

# Endocrine Therapy for Early and Late Stage Breast Cancer: Therapeutic Updates

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# NATALEE Study Design<sup>1-3</sup>

- Adult patients with HR+/HER2- EBC
  - Prior ET allowed up to 12 mo
  - **Anatomical stage IIA<sup>a</sup>**
    - **N0** with:
      - Grade 2 and evidence of high risk
        - Ki-67  $\geq 20\%$
        - Oncotype DX Breast Recurrence Score  $\geq 26$  **or**
        - High risk via genomic risk profiling
      - Grade 3
    - **N1**
  - **Anatomical stage IIB<sup>a</sup>**
    - N0 or N1
  - **Anatomical stage III**
    - N0, N1, N2, or N3
- N=5101<sup>b</sup>**

R 1:1<sup>c</sup>

**Ribociclib 400 mg/d**  
3 wk on/1 wk off  
**for 3 y**

**NSAI**  
Letrozole or anastrozole<sup>d</sup> for  $\geq 5$  y  
+ **goserelin** in men and  
premenopausal women

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## Primary End Point

- iDFS using STEEP criteria

## Secondary End Points

- Recurrence-free survival
- Distant disease-free survival
- OS
- PROs
- Safety and tolerability
- PK

## Exploratory End Points

- Locoregional recurrence-free survival
- Gene expression and alterations in tumor ctDNA/ctRNA samples

### Randomization stratification

**Anatomical stage:** II vs III

**Menopausal status:** men and premenopausal women vs postmenopausal women

**Receipt of prior (neo)adjuvant chemotherapy:** yes vs no

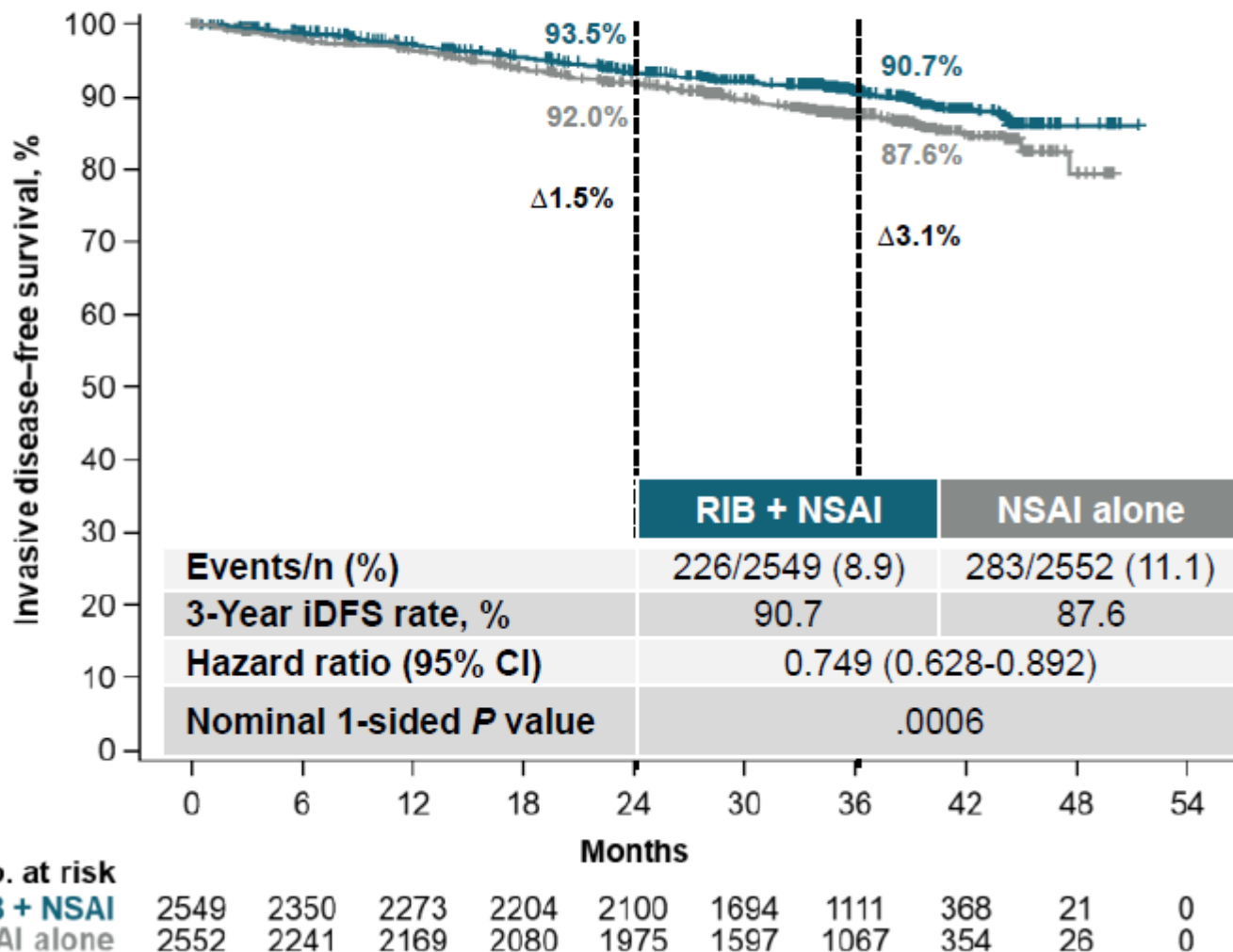
**Geographic location:** North America/Western Europe/Oceania vs rest of world

ct, circulating tumor; EBC, early breast cancer; ET, endocrine therapy; HER2, human epidermal growth factor receptor 2; HR, hormone receptor; iDFS, invasive disease-free survival; N, node; NSAI, nonsteroidal aromatase inhibitor; OS, overall survival; PK, pharmacokinetics; PRO, patient-reported outcome; R, randomized; STEEP, Standardized Definitions for Efficacy End Points in Adjuvant Breast Cancer Trials.

<sup>a</sup> Enrollment of patients with stage II disease was capped at 40%. <sup>b</sup> 5101 patients were randomized from Jan 10, 2019 to April 20, 2021. <sup>c</sup> Open-label design. <sup>d</sup> Per investigator choice.

1. Slamon D, et al. ASCO 2023. Oral LBA500. 2. Slamon DJ, et al. *J Clin Oncol*. 2019;37(15 suppl). Abstract TPS597. 3. Slamon DJ, et al. *Ther Adv Med Oncol*. 2023;15:17588359231178125

# Invasive Disease–Free Survival



1. Slamon D, et al. ASCO 2023. Oral LBA500.

- The median follow-up for iDFS was 33.3 months (maximum, 51 months)—an additional 5.6 months from the second interim efficacy analysis<sup>1</sup>
- The absolute iDFS benefit with ribociclib plus NSA was 3.1% at 3 years
- The risk of invasive disease was reduced by 25.1% with ribociclib plus NSA vs NSA alone

All subgroups had iDFS benefit with ribo+NSAI

- Stage II/ Stage III
- Node neg or bode positive
- Ki-67  $\leq$ 20%
- Ki-67  $>$ 20%

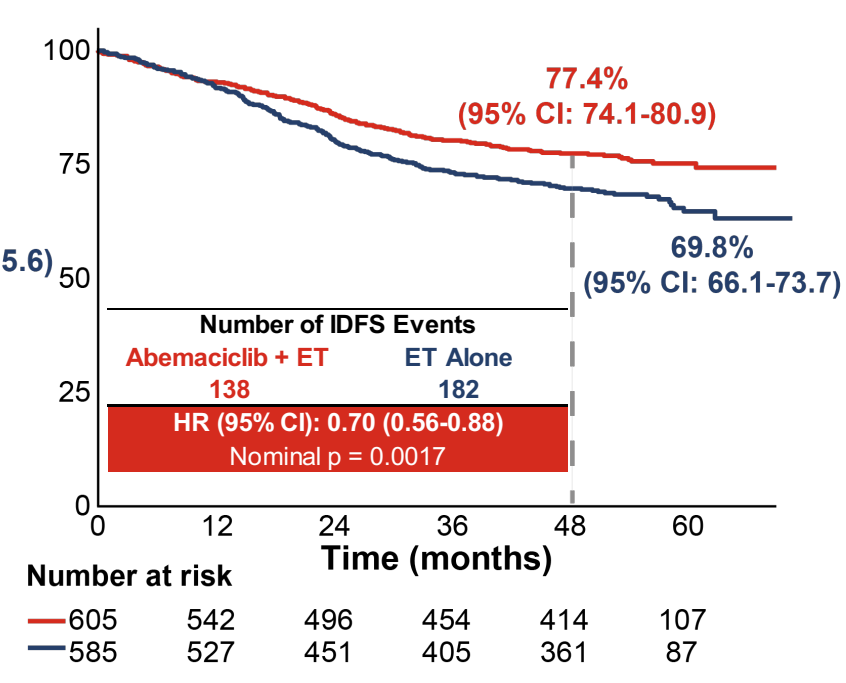
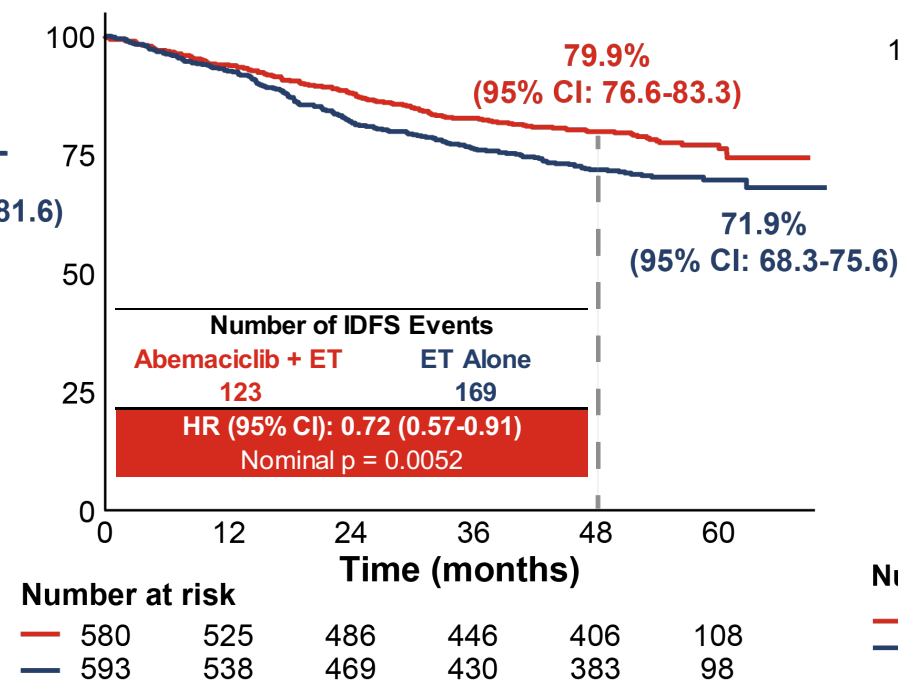
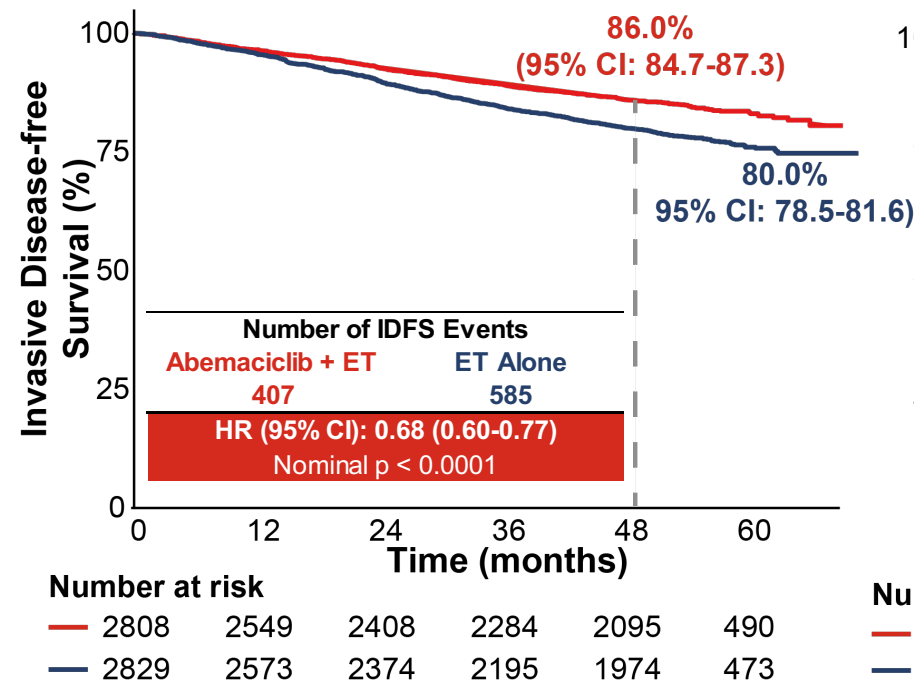
**DRFS also remains significantly improved with no new safety concerns**

# Abemaciclib benefit was consistently observed in biomarker subset of monarchE

ITT (N=5637)

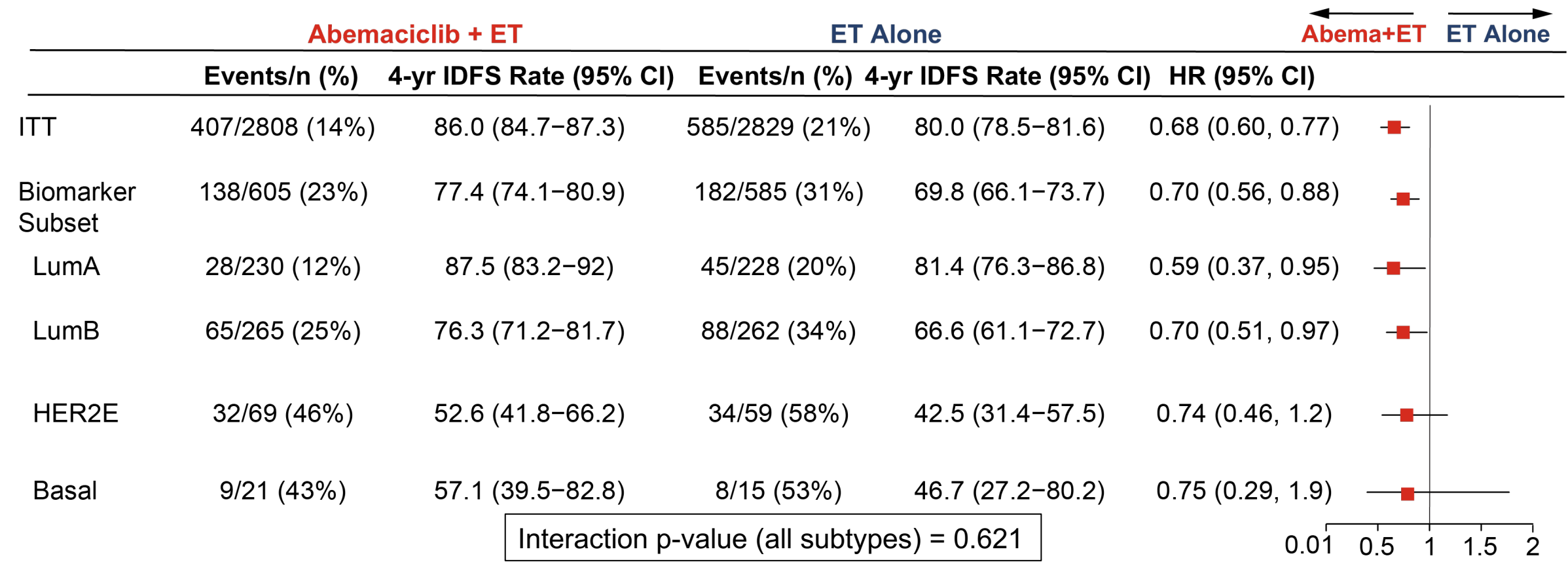
Biomarker WES (N=1173)\*

Biomarker RNA (N=1190)\*



\*biomarker subsets are enriched in IDFS events and thus IDFS event rates are higher than in the ITT population

# Consistent abemaciclib treatment benefit across all intrinsic molecular subtypes

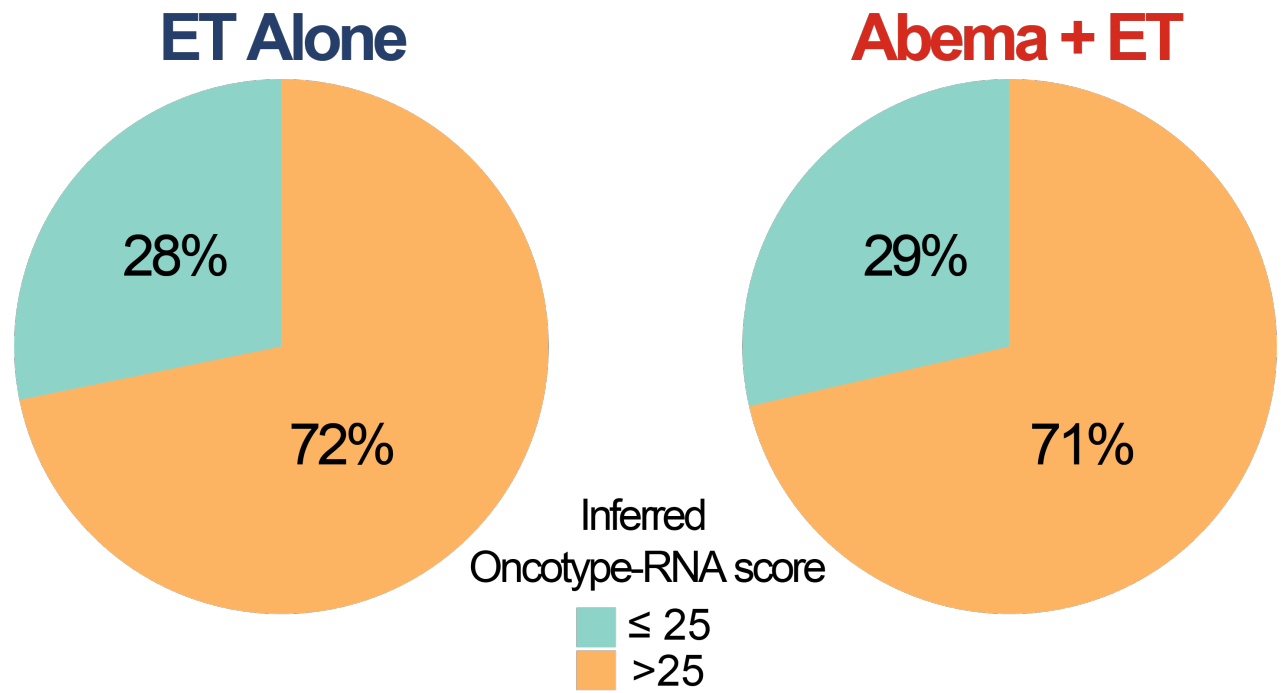
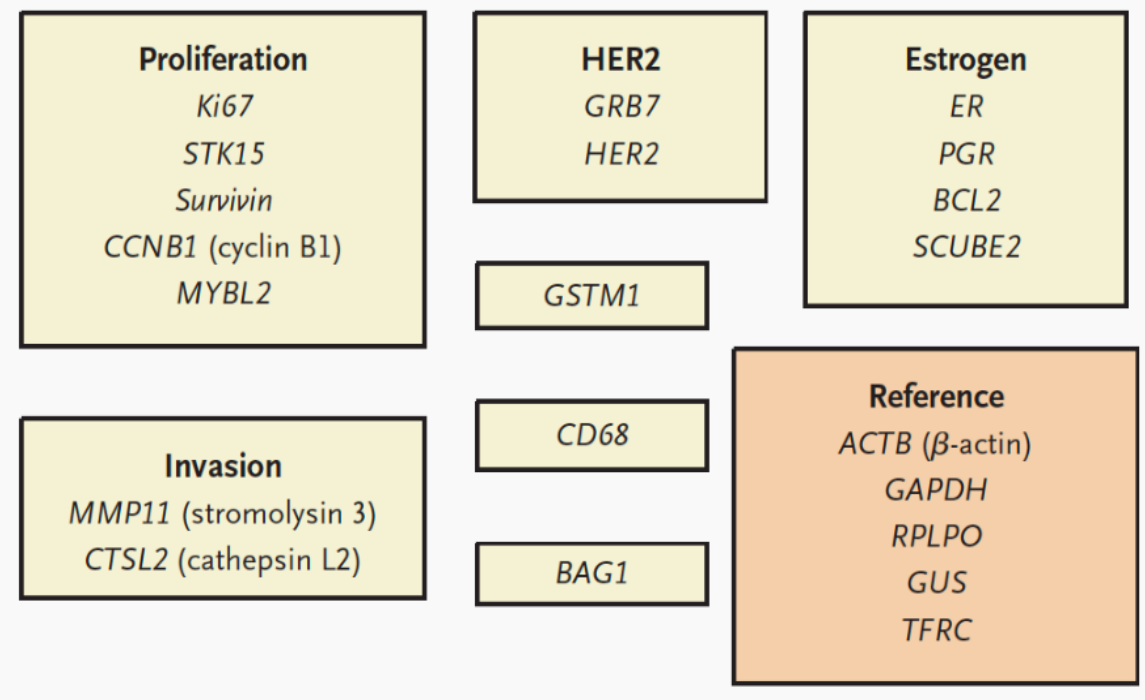


- The selected biomarker subset is enriched for IDFS events using case-cohort design
- IDFS rates are presented as indicative of relative prognosis across subtypes but do not inform the actual risk of recurrence within each subtype because of IDFS event enrichment

LumA = luminal A, LumB = luminal B, HER2E = Human Epidermal Growth Factor Receptor 2 – Enriched

# Inferred 21-gene Oncotype risk scores

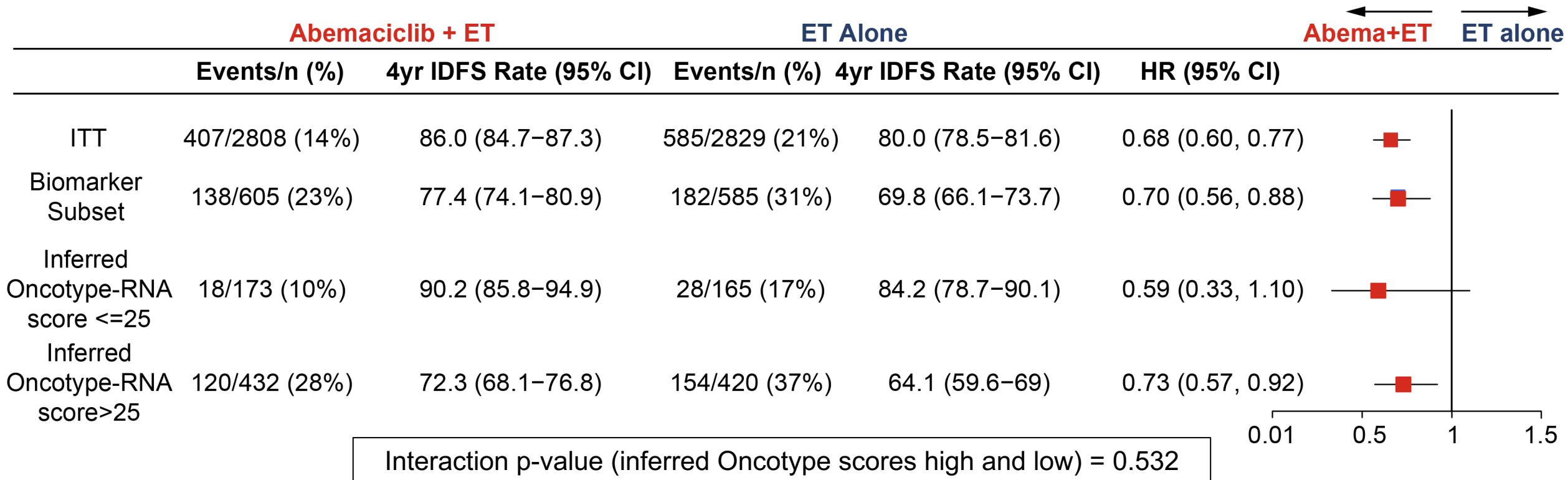
## 21-gene Oncotype expression signature score inferred from RNAseq



Observed high percentage of tumors with >25 risk score, reflective of the high-risk patient population

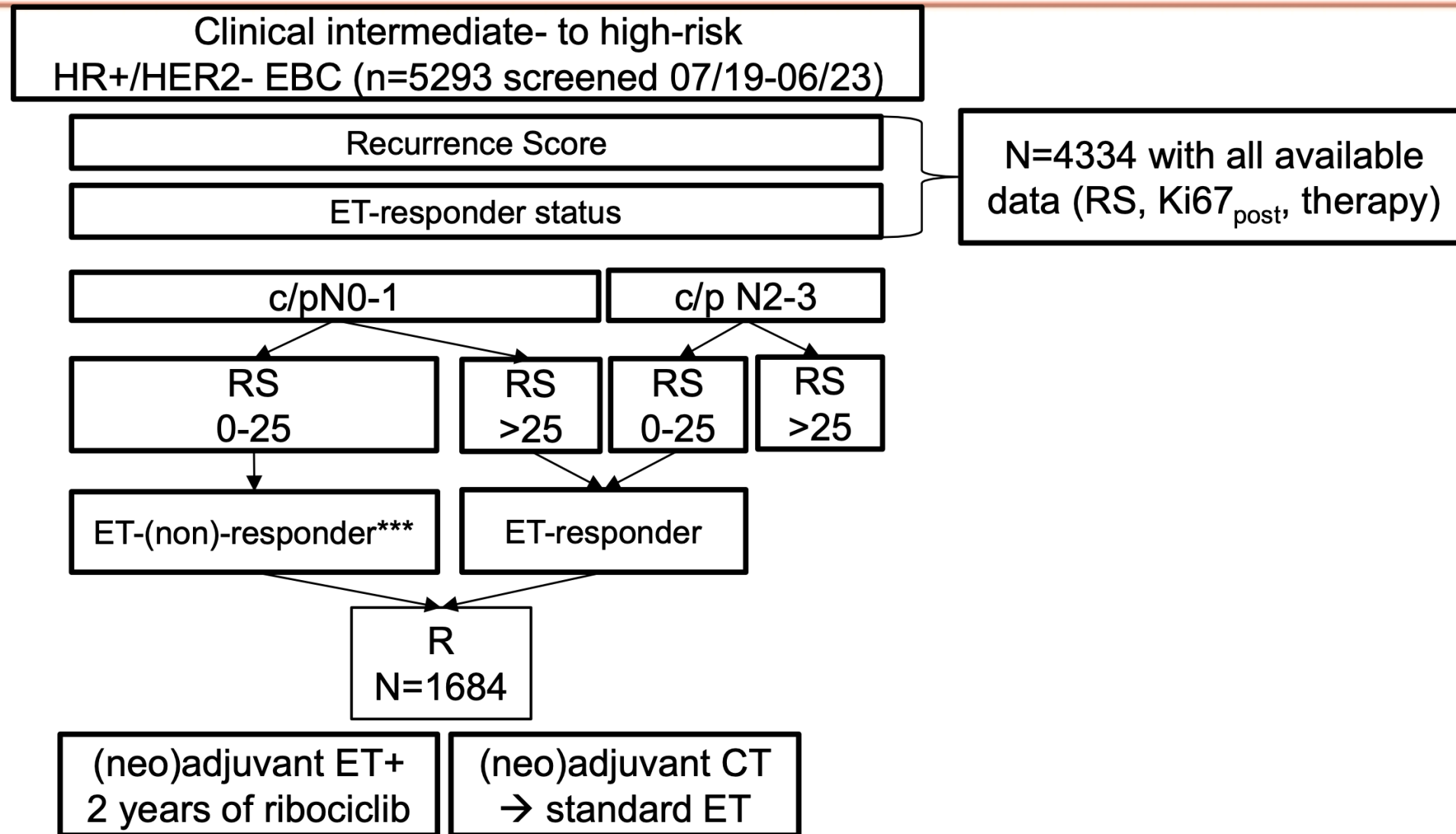
Paik, et al. 2004 N Engl J Med 351:2817-2826; Buss, et al. 2021

# Treatment benefit observed in inferred Oncotype risk scores



- The selected biomarker subset is enriched for IDFS events using case-cohort design
- IDFS rates are presented as indicative of relative prognosis across subtypes but do not inform the actual risk of recurrence within each subtype because of IDFS event enrichment

# ADAPTcycle



\*\*\* Participation of premenopausal N1 and N0 with RS 16-25 irrespective of ET-responder status allowed by investigator's decision, postmenopausal only if several risk factors

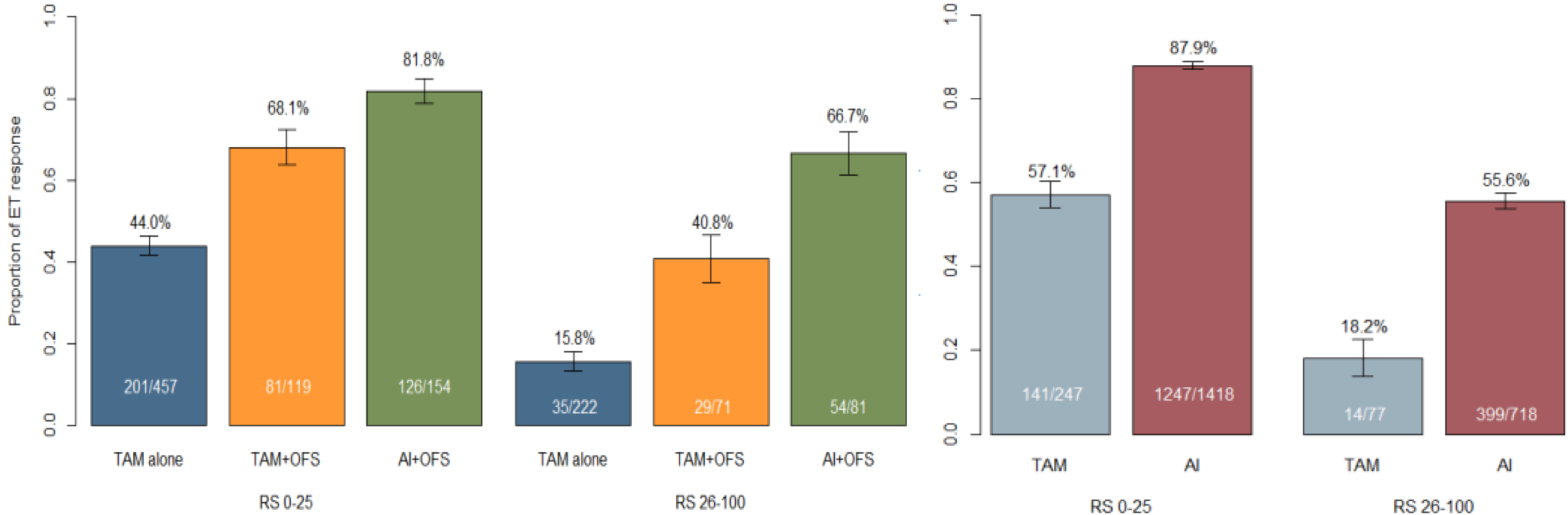


# ET-response rates and Recurrence Score

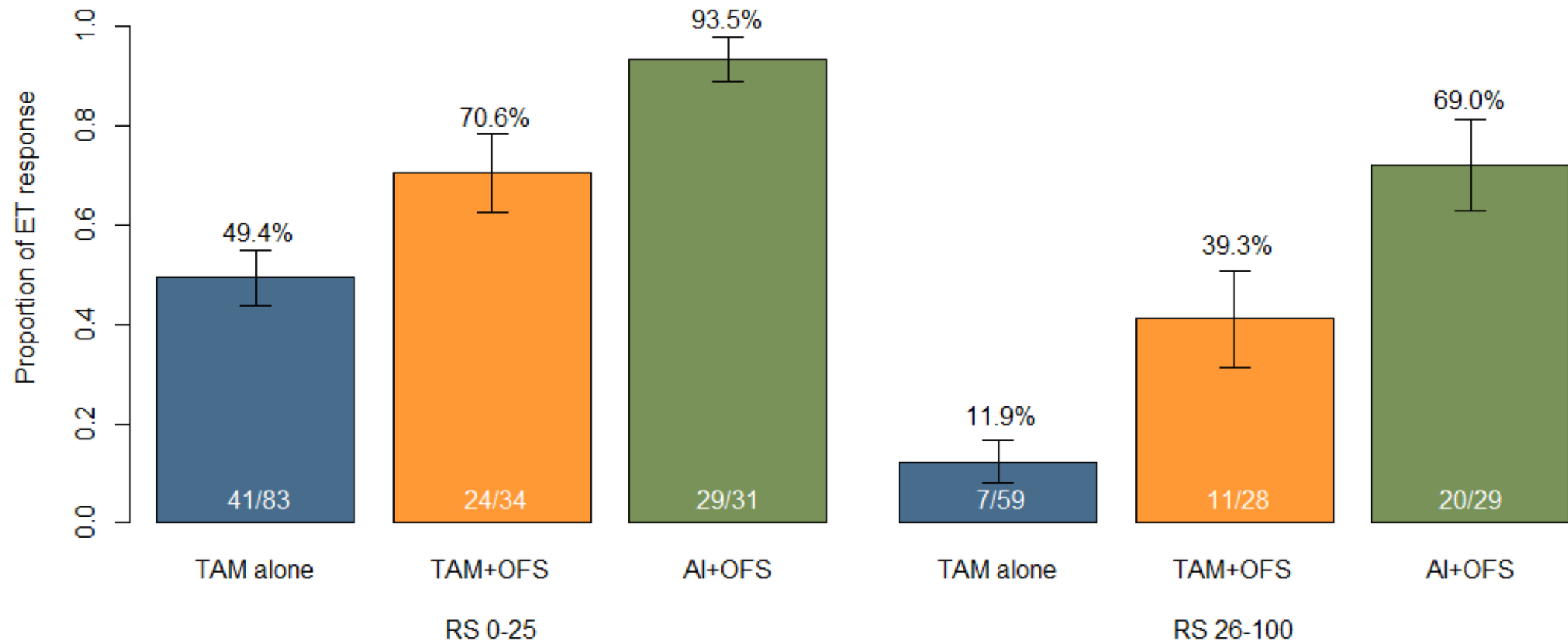


in  $\leq 50$ y and premenopausal

in  $> 50$ y or postmenopausal



# ET-response rates and Recurrence Score in $\leq 40$ y (premenopausal)

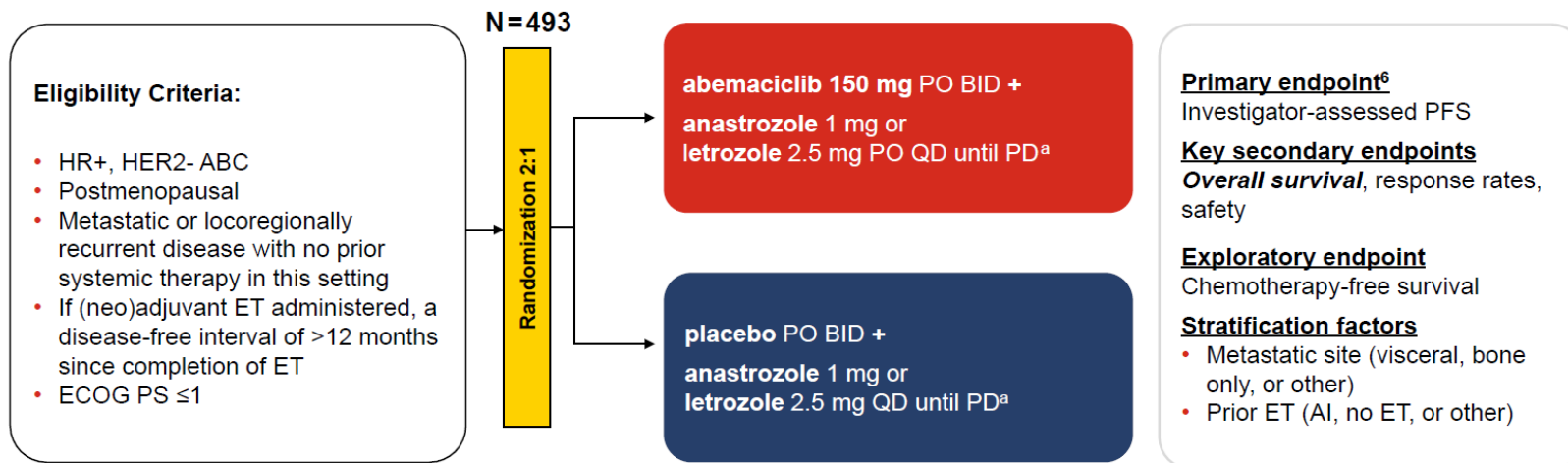


# Conclusions

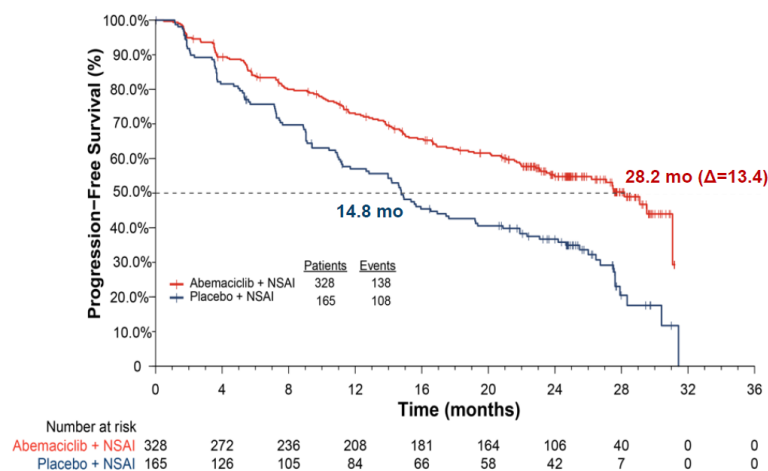


- In ADAPT, ET-response is associated with improved prognosis and identifies a subgroup of premenopausal N0-1 pts with excellent prognosis on ET alone
- ADAPTCycle screening cohort (n=4,334)
  - confirms ADAPT ET-response rates
  - shows first prospective data on Ki67<sub>post</sub> in premenopausal pts with all available ET options
  - demonstrates that adding OFS to TAM or AI substantially improves probability of ET-response in premenopausal pts - rates comparable to AI-treated postmenopausal pts
- → **with optimal ET, no difference in ET-sensitivity between pre- and postmenopausal pts observed**
- ADAPTCycle follow-up will demonstrate impact of ET-response (with and w/o OFS) on survival
- Based on ADAPT and ADAPTCycle, optimal ET (type / duration) for ET-response assessment:  
2-4w AI in postmenopausal pts; 4w GnRH and AI (started simultaneously) in premenopausal pts
- **ET-response should be considered in addition to gene expression testing for routine decision-making regarding chemotherapy use in HR+/HER2- N0-1 EBC to maximize the number of patients in whom chemotherapy can be spared**

# MONARCH 3: Final OS results of 1L abemaciclib + NSAI inhibitor for HR+, HER2- advanced breast cancer



## PFS benefit, leading to global regulatory approval



	abemaciclib + NSAI	placebo + NSAI
Median PFS (months)	28.2	14.8
HR (95% CI) 2-sided P value	0.540 (0.418-0.698) nominal p=0.000002*	

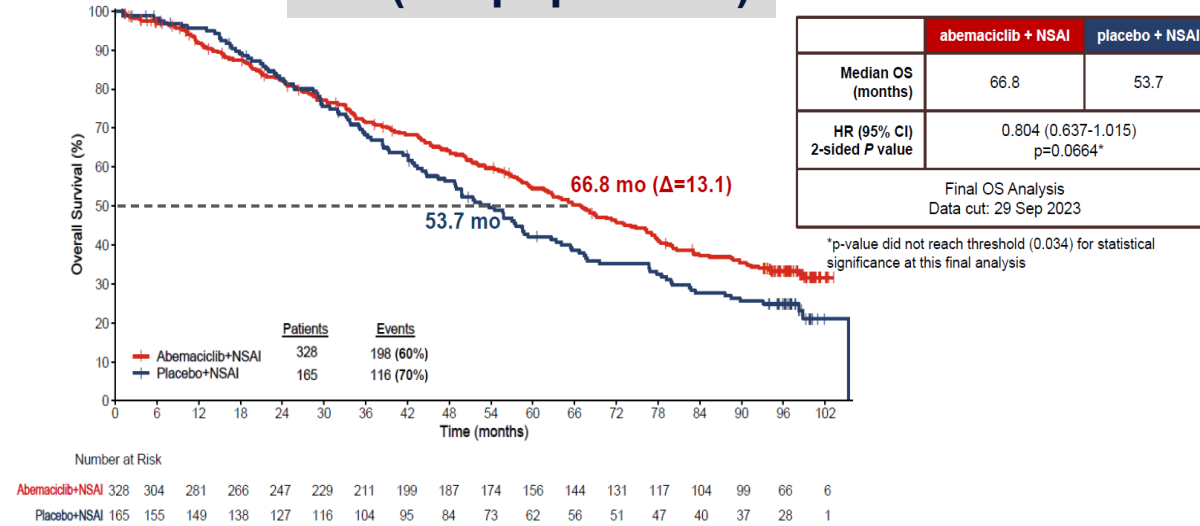
Pre-planned Final PFS Analysis<sup>5</sup>  
Data cut: 03 Nov 2017

\* Statistical significance was reached at the interim PFS analysis<sup>6</sup>

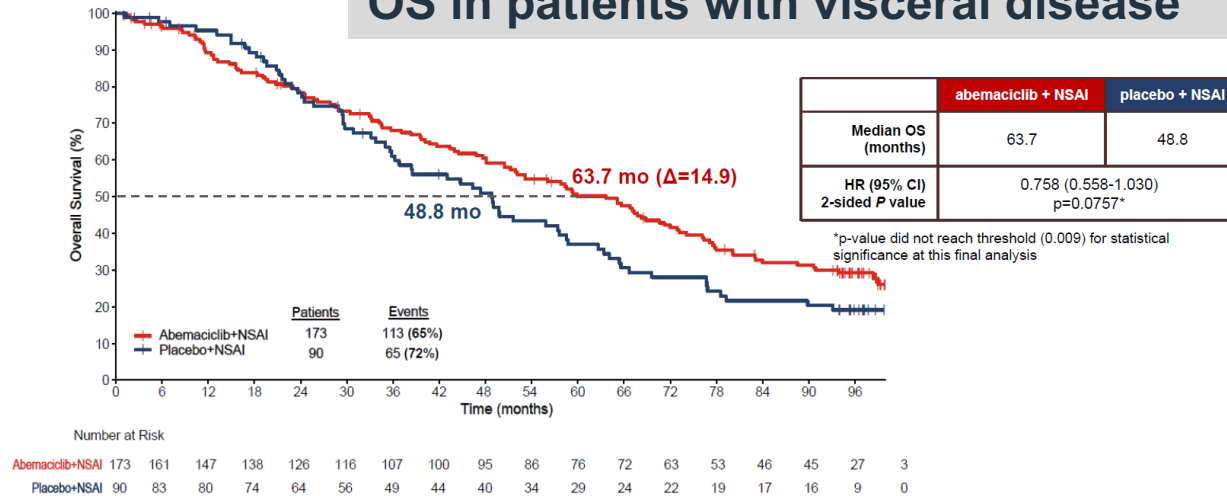
- At the final PFS data cut with a median follow-up of 26.7 months, PFS was prolonged by a median 13.4 months in patients receiving abemaciclib. At that time, OS was immature with 29.5% events observed across both arms
- Final OS:
  - ~315 events in the ITT
  - Data cutoff: Sep 29, 2023
  - Median follow up: 8.2 years
  - % of patients on treatment
    - Abemaciclib, 7%
    - Placebo, 3.0%

# MONARCH 3: Final OS results of 1L abemaciclib + NSAI inhibitor for HR+, HER2- advanced breast cancer

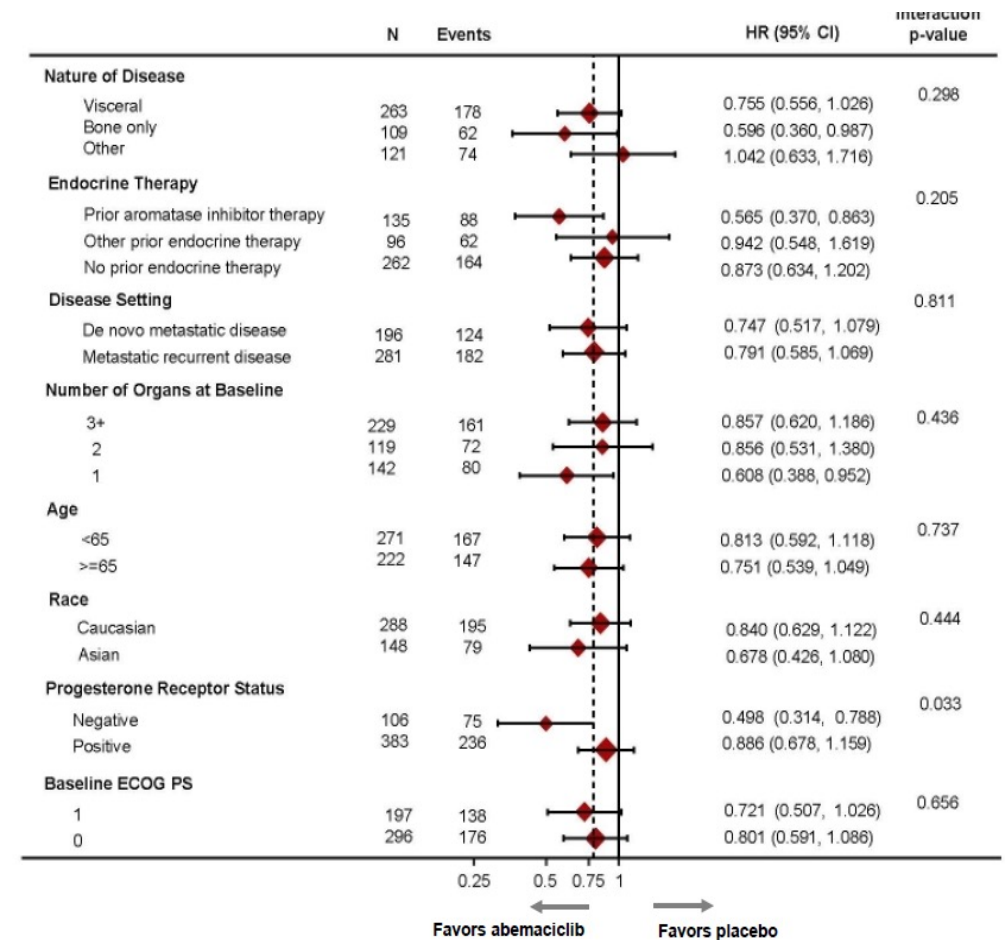
## OS (ITT population)



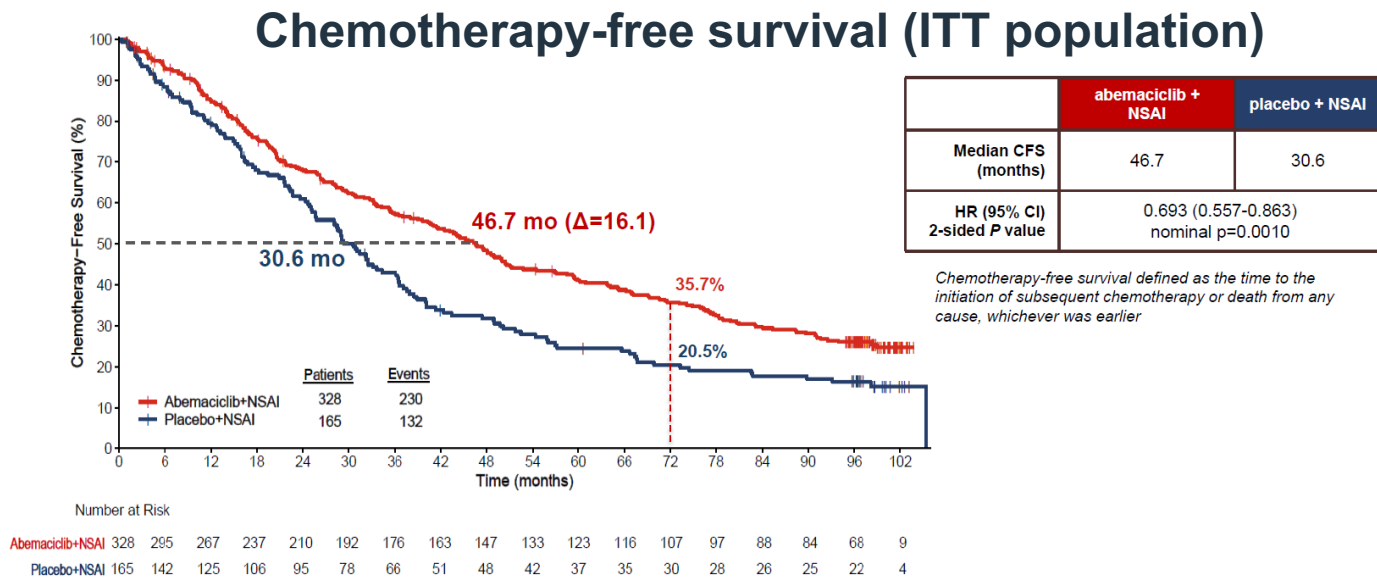
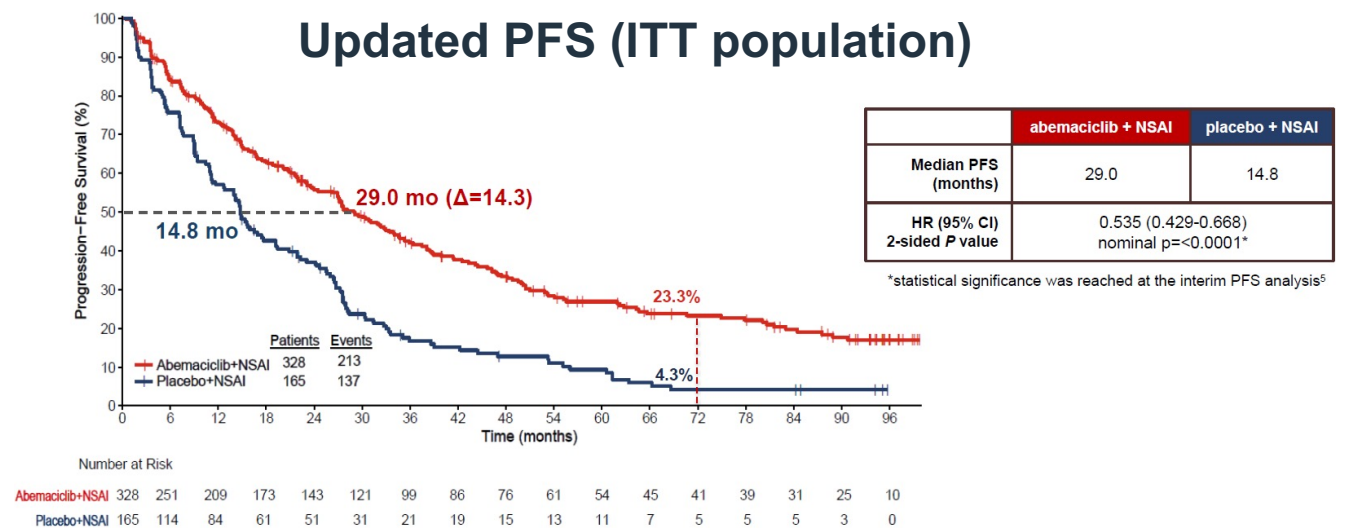
## OS in patients with visceral disease



## OS subgroup analysis



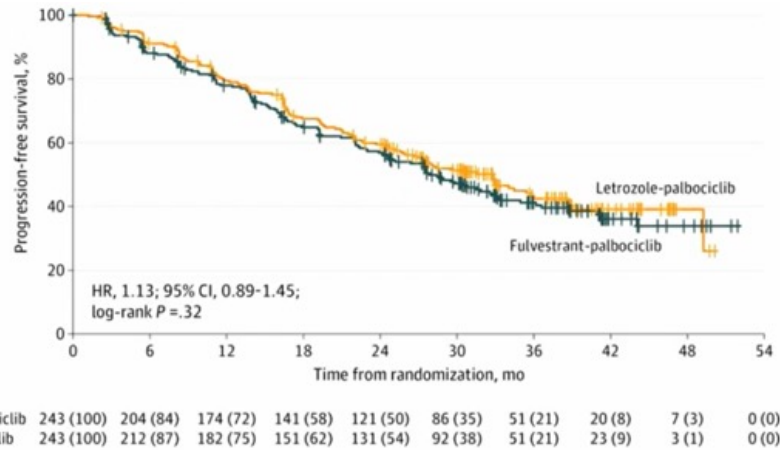
# MONARCH 3: Updated PFS and chemotherapy-free survival





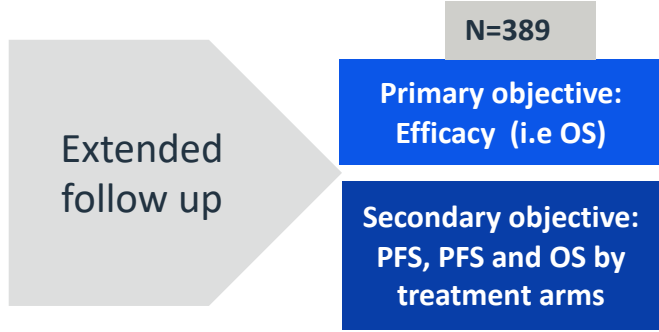
# PARSIFAL-LONG: Extended follow-up of fulvestrant/ palbociclib vs. letrozole/ palbociclib for HER2– advanced breast cancer

The PARSIFAL trial



Failed to show improvement in PFS of palbociclib + fulvestrant over fulvestrant/palbociclib vs. letrozole/palbociclib with a median follow-up of 32 m

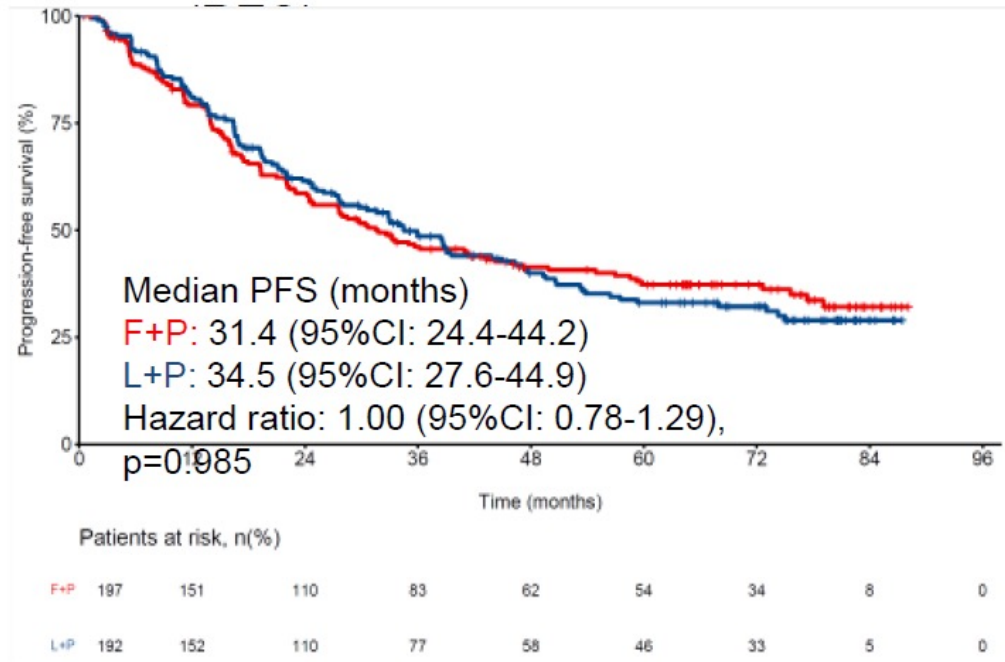
The PARSIFAL-Long trial



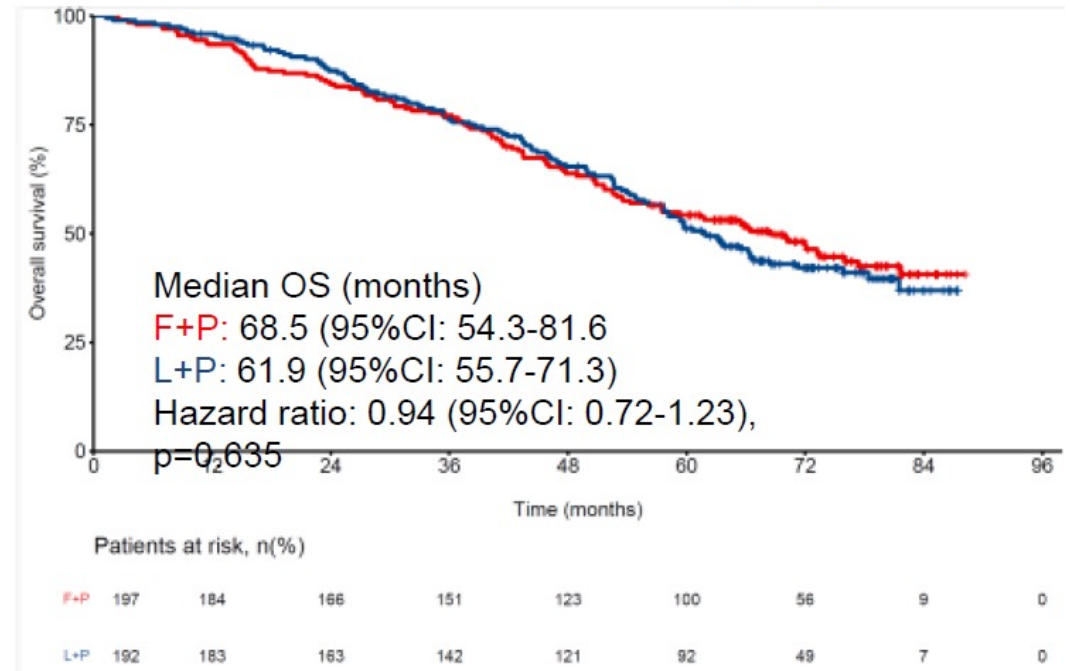
- Analysis included 32 of the original 47 sites
- 80.5% of patients from the PARSIFAL trial were included
- Baseline demographics and disease characteristics were similar between the PARSIFAL-LONG and the overall PARSIFAL ITT population
- Median follow-up of 59.7 months (IQR: 36.3–72.9)

# PARSIFAL-LONG: Efficacy, PFS and OS

## Progression-Free Survival



## Overall Survival (OS)



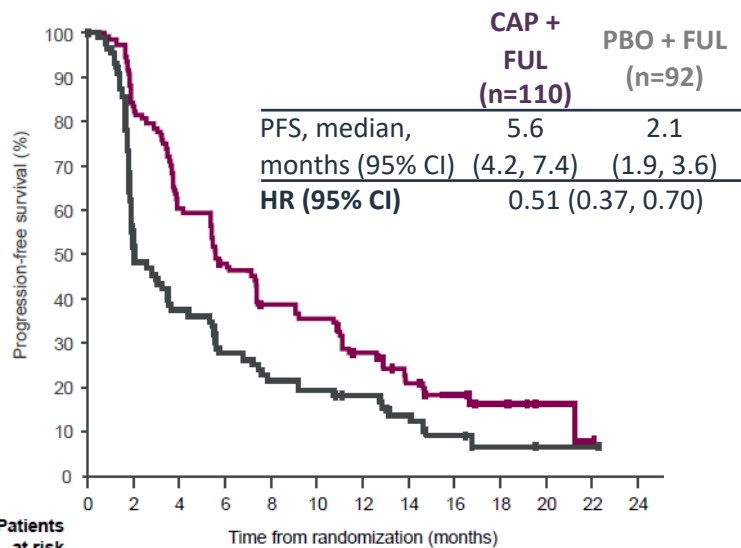
Medial follow-up: 59.7 months. Data cutoff: May 2023  
 Llombart-Cussac, et al. SABCS 2023. Abstract RF01-03



# CAPItello-291 (Phase 3, exploratory analysis): Capivasertib and fulvestrant for AI-resistant HR+/HER2- advanced breast cancer

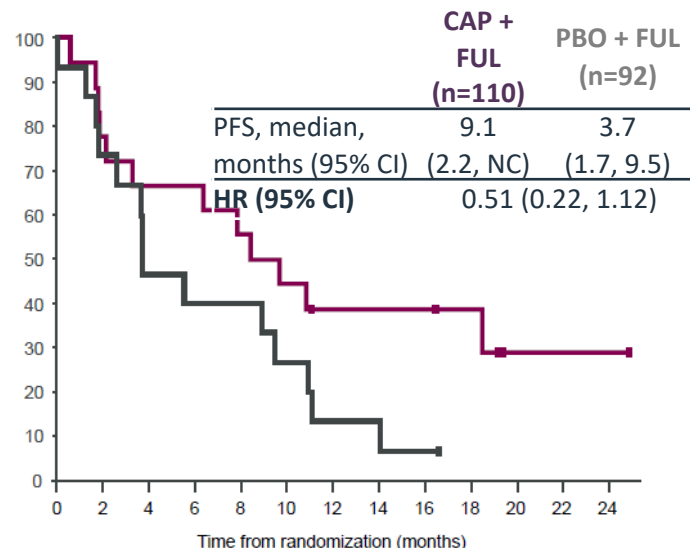
- **Objective:** Explore PFS by tumor PIK3CA/AKT1/PTEN-mutated status among patients from the CAPItell-291 study (including pooled analysis with inclusion of data from the Chinese extension cohort)
- **CAPItell-291 population:** Patients with HR+/HER2- advanced breast cancer after progression during during AI treatment with/without prior CDK4/6i therapy

## PIK3CA alteration only



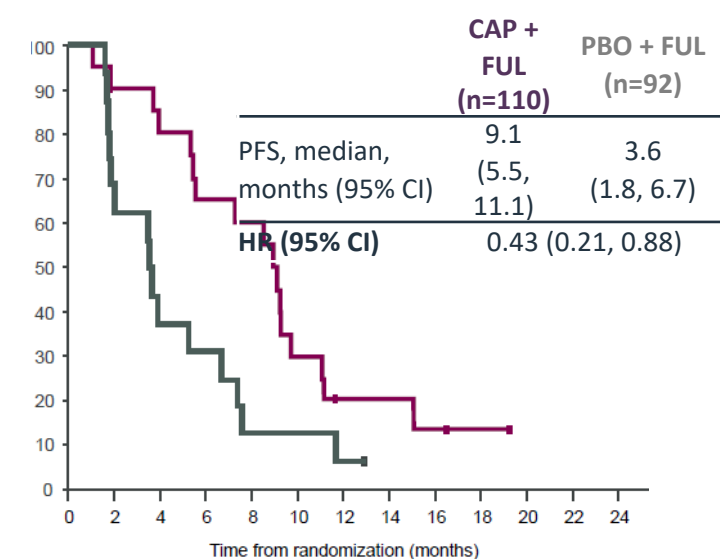
Patients at risk	0	2	4	6	8	10	12	14	16	18	20	22	24
Capivasertib plus fulvestrant	110	90	65	51	40	37	27	17	13	7	2	1	0
Placebo plus fulvestrant	92	48	31	23	18	16	13	9	5	2	1	1	0

## AKT1 alteration only



18	14	12	12	10	8	6	6	6	4	1	1	1
15	11	7	6	6	4	2	2	1	0	0	0	0

## PTEN alteration only



21	18	17	13	12	6	3	3	2	1	0	0	0
16	11	6	5	2	2	1	0	0	0	0	0	0

# EMERALD: Consistent Improvement in PFS vs SoC Across all Relevant *ESR1*-mut Subgroups

PFS Summary in *ESR1*-mut Patients With  $\geq 12$  Months of Prior CDK4/6 Inhibitor

Patients	Median PFS, months (95% CI)			HR (95% CI)
	% (n)	Elacestrant	SoC	
All <i>ESR1</i> -mut patients <sup>9</sup>	100 (159)	8.61 (4.14–10.84)	1.91 (1.87–3.68)	0.410 (0.262–0.634)
<i>ESR1</i> -mut and bone metastases <sup>a</sup>	86 (136)	9.13 (5.49–16.89)	1.91 (1.87–3.71)	0.381 (0.230–0.623)
<i>ESR1</i> -mut and liver and/or lung metastases <sup>b</sup>	71 (113)	7.26 (2.20–10.84)	1.87 (1.84–1.94)	0.354 (0.209–0.589)
<i>ESR1</i> -mut and <i>PIK3CA</i> -mut <sup>c</sup>	39 (62)	5.45 (2.14–10.84)	1.94 (1.84–3.94)	0.423 (0.176–0.941)
<i>ESR1</i> -mut and HER2-low expression <sup>d</sup>	48 (77)	9.03 (5.49–16.89)	1.87 (1.84–3.75)	0.301 (0.142–0.604)
<i>ESR1</i> -mut and <i>TP53</i> -mut	38 (61)	8.61 (3.65–24.25)	1.87 (1.84–3.52)	0.300 (0.132–0.643)

<sup>a</sup>85% of patients had bone and other sites of metastases (30% of these patients had no liver or lung involvement); <sup>b</sup>55% of patients had liver and other sites of metastases (10% of these patients had no lung or bone involvement); 25% of patients had lung and other sites of metastases (2% of these patients had no liver or bone involvement); <sup>c</sup>Includes E545K, H1047R, E542K amongst others; <sup>d</sup>HER2 IHC 1+, and 2+ with no ISH amplification. Data not available for all patients

# INAVO120 study design

## Key eligibility criteria

### Enrichment of patients with poor prognosis:

- **PIK3CA**-mutated, **HR+**, **HER2- ABC** by central ctDNA\* or local tissue/ctDNA test
- Measurable disease
- Progression during/within 12 months of adjuvant **ET** completion
- No prior therapy for **ABC**
- Fasting glucose <126 mg/dL and HbA<sub>1c</sub> <6.0%

### Stratification factors:

- Visceral Disease (Yes vs. No)
- Endocrine Resistance (Primary vs. Secondary)<sup>†</sup>
- Region (North America/Western Europe; Asia; Other)

N=325

R  
1:1

Enrolment period: December 2019 to September 2023

Inavolisib (9 mg QD PO)  
+ palbociclib (125 mg PO QD D1–D21)  
+ fulvestrant (500 mg C1D1/15 and Q4W)\*\*

Placebo (PO QD)  
+ palbociclib (125 mg PO QD D1–D21)  
+ fulvestrant (500 mg C1D1/15 and Q4W)\*\*

Until PD  
or toxicity

SURVIVAL  
FOLLOW-UP

### Endpoints

- Primary: PFS by Investigator
- Secondary: OS<sup>‡</sup>, ORR, BOR, CBR, DOR, PROs

\* Central testing for *PIK3CA* mutations was done on ctDNA using FoundationOne®Liquid (Foundation Medicine). In China, the central ctDNA test was the PredicineCARE NGS assay (Huidu). <sup>†</sup> Defined per 4th European School of Oncology (ESO)–European Society for Medical Oncology (ESMO) International Consensus Guidelines for Advanced Breast Cancer. <sup>‡</sup> Primary: relapse while on the first 2 years of adjuvant ET; Secondary: relapse while on adjuvant ET after at least 2 years or relapse within 12 months of completing adjuvant ET. <sup>§</sup> OS testing only if PFS is positive; interim OS analysis at primary PFS analysis;

\*\* Pre-menopausal women received ovarian suppression. ctDNA, circulating tumor DNA; R, randomized. 1. Cardoso F, et al. *Ann Oncol* 2018;29:1634–1657.

## Demographics and baseline disease characteristics

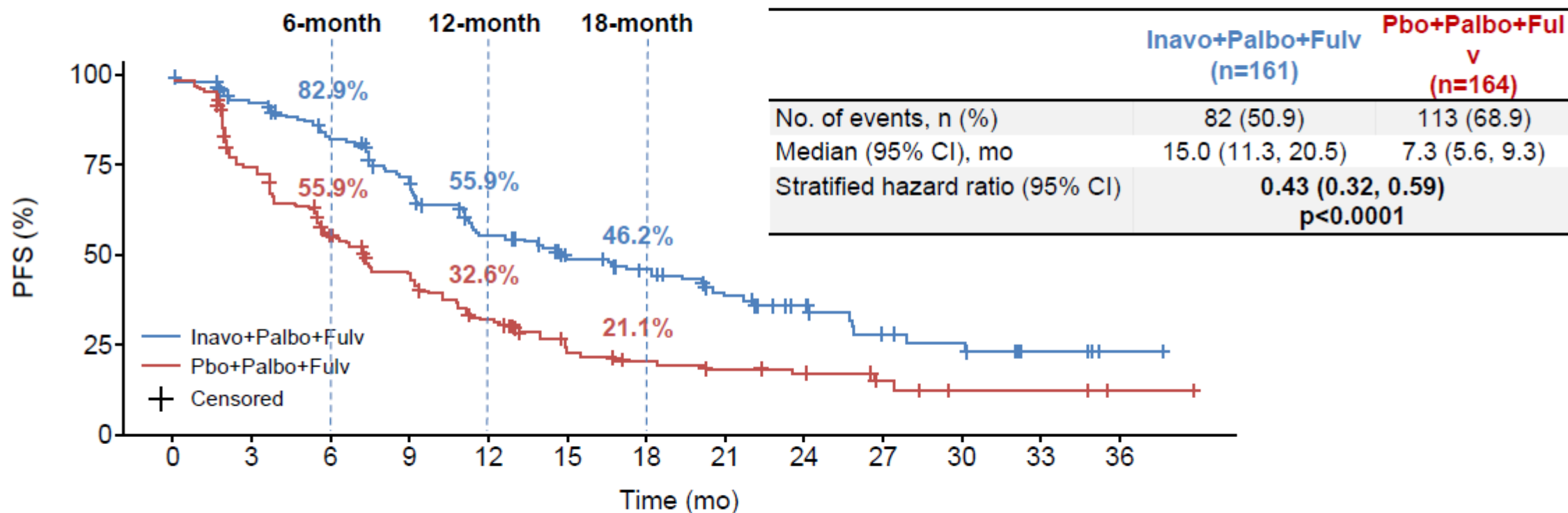
	Inavo+Palbo+Fulv (n=161)	Pbo+Palbo+Fulv (n=164)		Inavo+Palbo+Fulv (n=161)	Pbo+Palbo+Fulv (n=164)
<b>Age (year)</b>			<b>Number of organ sites, n (%)</b>		
Median	53.0	54.5	1	21 (13.0)	32 (19.5)
Min–Max	27–77	29–79	2	59 (36.6)	46 (28.0)
<b>Sex, n (%)</b>			≥3	81 (50.3)	86 (52.4)
Female	156 (96.9)	163 (99.4)	<b>Visceral disease, n (%)*</b>		
<b>Race, n (%)</b>			Liver	77 (47.8)	91 (55.5)
Asian	61 (37.9)	63 (38.4)	Lung	66 (41.0)	66 (40.2)
Black or African American	1 (0.6)	1 (0.6)	Bone only†	5 (3.1)	6 (3.7)
White	94 (58.4)	97 (59.1)	<b>ER<sup>‡</sup> and PgR status, n (%)</b>		
<b>ECOG PS, n (%)</b>			ER+/PgR+	113 (70.2)	113 (68.9)
0	100 (62.1)	106 (64.6)	ER+/PgR-	45 (28.0)	45 (27.4)
1	60 (37.3)	58 (35.4)	<b>Endocrine resistance, n (%)**</b>		
<b>Menopausal status at randomization, n (%)</b>			Primary	53 (32.9)	58 (35.4)
Premenopausal	65 (40.4)	59 (36.0)	Secondary	108 (67.1)	105 (64.0)
Postmenopausal	91 (56.5)	104 (63.4)			

301 (92.6%) pts were enrolled per ctDNA testing (284 [94.4%] central, 17 [5.6%] local) and 24 (7.4%) were enrolled per local tissue testing

\* "Visceral" (yes/no) refers to lung, liver, brain, pleural, and peritoneal involvement; † Patients with evaluable bone-only disease were not eligible; patients with disease limited to the bone but with lytic or mixed lytic/blastic lesions, and at least one measurable soft-tissue component per RECIST 1.1, may be eligible. ‡ Defined as 10% per ASCO-CAP guidelines. \*\* Endocrine resistance was defined per 4th ESO-[ESMO] International Consensus Guidelines for Advanced Breast Cancer. Primary resistance: Relapse while on the first 2 years of adjuvant endocrine therapy. Secondary resistance: Relapse while on adjuvant endocrine therapy after at least 2 years or relapse within 12 months of completing adjuvant endocrine therapy. ECOG PS, Eastern Cooperative Oncology Group Performance Status; ER, estrogen receptor, Fulv, fulvestrant; Inavo, inavolisib; Palbo, palbociclib; Pbo, placebo; PgR, progesterone receptor; RECIST, Response Evaluation Criteria in Solid Tumors.



## Primary endpoint: PFS (investigator-assessed)



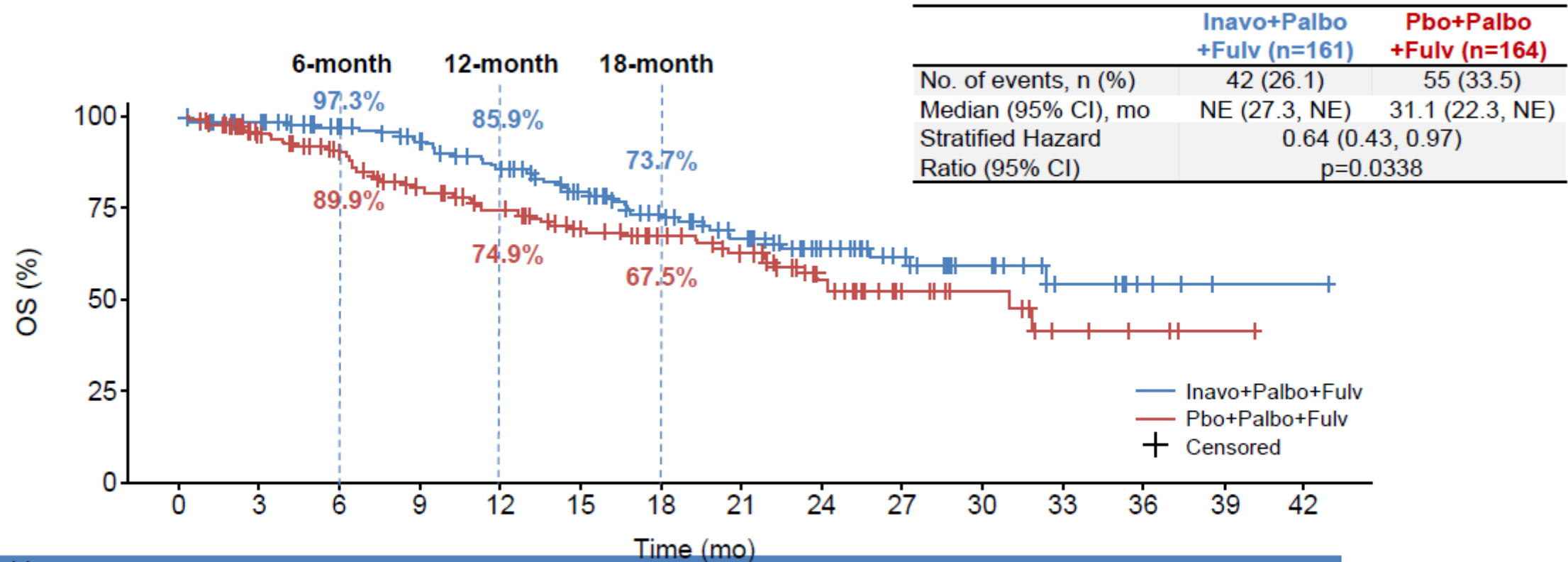
Patients at risk:	0	3	6	9	12	15	18	21	24	27	30	33	36
Inavo+Palbo+Fulv	161	134	111	92	66	48	41	31	22	13	11	5	1
Pbo+Palbo+Fulv	164	113	77	59	40	23	19	16	12	6	3	3	1

Median follow-up:  
**21.3 months**

CCOD: 29th September 2023

CI, confidence interval; Fulv, fulvestrant; Inavo, inavolisib; mo, months; Palbo, palbociclib; Pbo, placebo; PFS, progression-free survival.

## Key secondary endpoint: Overall survival (interim analysis)



Patients at risk:																
Inavo+Palbo+Fulv	161	143	127	114	101	85	69	56	38	26	17	8	4	1	1	
Pbo+Palbo+Fulv	164	139	120	98	87	72	61	52	33	19	11	5	3	1	0	

Median follow-up:  
**21.3 months**

The pre-specified boundary for OS (p of 0.0098 or HR of 0.592) was not crossed at this interim analysis

CI, confidence interval; Fulv, fulvestrant; Inavo, inavolisib; mo, months; NE, not estimable; OS, overall survival; Palbo, palbociclib; Pbo, placebo.

# Adverse events with any grade AEs $\geq 20\%$ incidence in either treatment group

Adverse Events	Inavo+Palbo+Fulv (N=162)		Pbo+Palbo+Fulv (N=162)	
	All Grades	Grade 3–4	All Grades	Grade 3–4
<b>Neutropenia</b>	<b>144 (88.9%)</b>	<b>130 (80.2%)</b>	<b>147 (90.7%)</b>	<b>127 (78.4%)</b>
Thrombocytopenia	78 (48.1%)	23 (14.2%)	73 (45.1%)	7 (4.3%)
<b>Stomatitis/Mucosal inflammation</b>	<b>83 (51.2%)</b>	<b>9 (5.6%)</b>	<b>43 (26.5%)</b>	<b>0</b>
Anemia	60 (37.0%)	10 (6.2%)	59 (36.4%)	3 (1.9%)
<b>Hyperglycemia</b>	<b>95 (58.6%)</b>	<b>9 (5.6%)</b>	<b>14 (8.6%)</b>	<b>0</b>
<b>Diarrhea</b>	<b>78 (48.1%)</b>	<b>6 (3.7%)</b>	<b>26 (16.0%)</b>	<b>0</b>
<b>Nausea</b>	<b>45 (27.8%)</b>	<b>1 (0.6%)</b>	<b>27 (16.7%)</b>	<b>0</b>
<b>Rash</b>	<b>41 (25.3%)</b>	<b>0</b>	<b>28 (17.3%)</b>	<b>0</b>
Decreased Appetite	38 (23.5%)	<2%	14 (8.6%)	<2%
Fatigue	38 (23.5%)	<2%	21 (13.0%)	<2%
COVID-19	37 (22.8%)	<2%	17 (10.5%)	<2%
Headache	34 (21.0%)	<2%	22 (13.6%)	<2%
Leukopenia	28 (17.3%)	11 (6.8%)	40 (24.7%)	17 (10.5%)
Ocular Toxicities	36 (22.2%)	0	21 (13.0%)	0

Key AEs are shown in **bold**. AEs were assessed per CTCAE V5. Neutropenia, thrombocytopenia, stomatitis/mucosal inflammation, anemia, hyperglycemia, diarrhea, nausea and rash were assessed as medical concepts using grouped terms

AE, adverse event; ALT, alanine aminotransferase; AST, aspartate aminotransferase; Fulv, fulvestrant; Inavo, inavolisib; Palbo, palbociclib; Pbo, placebo.

**6.8% stopped inavolisib due to toxicity**  
**70% had dose interruption and/or reduction**

# New Results from Endocrine Therapy Trials

- 3 yrs of ribociclib in high/intermediate risk pts improves iDFS and DRFS
- Adjuvant abemaciclib effective regardless of intrinsic subtype or RS
- LHRH agonist + AI most effective therapy for premenopausal pts – Responder to preop ET with Ki67 < 10% and RS < 26, ER/PR+++ and 0/1 N+ -- avoid chemoRx
- 1L MBC abemaciclib did not improve OS (13 mo additional OS vs AI alone) – likely due to smaller sample size
- Capivasertib effective in *PIK3CA*, *AKT* or *PTEN*-altered HR+ HER2- MBCs
- Elacestrant effective in CDKi-sensitive *ESR1*- and *PIK3CA*- or *p53*-mutant MBC regardless of metastatic site
- PI3K inhibitor inavolisib + fulvestrant + palbociclib in ET-resistant MBC is promising