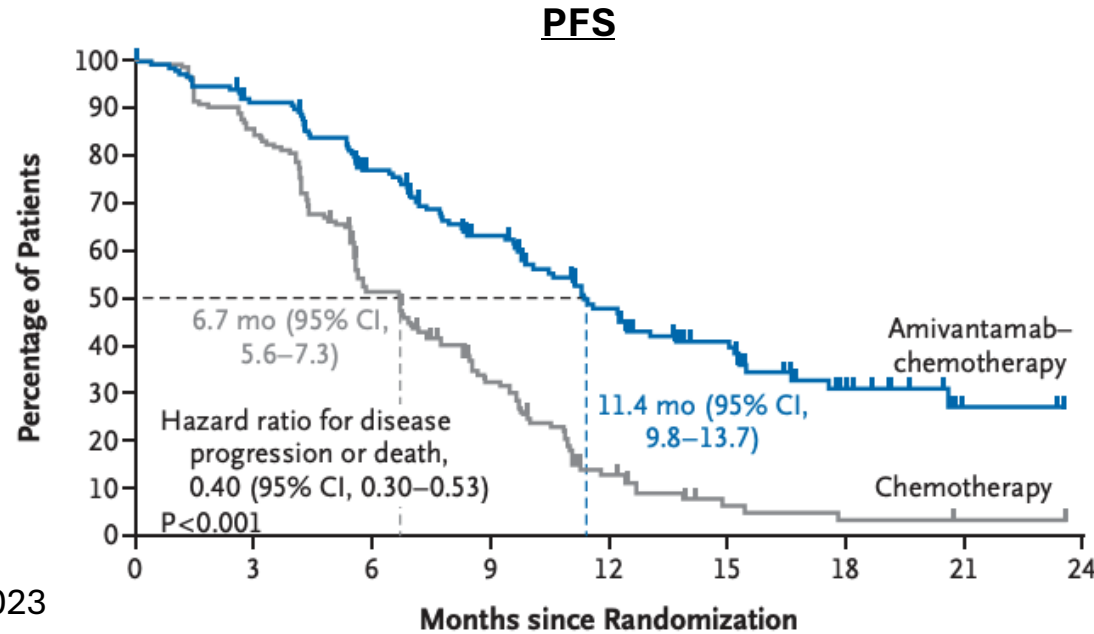


### Combination vs. 3G EGFR TKI



# EGFR Exon 20 Insertions, 1L

## PAPILLON: Amivantamab + chemotherapy

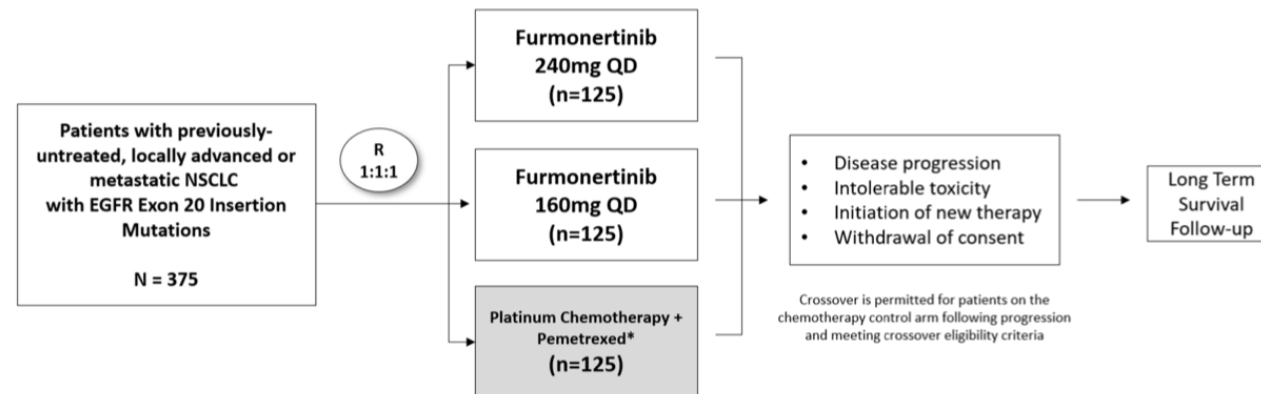


Zhou et al., NEJM, 2023

**Table 3. Adverse Events.\***

Adverse Events	Amivantamab–Chemotherapy (N=151)		Chemotherapy (N=155)	
	All Grades	Grade ≥3	All Grades	Grade ≥3
	<i>number of patients (percent)</i>			
Any event	151 (100)	114 (75)	152 (98)	83 (54)
Any serious event	56 (37)		48 (31)	
Any event resulting in death	7 (5)		4 (3)	
Any event leading to interruption of any agent	104 (69)		56 (36)	
Interruption in dose of amivantamab				
Any	97 (64)			
Related to amivantamab†	63 (42)			
Any event leading to reduction of any agent	73 (48)		35 (23)	
Reduction in dose of amivantamab				
Any	54 (36)			
Related to amivantamab†	54 (36)			
Any event leading to discontinuation of any agent	36 (24)		16 (10)	
Discontinuation of amivantamab				
Any	17 (11)			
Related to amivantamab†	10 (7)			
Discontinuation of all agents because of adverse events‡	12 (8)		12 (8)	

## FURMO-004: Furmonertinib versus chemotherapy



**Global, Phase 3 trial  
is ongoing**



# Stage IV Classical EGFR Mutations, 2L+

## MARIPOSA-2:

Amivantamab + chemotherapy

## ESMO 2024 Median OS from IA2

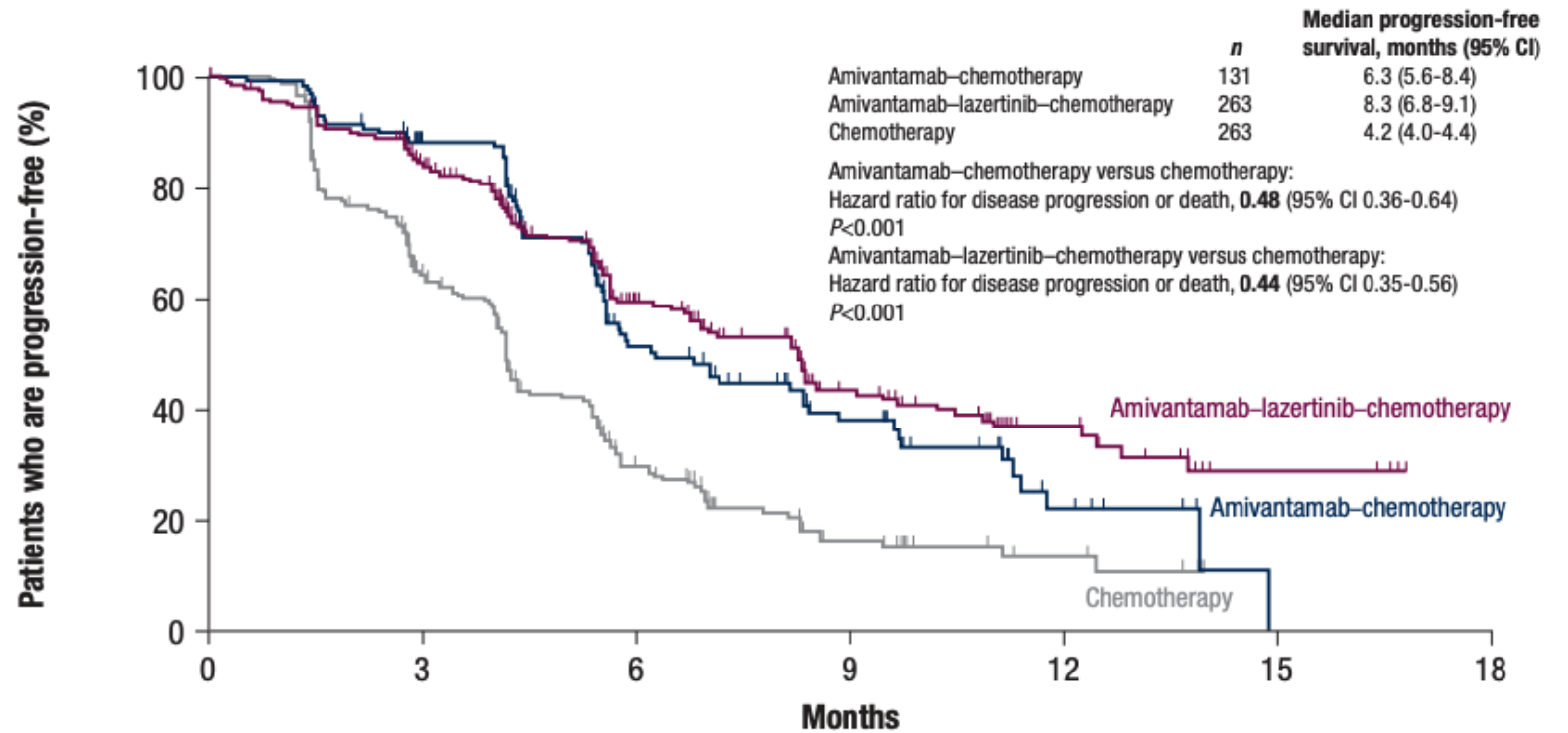
Ami-chemo: 17.7 months

Chemo: 15.3 months

Numerically improved with ami-chemo, did not yet meet prespecified significance

Amivantamab + chemotherapy very promising in the 2L+ setting.

Too much toxicity when Lazertinib is added to the amivantamab + chemotherapy



**Table 3. Treatment-emergent adverse events**

Event, n (%)	Chemotherapy (n = 243)	Amivantamab-chemotherapy (n = 130)	Amivantamab-lazertinib-chemotherapy (n = 263)
Any event	227 (93)	130 (100)	263 (100)
Grade ≥3	117 (48)	94 (72)	242 (92)
Any serious event	49 (20)	42 (32)	137 (52)
Any event resulting in death	3 (1)	3 (2)	14 (5)
Any event leading to:			
Interruptions of any study agent	81 (33)	84 (65)	202 (77)
Reductions of any study agent	37 (15)	53 (41)	171 (65)
Discontinuations of any study agent	9 (4)	24 (18)	90 (34)

# Stage IV Classical EGFR Mutations, 2L+

## HARMONI-A: Ivonescimab + chemotherapy

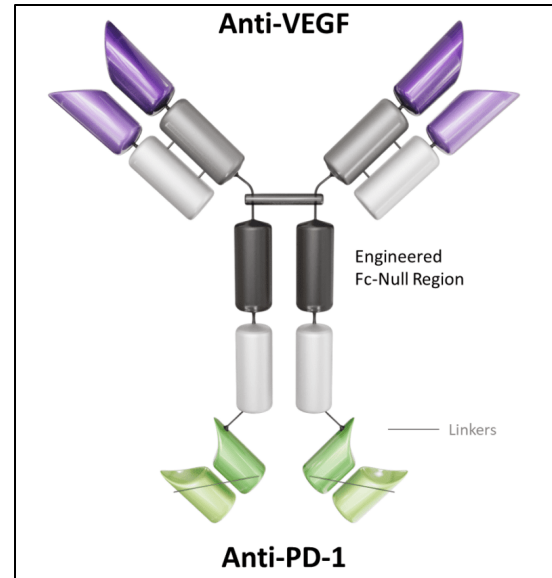
**Locally advanced or metastatic non-squamous NSCLC:**

- Positive sensitive EGFR mutation
- Progressed on 1<sup>st</sup>/2<sup>nd</sup> generation EGFR-TKI with negative T790, or on 3<sup>rd</sup> generation EGFR-TKI
- ECOG = 0 or 1
- Regardless of PD-L1 expression

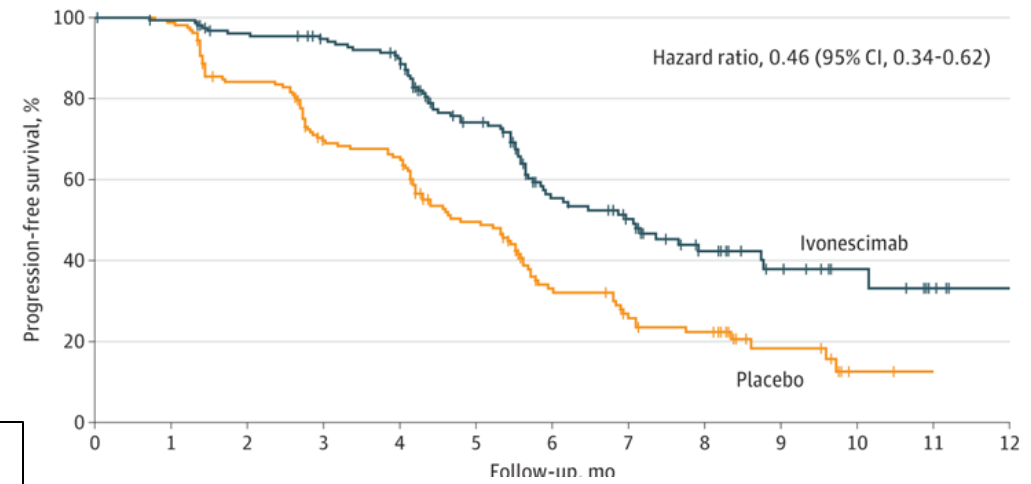


**Endpoints:**

- Primary**
  - OS, PFS assessed by irRC
- Secondary**
  - ORR by irRC, DoR, safety and tolerability



### Progression Free Survival



**Promising results with ivonescimab in the 2L+ setting in China. U.S. -based study is ongoing**

# HARMONi-2: Ivonescimab in NSCLC *without* EGFR or ALK, 1L

### Patient Population

- Stage IIIB-IV aNSCLC
- No prior systemic therapy
- No *EGFR* mutations or *ALK* rearrangements
- ECOG PS 0 or 1
- PD-L1 TPS  $\geq 1\%$

R  
1:1  
N=398

**Ivonescimab**  
20 mg/kg Q3W (N=198)

Treatment until no clinical benefit, unacceptable toxicity or up to 24 months

**Pembrolizumab**  
200 mg Q3W (N=200)

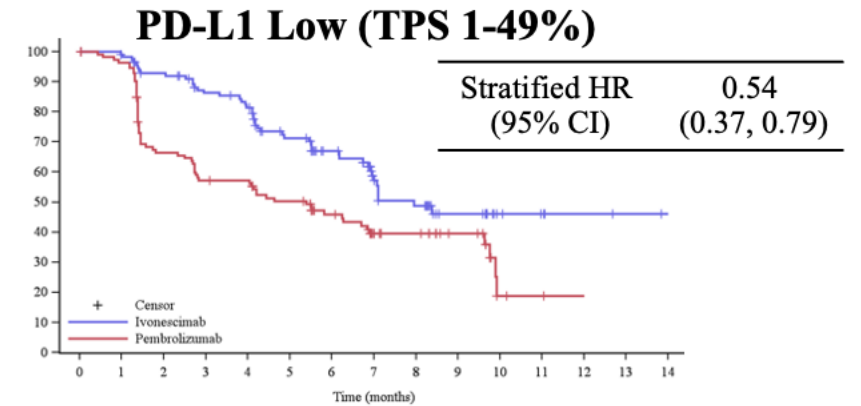
### Endpoints

- Primary:** PFS by blind IRRC per RECIST v1.1
- Secondary:** OS, PFS assessed by INVs, ORR, DoR, TTR and safety
- Exploratory:** QoL

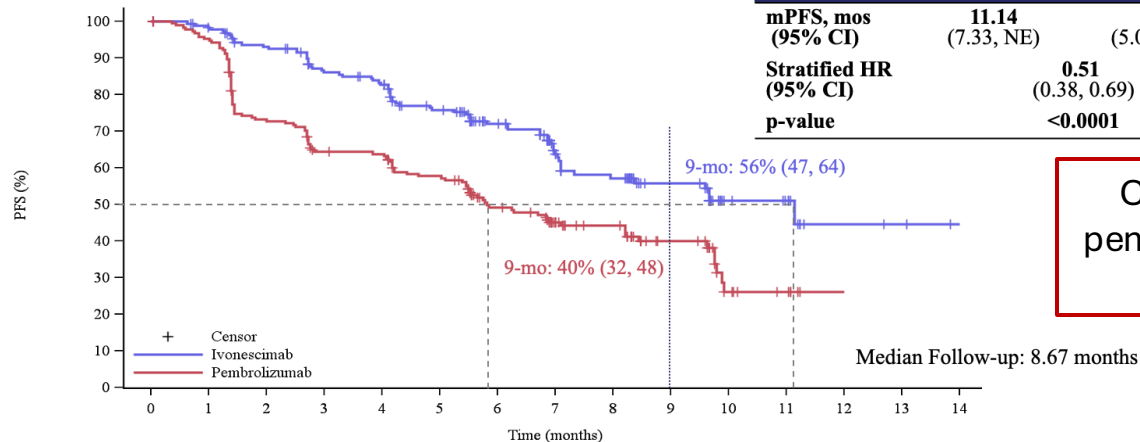
### Stratification

- Clinical stage (IIIB/C vs. IV)
- Histology (SQ vs. non-SQ)
- PD-L1 TPS ( $\geq 50\%$  vs. 1-49%)

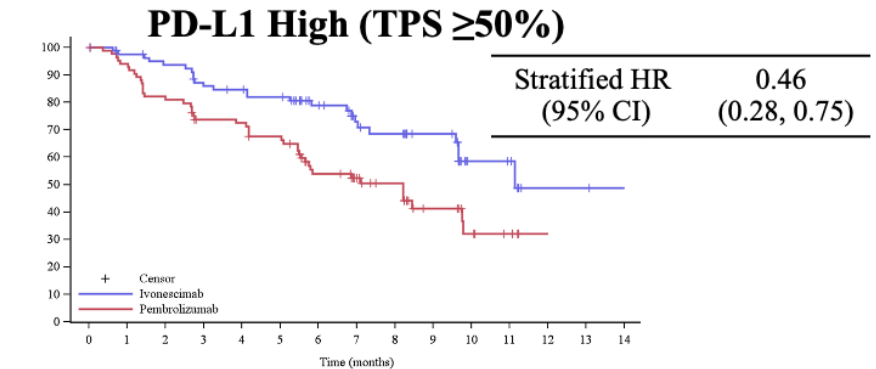
## PFS Benefit Observed Across PD-L1 Subgroups



## Primary endpoint: PFS per IRRC



Comparator arm was pembrolizumab alone (no chemotherapy)



# HARMONi-3: Ivonescimab + chemotherapy in squamous NSCLC, 1L

All PD-L1 subgroups included

(N=400)

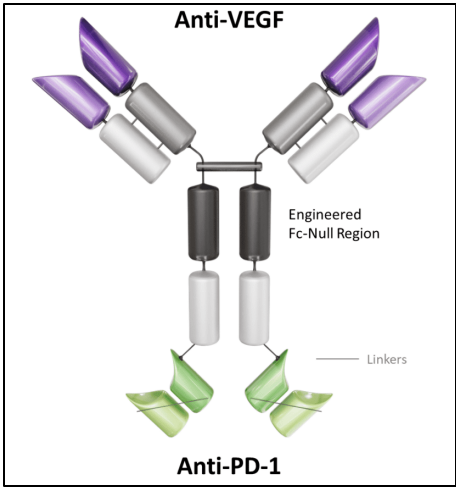
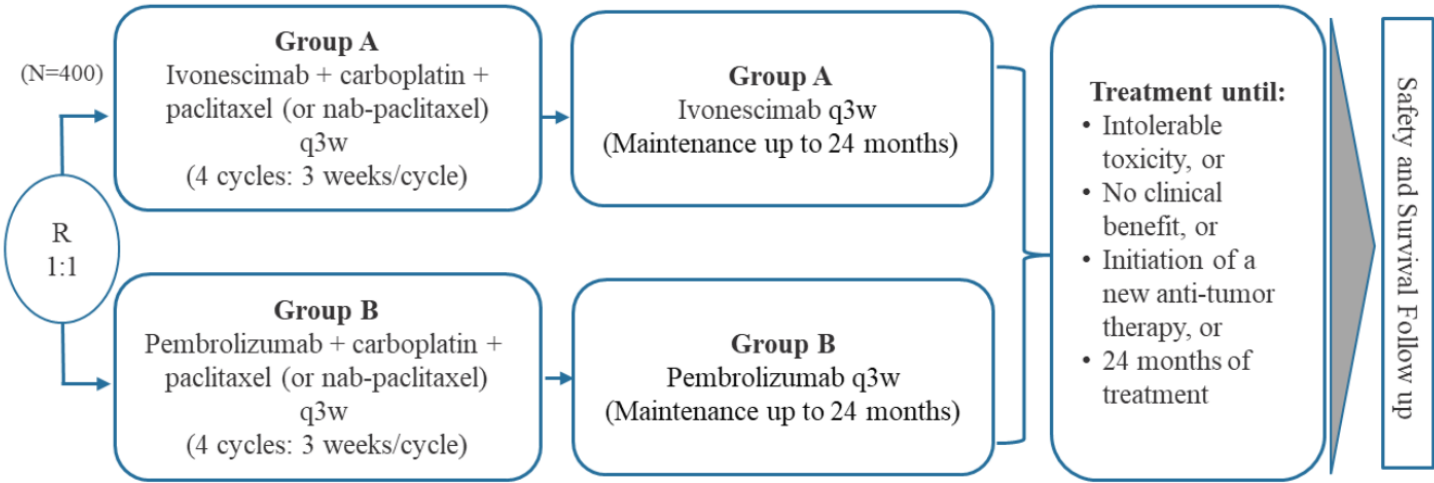
R 1:1

- Untreated metastatic squamous NSCLC
- ECOG 0 or 1

Stratification factors

- Sex (female vs male)
- Age (<65 vs ≥65 years)
- Geographic region: East Asia vs Rest of World
- Liver or brain metastases at study entry (present vs absent)

**Study Endpoints**  
 Primary endpoints: OS  
 Secondary endpoints: PFS, ORR, safety and tolerability

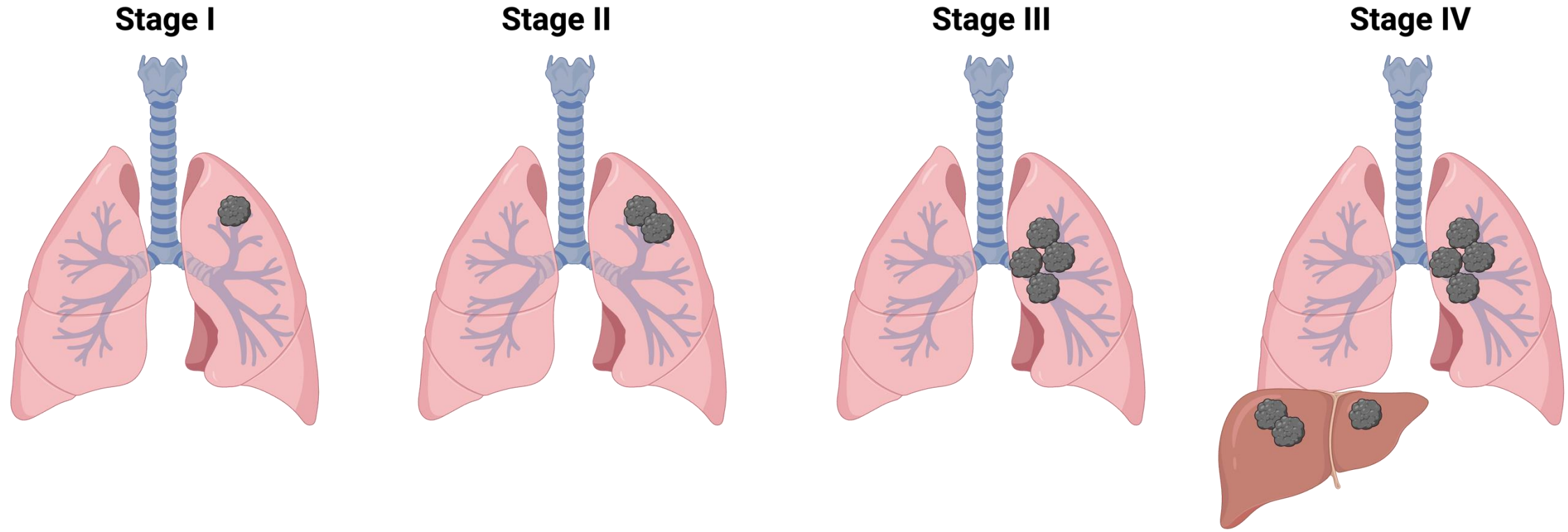


Randomization is 1:1 compared to chemotherapy + pembrolizumab

Phase 3 clinical trial is ongoing





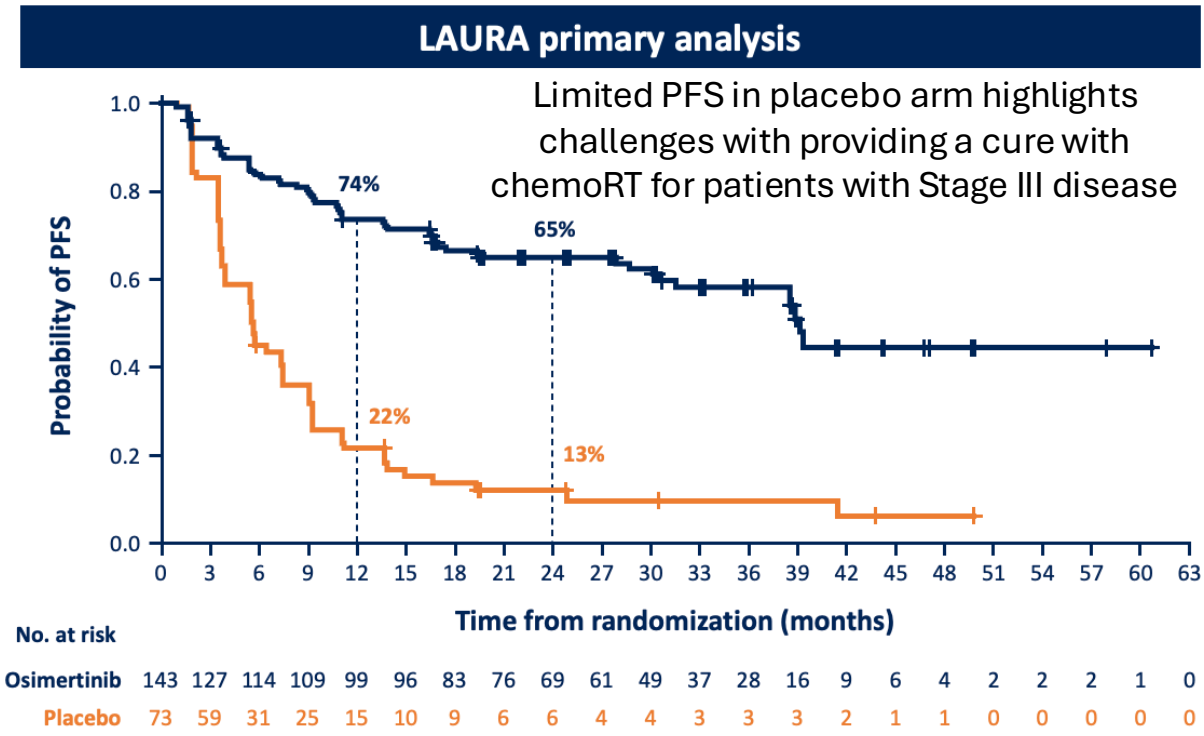
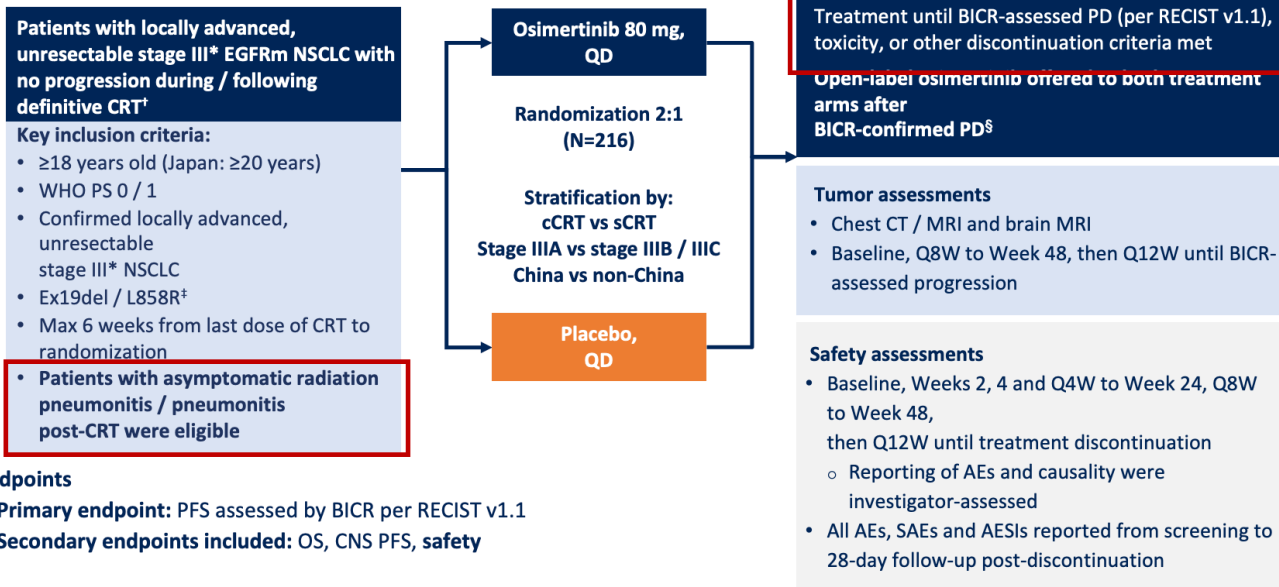


**Bringing therapeutic advances to earlier stages to potentially increase chances of providing a cure.**

# LAURA Clinical Trial

## Osimertinib after chemoRT for unresectable, locally advanced NSCLC

### LAURA Phase 3 double-blind study design (NCT03521154)



- Also, trend for improved OS with osimertinib, but data not mature
- Incidence of Grade ≥3 adverse events: 35% osimertinib versus 12% in placebo group

# This was a big year for EGFR...

	Classical EGFR Mutations	EGFR Exon 20 Insertion
<b>Stage III</b>	<ul style="list-style-type: none"> <li>Indefinite osimertinib after chemoradiation</li> </ul>	
<b>Stage IV 1L Setting</b>	<ul style="list-style-type: none"> <li>Osimertinib</li> <li>Osimertinib + chemotherapy</li> <li>Osimertinib + chemo based on cfDNA*</li> <li>Amivantamab + Lazertinib</li> </ul>	<ul style="list-style-type: none"> <li>Amivantamab + chemotherapy</li> <li>Furmonertinib*</li> </ul>
<b>Stage IV 2L + Setting</b>	<ul style="list-style-type: none"> <li>Amivantamab + chemotherapy</li> <li>Ivonescimab + chemotherapy*</li> </ul>	<ul style="list-style-type: none"> <li>Zipalertinib*</li> </ul>

\*Denotes approaches currently in clinical trials

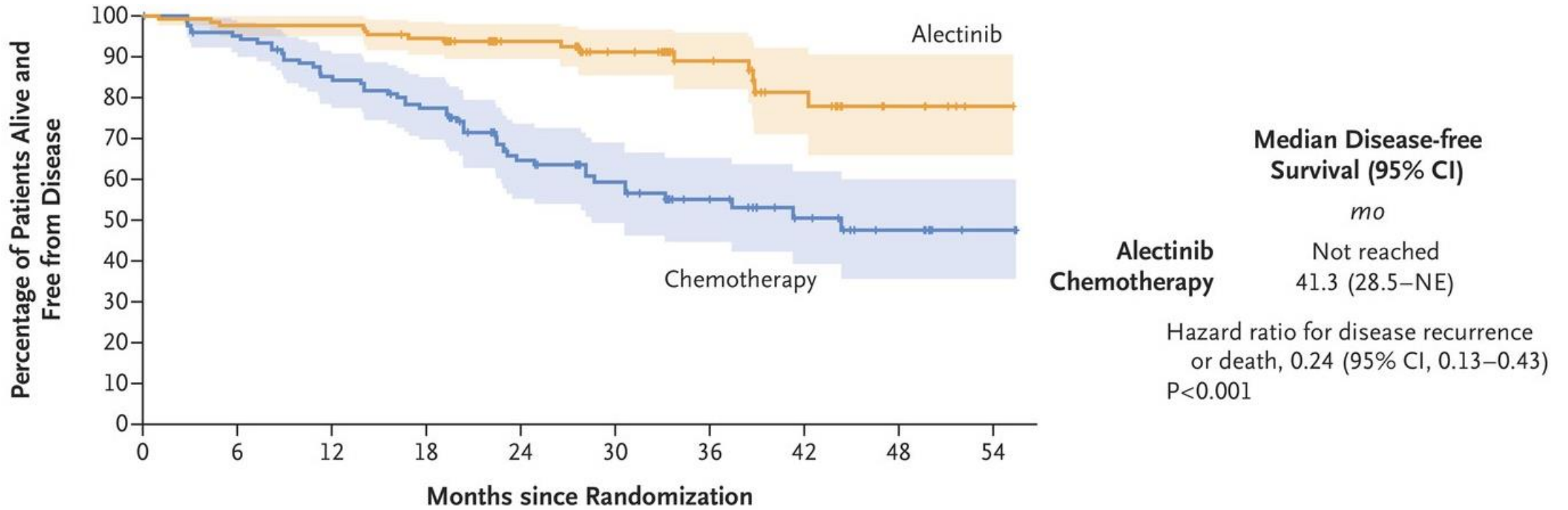
**Discovery of EGFR mutations  
dramatically changed lung  
cancer treatment**

**20TH ANNIVERSARY OF LANDMARK FINDINGS**



# ALINA Clinical Trial

Marked PFS benefit with adjuvant alectinib compared to chemotherapy after resection of Stage IB-IIIa NSCLC



	ALINA	ADAURA
Disease	Resected stage IB-IIIa ALK rearranged NSCLC	Resected Stage IB-IIIa EGFR mutated NSCLC
Treatment	Alectinib (2 years) <u>without</u> chemotherapy	Osimertinib (3 years); 60% <u>received</u> chemotherapy

***Should we be giving adjuvant chemotherapy before alectinib?***

# Neoadjuvant versus Perioperative

PERIOPERATIVE STRATEGY

NEOADJUVANT STRATEGY

ADJUVANT STRATEGY

SURGERY

IMpower 010: CT → Atezolizumab 1 year



PD-L1 ≥50%

KEYNOTE 091: CT (Optional) → Pembrolizumab 1 year



After CT

CheckMate 816 : Nivolumab + CT x 3 cycles

SURGERY



PD-L1 ≥1%

CheckMate 77T : Nivolumab + CT x 4 cycles

SURGERY

Nivolumab 1 year

KEYNOTE 671: Pembrolizumab + CT x 4 cycles

SURGERY

Pembrolizumab 1 year



CHMP

AEGEAN: Durvalumab + CT x 4 cycles

SURGERY

Durvalumab 1 year

NEOTORCH: Toripalimab + CT x 3 cycles

SURGERY

Toripalimab + CT x 1 → Toripalimab 1 year

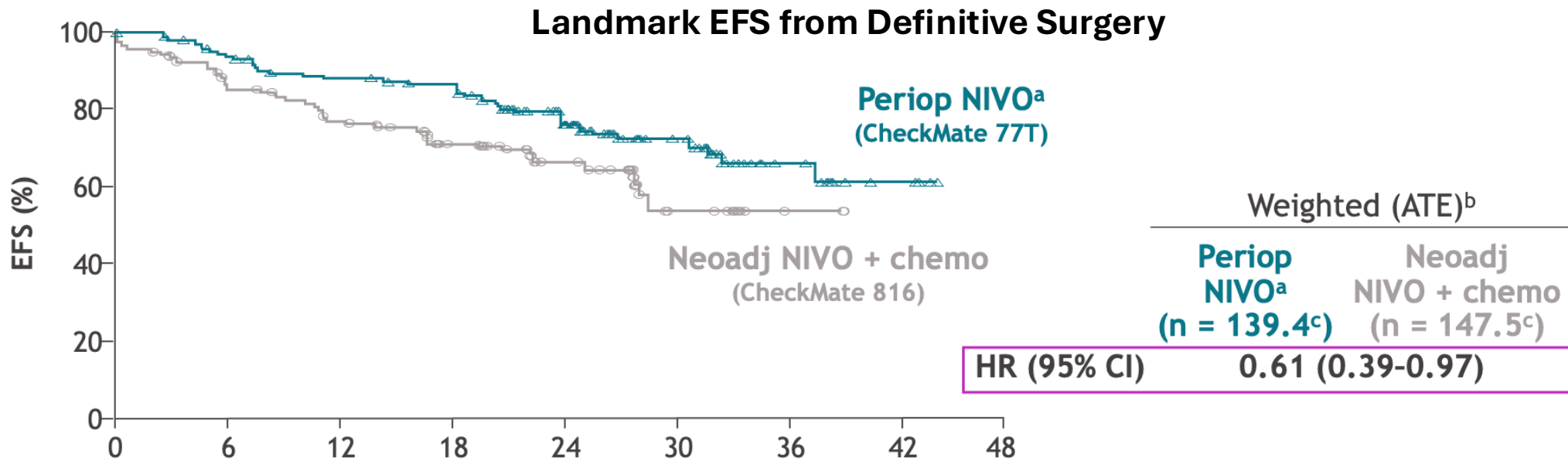
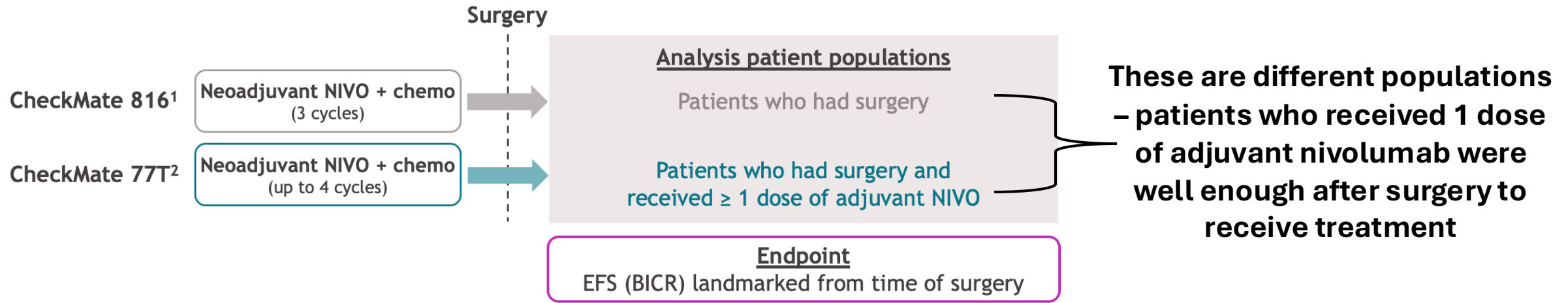
RATIONALE 315: Tislelizumab + CT x 3-4 cycles

SURGERY

Tislelizumab 1 year

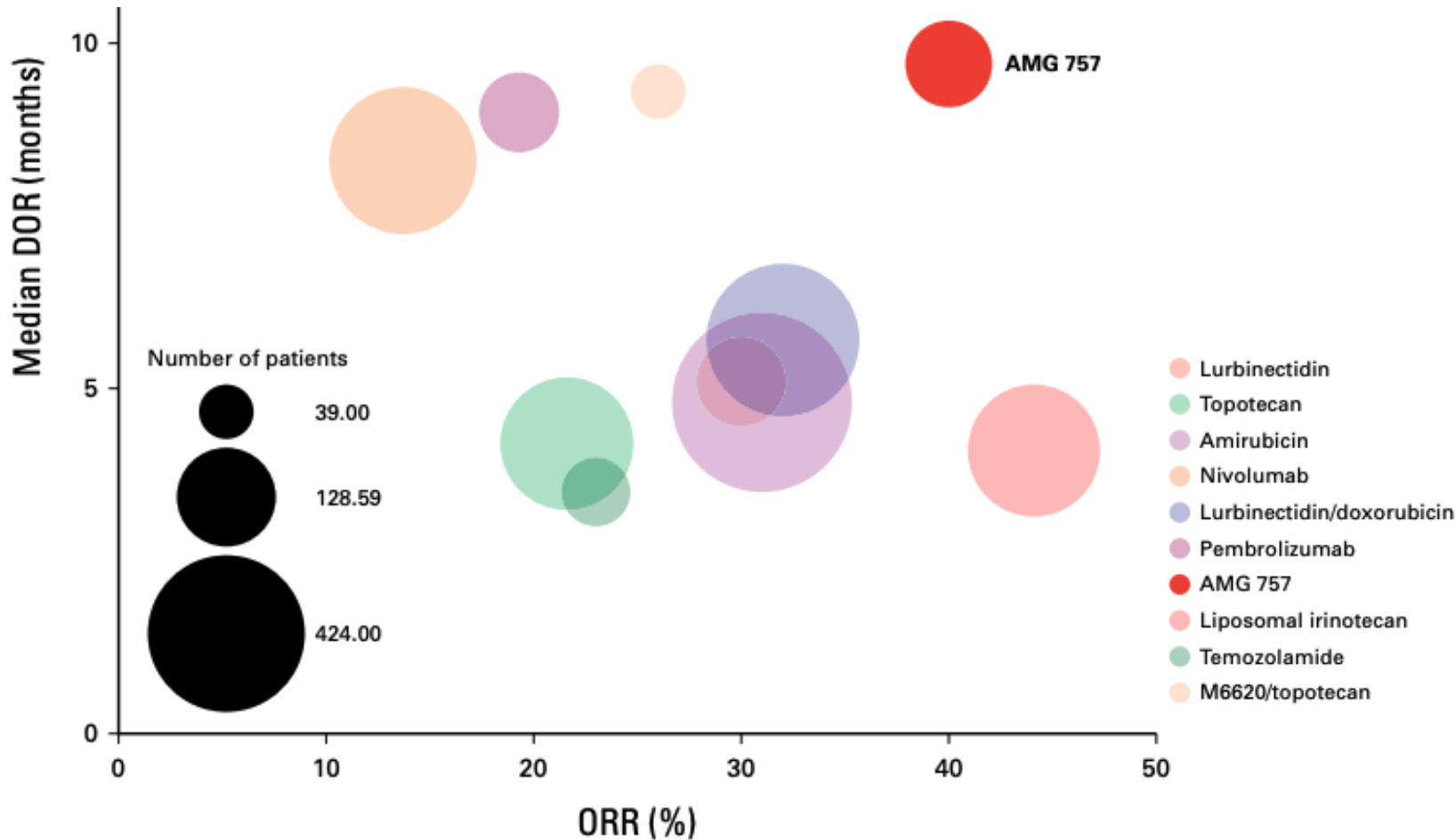
*How critical is this adjuvant nivolumab in the perioperative approach?*

# Perioperative versus neoadjuvant nivolumab

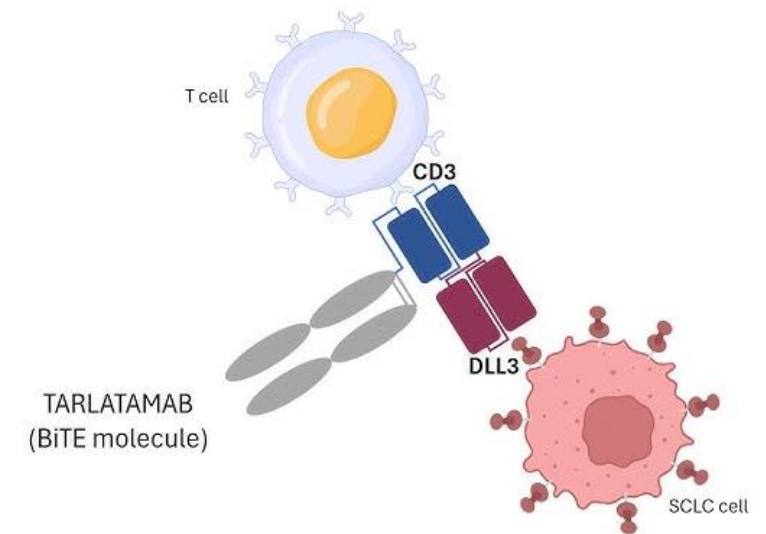


# Small Cell Lung Cancer: New Hope, New Challenges

### 2L+ SCLC Durations of Response Across Clinical Trials

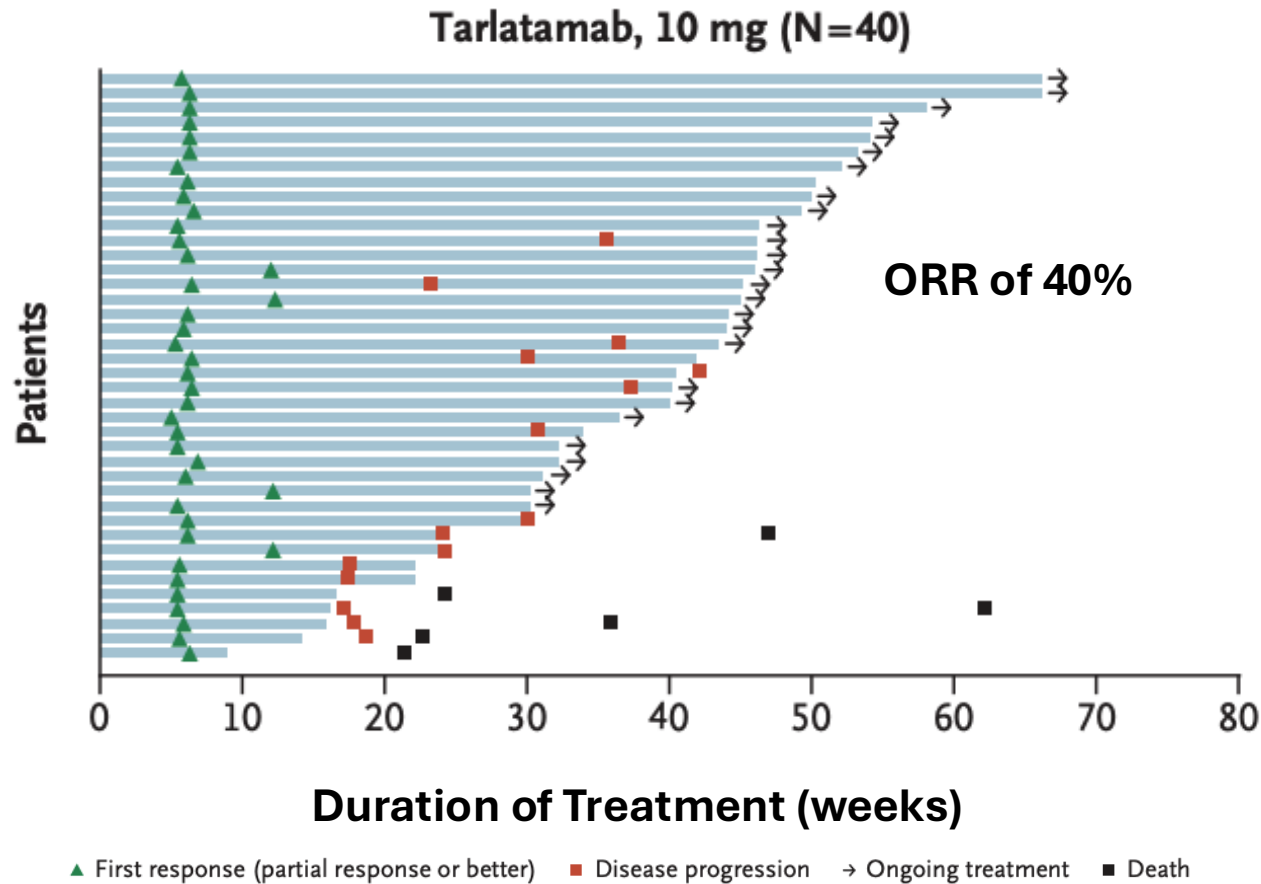


### Tarlatamab (AMG 757) is a Bispecific T Cell Engager (BiTE)





# FDA grants accelerated approval to tarlatamab-dlle for extensive stage small cell lung cancer



Previous use of PD-L1 or PD-1 inhibitor — no. (%)

Yes	73 (73)
No	27 (27)

Duration of sensitivity to platinum-based treatment — no. (%)§

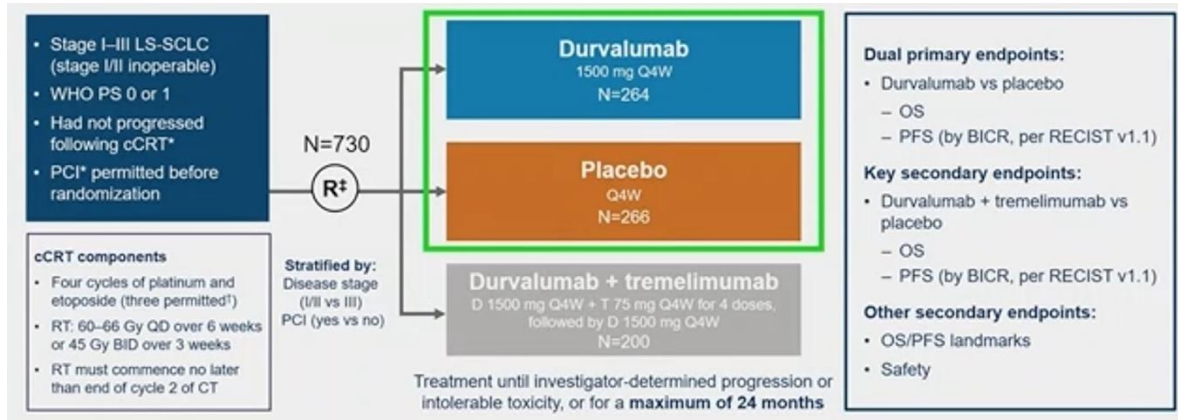
<90 days	28 (28)
90 to <180 days	22 (22)
≥180 days	20 (20)
Unknown	30 (30)
DLL3 expression — no./total no. (%)¶	80/83 (96)

**Table 3. Adverse Events (Safety Analysis Population).\***

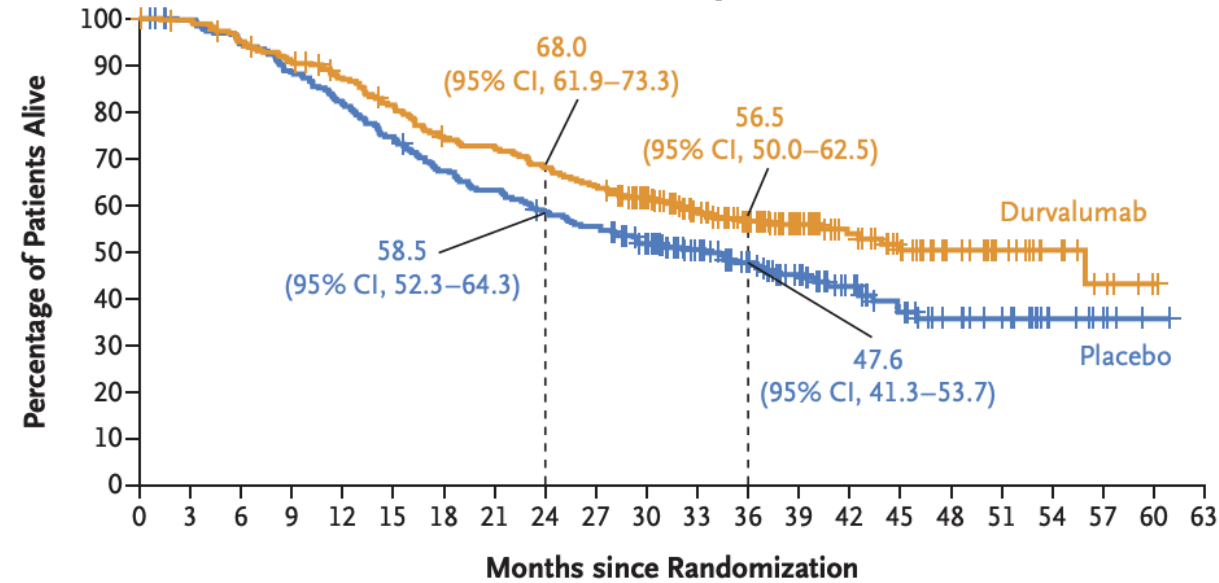
Adverse Events	Tarlatamab, 10 mg	
	Parts 1 and 2 (N=99)	Part 3, Reduced Monitoring (N=34)
Cytokine-release syndrome†		
Overall	49 (49)	19 (56)
Grade ≥3 severity	0	1 (3)
Serious	26 (26)	5 (15)
Leading to tarlatamab discontinuation	0	0
Fatal	0	0
ICANS and associated neurologic events‡		
Overall	7 (7)	4 (12)
Grade ≥3 severity	0	0
Serious	2 (2)	2 (6)
Leading to tarlatamab discontinuation	1 (1)	0
Fatal	0	0

# Improved Overall Survival with Consolidative Durvalumab

ADRIATIC: Phase 3, randomized, double-blind RCT



2 years of consolidative durvalumab associated with improved OS



	No. of Deaths/ Total No. (%)	Median Overall Survival (95% CI)
<b>Durvalumab</b>	115/264 (43.6)	55.9 (37.3–NR)
<b>Placebo</b>	146/266 (54.9)	33.4 (25.5–39.9)

Stratified hazard ratio for death, 0.73 (98.321% CI, 0.54–0.98)  
P=0.01

# Key Practice Changes in Lung Cancer

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**This was a big year...**

1L treatment of driver mutated, Stage IV NSCLC

- **Lorlatinib** for most people (ALK+)
- **Evolving 1L treatment options** other than osimertinib (classical EGFR+)
- **Amivantamab + chemo** (EGFR exon 20)

**Osimertinib indefinitely** after chemoradiation (EGFR+)

**Adjuvant alectinib** for 2 years after surgical resection (ALK+)

**Tarlatamab 2L+** for SCLC

**Consolidative durvalumab** for 2 years after chemoRT (early-stage SCLC)

**These advances are only possible through clinical trials**