

Optimal Adjuvant Treatment for Resected NSCLC

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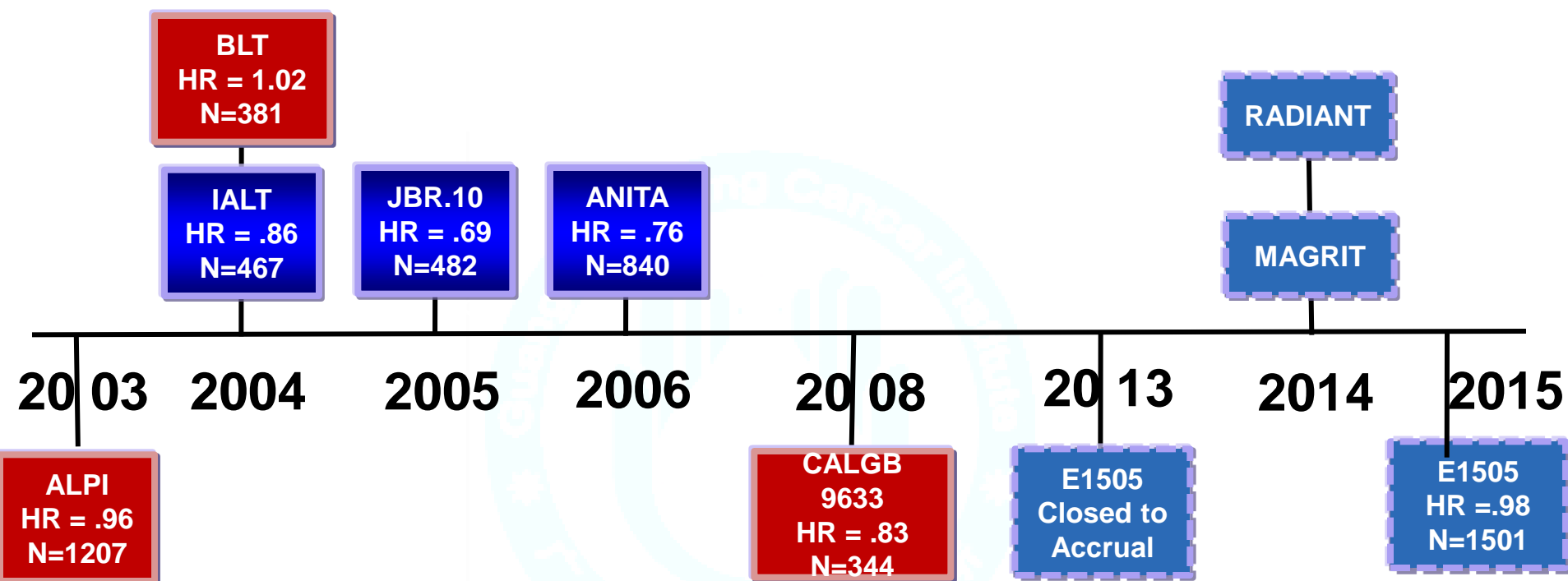
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Guangzhou/P.R. China

Disclosure

- Conducting research sponsored by Roche, Boehringer-Ingelheim, AstraZeneca, Pfizer, Novartis, BMS;
- Received the honorarium from Roche, AstraZeneca, Eli Lilly, Sanofi.

Adjuvant Therapy Timeline

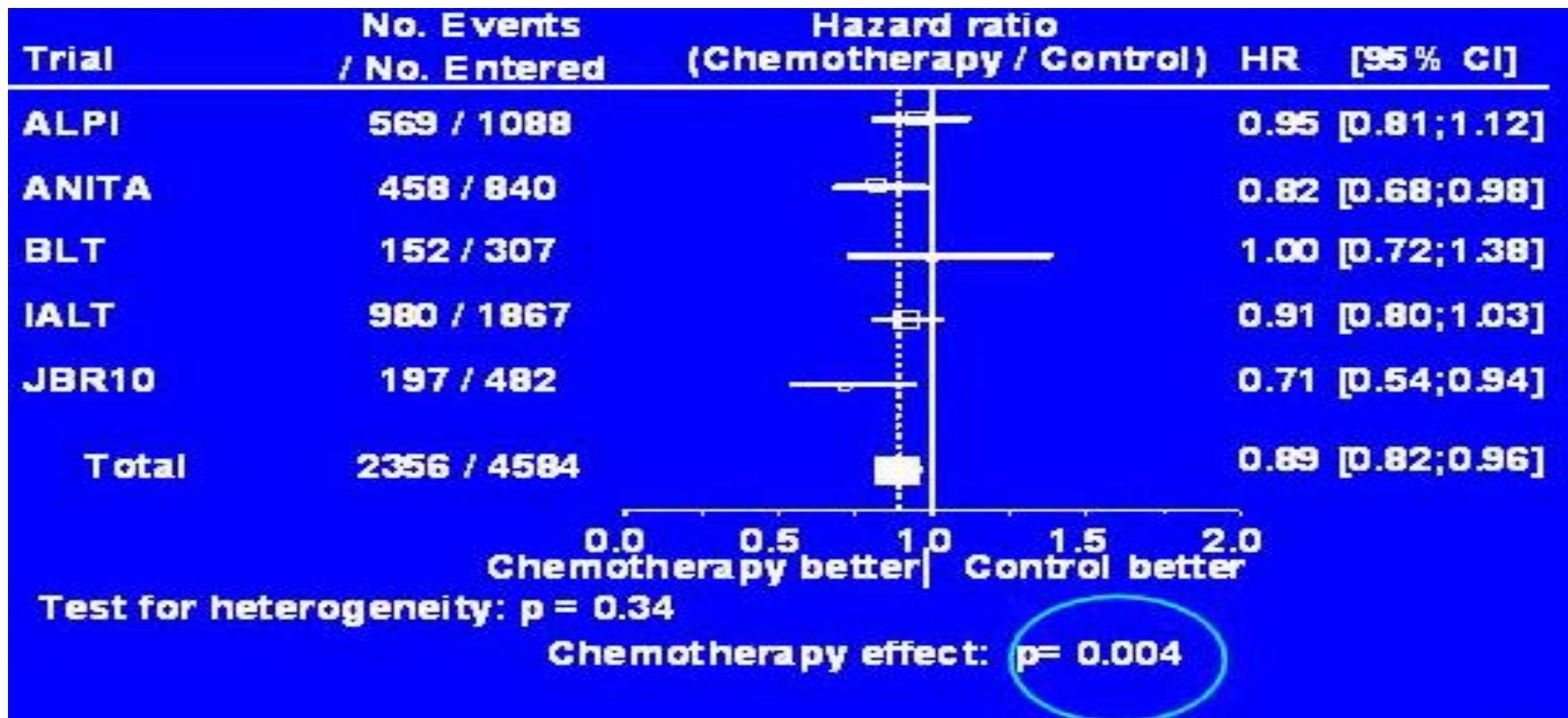


ALPI-MVP vs OBS Stage I-III A Scagliotti GV et al. *J Natl Cancer Inst* 2003; 95: 1453-61
 BLT-CPPP-based vs OBS Stage I-III Waller D et al. *Eur J Cardiothoracic Surg* 2004;26:173-182
 IALT-CDDP-based vs OBS Stage I-III Arriagada R et al. *N Engl J Med* 2004; 350: 350-61
 JBR.10-CDDP-VNR vs OBS Stage IB-II Winton T et al. *N Engl J Med* 2005; 352:2589-97
 ANITA-CDDP-VNR vs OBS Stage IB-III A Douillard JY et al. *Lancet Oncol* 2006; 7: 719-27
 CALGB 9633-PAC-CARBO vs OBS Stage IB Strauss GM et al. *J Clin Oncol* 2008; 26: 5043-51

IALT was first trial that confirmed ADJ in NSCLC, 2004

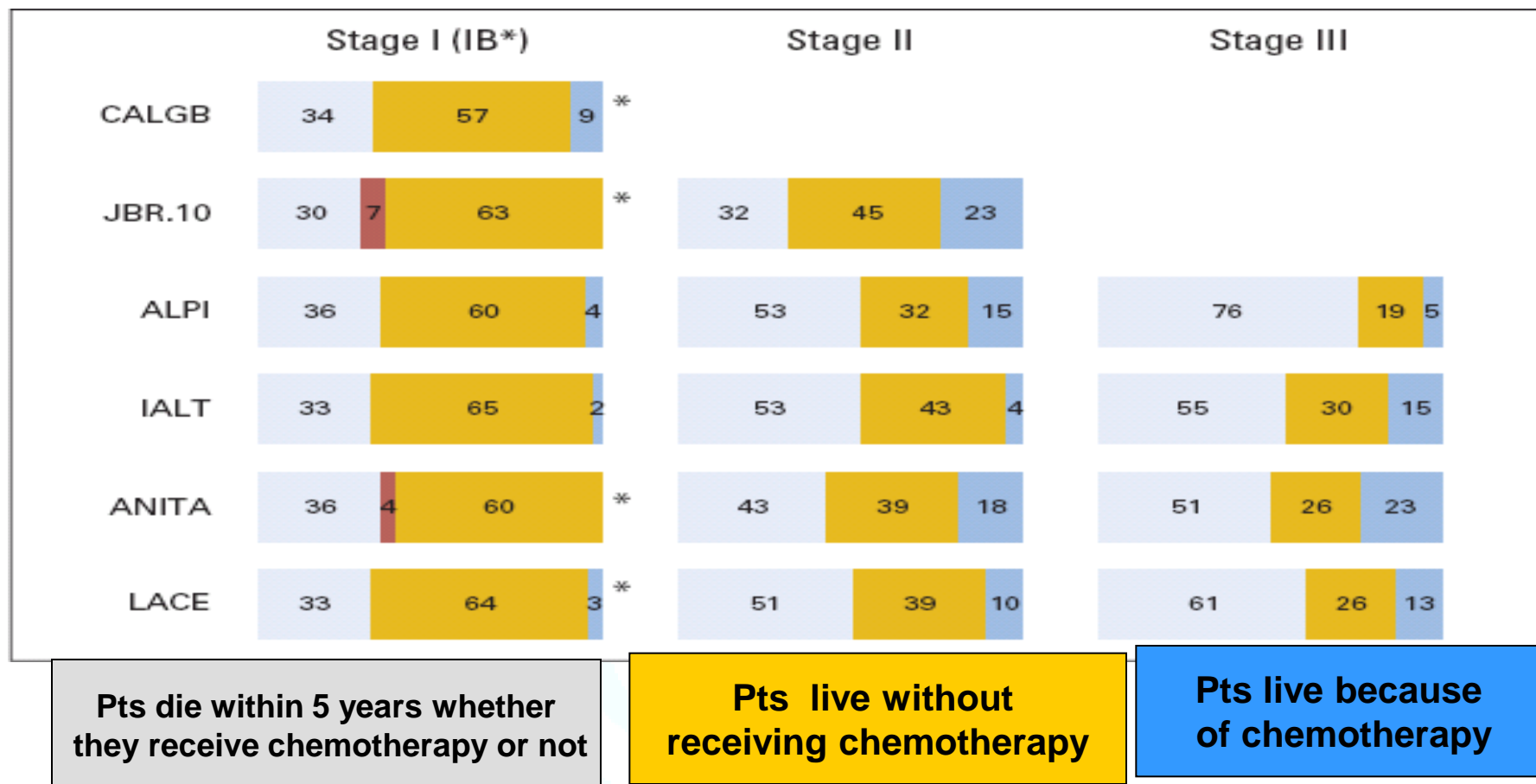
Cisplatin-Based Adjuvant Chemotherapy in Patients with Completely Resected Non-Small-Cell Lung Cancer

The International Adjuvant Lung Cancer Trial Collaborative Group*



LACE IPD SR: 4584 cases from 5 trials (JCO 2008,26:3552)

CCO & ASCO guideline 2007



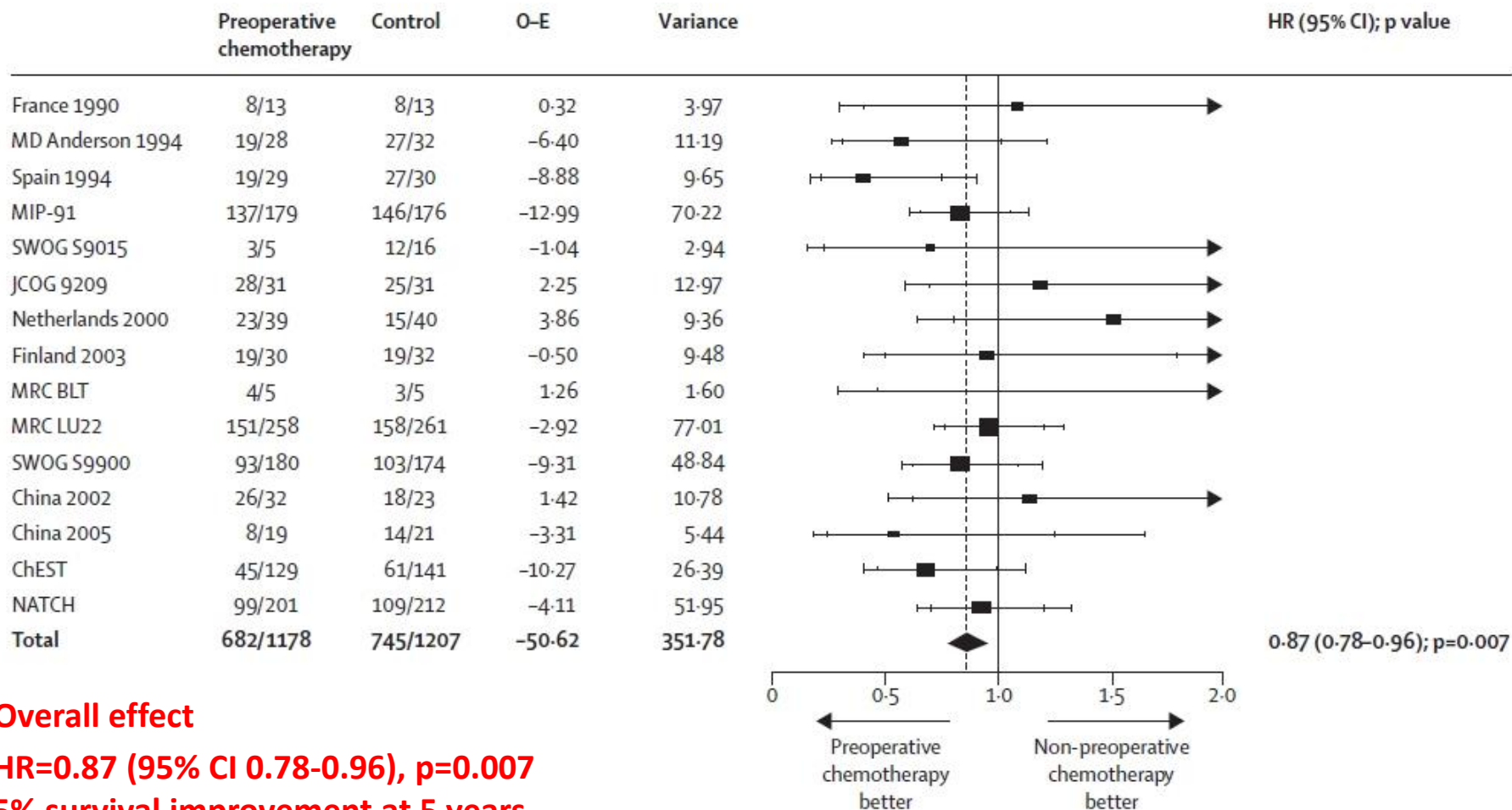
Estimated absolute risk and benefit for 100 patients with NSCLC

II、III期: To prevent one death at 5 years for every 15 patients treated.

I 期: To treat 43 patients to prevent one death

Neo-adjuvant: Overall survival

15 trials, 2385 patients, 1427 deaths



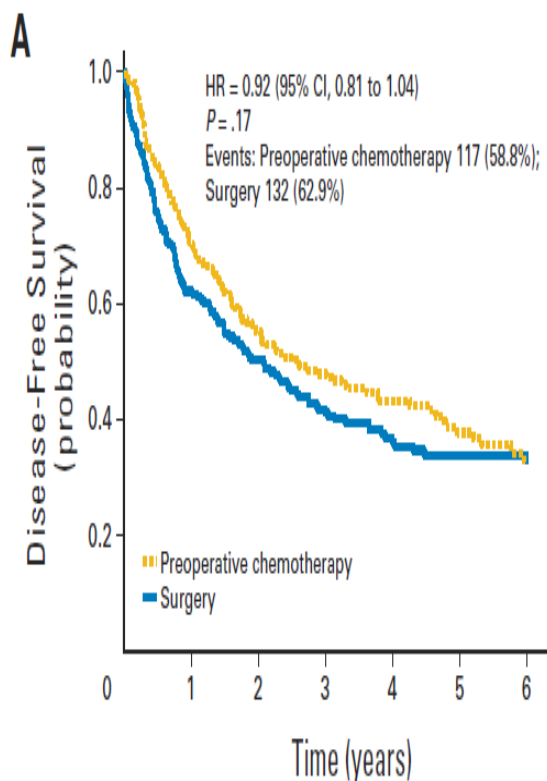
Overall effect

HR=0.87 (95% CI 0.78-0.96), p=0.007

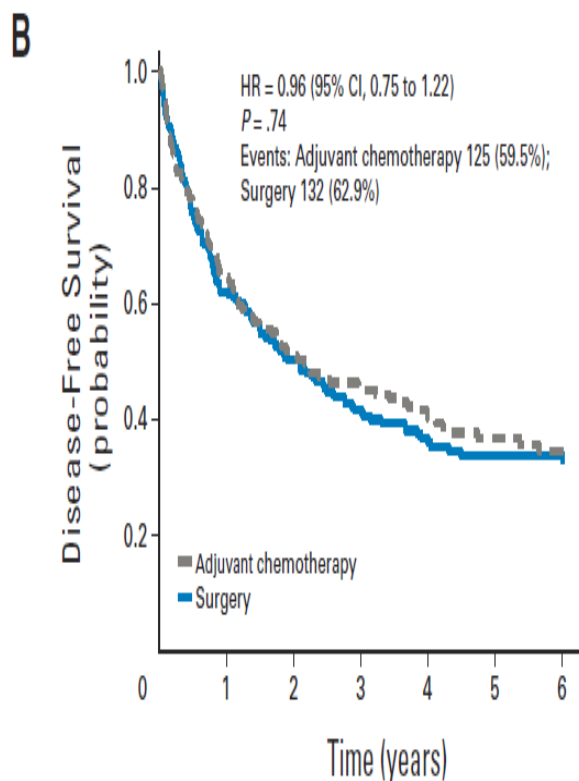
5% survival improvement at 5 years

Heterogeneity: chi-square=18.75, df=14, p=0.175, I²=25.35

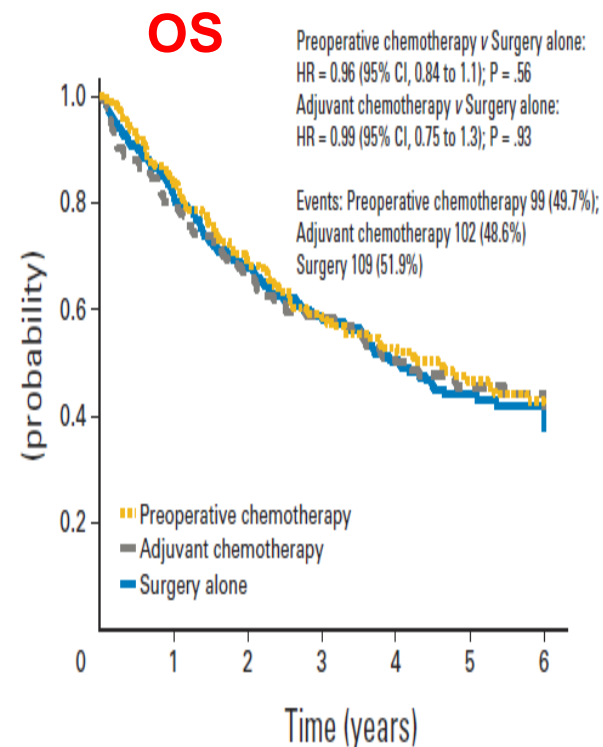
Preoperative Chemotherapy Plus Surgery Versus Surgery Plus Adjuvant Chemotherapy Versus Surgery Alone in Early-Stage Non-Small-Cell Lung Cancer



No. at risk						
Preoperative	140	105	81	57	37	26
Surgery	130	98	77	53	34	23



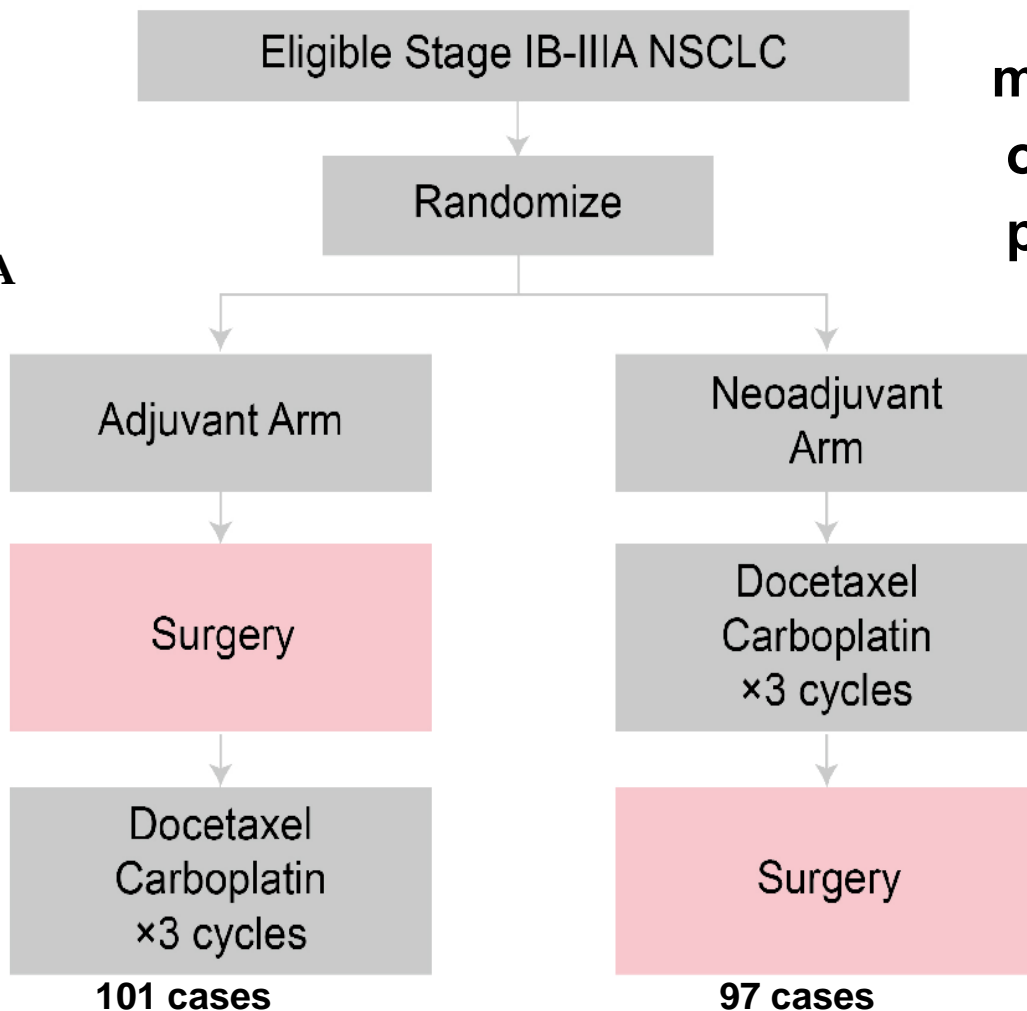
No. at risk						
Adjuvant	131	95	71	54	37	25
Surgery	130	98	77	53	34	23



No. at risk						
Preoperative	165	131	99	71	45	31
Adjuvant	161	121	90	65	40	29
Surgery	168	131	105	72	40	27

CSLC 0501: Neo vs adj in resected NSCLC

Stratification:
Center
IB VS II VS IIIA

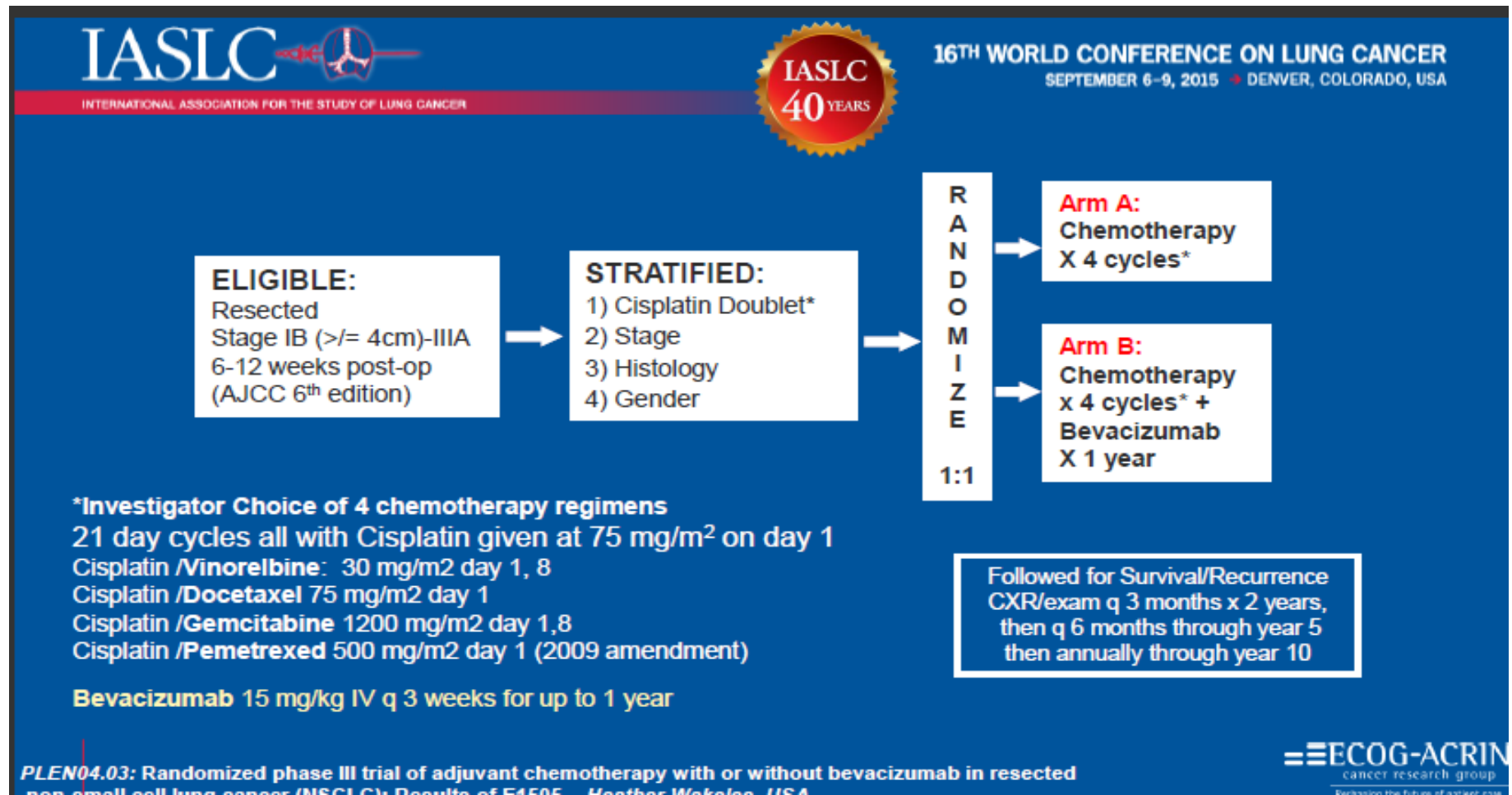


multi-center
open label
phase 3 trial

Estimated Enrollment :410

Start : Mar. 2006
Dec. 2010 (early closed)

Could we add a new drug in chemo double to improve survival?



SINGAPORE
2015

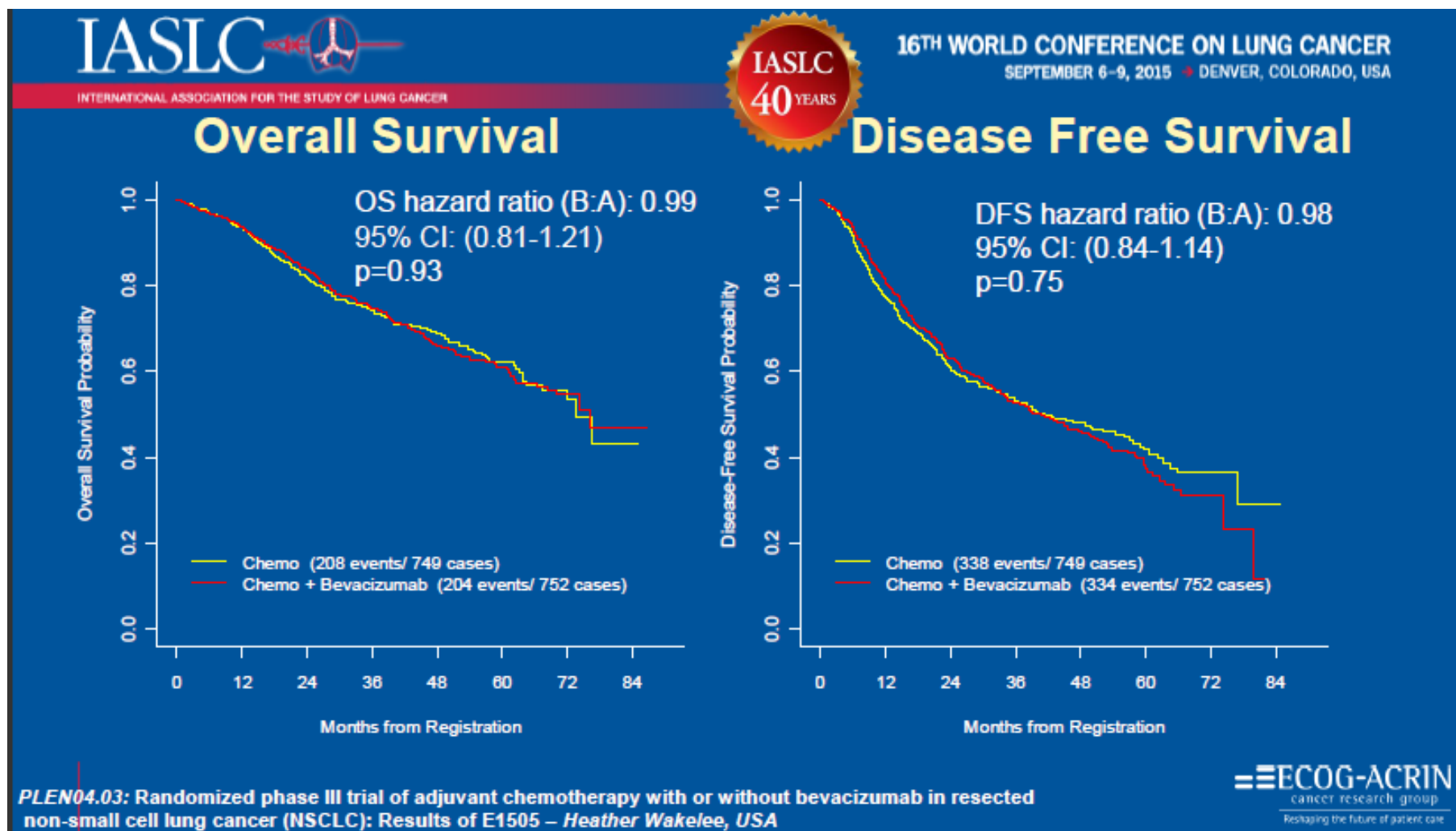
ESMO ASIA

18-21 DECEMBER
SINGAPORE



广东省肺癌研究所
Guangdong Lung Cancer Institute

E1505 not met its primary end point



MAGRIT, a double-blind, randomized, placebo-controlled phase III study to assess the efficacy of the recMAGE-A3 + AS15 cancer immunotherapeutic as adjuvant therapy in patients with resected MAGE-A3-positive non-small cell lung cancer (NSCLC)

- **Study objective**

- To determine if recMAGE-A3 + AS15 cancer immunotherapeutic (MAGE-A3 CI) as adjuvant therapy over 27 months improves DFS in patients with resected NSCLC

Key patient inclusion criteria

- Stages IB, II, IIIA NSCLC
 - Completely resected tumour
 - MAGE-A3-positive
 - PS 0–2
- (n=2,272)

R
2:1

**13 IM injections of MAGE-A3
CI
(n=1,515)**

PD

Stratification

- Chemotherapy

**13 IM injections of placebo
(n=757)**

PD

Primary endpoint

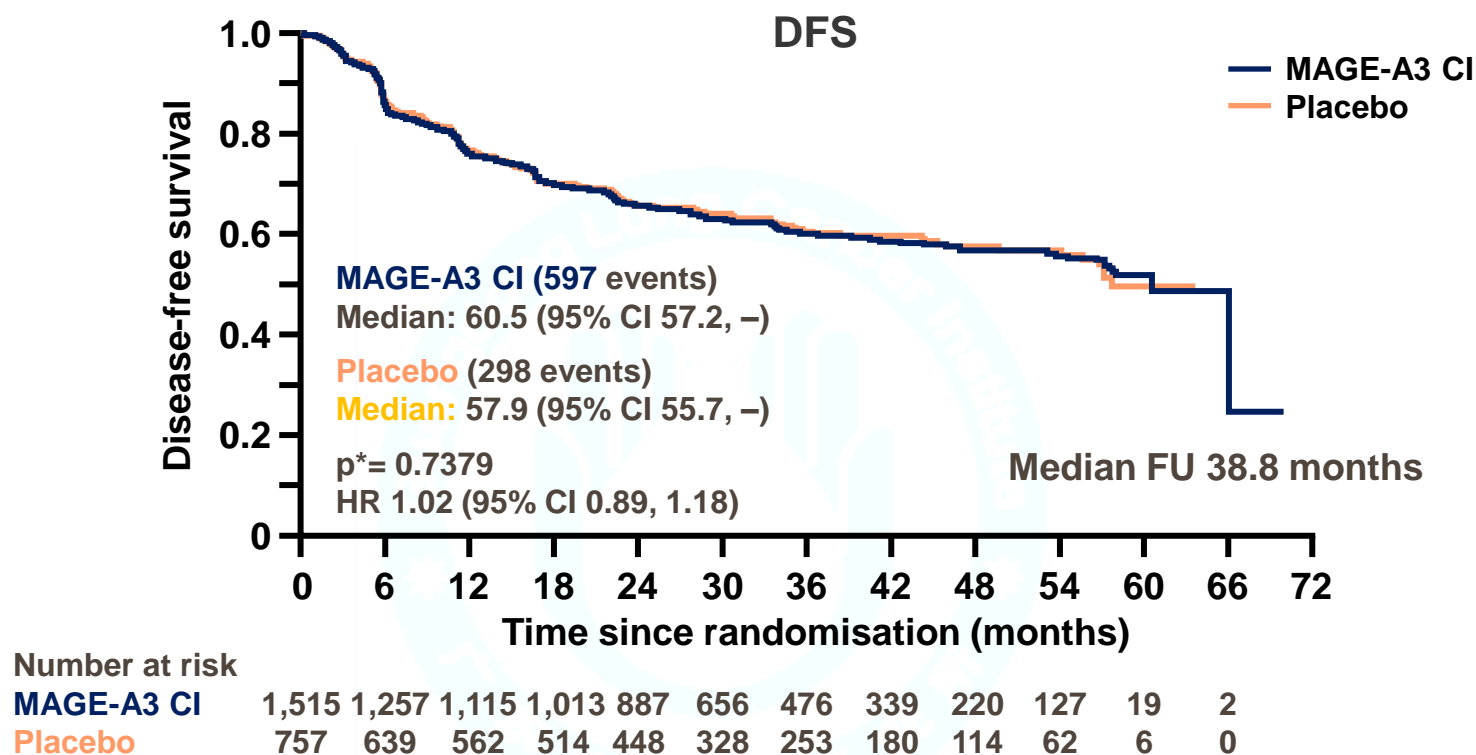
- DFS

Secondary endpoints

**OS, lung cancer specific survival,
immunogenicity**

Safety, health-related QoL

MAGRIT trial: Adjuvant vaccine therapy in patients with resected MAGE-A3-positive non-small cell lung cancer (NSCLC)



*Likelihood ratio test from Cox regression model stratified by chemotherapy and adjusted for baseline variables used as minimisation factors

Vansteenkiste et al. Ann Oncol 2014; 25 (suppl 4): abstr 11730

Summary: Current status of Adjuvant treatment

- Adjuvant and neo-adjuvant chemotherapy give 5% survival benefit for patients with resected stage 2-3A NSCLC
- Adjuvant chemo in stage 1b is controversy
- Adjuvant vaccine immunotherapy don't work in resected NSCLC
- New adjuvant therapy paradigm is an option

EGFR-TKI vs Chemotherapy in 1L EGFR-mu NSCLC

Trial	Patient Population	TKI	Pts No.	PFS (months)			OS (months)		
				TKI	Chemo	HR(95%CI)	TKI	Chemo	HR(95%CI)
EGFR mutation+ subgroup analysis in phase III trials									
IPASS	Asia, non-smoker	Gefitinib	261	9.5	6.3	0.48 (0.36-0.64)	21.6	21.9	0.78 (0.50-1.20)
First Signal	Korea, non-smoker	Gefitinib	42	8.4	6.7	0.61 (0.31-1.22)	30.6	26.5	0.82 (0.352-1.922)
Phase III trials in EGFR mutation+ patients									
NEJ002	Japan	Gefitinib	228	10.8	5.4	0.322 (0.236-0.438)	27.7	26.6	0.88 (0.634-1.241)
WJTOG3405	Japan	Gefitinib	172	9.6	6.6	0.520 (0.378-0.715)	35.5	38.8	1.185 (0.767-1.829)
OPTIMAL	China	Erlotinib	154	13.1	4.6	0.16 (0.10-0.26)	32.1	37.5	1.065
EURTAC	Caucasian	Erlotinib	174	9.7	5.2	0.37 (0.25-0.54)	22.9	18.8	0.80 (0.47-1.37)
LUX-Lung3	Asia, non-Asia	Afatinib	345	11.1	6.9	0.58 (0.43-0.78)	27.3	24.3	0.81 (0.66-0.99)
LUX-Lung6	Asia	Afatinib	364	11.0	5.6	0.28 (0.20-0.39)			
ENSURE	China	Erlotinib	210	11.0	5.6	0.42 (0.27-0.66)	26.3	25.5	0.91 (0.63-1.31)

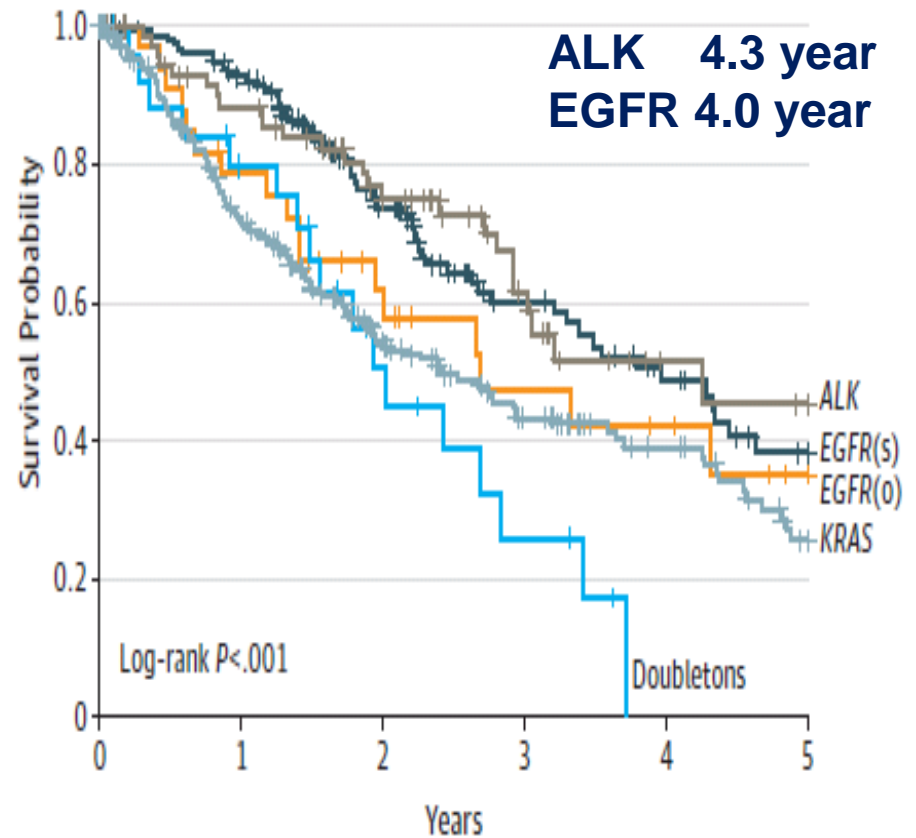
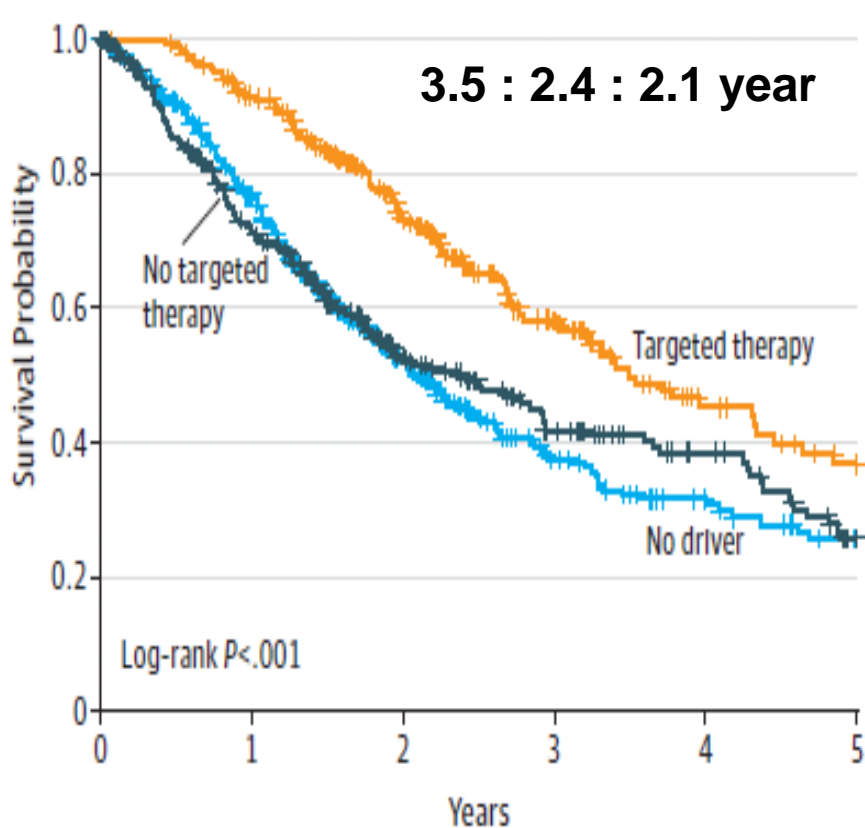
1. Mok, et al. NEJM 2009; 2. Han et al. JCO 2012. 3. Maemondo, et al. NEJM 2010; 4. Mitsudomi, et al. Lancet Oncol 2010; 5. Zhou, et al. Lancet Oncol 2011; 6. Rosell et al. Lancet Oncol 2012. 7. Sequist, et al. JCO 2013. 8. Wu et al. Lancet Oncol 2014 9. Wu et al. Ann Oncol 2015

EGFR-TKI vs Chemotherapy in 1L EGFR-mu NSCLC

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LUX-Lung3	Asia, non-Asia	Afatinib	345	11.1	6.9	0.58 (0.43-0.78)	Exon19 31.7 20.7 0.59 (0.45-0.77)		
LUX-Lung6	Asia	Afatinib	364	11.0	5.6	0.28 (0.20-0.39)			
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Target therapy has improved OS for advanced NSCLC with driver genes

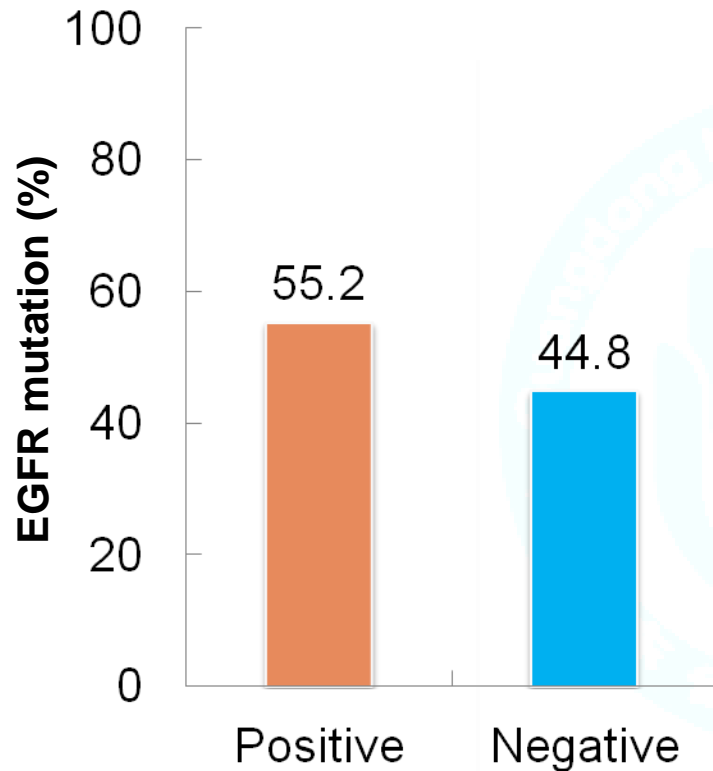


Knowledge Gaps

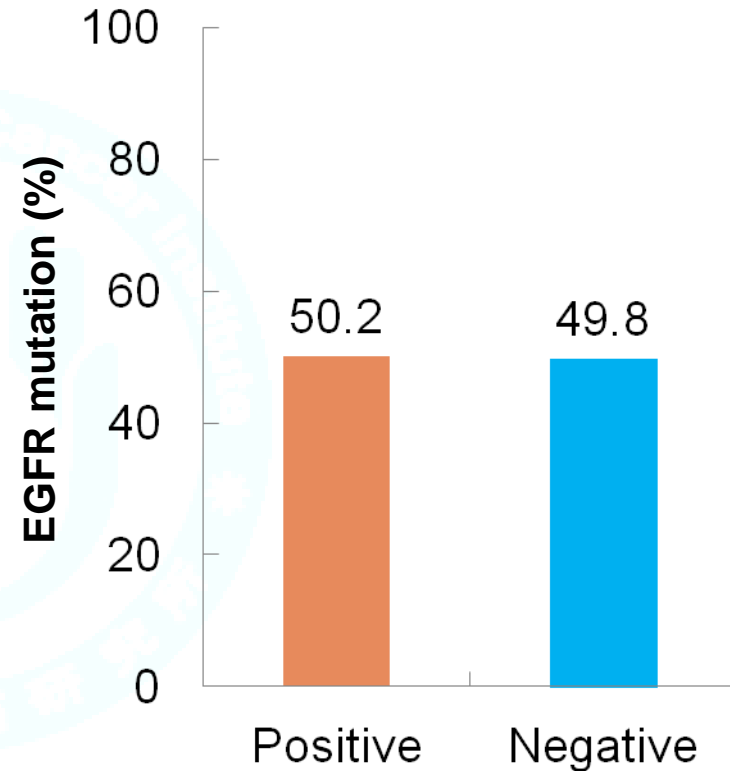
- **Could advantage of EGFR TKIs in advanced NSCLC translate to early NSCLC?**
- **Is EGFR mutation rate different between early stage and advanced NSCLC?**
- Heterogeneity in resected NSCLC
- What novel treatment strategies are being pursued?

EGFR mutation between early and advanced NSCLC

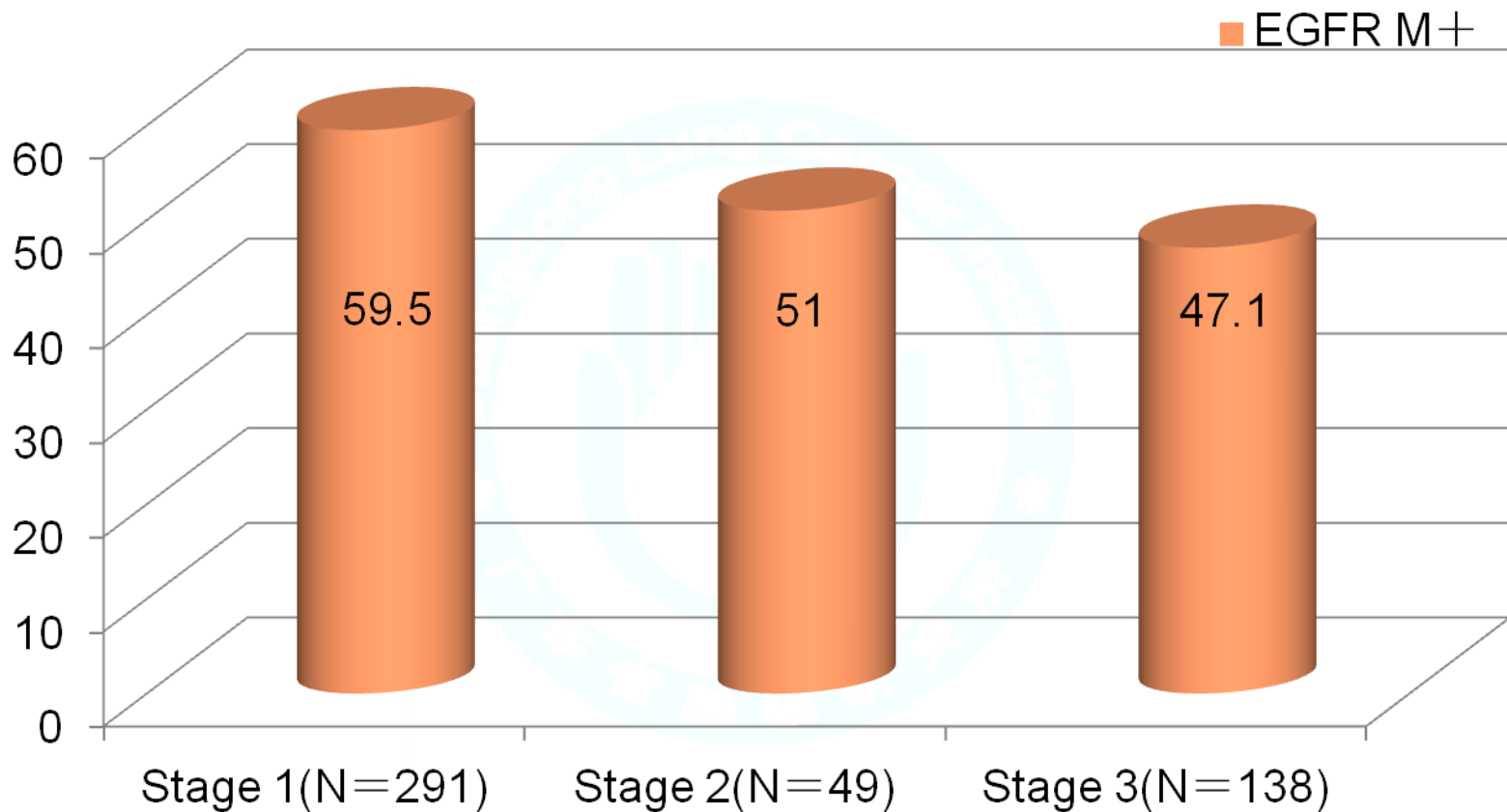
2013 ASCO Early stage NSCLC
ICAN



2012 ASCO Advanced NSCLC
PIONEER

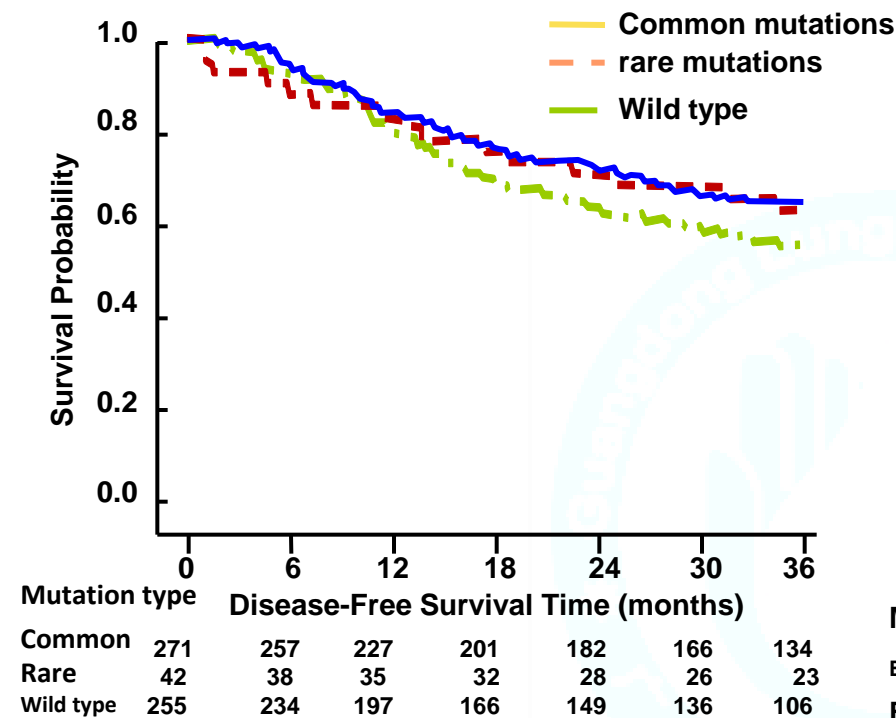


EGFR Mutation Rate by pStage



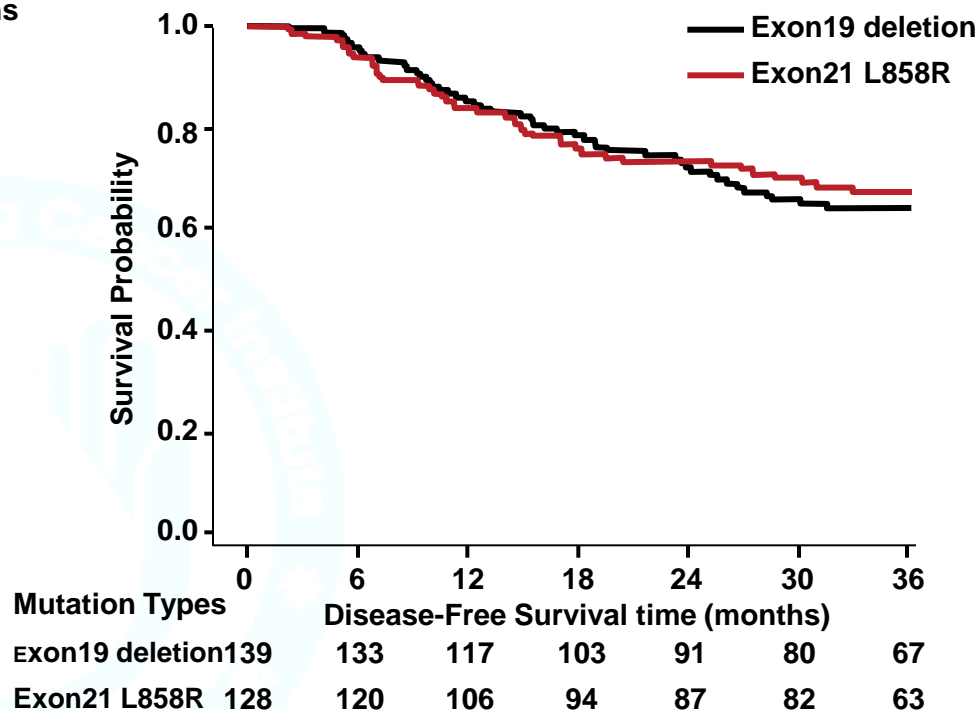
Results: 3-yr DFS rate

3-yr DFS
(Common Mut. vs. rare Mut. vs. wild type)



Mutation type	3-yr DFS rate(95% CI)	P Value*
Common mutation	66.0% (59.8%, 71.4%)	0.1021
Rare mutation	63.4% (46.7%, 76.1%)	
Wild type	56.8% (50.2%, 62.8%)	

3-yr DFS
(Exon19Del vs. Exon21 L858R)



Mutation type	3-yr DFS rate(95% CI)	P Value
exon19 deletion	63.8% (54.9%, 71.4%)	0.6864
exon21 L858R	67.2% (58.2%, 74.7%)	

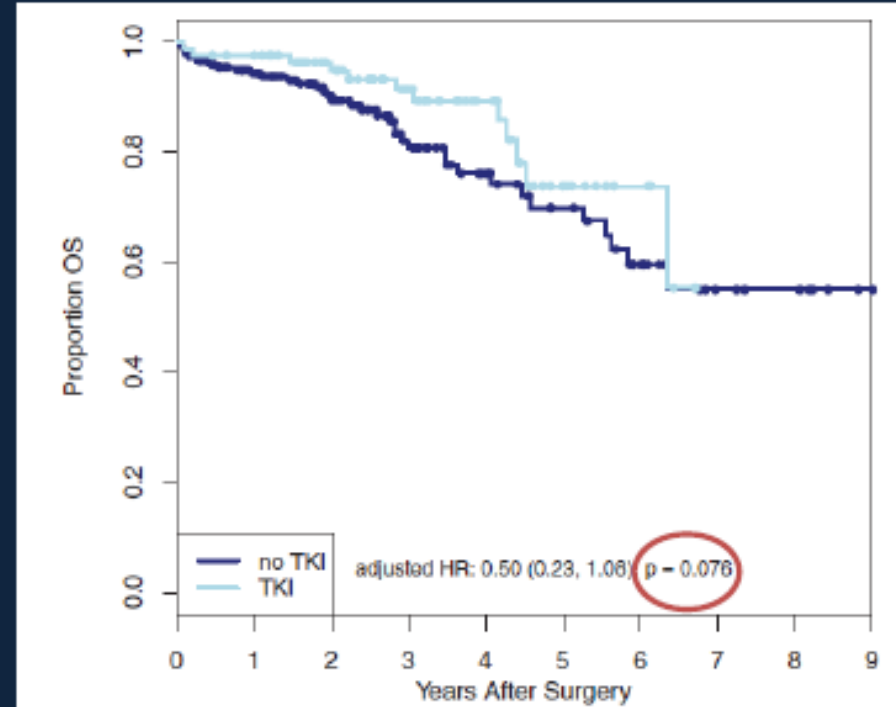
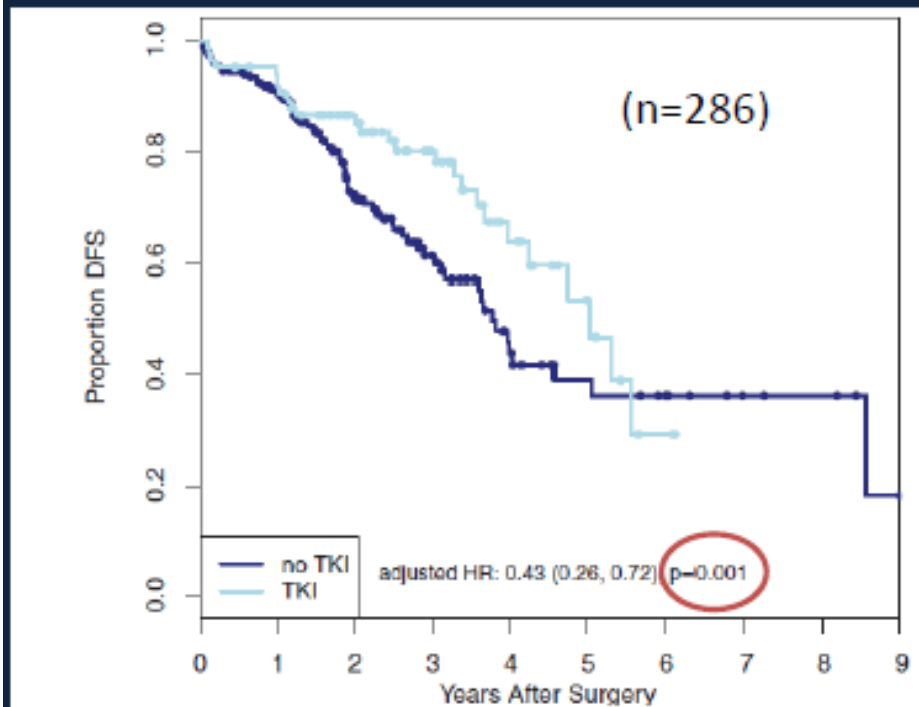
Knowledge Gaps

- **Could advantage of EGFR TKIs in advanced NSCLC translate to early NSCLC?**
 - Is EGFR mutation rate different between early stage and advanced NSCLC?
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Retrospective study: Adjuvant TKI for EGFR+ NSCLC

	No Adjuvant Gefitinib/ Erlotinib (n=202)	Adjuvant Gefitinib/ Erlotinib (n=84)
Stage I	84%	52%
Stage II	8%	17%
Stage III	8%	31%

“Difficult to distinguish the prognostic from the predictive impact of EGFR mutations in a retrospective study where EGFR TKI is preferably administered to higher stage diseases”



Retrospective study: Adjuvant TKI for EGFR+ NSCLC

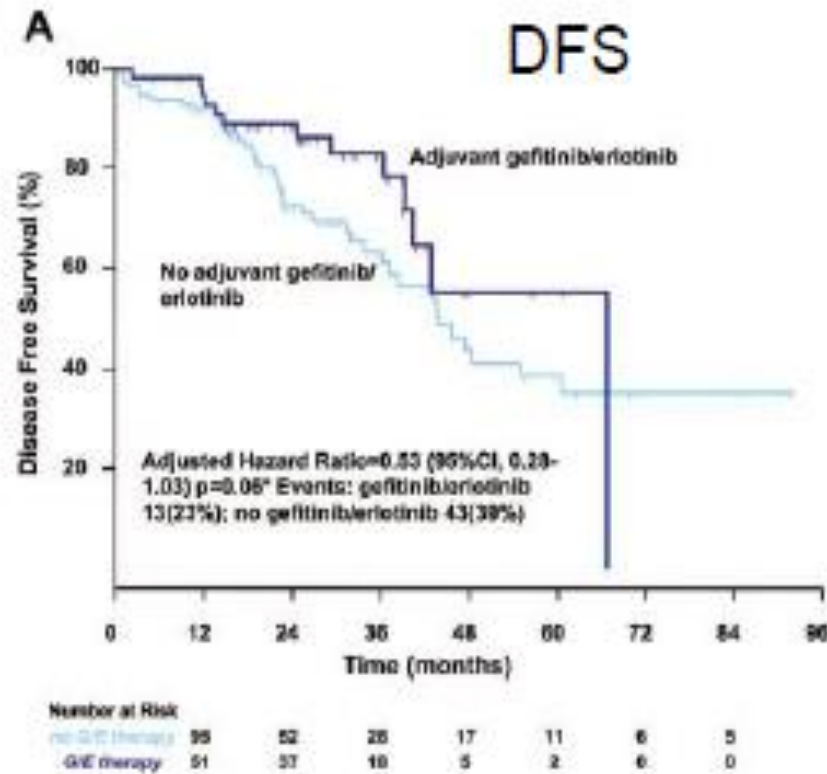


TABLE 3. Multivariate Disease-Free Survival Analysis

$n = 167$	N (Event N)	2-yr Survival (95% CI)	Adjusted Hazard Ratio* (95% CI)	Adjusted p
Adjuvant erlotinib/gefitinib	56 (13)	89% (77-95)	0.53 (0.28-1.03)	0.06
No adjuvant erlotinib/gefitinib	111 (43)	72% (61-80)		

* Adjusted for sex, type of surgery, stage, and adjuvant cisplatin chemotherapy; hazard ratio less than 1.00 indicates improved survival.

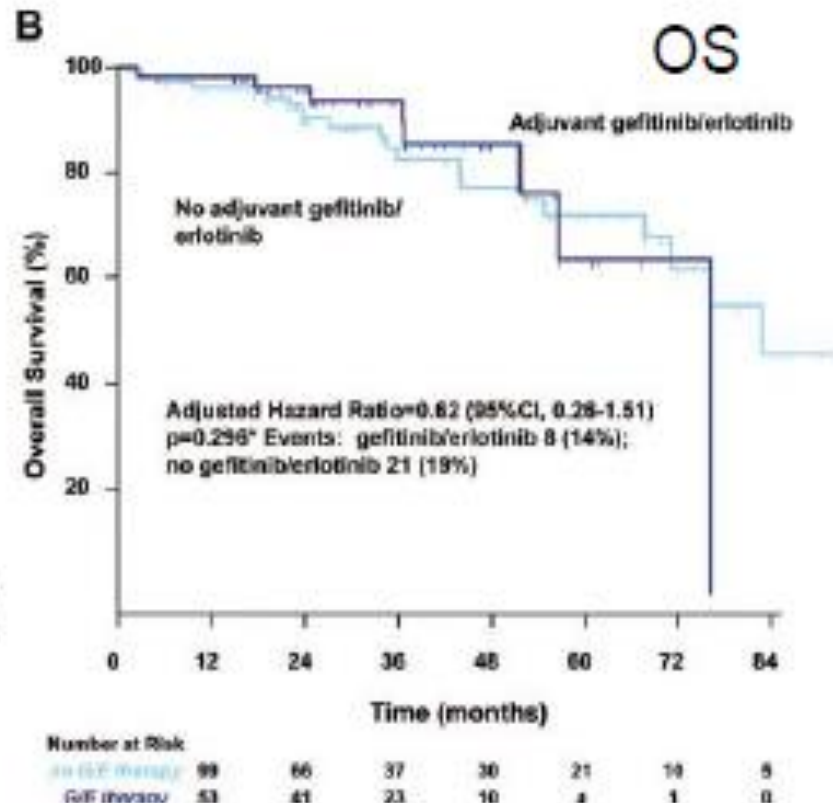


TABLE 4. Multivariate Overall Survival Analysis

$n = 167$	N (Event N)	2-yr Survival (95% CI)	Adjusted Hazard Ratio* (95% CI)	Adjusted p
Adjuvant erlotinib/gefitinib	56 (8)	96% (85-99)	0.62 (0.26-1.51)	0.296
No adjuvant erlotinib/gefitinib	111 (21)	90% (82-95)		

* Adjusted for sex, type of surgery, stage, and adjuvant cisplatin chemotherapy; hazard ratio less than 1.00 indicates improved survival.

Adjuvant Gefitinib: JBR.19

- Path stage IB - III NSCLC
- Complete surgical resection
- PS 0-2
- Adjuvant chemo and /or XRT allowed

N = 503

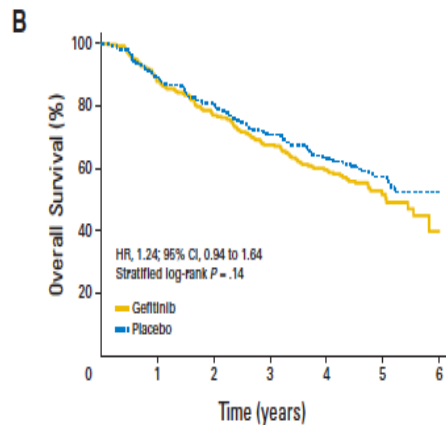
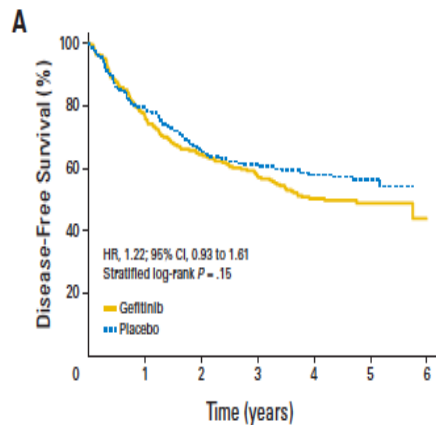
R

Gefitinib
250 mg po qd
x 2 years

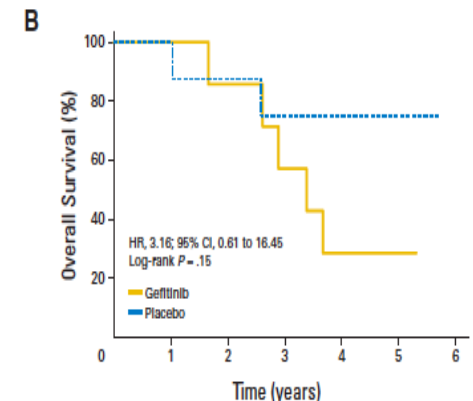
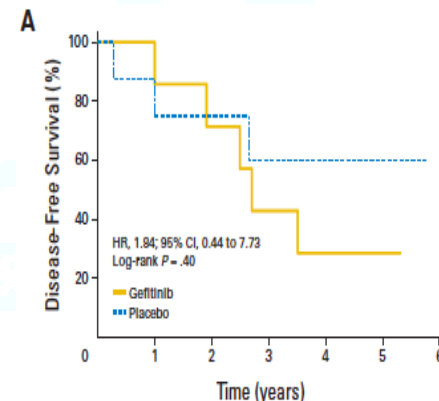
Placebo
PO qd
x 2 years

All patients

EGFR Mutated



No. at risk							
Placebo	252	189	154	135	109	37	3
Gefitinib	251	181	149	131	100	29	2



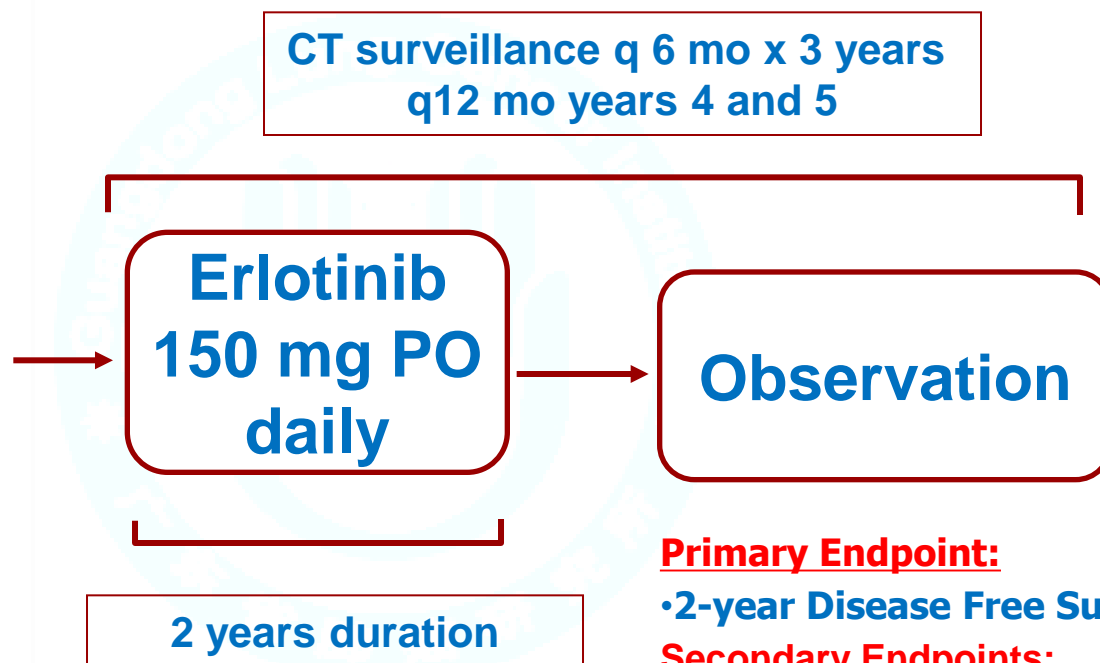
No. at risk							
Placebo	8	6	5	4	4	1	0
Gefitinib	8	7	6	5	3	2	1

No. at risk							
Placebo	8	8	7	6	6	2	0
Gefitinib	8	7	6	4	2	1	0

SELECT: Study Design

- ◆ Single arm, open-label Phase II study
- ◆ Adjuvant erlotinib following standard therapy

- Surgically resected Stage IA-IIIa NSCLC
- EGFR mut
- Surgically resected
- Completed routine adjuvant chemotherapy and/or XRT



Primary Endpoint:

- 2-year Disease Free Survival >86%

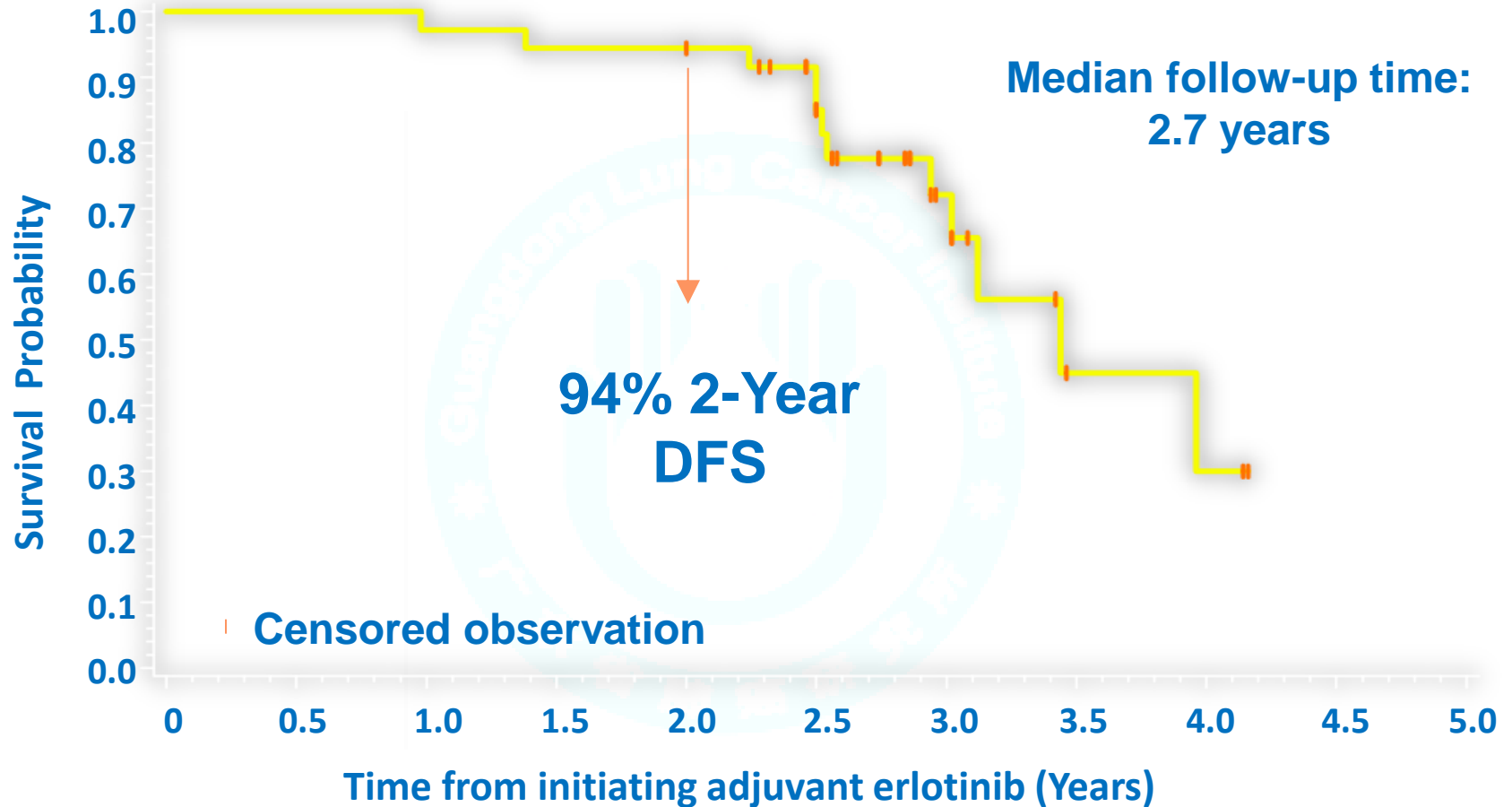
Secondary Endpoints:

- Safety and Tolerability
- Median Disease Free Survival
- Overall Survival

SELECT: Disease-Free Survival

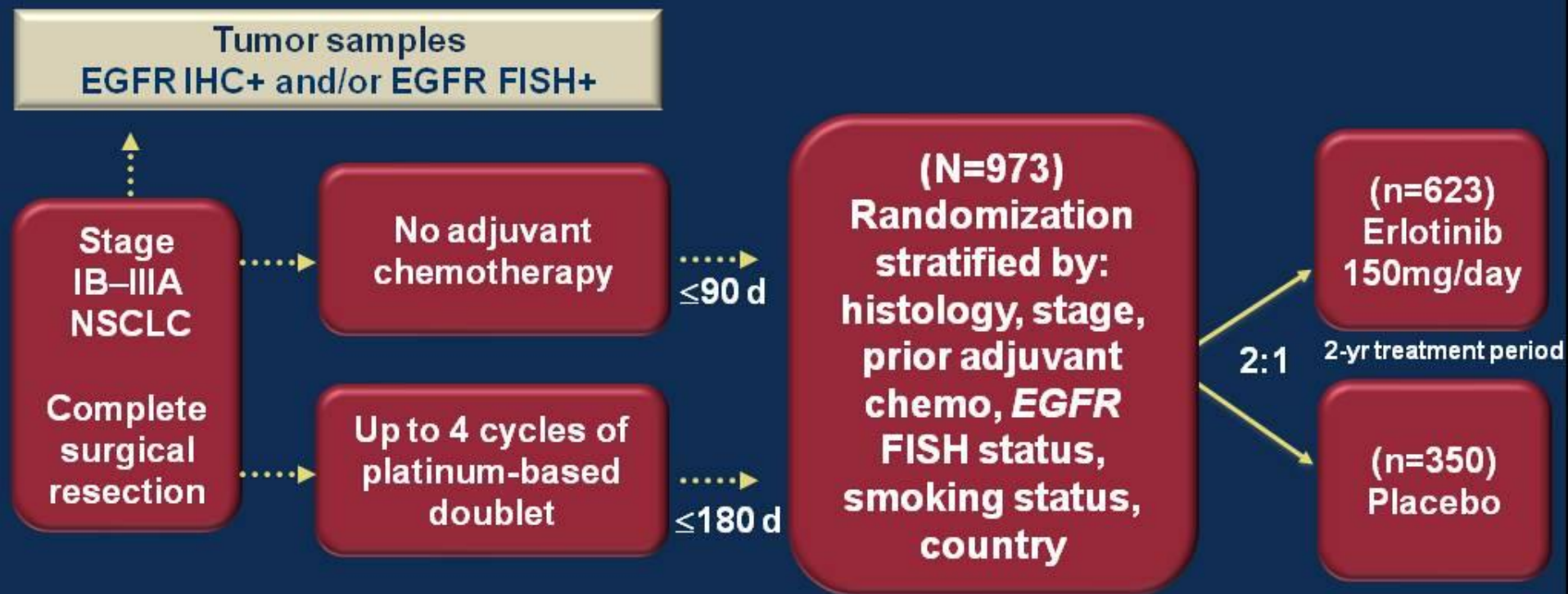
69% of patients completed >90% of therapy

39% of patients had 1+ dose reductions



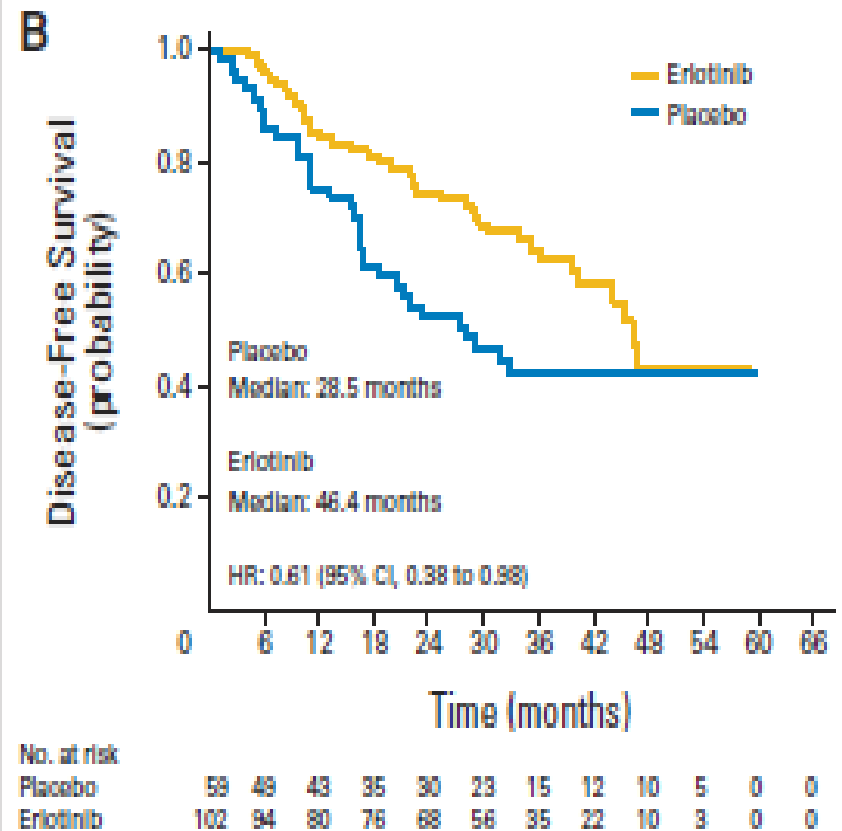
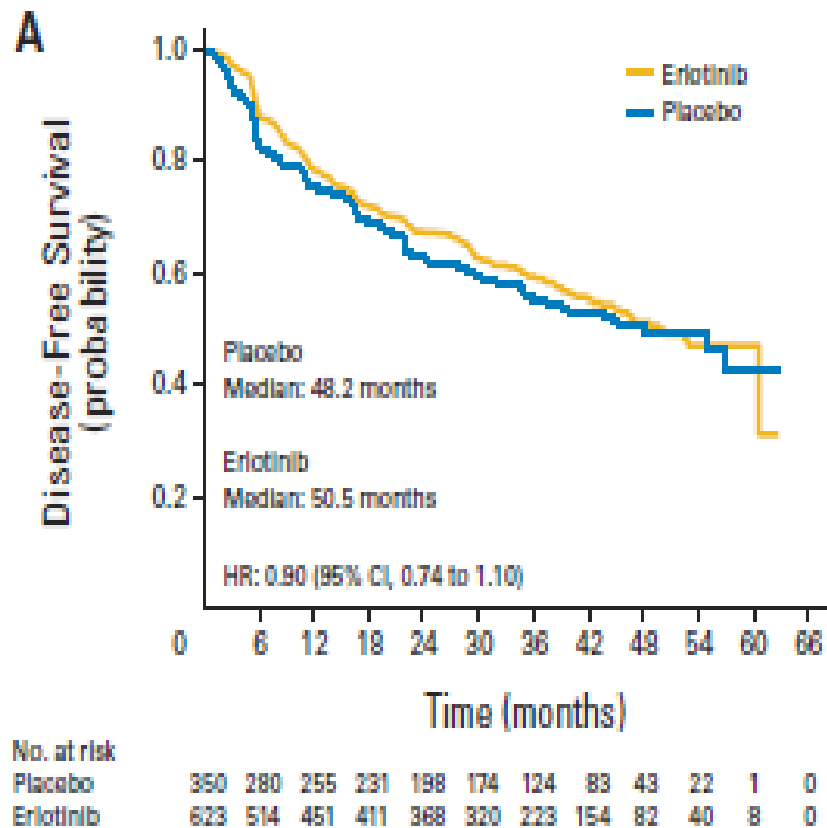
Patients at Updated 2yr DFS with N=100 is 89%

RADIANT Trial Design

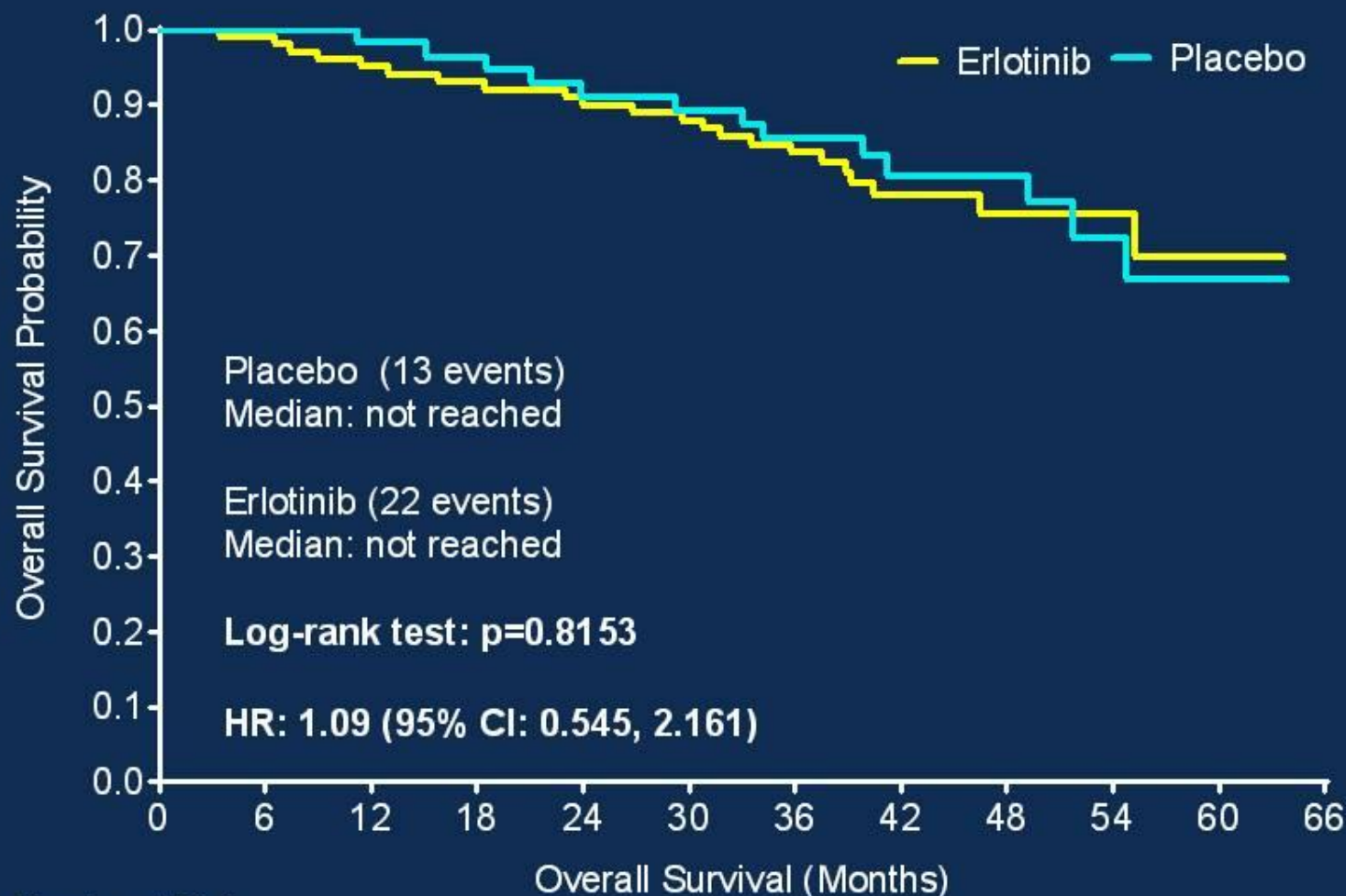


- **Radiology assessment:** every 3 months on treatment and yearly during long-term follow up
- **Primary endpoint:** DFS
- **Secondary endpoints:** Overall survival (OS); DFS and OS in patients with del19/L858R (*EGFR* M+)

Adjuvant Erlotinib Versus Placebo in Patients With Stage IB-III A Non-Small-Cell Lung Cancer (RADIANT): A Randomized, Double-Blind, Phase III Trial



Overall Survival: *EGFR* M+



Number at Risk

Placebo	59	57	56	53	51	50	41	30	24	14	5	0
Erlotinib	102	100	94	91	88	86	75	43	26	15	7	0

RADIANT Conclusions

- Erlotinib following resection and adjuvant chemotherapy did NOT prolong DFS in patients with EGFR expressing tumors
- In the subset of patients whose tumors had del19 and L858R mutations, DFS favored erlotinib.
 - Not statistically significant due to hierarchical testing.
- **No Overall Survival benefit noted, even in EGFRmut**

Knowledge Gaps

- **Could advantage of EGFR TKIs in advanced NSCLC translate to early NSCLC?**
 - Is EGFR mutation rate different between early stage and advanced NSCLC?
- **Heterogeneity in resected NSCLC**
- What novel treatment strategies are being pursued?

Resected NSCLC is heterogeneity:

Major Changes in Stage 1B Classification

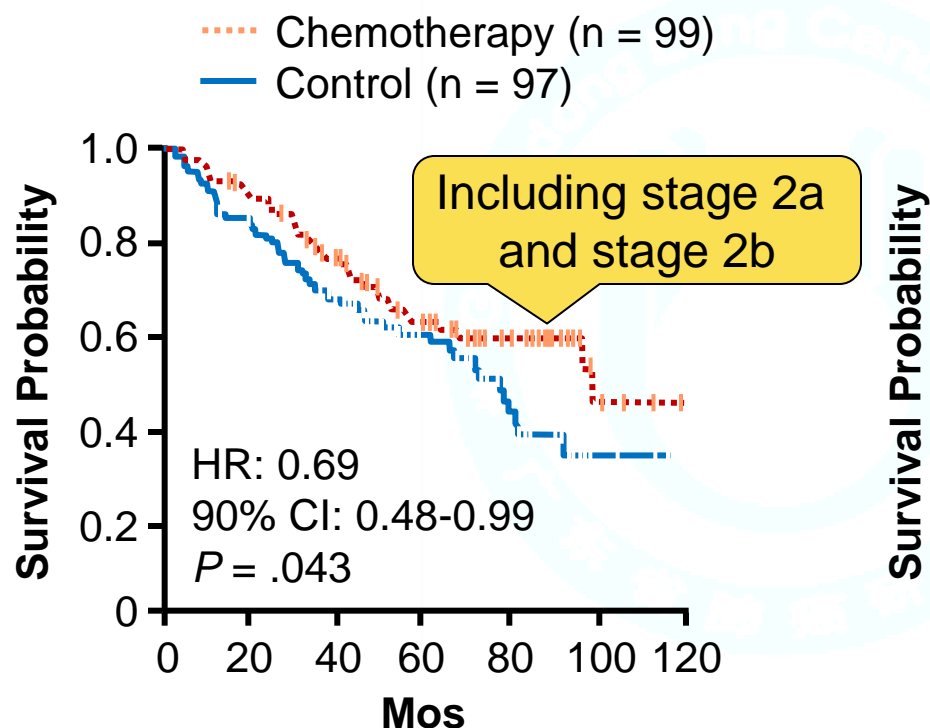
6 th Edition TNM (CALGB 9633)	7 th Edition TNM		
Stage 1B	Stage 1B	Stage 2A	Stage 2B
T2 (>3cm)	T2A (>3-5cm)		
		T2B (>5-7cm)	
			T3 (>7cm)

13% stage 1B in IASLC database with 58% 5-y survival

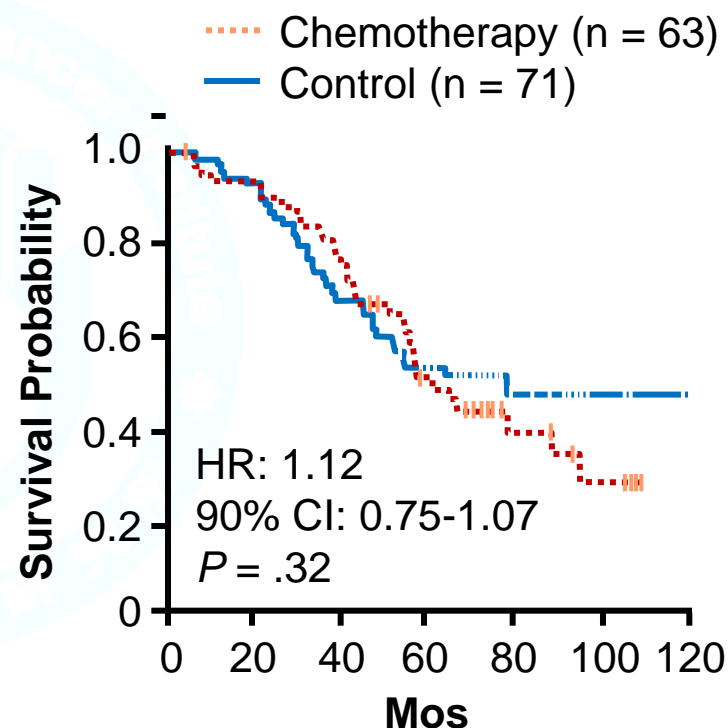
CALGB 9633: Adjuvant chemo for stage 1B

Survival by Tumor Size

Tumor ≥ 4 cm



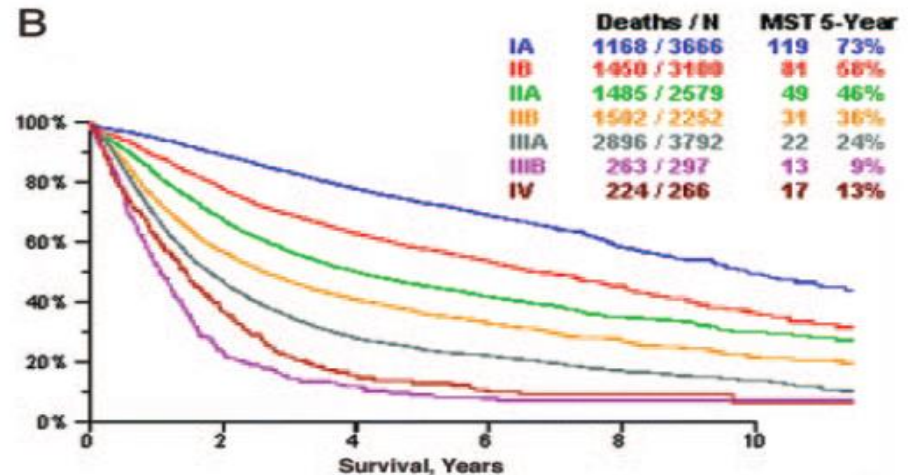
Tumor < 4 cm



Strauss GM, et al. J Clin Oncol. 2008;26:5043-5051

Resected NSCLC is heterogeneity

Stage	MST
Stage 1A	119
Stage 1B	81
Stage 2A	49
Stage 2B	31
Stage 3A	22



Type	Reference	Stage 1 (%)	Stage 2 (%)	Stage 3(%)
Retrospective	Janjigian 2010	54	20	27
	D'Angelo 2012	52	17	31
Prospective	BR.19 2013	53	35	12
	Select 2014	44	27	28
	Radian 2014	51	33	16

What secret behind PFS from retrospective and prospective



D'Amico

Survival Probability

Stop drug
in 2 years

TKIs delay recurrence
not prolong overall survival

Survival time (m)



Knowledge Gaps

- Could advantage of EGFR TKIs in advanced NSCLC translate to early NSCLC?
- Is EGFR mutation rate different between early stage and advanced NSCLC?
- Heterogeneity in resected NSCLC
- **What novel treatment strategies are being pursued?**

Phase II study of biomarker-guided neoadjuvant treatment strategy for IIIA-N2 non-small cell lung cancer based on epidermal growth factor receptor mutation status

- Study objective

- To evaluate the role of biomarker-guided neoadjuvant treatment strategy in patients with IIIA-N2 NSCLC stratified by EGFR mutation status

Key patient inclusion criteria

- Resectable histologically documented stage IIIA-N2 NSCLC (n=24)

EGFR mutation
Neoadjuvant erlotinib
for 42 days
(n=12)

PD

Wild-type EGFR
Neoadjuvant gemcitabine/
carboplatin
for 3 cycles
(n=12)

PD

Primary endpoint

- RR

Secondary endpoints:

- PFS and OS

RR for erlotinib and GC regimen

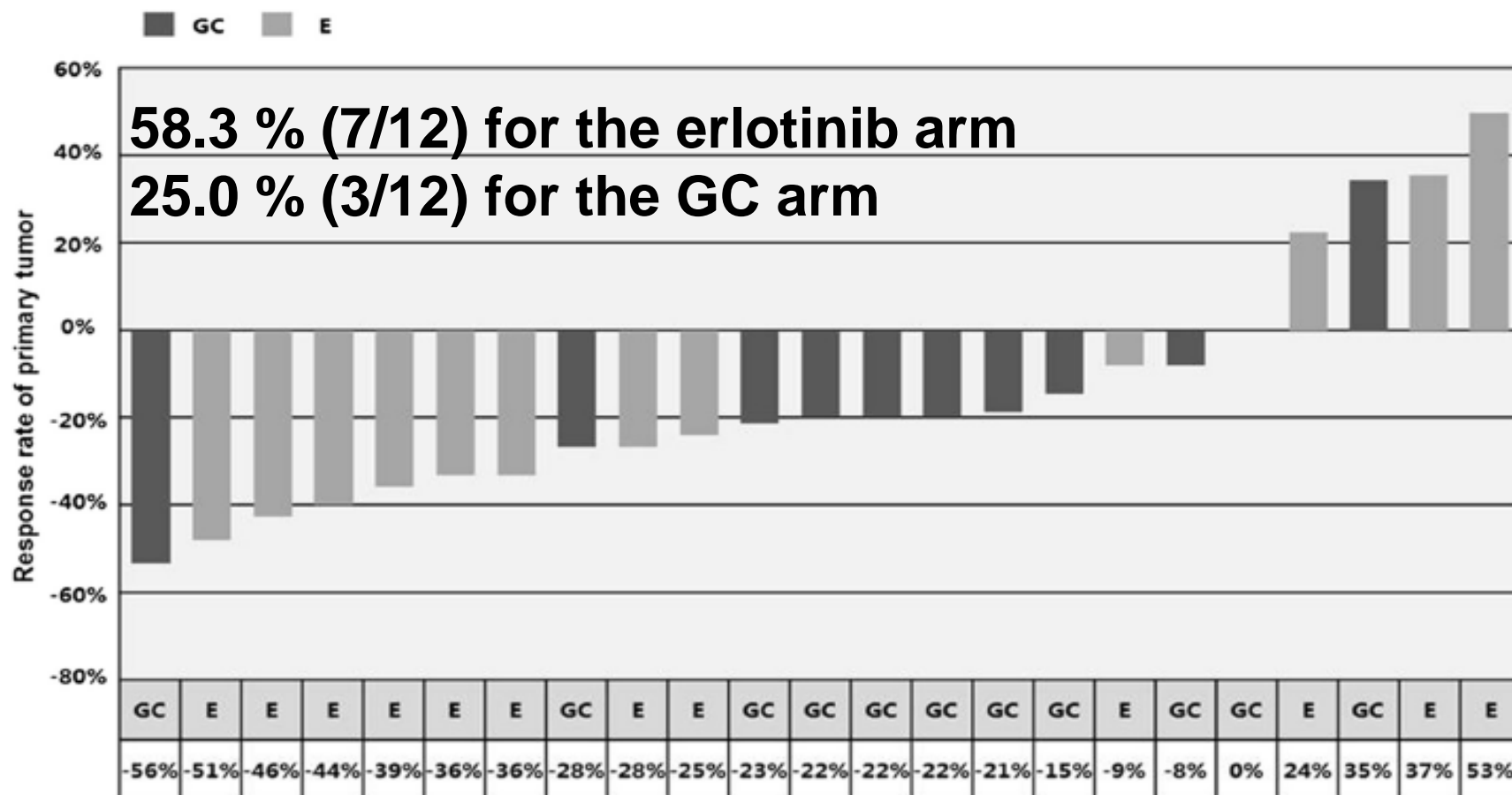
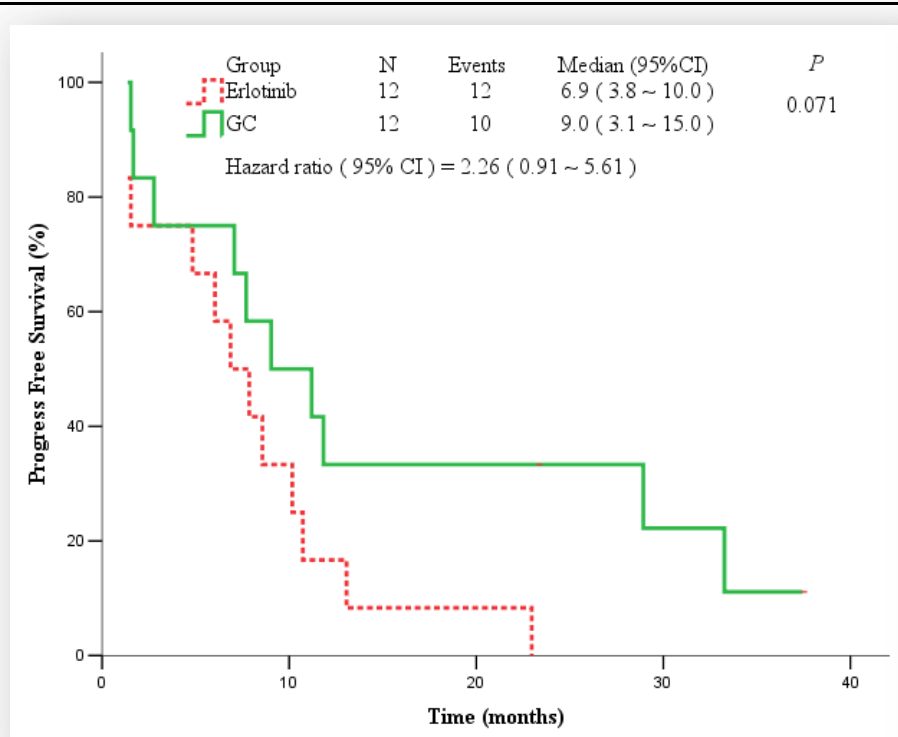
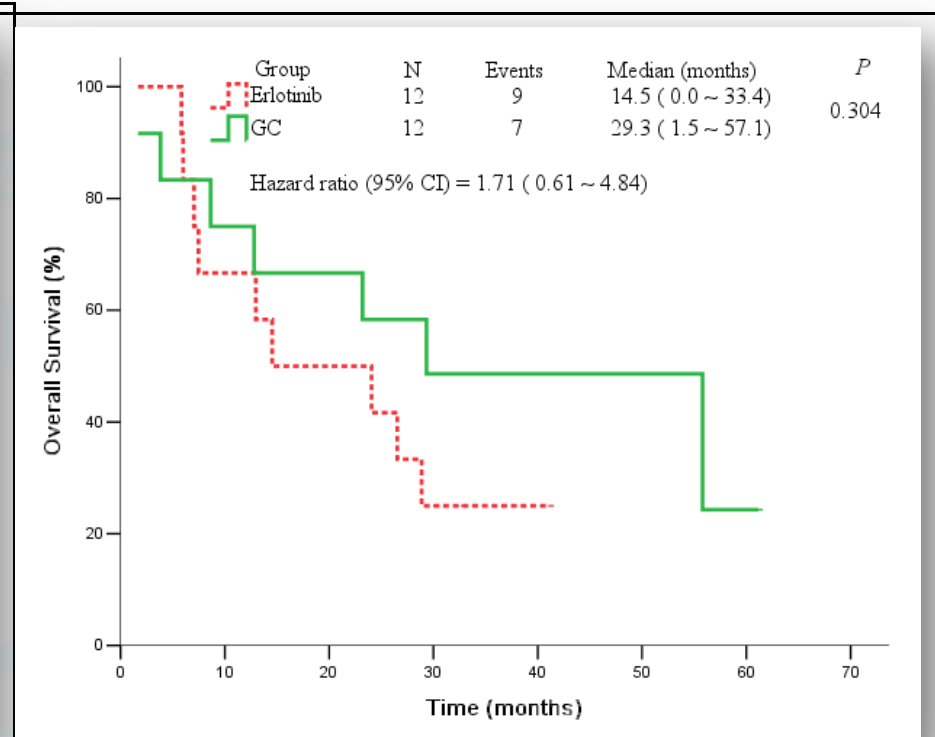


Fig. 1 Waterfall plot of response to neoadjuvant treatment. Abbreviations: GC, gemcitabine/carboplatin; E, erlotinib. Note: The response rate of one case in the GC arm was not available

PFS and OS comparison



B:PFS comparison between the 2 arms



C:OS comparison between the 2 arms

CTONG 1103 (EMERGING)

2011-2018

- Treatment naive
 - IIIA-N2 NSCLC
 - N2 confirmed by mediastinoscopy / EBUS / PET-CT
 - EGFR activating mutation
 - ECOG 0~1
 - Age ≥ 18 Y
- (n=90)

R 1:1

Erlotinib
150mg/d
 $\times 6$ weeks

non
- PD

surgery

Erlotinib
150mg/d
1 year

Gem
1250mg/m²
d1, 8 + Cis
75mg/m² d1
q3w \times
2 cycles

non
- PD

surgery

Gem/Cis
q3w \times
2 cycles

primary endpoint

- ORR

secondary endpoint

- Lymph node downgrade rate
- Complete resection rate
- pCR
- PFS
- OS
- QoL
- safety

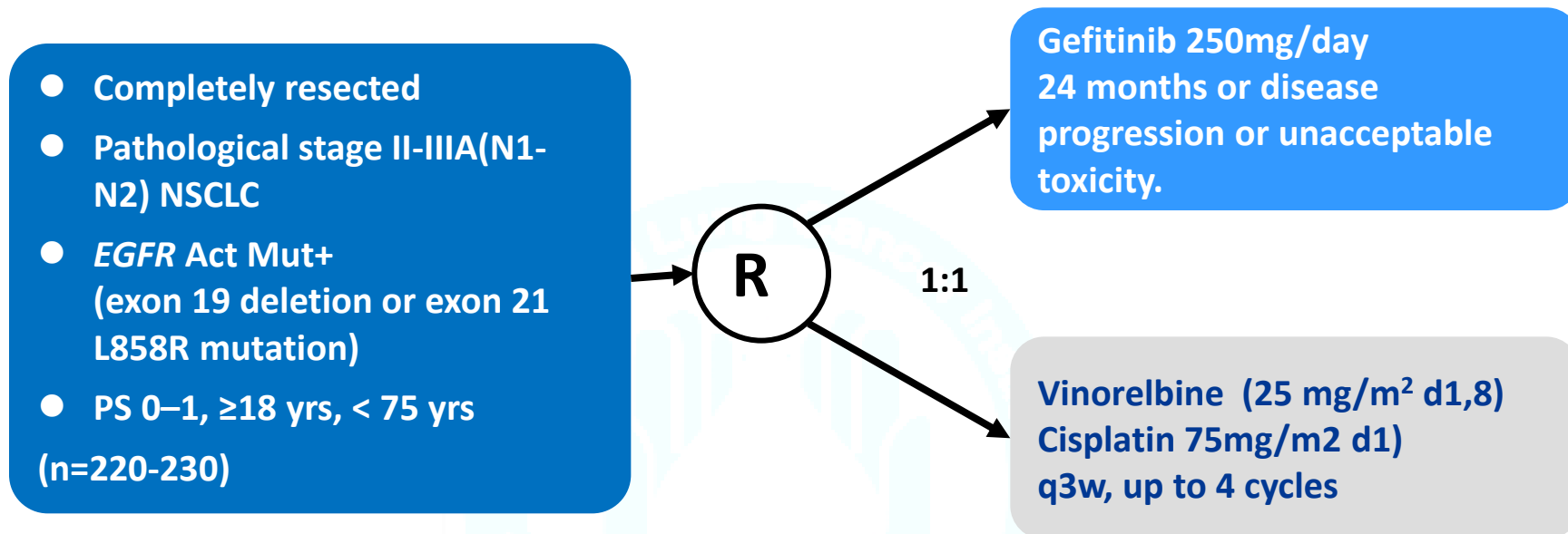
exploratory research

- 24w & 48w DFS rate
- biomarker profile



China: CTONG 1104 (ADJUVANT)

Japan: WJOG 6401L



Primary endpoint

- Disease-free survival (PFS)

Secondary endpoints

- Overall survival (OS), 3 years DFS rate, 5 years DFS rate, 5 years OS rate, Safety, HRQoL (FACT-L, LCSS), exploratory biomarker analyses

Stratification factors

- Mutation type
- N stage
- Smoking status

Efficacy assessment

- Every 3 months

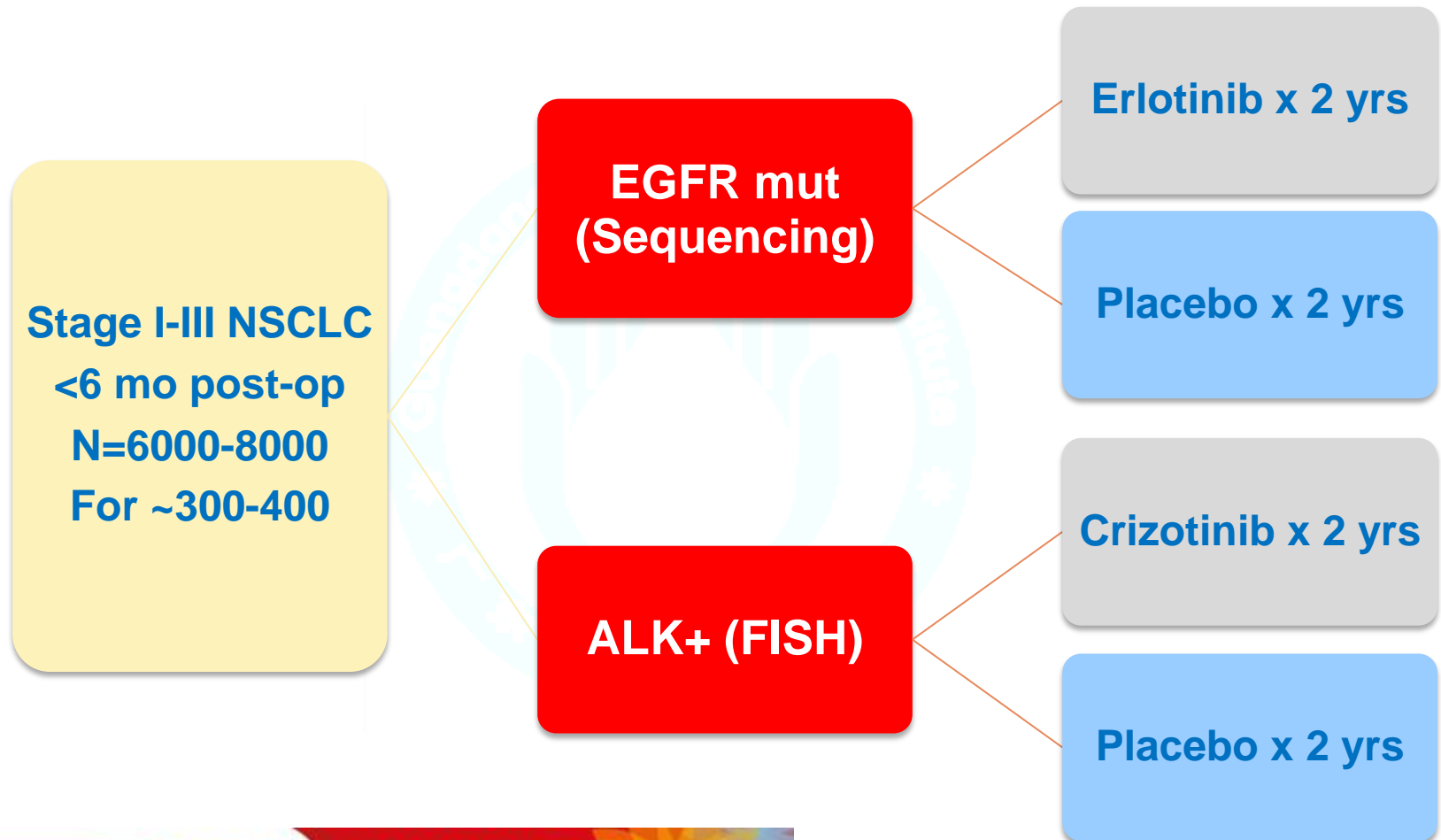
China: 222 cases
FPI: Sep. 15, 2011
LPI: Apr. 24, 2014

JAPAN: 230 cases
LPI: Dec 2015

ICOTINIB Phase III Adjuvant trials

- Completely resected stage II-IIIa NSCLC with EGFR mutations (Exon 19 or 21)
 - NCT01996098
 - AFTER 4 cycles adjuvant platinum chemotherapy
 - Randomized to Icotinib (125 mg po tid) x 6 or 12 mo vs Observation
 - DFS primary endpoint, N=477
 - PI: SY Wang – Sun Yat-sen University Cancer Center
 - Pending: NCT02125240
 - NO prior adjuvant therapy
 - Randomized to Icotinib (125 mg po tid) vs placebo
 - 2 yr DFS primary endpoint, N= 300
 - PI:YK Shi – Cancer Hospital, Chinese Academy of Medical Sciences

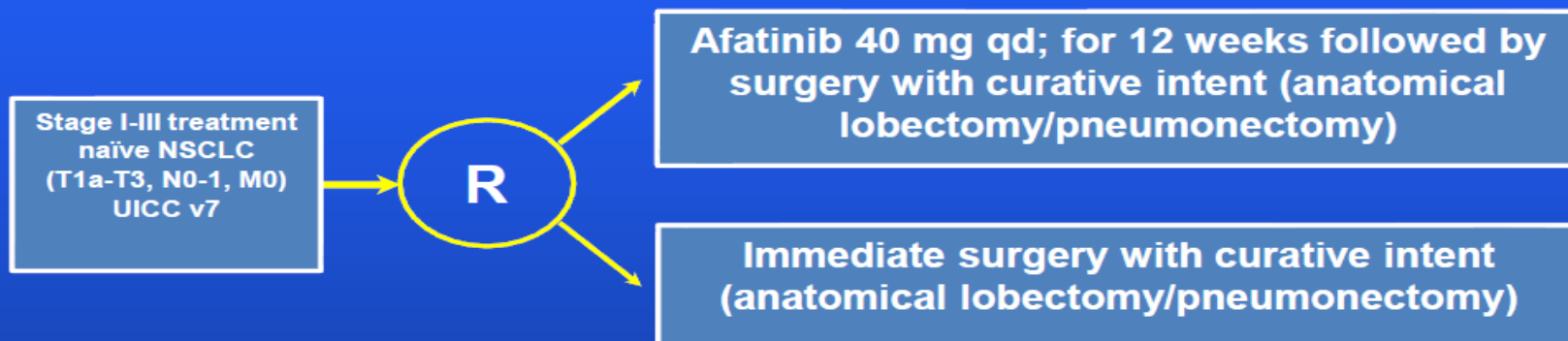
US ALCHEMIST: Adjuvant Lung Cancer Enrichment Marker Identification and Sequencing Trial



Adjuvant Therapy: Molecular Selection

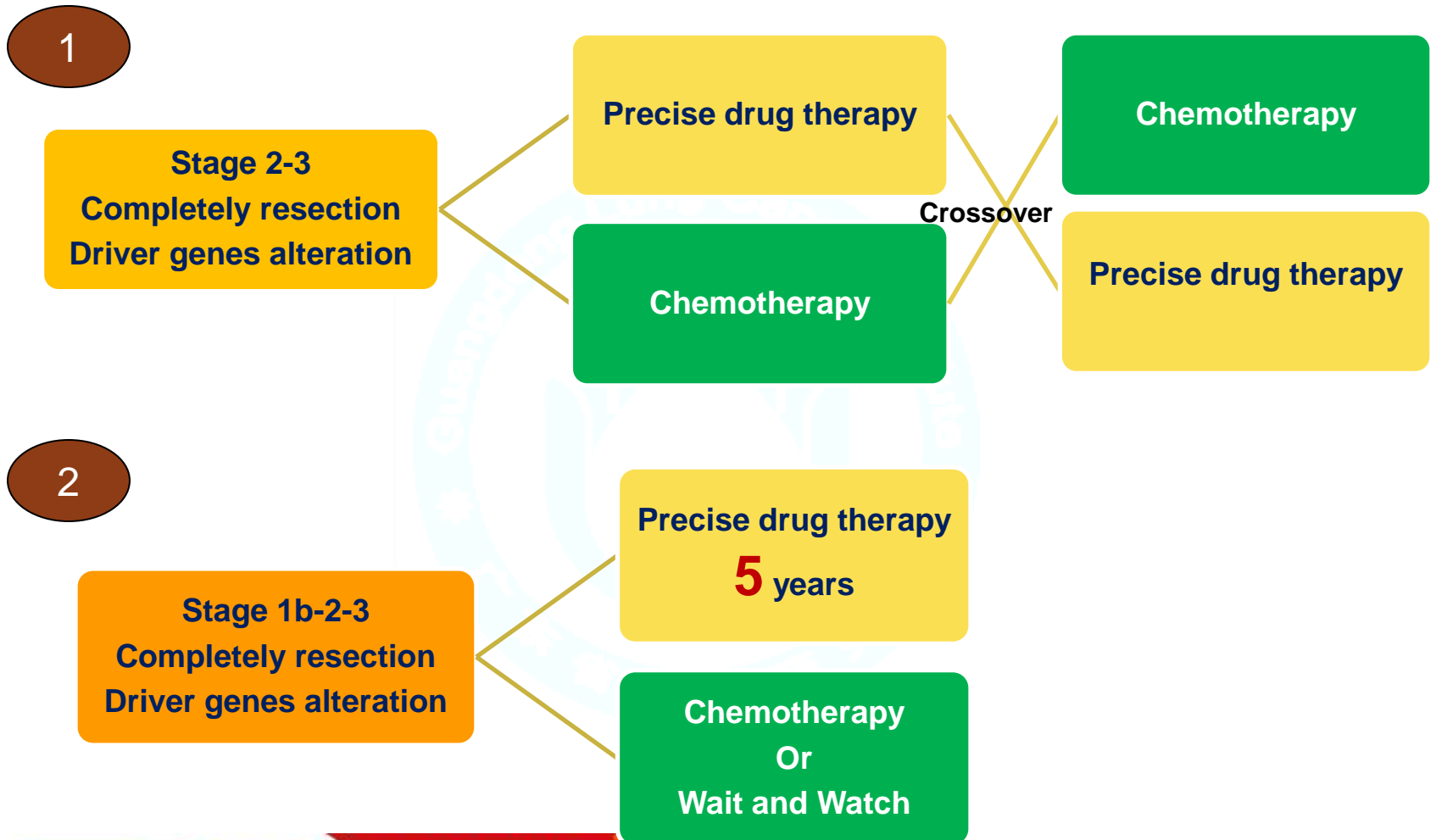
EORTC 08115-REMnant: NEOadjuvant Afatinib (BIBW2992) in EGFR Mutant Operable NSCLC; a study of the EORTC Lung Cancer Group

Study coordinator: Dr Sanjay Popat, Royal Marsden Hospital



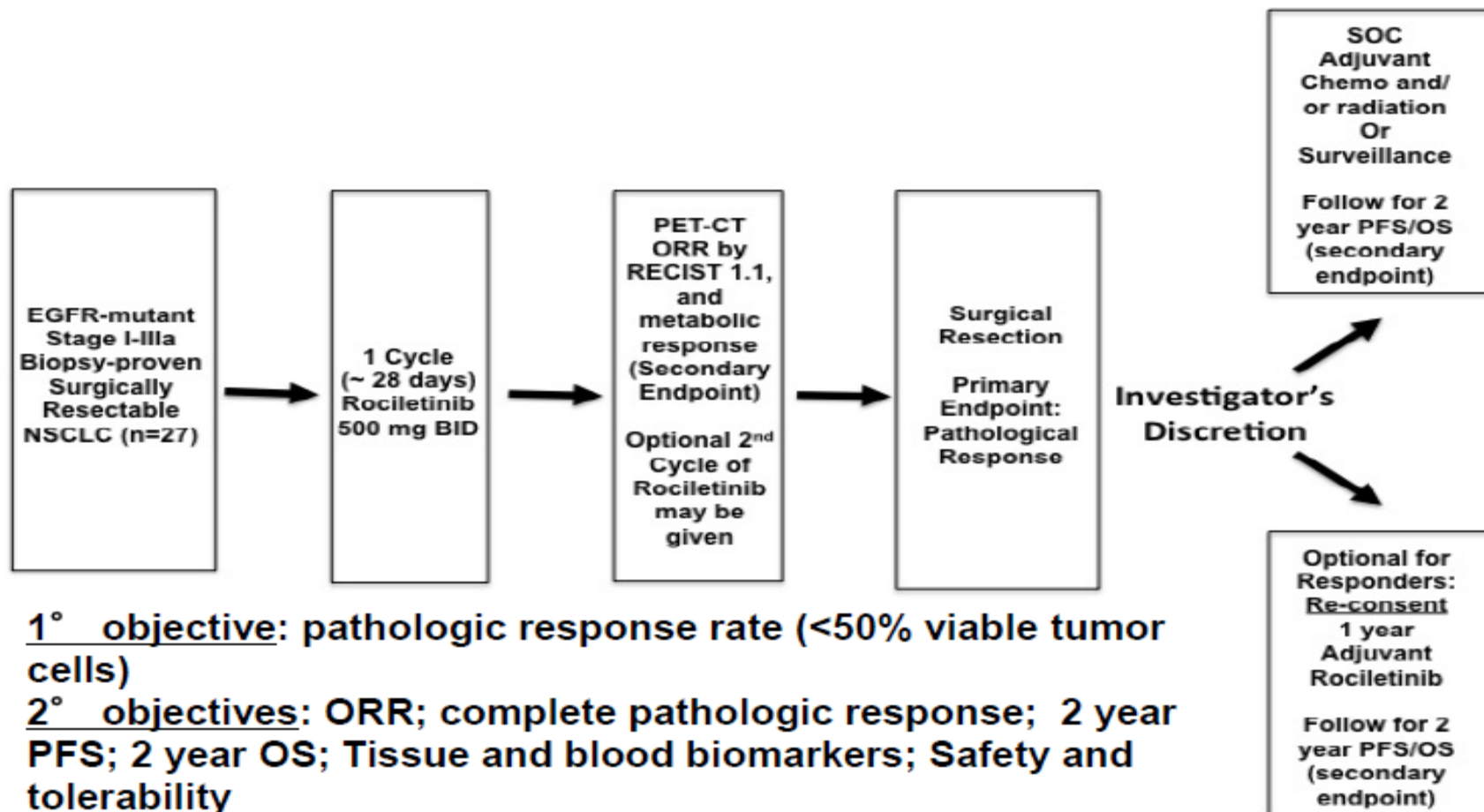
- There will be a minimum of 1 week between the last dose of afatinib and surgery.
- The first 5 patients will form a safety run-in to check that afatinib treatment doesn't delay surgery
- Endpoints and statistical considerations under discussion

Key Trials in Future



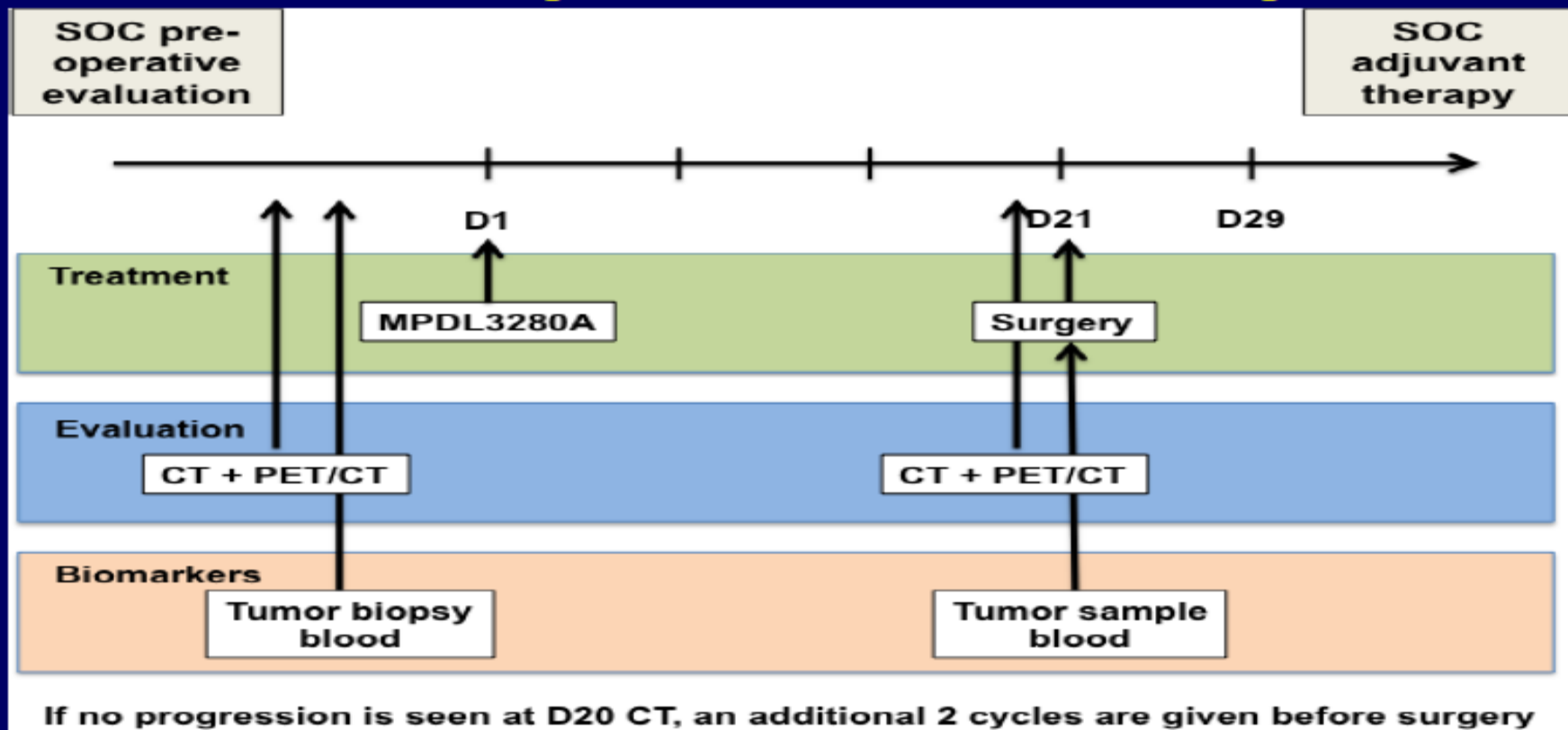
3rd generation EGFR TKI in Neoadjuvant setting

Neoadjuvant Rociletinib Trial: UCSF & UCD



Checkpoint Inhibitor in Neoadjuvant Setting

LCMC 3 Neoadjuvant Schema & Objectives



1° objective: 15% PR; **2° objectives:** Safety; OS and DFS; ORR by PD-L1 biomarker; Evaluate tumor and LN infiltrates.

Conclusions

- Could advantage of EGFR TKIs in advanced NSCLC translate to early NSCLC?
- Is EGFR mutation rate different between early stage and advanced NSCLC?
- Heterogeneity in resected NSCLC
- What novel treatment strategies are being pursued?
- Is There a Role for Adjuvant EGFR TKIs in Early NSCLC?

Conclusions

- Could advantage of EGFR TKIs in advanced NSCLC translate to early NSCLC? **Maybe**
- Is EGFR mutation rate different between early stage and advanced NSCLC? **No**
- Heterogeneity in resected NSCLC **Yes**
- What novel treatment strategies are being pursued? **Waiting**
- **Is There a Role for Adjuvant EGFR TKIs in Early NSCLC?** **Maybe**

What is the optimal adjuvant treatment for resected NSCLC?

Adjuvant chemotherapy for Stage 2-3 NSCLC



2004



2015



感谢肺研所团队
每一个人的贡献

Acknowledge
my team!