

# Letters

## RESEARCH LETTER

### Association of Nausea and Vomiting in Pregnancy With Prenatal Marijuana Use

Use of marijuana, an antiemetic, is increasing among pregnant women,<sup>1,2</sup> and data from 2 small surveys<sup>3,4</sup> indicate that women self-report using marijuana to alleviate nausea and vomiting in pregnancy (NVP). To date, only 1 epidemiologic study<sup>5</sup> has examined whether women with NVP are at elevated risk of using marijuana. The study of 4735 pregnant women in Hawaii<sup>5</sup> from 2009 through 2011 found that self-reported prenatal marijuana use was more prevalent among those with (3.7%) vs without (2.3%) self-reported severe nausea during pregnancy. We used data from a large California health care system with standard universal screening for prenatal marijuana use via self-report and urine toxicologic tests from January 1, 2009, through December 31, 2016, to test whether prenatal marijuana use is elevated among females with a diagnosis of NVP.

**Methods** | Kaiser Permanente Northern California (KPNC) is a multispecialty health care system serving more than 4 million members representative of the Northern California area. The sample consisted of pregnant females 12 years or older in KPNC who completed a self-reported substance use questionnaire and urine toxicologic test in the first trimester (at approximately 8 weeks gestation) during standard prenatal care. All positive toxicologic test findings were confirmed with a laboratory test result. The institutional review board of KPNC approved this study and waived the need for informed consent.

Nausea and vomiting during the first trimester of pregnancy (90 days from last menstrual period) was based on *International Classification of Disease, Ninth Revision, Clinical Modification*, and *Tenth Revision, Clinical Modification*, diagnostic codes in the electronic health record and categorized as severe (hyperemesis gravidarum [codes 643.00, 643.03, 643.10, 643.13, O21.0, and O21.1]), mild (other NVP diagnoses [codes 536.2, 643.80, 643.90, 643.93, 787.01, 787.02, 787.03, G43.A0, O21.9, R11.0, R11.10, R11.11, and R11.2]), or none. We estimated the adjusted odds of prenatal marijuana use among females with NVP using multilevel logistic re-

gression, controlling for age, race/ethnicity, median neighborhood household income, year, and self-reported marijuana use in the year before pregnancy from the universal screening questionnaire for prenatal substance use. We used in the PROC GLIMMIX procedure in SAS software (version 9.3; SAS Institute, Inc) for all analyses, and 2-sided  $P < .05$  was considered statistically significant.

**Results** | Of 279 457 screened pregnancies from 2009 through 2016,<sup>2</sup> 220 510 (78.9%) underwent screening in the first trimester. The sample was 36.7% white, 27.1% Hispanic, 16.8% Asian, 5.7% black, and 13.7% other. Age distribution included 1.2% aged 12 to 17 years; 15.3%, 18 to 24 years; 62.7%, 25 to 34 years; and 20.9%, 35 years or older. A total of 17.9% of participants had more than 1 pregnancy from 2009 through 2016. The mean (SD) median neighborhood household income was \$74 651 (\$30 650), and 8.3% self-reported marijuana use in the year before pregnancy. Among pregnant females with a positive self-report or toxicologic test finding, 0.7% were positive on self-report only, 3.1% were positive on toxicologic test finding only, and 1.5% were positive on both.

The prevalence of severe NVP was 2.3%; of mild NVP, 15.3%. The prevalence of prenatal marijuana use by self-report or toxicologic test findings was 5.3%, and was greater among females with severe NVP (580 of 5140 [11.3%]) and mild NVP (2817 of 33 691 [8.4%]) vs no NVP (8248 of 181 679 [4.5%]). Relative to females without NVP, those with severe (adjusted odds ratio, 3.80; 95% CI, 3.19-4.52;  $P < .001$ ) and mild (adjusted odds ratio, 2.37; 95% CI, 2.17-2.59;  $P < .001$ ) NVP had increased odds of marijuana use (Table).

**Discussion** | In a large, diverse sample of pregnant females from 2009 to 2016 who underwent universal marijuana screening in California, those with severe NVP had nearly 4 times greater odds of prenatal marijuana use, and those with mild NVP had more than 2 times greater odds of prenatal marijuana use than females without NVP. Although results are consistent with the hypothesis that women use marijuana to self-medicate for NVP, marijuana use may also contribute to NVP, or clinicians may diagnose NVP more frequently among women who report using marijuana to treat it.

Table. Adjusted Odds for Marijuana Use Among Females Undergoing Screening in the First Trimester of Pregnancy<sup>a</sup>

NVP Category	No. (%) of Participants (n = 220 510)	Marijuana Use	
		aOR (95% CI)	P Value
None	181 679 (82.4)	1 [Reference]	NA
Mild	33 691 (15.3)	2.37 (2.17-2.59)	<.001
Severe	5140 (2.3)	3.80 (3.19-4.52)	<.001

Abbreviations: aOR, adjusted odd ratio; NA, not applicable; NVP, nausea and vomiting in pregnancy.

<sup>a</sup> Analyses are controlled for standard covariates based on prior literature and availability in electronic health records, including age group, race/ethnicity,

median neighborhood household income, year, and self-reported marijuana use in the year before pregnancy. The median sample size across years was 27 017 (range, 26 451-28 149).

This study was limited to pregnant females in KPNC who were screened for marijuana use at approximately 8 weeks gestation, and results may not generalize to females without health care coverage or with late entry to prenatal care. Clinicians may not diagnose very mild NVP, and our sample may reflect a subset of patients with more severe NVP. We could not distinguish prenatal marijuana use before vs after participants knew they were pregnant, and misclassification is possible given variability in the time that marijuana is detectable in urine.

The health effects of prenatal marijuana use are unclear, and national guidelines recommend that pregnant women discontinue use.<sup>6</sup> Patients with NVP should be screened for marijuana use and educated about effective and safe NVP treatments.

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**Accepted for Publication:** June 8, 2018.

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**Published Online:** August 20, 2018. doi:10.1001/jamainternmed.2018.3581

**Author Contributions:** Dr Young-Wolff had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

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**Obtained funding:** Young-Wolff.

**Administrative, technical, or material support:** Young-Wolff, Sarovar, Avalos, Conway, Armstrong.

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**Conflict of Interest Disclosures:** None reported.

**Funding/Support:** This study was supported by award K01 DA043604 from the National Institute on Drug Abuse, National Institutes of Health (NIH), and award K01 MH103444 from the National Institute of Mental Health, NIH.

**Role of the Funder/Sponsor:** The sponsor had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication.

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