Supplementary Online Content

Pennell PB, Karanam A, Meador KJ, et al; MONEAD Study Group. Antiseizure medication concentrations during pregnancy: results from the Maternal Outcomes and Neurodevelopmental Effects of Antiepileptic Drugs (MONEAD) study. *JAMA Neurol*. Published online February 14, 2022. doi:10.1001/jamaneurol.2021.5487

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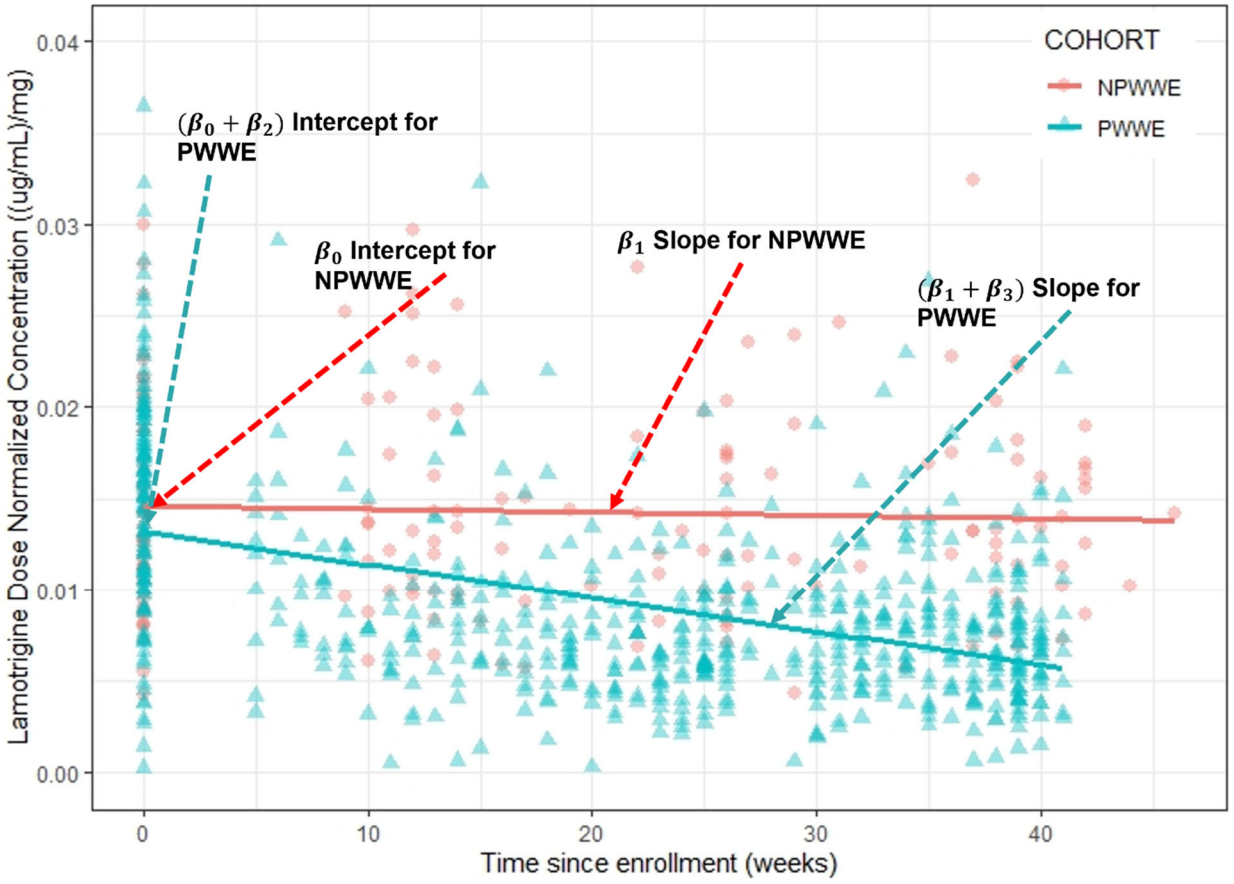
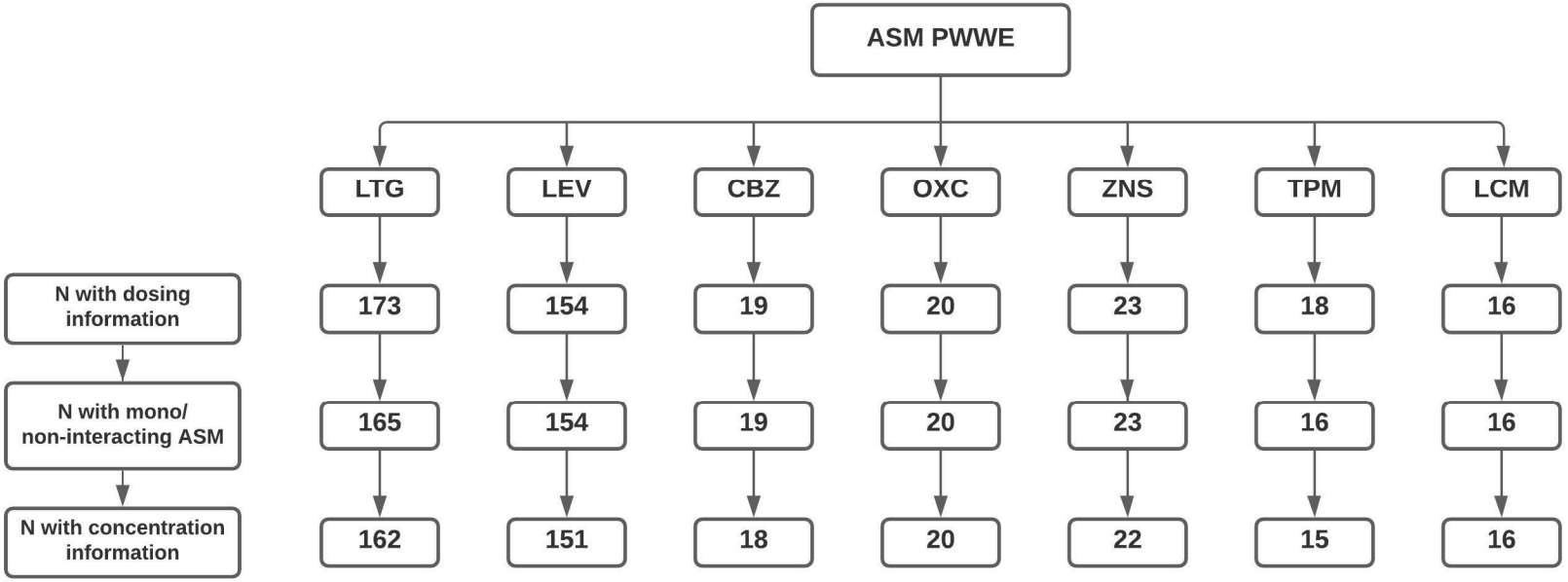
This supplementary material has been provided by the authors to give readers additional information about their work.

eFigure 1. Representative Figure for the Linear Mixed-Effect Analysis for Lamotrigine



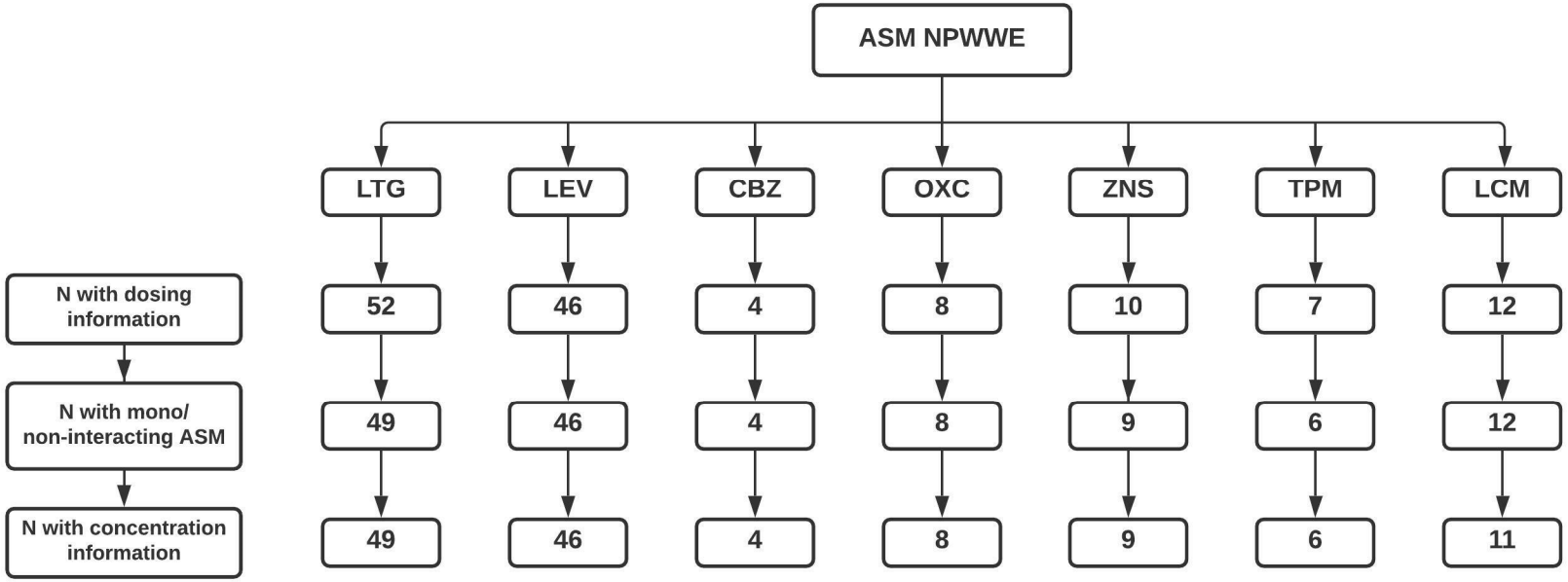
Legend: X-axis represents study weeks (gestational age for PWWE and weeks since enrollment for NPWWE)

eFigure 2. Number of Pregnant Women With Epilepsy Included in the Analysis



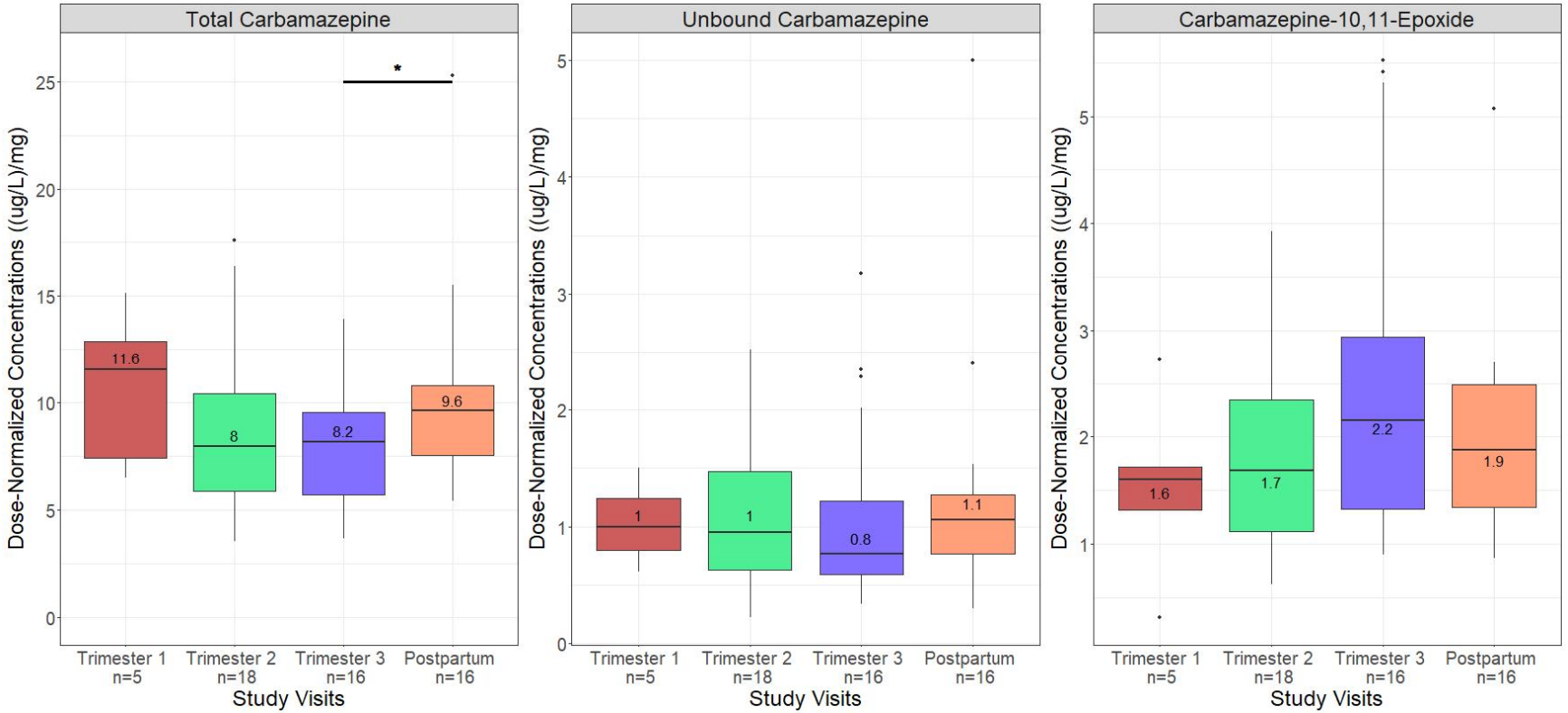
ASM PWWE: Pregnant Women with Epilepsy on Antiseizure Medications; N: Sample Size; LTG: Lamotrigine; LEV: Levetiracetam; CBZ: Carbamazepine; OXC: Oxcarbazepine; ZNS: Zonisamide; TPM: Topiramate; LSM: Lacosamide.

eFigure 3. Number of Nonpregnant Women With Epilepsy Included in the Analysis



ASM NPWWE: Non-Pregnant Women with Epilepsy on Antiseizure Medications; N: Sample Size; LTG: Lamotrigine; LEV: Levetiracetam; CBZ: Carbamazepine; OXC: Oxcarbazepine; ZNS: Zonisamide; TPM: Topiramate; LSM: Lacosamide.

eFigure 4. Total and Unbound Carbamazepine and Carbamazepine-10,11-Epoxide Dose-Normalized Concentrations During Pregnancy Compared With Postpartum



Legend: Boxplots showing differences in gestational dose normalized concentrations compared to postpartum for total carbamazepine, free carbamazepine, carbamazepine-10,11-epoxide and topiramate. Box plots show the median and the 25th and 75th percentiles. Whiskers represent 1.5 times the interquartile range. Circles not connected by vertical lines or lying on horizontal whiskers represent outliers. Black horizontal lines indicate statistically significant difference using postpartum as comparator. *indicates significance $p < 0.05$. Numbers in the boxplot represent median values of DNC.

eTable. Linear Mixed-Effect Model Parameter Estimates for Antiseizure Medication Dose-Normalized Concentrations in Pregnant Women With Epilepsy and Control Nonpregnant Women With Epilepsy Cohorts Using Data From Postpartum Visits

ASM	Intercepts ((ug/L)/mg)			Slopes (1/week)	
	β_0: Common Baseline #	β_2: Additional Baseline for Pregnant ##	Estrogen-based Hormonal Medication	β_1: Common Slope **	β_3: Additional Slope for Pregnant ***
	Estimate (SE), p-value	Estimate (SE), p-value	Estimate (SE), p-value	Estimate (SE), p-value	Estimate (SE), p-value
Carbamazepine	16.9 (3.21), <0.001	-6.84 (3.59), 0.07	NA	-0.1 (0.08), 0.22	0.1 (0.09), 0.26
Carbamazepine- 10,11-epoxide	2.29 (0.65), <0.001	-0.26 (0.73), 0.72	NA	-0.02 (0.01), 0.17	0.02 (0.01), 0.28
Carbamazepine unbound	4.3 (0.88), <0.001	-3.34 (0.99), <0.001	NA	-0.04 (0.02), 0.11	0.05 (0.02), 0.02
Lacosamide	22.97 (2.58), <0.001	-6.45 (3.33), 0.07	NA	-0.11 (0.09), 0.24	0.32 (0.11), 0.01
Lamotrigine	15.42 (1.36), <0.001	0.9 (1.54), 0.56	-3.36 (1.34), 0.01	-0.01 (0.04), 0.82	-0.01 (0.05), 0.85
Levetiracetam	12 (1.24), <0.001	1.14 (1.43), 0.42	0.14 (1.63), 0.52	0 (0.04), 0.9	-0.05 (0.04), 0.26
Oxcarbazepine	13.56 (3.44), <0.001	-1.54 (3.77), 0.69	NA	-0.02 (0.09), 0.81	0.04 (0.09), 0.64
Oxcarbazepine unbound	9.17 (2.51), <0.001	-2.86 (2.77), 0.31	NA	-0.02 (0.04), 0.72	0.05 (0.05), 0.32
Topiramate	31.74 (6.58), <0.001	-9.11 (7.86), 0.27	NA	-0.06 (0.21), 0.79	0.2 (0.24), 0.41
Zonisamide	51.07 (7.15), <0.001	-15.19 (8.85), 0.1	NA	-0.13 (0.16), 0.43	0.37 (0.2), 0.07

Abbreviations: SE, standard error.
Dose Normalized Concentrations estimate at nonpregnant state in both pregnant and control cohorts; ## A significant p-value for β_2 represents that the pregnant cohort has differences in dose normalized concentrations estimates at nonpregnant state compared to control cohort; ** Change in dose normalized concentrations with respect to time in both pregnant and control cohorts; *** A significant p-value for β_3 represents that the pregnant cohort have significant change in dose normalized concentrations during pregnancy compared to nonpregnant cohort.
Model Equations are presented in Equations 2 and 3.