

EMERGE and ENGAGE Topline Results: Two Phase 3 Studies to Evaluate Aducanumab in Patients With Early Alzheimer's Disease

Samantha Budd Haeberlein,¹ Christian von Hehn,¹ Ying Tian,¹ Spyros Chalkias,¹ Kumar Kandadi Muralidharan,¹ Tianle Chen,¹ Shuang Wu,¹ Jie Li,¹ LeAnne Skordos,¹ Laura Nisenbaum,¹ Raj Rajagovindan,¹ Gersham Dent,¹ Katie Harrison,¹ Ivan Nestorov,¹ Ying Zhu,¹ Craig Mallinckrodt,¹ Alfred Sandrock¹

¹Biogen, Cambridge, MA, USA

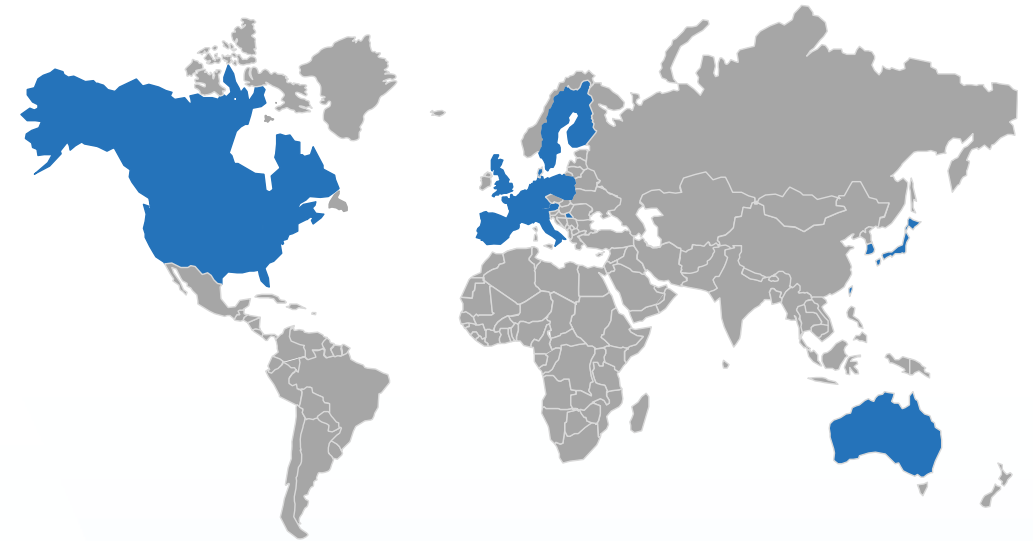
Disclosures: SBH (presenter), CvH, YT, SC, KKM, TC, SW, JL, LS, LN, RR, GD, KH, IN, YZ, CM, and AS are employees Biogen

Forward-looking statements

- This presentation contains forward-looking statements, including statements made pursuant to the safe harbor provisions of the Private Securities Litigation Reform Act of 1995, relating to additional results from the Phase 3 clinical studies of aducanumab; the potential clinical effects of aducanumab; the potential benefits, safety, and efficacy of aducanumab; potential regulatory discussions, submissions, and approvals and the timing thereof; clinical development programs, clinical trials, data readouts, and presentations related to aducanumab; the enrollment of any future clinical studies of aducanumab; the treatment of Alzheimer's disease; the potential of Biogen's commercial business and pipeline programs, including aducanumab; the anticipated benefits and potential of Biogen's collaboration arrangements with Eisai Co, Ltd; and risks and uncertainties associated with drug development and commercialization. These forward-looking statements may be accompanied by such words as "aim," "anticipate," "believe," "could," "estimate," "expect," "forecast," "intend," "may," "plan," "potential," "possible," "will," "would," and other words and terms of similar meaning. Drug development and commercialization involve a high degree of risk, and only a small number of research and development programs result in commercialization of a product. Results in early-stage clinical trials may not be indicative of full results or results from later-stage or larger-scale clinical trials and do not ensure regulatory approval. You should not place undue reliance on these statements or the scientific data presented.
- These statements involve risks and uncertainties that could cause actual results to differ materially from those reflected in such statements, including actual timing and content of submissions to and decisions made by the regulatory authorities regarding aducanumab; regulatory submissions may take longer or be more difficult to complete than expected; regulatory authorities may require additional information or further studies, or may fail or refuse to approve or may delay approval of Biogen's drug candidates, including aducanumab; actual timing and enrollment of future studies of aducanumab; the occurrence of adverse safety events and/or unexpected concerns that may arise from additional data or analysis; risks of unexpected costs or delays; the risks of other unexpected hurdles; uncertainty of success in the development and potential commercialization of aducanumab; failure to protect and enforce Biogen's data, intellectual property, and other proprietary rights and uncertainties relating to intellectual property claims and challenges; risks relating to the potential launch of aducanumab, including preparedness of healthcare providers to treat patients, the ability to obtain and maintain adequate reimbursement for aducanumab, and other unexpected difficulties or hurdles; product liability claims; third-party collaboration risks; the impact related to the effect of COVID-19 or other public health epidemics on our operations, including employees; and the other risks and uncertainties that are described in the Risk Factors section of our most recent annual or quarterly report and in other reports we have filed with the U.S. Securities and Exchange Commission. These statements are based on our current beliefs and expectations and speak only as of the date of this presentation. We do not undertake any obligation to publicly update any forward-looking statements, whether as a result of new information, future developments, or otherwise.

Aducanumab Phase 3 studies EMERGE and ENGAGE

Studies	Two identical, 18-month, randomized, double-blind, placebo-controlled, Phase 3 studies
Geography/ sample size	3285 patients at 348 sites in 20 countries
Population	<ul style="list-style-type: none"> ▪ Early Alzheimer's disease (MCI due to Alzheimer's disease + mild Alzheimer's disease dementia) <ul style="list-style-type: none"> • MMSE 24-30, CDR-G 0.5, RBANS ≤ 85, with confirmed amyloid pathology
Doses	<ul style="list-style-type: none"> ▪ Two dosing regimens (low and high) and placebo; randomized 1:1:1
Primary endpoint	<ul style="list-style-type: none"> ▪ CDR-SB at 18 months
Other endpoints	<ul style="list-style-type: none"> ▪ Secondary: MMSE, ADAS-Cog 13, ADCS-ADL-MCI ▪ Sub-studies: amyloid PET, tau PET, CSF disease-related biomarkers

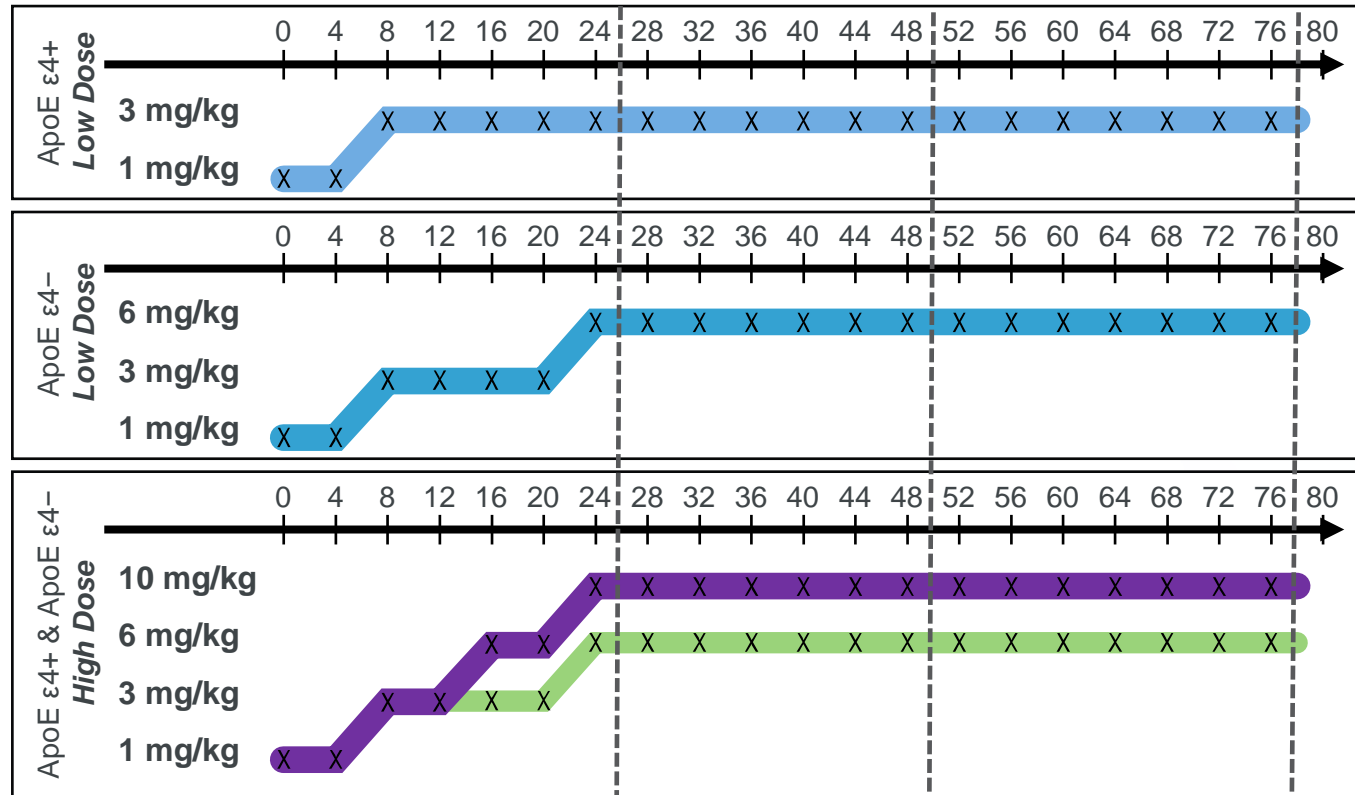


Countries with active sites included:

Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Italy, Japan, the Netherlands, Poland, Portugal, South Korea, Spain, Sweden, Switzerland, Taiwan, United Kingdom, United States

EMERGE and ENGAGE: Dose regimen

Early enrolled patients in the high dose arm received a lower dose



Median cumulative dose
at Week 78

56 mg/kg

Low dose

- Titrated to 3 or 6 mg/kg
- Maintained throughout study

98 mg/kg

116 mg/kg
(pre-PV4)

High dose

- Titrated to 6 or 10 mg/kg in Protocol Versions 1-3
- Titrated to 10 mg/kg in Protocol Version 4 and higher

153 mg/kg
(post-PV4)

Expected # of 10 mg/kg in high dose group

by Week 26: 1 dose

by Week 50: 7 doses

by Week 78: 14 doses

EMERGE and ENGAGE Topline Results

Baseline demographics

	EMERGE			ENGAGE		
	Placebo (n=548)	Low dose (n=543)	High dose (n=547)	Placebo (n=545)	Low dose (n=547)	High dose (n=555)
Age in years, mean ± SD	70.8±7.40	70.6±7.45	70.6±7.47	69.8±7.72	70.4±6.96	70.0±7.65
Female, n (%)	290 (52.9)	269 (49.5)	284 (51.9)	287 (52.7)	284 (51.9)	292 (52.6)
Race, n (%)						
Asian	47 (8.6)	38 (7.0)	41 (7.5)	55 (10.1)	55 (10.1)	65 (11.7)
White	415 (75.7)	418 (77.0)	405 (74.0)	413 (75.8)	412 (75.3)	413 (74.4)
Education years, mean ± SD	14.5±3.82	14.5±3.63	14.6±3.74	14.7±3.66	14.6±3.77	14.6±3.72
Alzheimer's disease medications used, n (%)	279 (50.9)	277 (51.0)	277 (50.6)	293 (53.8)	307 (56.1)	307 (55.3)
ApoE ε4, n (%)						
Carriers	367 (67.0)	362 (66.7)	365 (66.7)	376 (69.0)	391 (71.5)	378 (68.1)
Non-carriers	178 (32.5)	178 (32.8)	181 (33.1)	167 (30.6)	156 (28.5)	176 (31.7)
Clinical stage, n (%)						
MCI due to Alzheimer's disease	446 (81.4)	452 (83.2)	438 (80.1)	443 (81.3)	440 (80.4)	442 (79.6)
Mild Alzheimer's disease	102 (18.6)	91 (16.8)	109 (19.9)	102 (18.7)	107 (19.6)	113 (20.4)
Amyloid PET SUVR, mean composite ± SD (n) <i>PET sub-study population only</i>	1.37±0.175 (157)	1.39±0.181 (157)	1.38±0.183 (171)	1.38±0.198 (203)	1.39±0.186 (198)	1.41±0.177 (181)

ITT population.

ApoE, apolipoprotein E; ITT, intent to treat; MCI, mild cognitive impairment; PET, positron-emission tomography; SD, standard deviation; SUVR, standardized uptake value ratio.

Baseline disease characteristics

	EMERGE			ENGAGE		
	Placebo (n=548)	Low dose (n=543)	High dose (n=547)	Placebo (n=545)	Low dose (n=547)	High dose (n=555)
RBANS delayed memory score, mean ± SD	60.5±14.23	60.0±14.02	60.7±14.15	60.0±13.65	59.5±14.16	60.6±14.09
MMSE score, mean ± SD	26.4±1.78	26.3±1.72	26.3±1.68	26.4±1.73	26.4±1.78	26.4±1.77
CDR global score, n (%)						
0.5	544 (99.3)	543 (100)	546 (99.8)	544 (99.8)	546 (99.8)	554 (99.8)
1	3 (0.5)	0	1 (0.2)	1 (0.2)	1 (0.2)	0
CDR-SB score, mean ± SD	2.47±0.999	2.46±1.011	2.51±1.053	2.40±1.012	2.43±1.014	2.40±1.009
ADAS-Cog 13 score, mean ± SD	21.9±6.73	22.5±6.76	22.2±7.08	22.5±6.56	22.5±6.30	22.4±6.54
ADCS-ADL-MCI score, mean ± SD	42.6±5.73	42.8±5.48	42.5±5.82	43.0±5.55	42.9±5.73	42.9±5.70

ITT population.

ADAS-Cog 13, Alzheimer's Disease Assessment Scale–Cognitive Subscale (13-item); ADCS-ADL-MCI, Alzheimer's Disease Cooperative Study–Activities of Daily Living Inventory (mild cognitive impairment version); CDR-SB, Clinical Dementia Rating–Sum of Boxes; ITT, intent to treat; MCI, mild cognitive impairment; MMSE, Mini-Mental State Examination; RBANS, Repeatable Battery for Assessment of Neuropsychological Status.

Patient disposition

Randomized	EMERGE (N=1643)			ENGAGE (N=1653)		
Dosed	n=1638			n=1647		
	Placebo n=548	Low dose n=543	High dose n=547	Placebo n=545	Low dose n=547	High dose n=555
Discontinued treatment^a, n (%)	82 (15.0)	108 (19.9)	131 (23.9)	96 (17.6)	105 (19.2)	148 (26.7)
Adverse event	16 (2.9)	41 (7.6)	46 (8.4)	26 (4.8)	43 (7.9)	64 (11.5)
Consent withdrawn	6 (1.1)	22 (4.1)	18 (3.3)	14 (2.6)	11 (2.0)	15 (2.7)
Death	5 (0.9)	0	5 (0.9)	0	3 (0.5)	1 (0.2)
Study visit burden	2 (0.4)	7 (1.3)	5 (0.9)	4 (0.7)	3 (0.5)	9 (1.6)
Site terminated by sponsor	21 (3.8)	10 (1.8)	14 (2.6)	16 (2.9)	16 (2.9)	24 (4.3)
Other	23 (4.2)	23 (4.2)	28 (5.1)	28 (5.1)	22 (4.0)	28 (5.0)
Withdrew from study^a, n (%)	39 (7.1)	54 (9.9)	66 (12.1)	58 (10.6)	60 (11.0)	78 (14.1)
Adverse event	10 (1.8)	11 (2.0)	18 (3.3)	16 (2.9)	23 (4.2)	26 (4.7)
Consent withdrawn	8 (1.5)	28 (5.2)	22 (4.0)	21 (3.9)	14 (2.6)	23 (4.1)
Death	5 (0.9)	0	6 (1.1)	0	3 (0.5)	2 (0.4)
Study visit burden	2 (0.4)	7 (1.3)	5 (0.9)	5 (0.9)	3 (0.5)	11 (2.0)
Site terminated by sponsor	0	0	1 (0.2)	2 (0.4)	1 (0.2)	0
Other	3 (0.5)	4 (0.7)	3 (0.5)	5 (0.9)	5 (0.9)	9 (1.6)
Completed placebo-controlled period, n (%)	275 (50.2)	274 (50.5)	285 (52.1)	319 (58.5)	314 (57.4)	275 (49.5)

ITT population. ^aSome categories with less than 1% patients are not displayed, including lost to follow-up, disease progression, pregnancy, investigator decision, relocation, change of treatment, withdrawal by parent/guardian, protocol amendment, site terminated by investigator and loss of capacity. ITT, intent to treat.

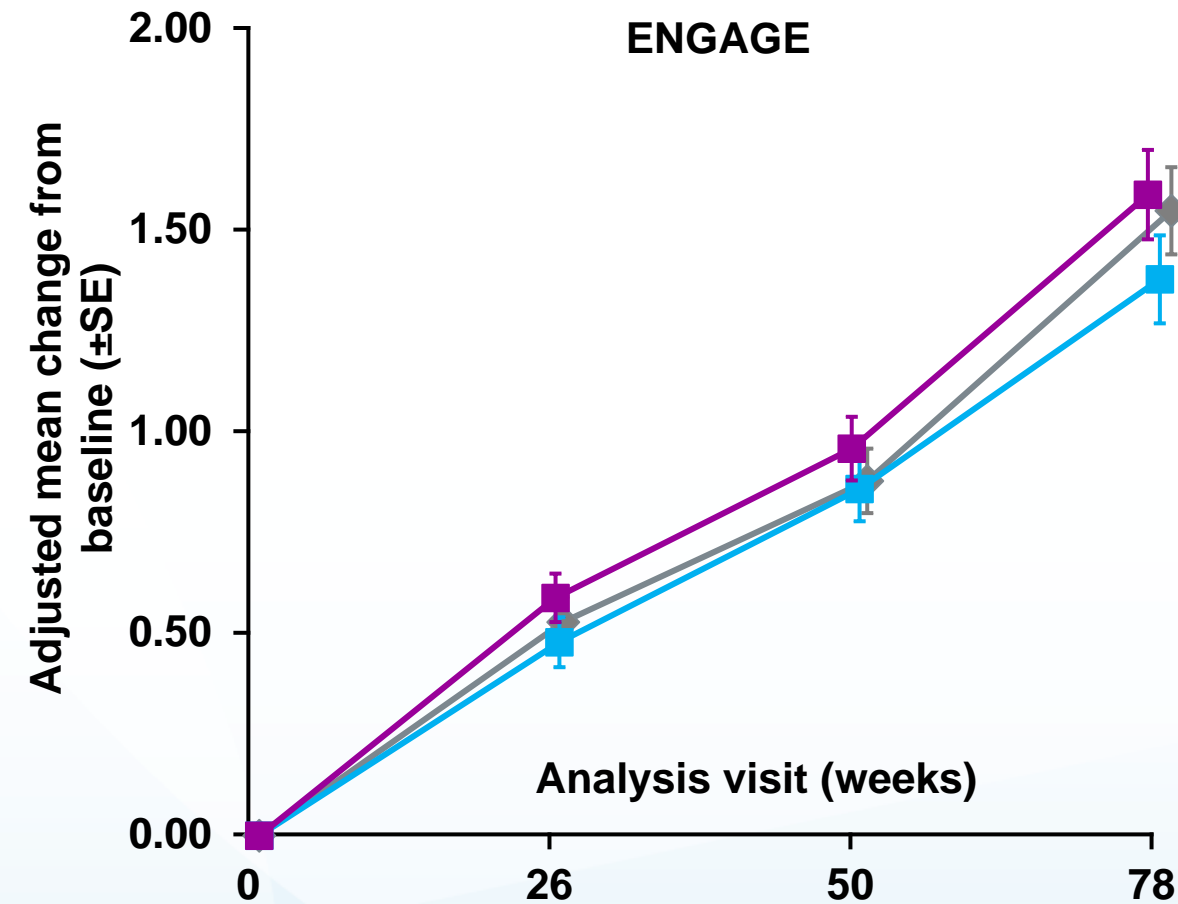
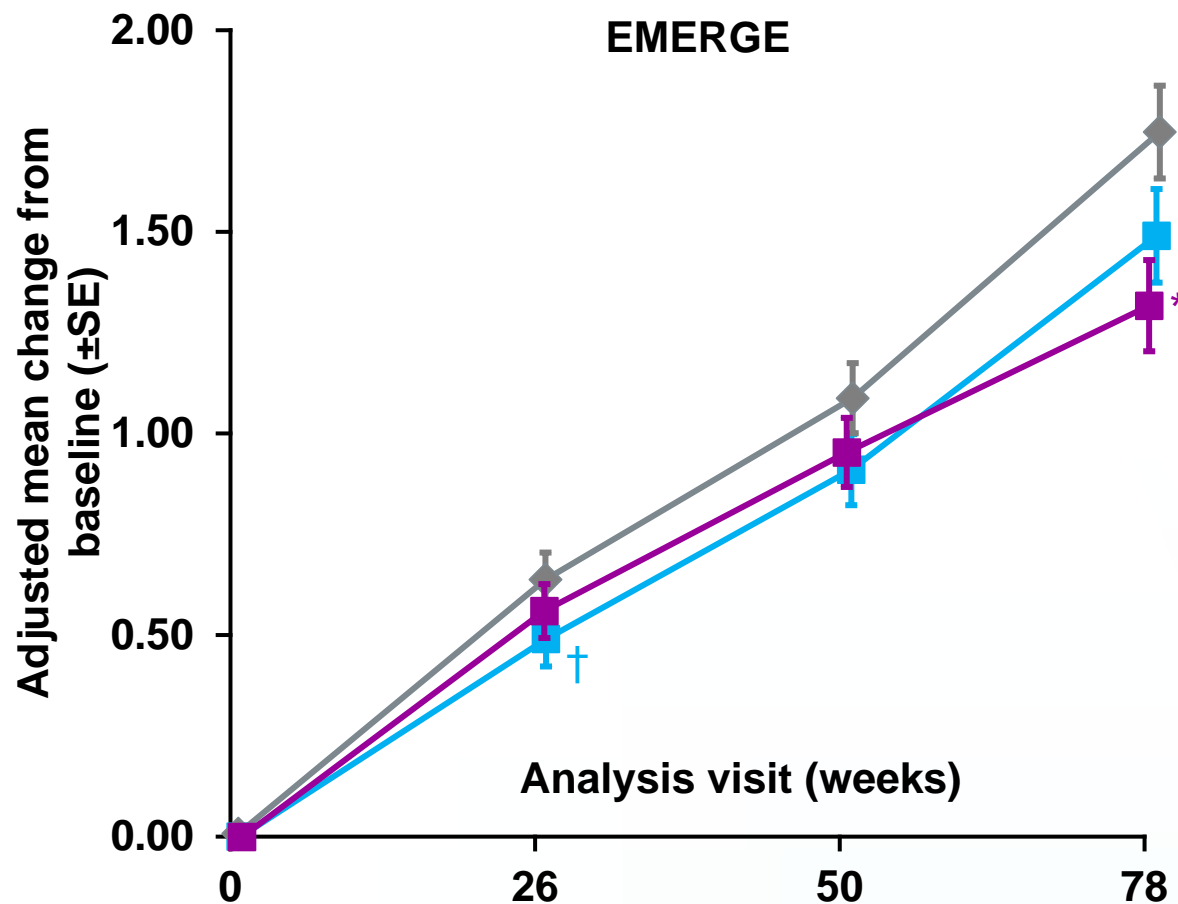
Prespecified primary and secondary endpoints at Week 78

	EMERGE			ENGAGE		
	Placebo decline (n=548)	Difference vs. placebo (%) ^a p-value		Placebo decline (n=545)	Difference vs. placebo (%) ^a p-value ^b	
		Low dose (n=543)	High dose (n=547)		Low dose (n=547)	High dose (n=555)
CDR-SB	1.74	-0.26 (-15%) 0.0901	-0.39 (-22%) 0.0120	1.56	-0.18 (-12%) 0.2250	0.03 (2%) 0.8330
MMSE	-3.3	-0.1 (3%) 0.7578	0.6 (-18%) 0.0493	-3.5	0.2 (-6%) 0.4795	-0.1 (3%) 0.8106
ADAS-Cog 13	5.162	-0.701 (-14%) 0.1962	-1.400 (-27%) 0.0097	5.140	-0.583 (-11%) 0.2536	-0.588 (-11%) 0.2578
ADCS-ADL-MCI	-4.3	0.7 (-16%) 0.1515	1.7 (-40%) 0.0006	-3.8	0.7 (-18%) 0.1225	0.7 (-18%) 0.1506

ITT population. ^aDifference vs placebo at Week 78. Negative percentage means less progression in the treated arm.

ADAS-Cog 13, Alzheimer's Disease Assessment Scale–Cognitive Subscale (13-item); ADCS-ADL-MCI, Alzheimer's Disease Cooperative Study–Activities of Daily Living Inventory (mild cognitive impairment version); CDR-SB, Clinical Dementia Rating–Sum of Boxes; ITT, intent to treat; MCI, mild cognitive impairment; MMSE, Mini-Mental State Examination.

Longitudinal change from baseline in CDR-SB

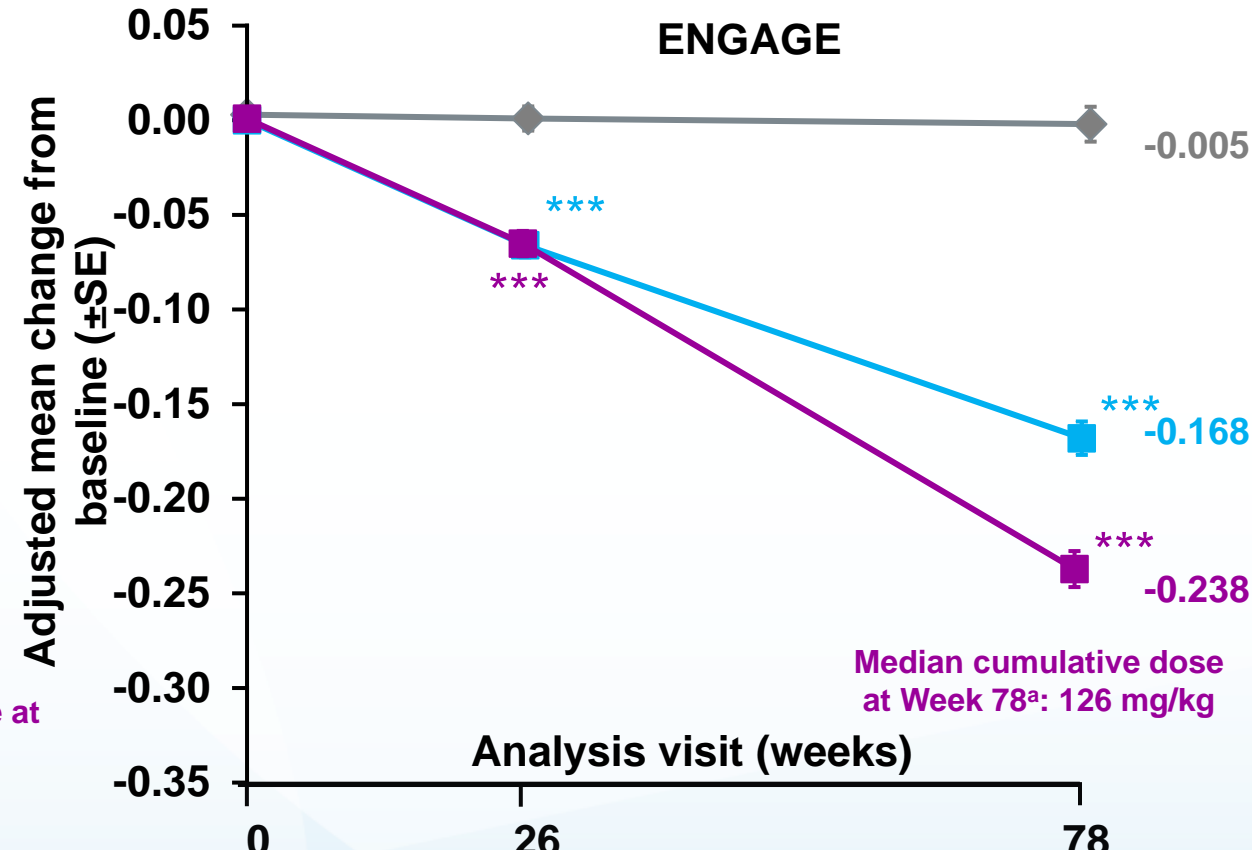
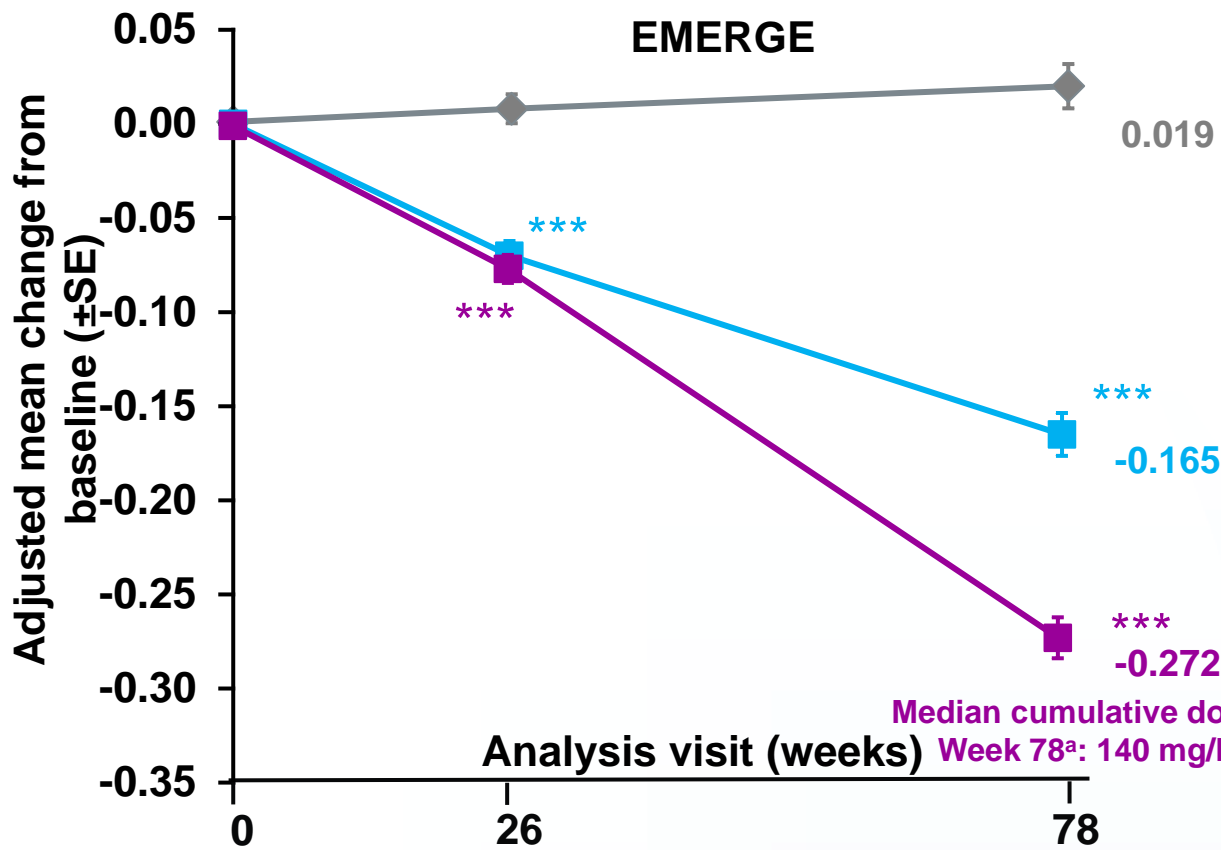


Placebo	n=547	531	429	288
Low dose adu	n=543	512	420	289
High dose adu	n=547	513	431	299

Placebo	n=545	522	455	333
Low dose adu	n=547	529	454	331
High dose adu	n=554	532	448	293

ITT population. * $p < 0.05$, † $p < 0.1$ and ≥ 0.05 compared with placebo (nominal). Values at each time point were based on an MMRM model, with change from baseline in CDR-SB as the dependent variable and with fixed effects of treatment group, categorical visit, treatment-by-visit interaction, baseline CDR-SB, baseline CDR-SB by visit interaction, baseline MMSE, Alzheimer's disease symptomatic medication use at baseline, region, and laboratory ApoE $\epsilon 4$ status. ApoE, apolipoprotein E; CDR-SB, Clinical Dementia Rating-Sum of Boxes; ITT, intent to treat; MMRM, mixed model for repeated measure; MMSE, Mini Mental State Examination; SE, standard error.

Longitudinal change from baseline in amyloid PET SUVR



	0	26	78
Placebo	n=157	128	74
Low dose adu	n=157	125	79
High dose adu	n=171	136	87

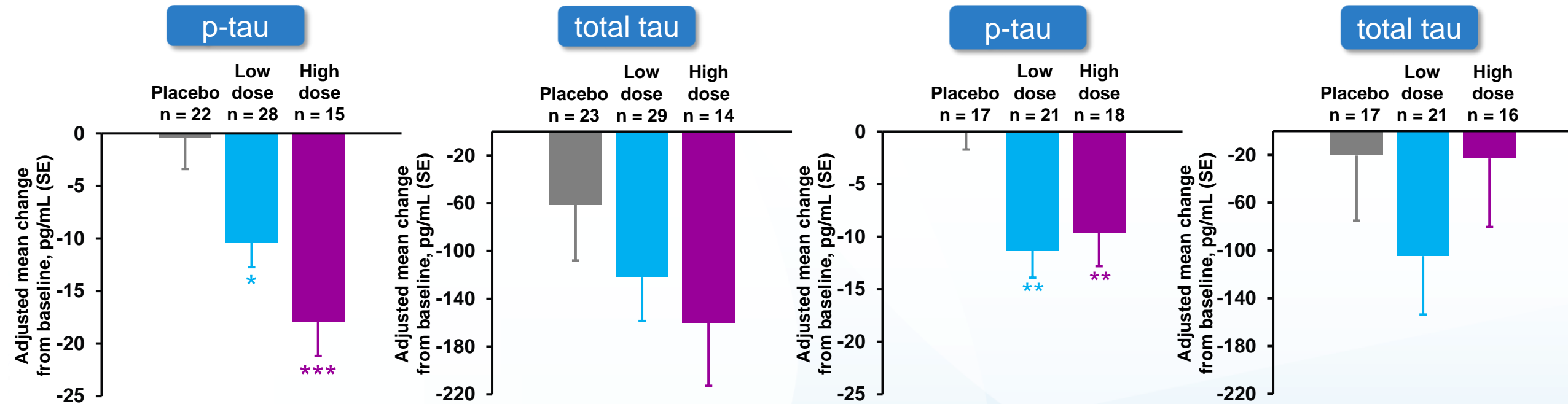
	0	26	78
Placebo	n=203	164	104
Low dose adu	n=198	166	116
High dose adu	n=181	149	97

^aCalculated from patients with Week 78 PET assessment. ¹⁸F-florbetapir amyloid PET analysis population. ***p<0.0001 compared with placebo (nominal). Values at each time point were based on an MMRM model, with change from baseline in MMSE as the dependent variable and with fixed effects of treatment group, categorical visit, treatment-by-visit interaction, baseline SUVR, baseline SUVR by visit interaction, baseline MMSE, Alzheimer's disease symptomatic medication use at baseline, region, and laboratory ApoE ε4 status. ApoE, apolipoprotein E; MMRM, mixed model for repeated measure; MMSE, Mini Mental State Examination; PET, positron emission tomography; SE, standard error; SUVR, standardized uptake value ratio.

CSF biomarkers of tau pathology and neurodegeneration

EMERGE

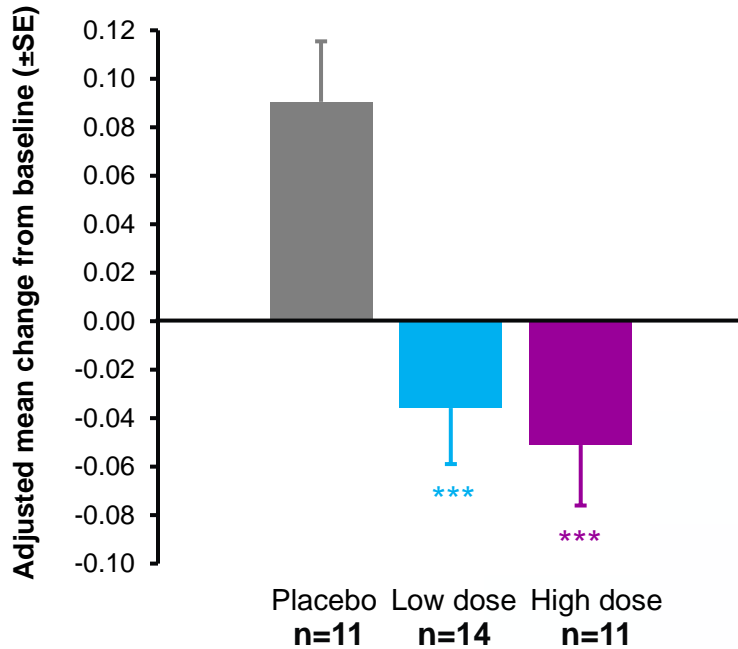
ENGAGE



CSF modified analysis population (patients with both baseline and post-baseline CSF assessments). * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ compared with placebo (nominal). Values were based on an ANCOVA model at Week 78, fitted with change from baseline as the dependent variable, and with categorical treatment, baseline biomarker value, baseline age, and laboratory ApoE $\epsilon 4$ status (carrier and non-carrier) as the independent variables. ANCOVA, analysis of covariance; ApoE, apolipoprotein; CSF, cerebrospinal fluid; SE, standard error.

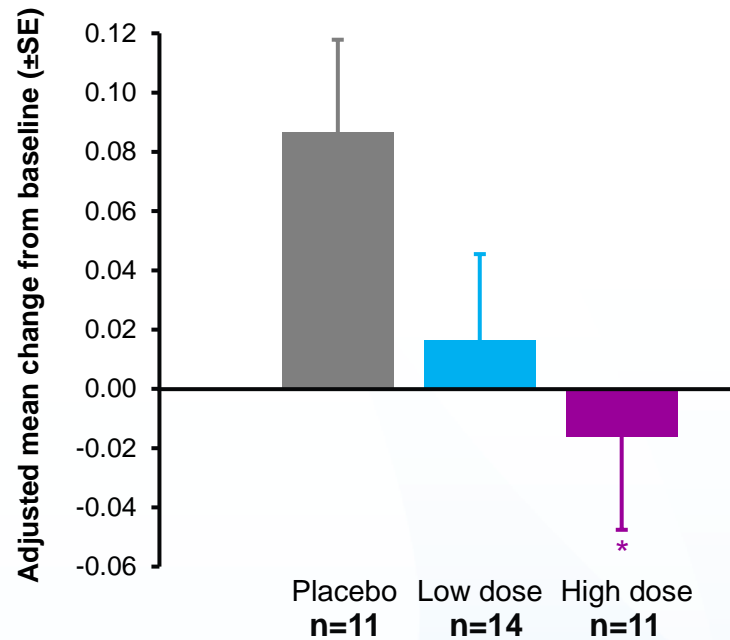
EMERGE and ENGAGE: tau PET composite SUVR change from baseline

Medial temporal composite



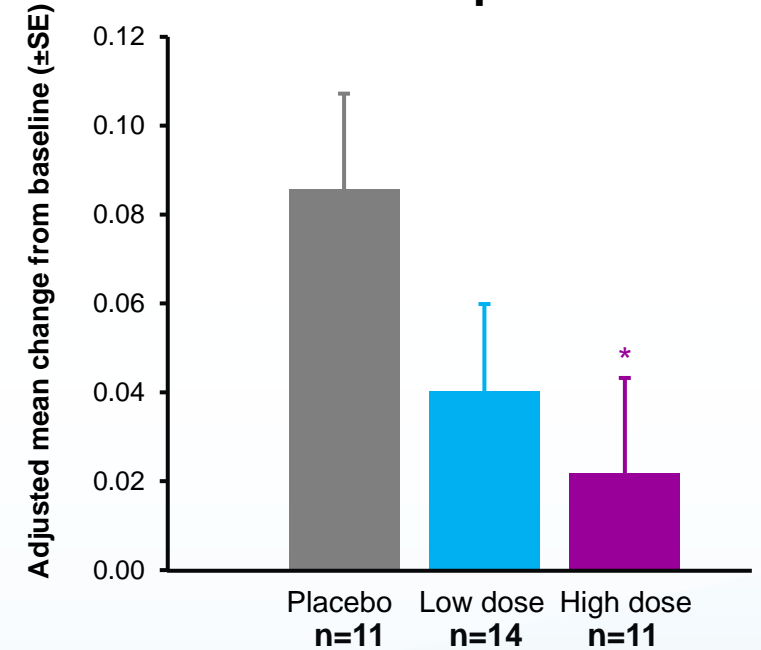
HIPPOCAMPUS
 PARAHIPPOCAMPAL
 TEMPORAL LOBE ANTERIOR MEDIAL
 (includes Entorhinal and Amygdala)
 TEMPORAL LOBE ANTERIOR LATERAL

Temporal composite



TEMPORAL LOBE Comprised of:
 SUPERIOR, POSTERIOR, MIDDLE INFERIOR
 POSTERIOR, SUPERIOR ANTERIOR,
 FUSIFORM GYRUS

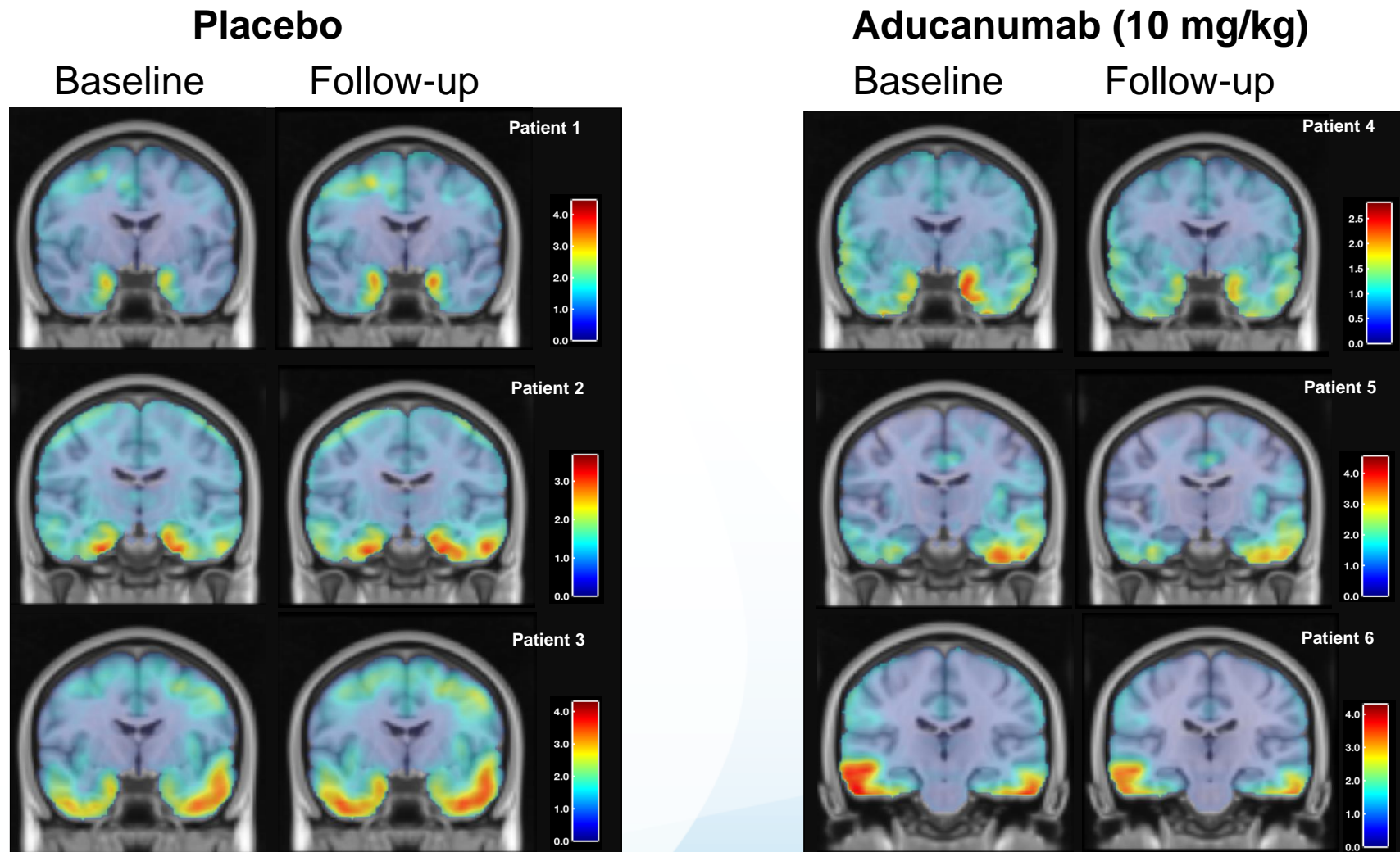
Frontal composite



FRONTAL LOBE Comprised of:
 MIDDLE, PRECENTRAL, STRAIGHT GYRUS
 INFERIOR, SUPERIOR
 ORBITOFRONTAL CORTEX Comprised of:
 ANTERIOR, MEDIAL, LATERAL, POSTERIOR

Tau PET modified analysis population (patients with both baseline and post-baseline tau PET assessments). *P <0.05, ***P<0.001 compared with placebo (nominal). Values based on an ANCOVA model, fitted with change from baseline as dependent variable, and with categorical treatment, baseline tau PET value and laboratory ApoE ε4 status (carrier and non-carrier) as independent variables. Due to the early termination of the studies, all the post-baseline tau PET assessments were performed within a range of 9 to 20 months post-baseline in the placebo-controlled period. ANCOVA, analysis of covariance; PET, positron emission tomography; SUVR, standardized uptake value ratio.

Tau deposition in representative patients



Representative images from 3 patients in placebo group and 3 patients in aducanumab high dose group.

Safety summary

	EMERGE			ENGAGE		
	Placebo (n=547)	Low dose (n=544)	High dose (n=547)	Placebo (n=541)	Low dose (n=548)	High dose (n=558)
Patients with an AE, n (%)	476 (87.0)	477 (87.7)	505 (92.3)	465 (86.0)	491 (89.6)	500 (89.6)
Patients with an SAE, n (%)	77 (14.1)	69 (12.7)	66 (12.1)	69 (12.8)	71 (13.0)	71 (12.7)
Patients permanently discontinuing treatment due to AE, n (%)	16 (2.9)	42 (7.7)	48 (8.8)	28 (5.2)	45 (8.2)	64 (11.5)
Patients permanently discontinuing treatment due to ARIA, n (%)	1 (0.2)	25 (4.6)	36 (6.6)	6 (1.1)	27 (4.9)	41 (7.3)
Number of all-cause deaths, n (%)	5 (0.9)	0	6 (1.1)	0	3 (0.5)	2 (0.4)

Safety population. Patients randomized to placebo who accidentally received active dose are summarized under active groups (4 in ENGAGE and 1 in EMERGE).

All safety data presented are from the placebo-controlled period.

AE, adverse event; ARIA, amyloid-related imaging abnormalities; SAE, serious adverse event.

Adverse events with incidence >10%

	EMERGE			ENGAGE		
	Placebo (n=547)	Low dose (n=544)	High dose (n=547)	Placebo (n=541)	Low dose (n=548)	High dose (n=558)
Patients with any event, n (%)	476 (87.0)	477 (87.7)	505 (92.3)	465 (86.0)	491 (89.6)	500 (89.6)
ARIA-E (%)	12 (2.2)	140 (25.7)	186 (34.0)	16 (3.0)	139 (25.4)	198 (35.5)
Headache (%)	83 (15.2)	106 (19.5)	106 (19.4)	81 (15.0)	98 (17.9)	114 (20.4)
ARIA-H, microhemorrhage (%)	38 (6.9)	88 (16.2)	102 (18.6)	31 (5.7)	85 (15.5)	98 (17.6)
Nasopharyngitis (%)	90 (16.5)	70 (12.9)	87 (15.9)	67 (12.4)	64 (11.7)	66 (11.8)
ARIA-H, superficial siderosis (%)	14 (2.6)	50 (9.2)	73 (13.3)	10 (1.8)	48 (8.8)	86 (15.4)
Fall (%)	68 (12.4)	64 (11.8)	69 (12.6)	55 (10.2)	77 (14.1)	83 (14.9)

This table includes patients who received at least one dose of investigational treatment.

Safety population. Patients randomized to placebo who accidentally received active dose are summarized under active groups (4 in ENGAGE and 1 in EMERGE).

All safety data presented are from the placebo-controlled period.

ARIA-E, amyloid related imaging abnormality-edema/effusion; ARIA-H, amyloid related imaging abnormality-micro-hemorrhages and hemosiderin deposits.

ARIA incidence

	EMERGE			ENGAGE		
	Placebo (n=544)	Low dose (n=537)	High dose (n=541)	Placebo (n=533)	Low dose (n=544)	High dose (n=554)
ARIA-E^a, n/total (%)	12/544 (2.2)	140/537 (26.1)	186/541 (34.4)	16/533 (3.0)	139/544 (25.6)	198/554 (35.7)
ApoE ε4 carriers	7/371 (1.9)	109/366 (29.8)	154/362 (42.5)	9/371 (2.4)	112/390 (28.7)	158/378 (41.8)
ApoE ε4 non-carriers	5/173 (2.9)	31/171 (18.1)	32/179 (17.9)	7/162 (4.3)	27/154 (17.5)	40/176 (22.7)
ARIA-H, microhemorrhage, n (%)	38 (7.0)	88 (16.4)	102 (18.9)	31 (5.8)	85 (15.6)	98 (17.7)
ARIA-H, superficial siderosis, n (%)	14 (2.6)	50 (9.3)	73 (13.5)	10 (1.9)	48 (8.8)	86 (15.5)
ARIA-H, macrohemorrhage, n (%)	0	1 (0.2)	3 (0.6)	4 (0.8)	0	3 (0.5)
Any ARIA (either E or H), n (%)	56 (10.3)	176 (32.8)	223 (41.2)	52 (9.8)	167 (30.7)	223 (40.3)
Symptomatic status, n (%)	56	176	223	52	167	223
Asymptomatic ARIA	53 (94.6)	138 (78.4)	179 (80.3)	49 (94.2)	139 (83.2)	158 (70.9)
Symptomatic ARIA	3 (5.4)	38 (21.6)	44 (19.7)	3 (5.8)	28 (16.8)	65 (29.1)

This table includes patients who had at least one post-baseline safety MRI.

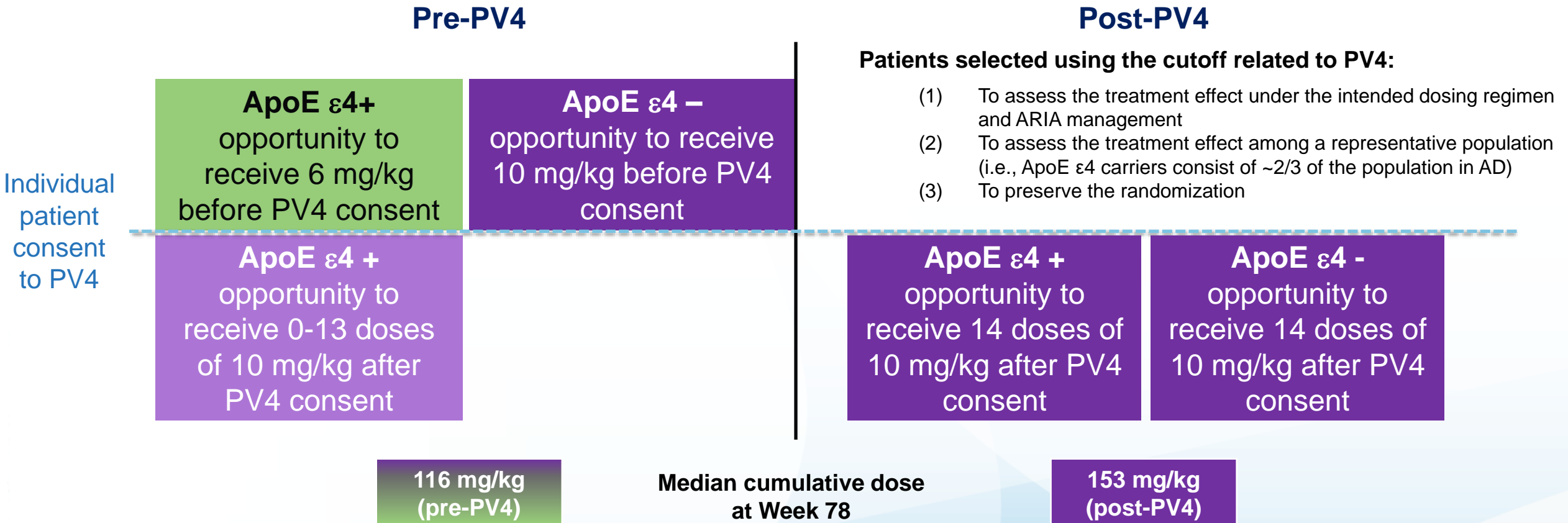
- Symptoms reported in patients with ARIA included: headache, dizziness, visual disturbances, nausea and vomiting
- ARIA-E episodes generally resolved within 4-16 weeks
- The majority of patients who experienced ARIA were able to continue investigational treatment

Safety MRI population (patients with at least one post-baseline MRI). ^aARIA-E with or without ARIA-H.

All safety data presented are from the placebo-controlled period.

ARIA, amyloid-related imaging abnormalities; ARIA-E, amyloid-related imaging abnormalities due to vasogenic edema; ARIA-H, amyloid-related imaging abnormalities due to microhemorrhage, superficial siderosis or macrohemorrhage. 17

Defining a population by a randomized cohort who had the opportunity for all 14 doses of 10 mg/kg



CDR-SB for ITT population compared with Post-PV4 population for EMERGE and ENGAGE at Week 78

ITT

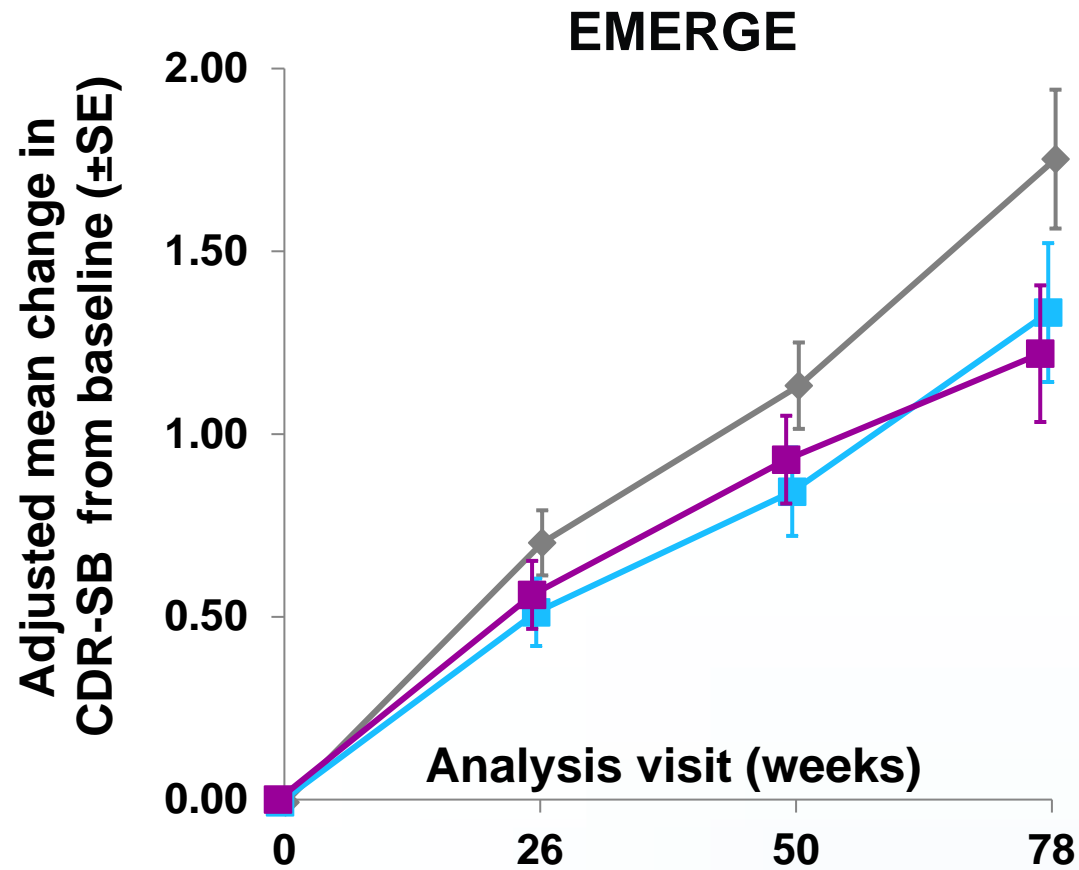
Post-PV4^{a,b}

EMERGE	Placebo decline (n=548)	Low dose (n=543)	High dose (n=547)	Placebo decline (n=304)	Low dose (n=295)	High dose (n=288)
		diff vs. placebo, (%) ^c	diff vs. placebo (%) ^c		diff vs. placebo (%) ^c	diff vs. placebo (%) ^c
CDR-SB	1.74	-0.26 (-15%)	-0.39 (-22%)	1.76	-0.42 (-24%)	-0.53 (-30%)

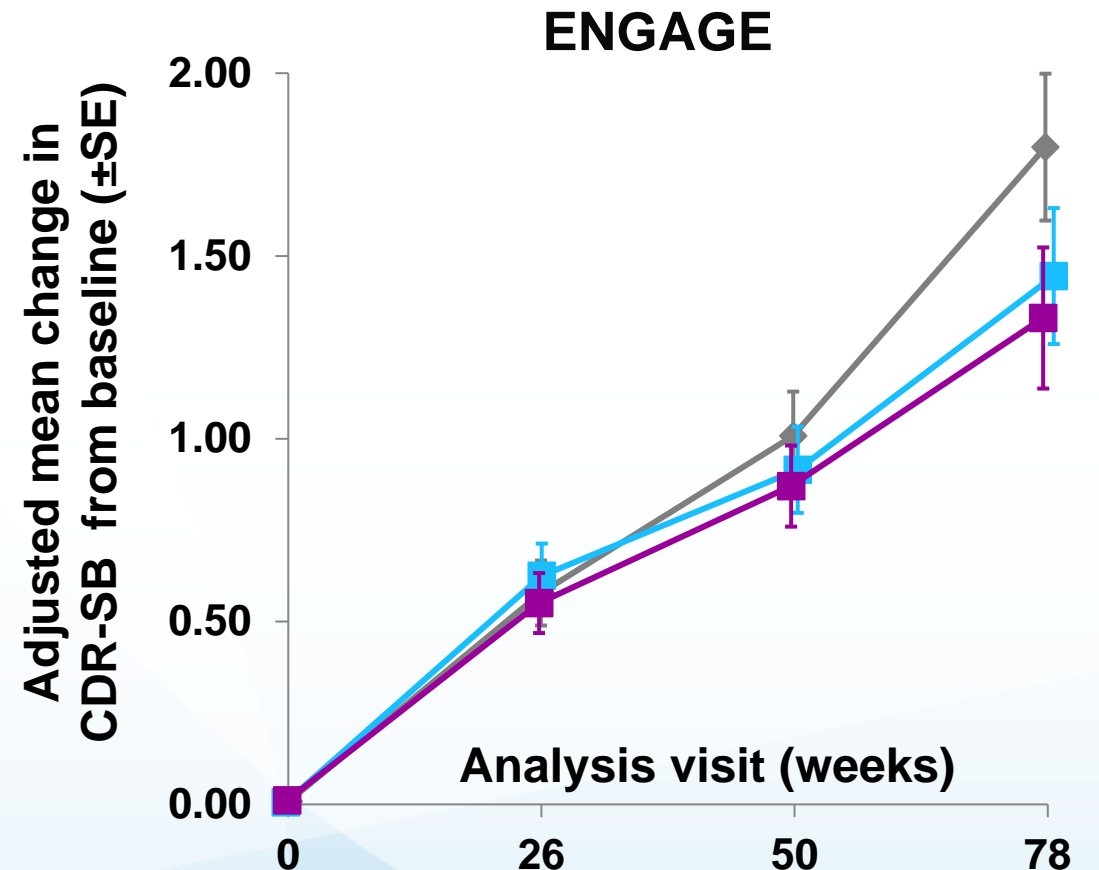
ENGAGE	Placebo decline (n=545)	Low dose (n=547)	High dose (n=555)	Placebo decline (n=247)	Low dose (n=261)	High dose (n=282)
		diff vs. placebo, (%) ^c	diff vs. placebo (%) ^c		diff vs. placebo (%) ^c	diff vs. placebo (%) ^c
CDR-SB	1.56	-0.18 (-12%)	0.03 (2%)	1.79	-0.35 (-20%)	-0.48 (-27%)

^aMMRM model was fitted separately for pre- and post-Protocol Version 4 set; ^bPatients who consented to PV4 or higher version prior to Week 16 in ITT population; ^cDifference vs placebo at Week 78. Negative percentage means less progression in the treated arm; N denotes the number of all randomized and dosed patients that were included in the ITT analysis. CDR-SB, Clinical Dementia Rating–Sum of Boxes; ITT, intent to treat.

Population^{a,b} randomized with the opportunity to receive 14 doses of 10 mg/kg



Placebo	n=303	293	198	74
Low dose aducanumab	n=295	280	197	76
High dose aducanumab	n=288	271	200	80



Placebo	n=247	236	174	66
Low dose aducanumab	n=261	251	185	82
High dose aducanumab	n=282	276	204	69

^aMMRM model was fitted separately for pre- and post-Protocol Version 4 set; ^bPatients who consented to PV4 or higher version prior to Week 16 in ITT population. CDR-SB, Clinical Dementia Rating–Sum of Boxes; PV4, Protocol Version 4; SE, standard error.

Summary of aducanumab Phase 3 topline results

Following study termination based on futility, analysis of a larger dataset showed:

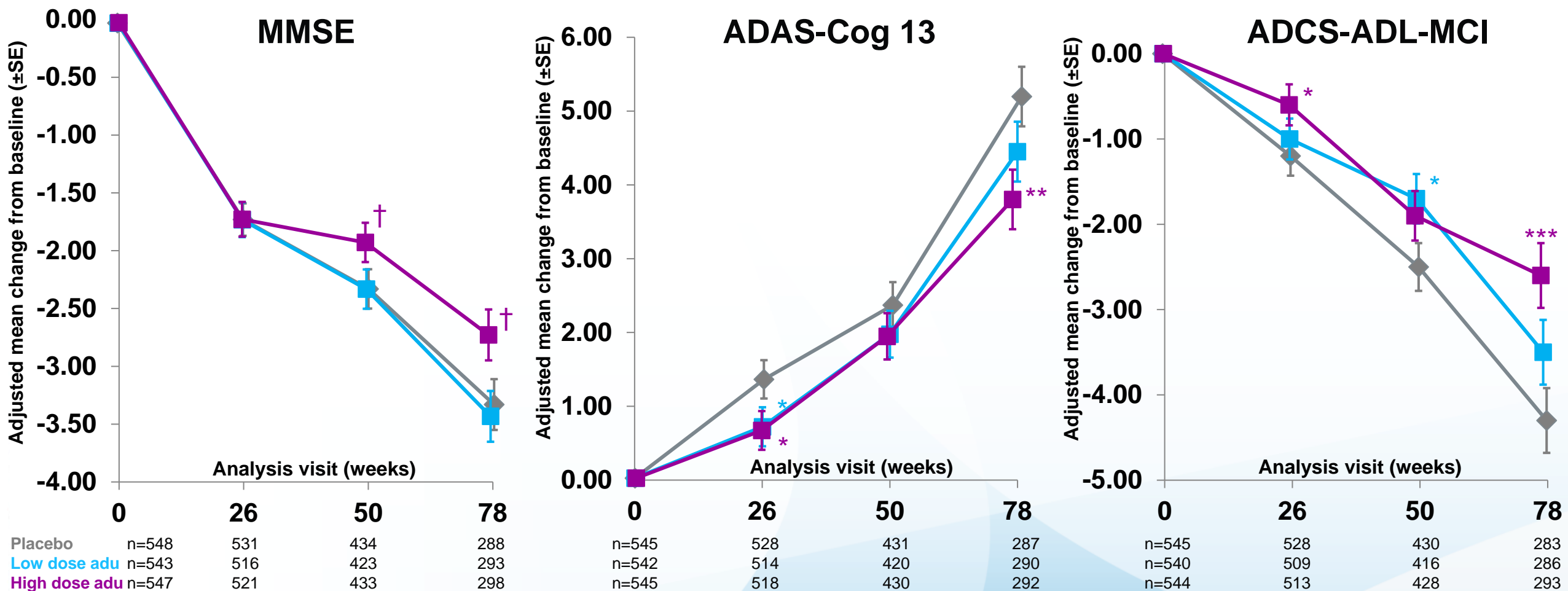
- In EMERGE, high dose aducanumab reduced clinical decline as measured by primary and secondary endpoints
- In ENGAGE, aducanumab did not reduce clinical decline
 - In a post hoc analysis, data from a subset of patients exposed to high dose aducanumab support the positive findings of EMERGE
- In sub-studies, aducanumab showed an effect on disease related biomarkers
- The most common AEs were ARIA-E and headache
- We are finalizing the details of a re-dosing study with the aim to offer access to aducanumab to eligible patients previously enrolled in the aducanumab clinical studies

Acknowledgments

- We thank all patients and family members who participated in the aducanumab studies and the investigators and staff who conducted these studies, DSMB, and steering committee members
- We also thank those who contributed to this work, including Kimberly Umans, Stacy Lindborg, John O’Gorman, Xiaopeng Miao, Charlie Cao, Carmen Castrillo-Viguera, Ping He, Carol Yurgalevitch, Ivana Rubino, and Eric Ponton

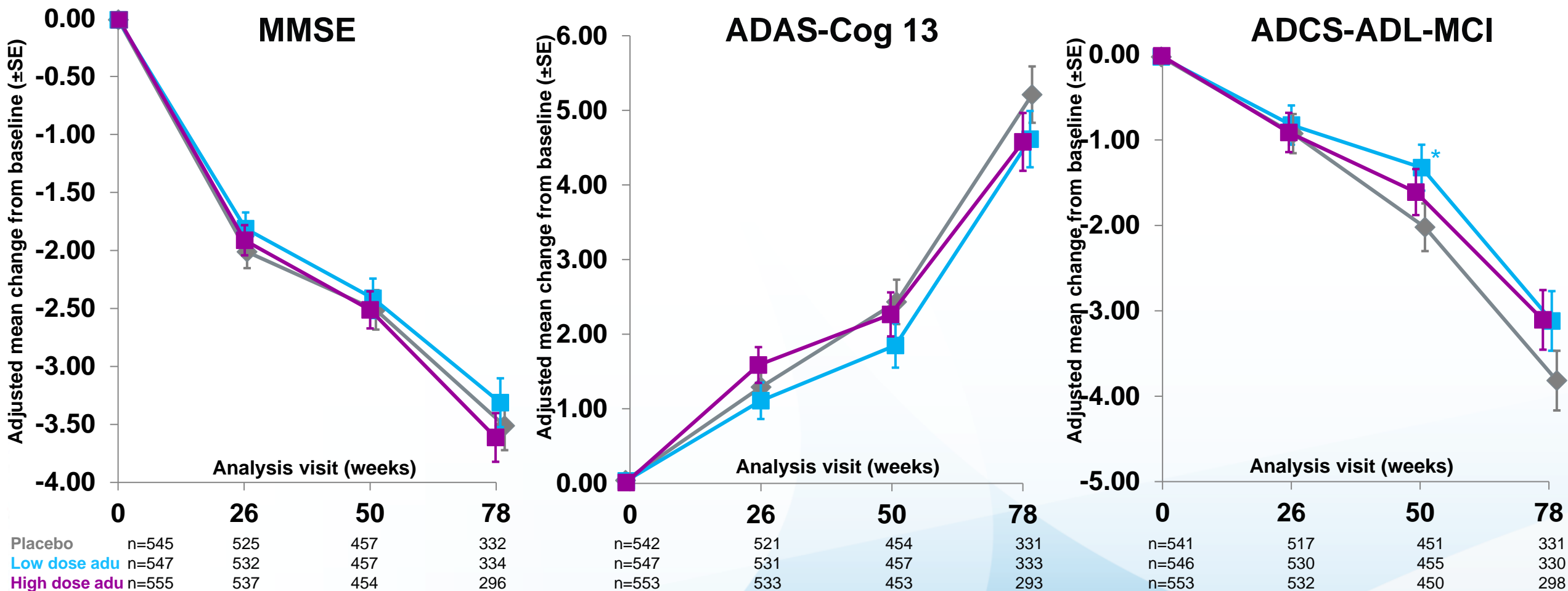
BACK-UP

EMERGE: Longitudinal change from baseline in MMSE, ADAS-Cog 13 and ADSC-ADL-MCI



ITT population. †p<0.1 and ≥0.05, *p<0.05, **p<0.01, ***p<0.001 compared with placebo (nominal). Values at each time point were based on an MMRM model, with change from baseline in MMSE, ADAS-Cog 13, or ADCS-ADL-MCI as the dependent variable and with fixed effects of treatment group, categorical visit, treatment-by-visit interaction, baseline measure, baseline measure by visit interaction, Alzheimer's disease symptomatic medication use at baseline, region, and laboratory ApoE ε4 status. ADAS-Cog 13, Alzheimer's Disease Assessment Scale–Cognitive Subscale (13-item); ADCS-ADL-MCI, Alzheimer's Disease Cooperative Study–Activities of Daily Living Inventory (mild cognitive impairment version); ApoE, apolipoprotein E; ITT, intent to treat; MMRM, mixed model for repeated measure; MMSE, Mini Mental State Examination; SE, standard error.

ENGAGE: Longitudinal change from baseline in MMSE, ADAS-Cog 13 and ADSC-ADL-MCI



ITT population. *p <0.05 compared with placebo (nominal). compared with placebo (nominal). Values at each time point were based on an MMRM model, with change from baseline in MMSE, ADAS-Cog 13, or ADCS-ADL-MCI as the dependent variable and with fixed effects of treatment group, categorical visit, treatment-by-visit interaction, baseline measure, baseline measure by visit interaction, Alzheimer's disease symptomatic medication use at baseline, region, and laboratory ApoE ϵ 4 status. ADAS-Cog 13, Alzheimer's Disease Assessment Scale-Cognitive Subscale (13-item); ADCS-ADL-MCI, Alzheimer's Disease Cooperative Study-Activities of Daily Living Inventory (mild cognitive impairment version); ApoE, apolipoprotein E; ITT, intent to treat; MMRM, mixed model for repeated measure; MMSE, Mini Mental State Examination; SE, standard error.