

Umbilical Cord Drug Testing and Associations of Positive Results with PHQ-9 Scores

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Introduction

Substance use during pregnancy can lead to poorer pregnancy outcomes, including increased maternal and infant morbidity and mortality. The CDC has identified “mental health conditions (including deaths to suicide and overdose/poisoning related to substance use disorder)” to be the leading cause of *preventable* pregnancy-related deaths. Substance use is often associated with co-existing mood disorders, but **little is currently known about the association between perinatal substance use and maternal depression screening in the antepartum and early postpartum period.**

Methods

Retrospective chart review

- Completed for neonates and birthing parent whose umbilical cord underwent drug screening
- Deliveries that occurred between January 2015 and February 2023 (change in indications for ordering, beginning February 13, 2023)
- Neonates delivered and/or admitted at University of Iowa Hospital and Clinics (UIHC)
- Demographic data, obstetrical/neonatal outcomes, drug screening results and other health history information were collected from the electronic medical record
- Descriptive statistics and t-tests used for data analysis where appropriate

Patient Health Questionnaire-9 (PHQ-9)

- Validated screening tool for depression (including in pregnancy)
- Scores obtained at new obstetric visit (NOB), 28-week/third trimester visit, in-patient (labor & delivery), and post-partum visit
- A score ≥ 10 is considered concerning for a mood disturbance

Demographics

Race (n=170)	n	% Total Cohort
White	122	65.9%
Black	34	20.0%
Hispanic	11	6.5%
Other (including multiple races)	13	7.6%

Table 1. Cohort Racial Demographics.

Insurance (n=170)	n	% Total Cohort
Public	113	66.5%
Private	48	28.2%
Other	9	5.2%

Table 2. Cohort Insurance Demographics.

Results

Umbilical Cord Drug Testing Results

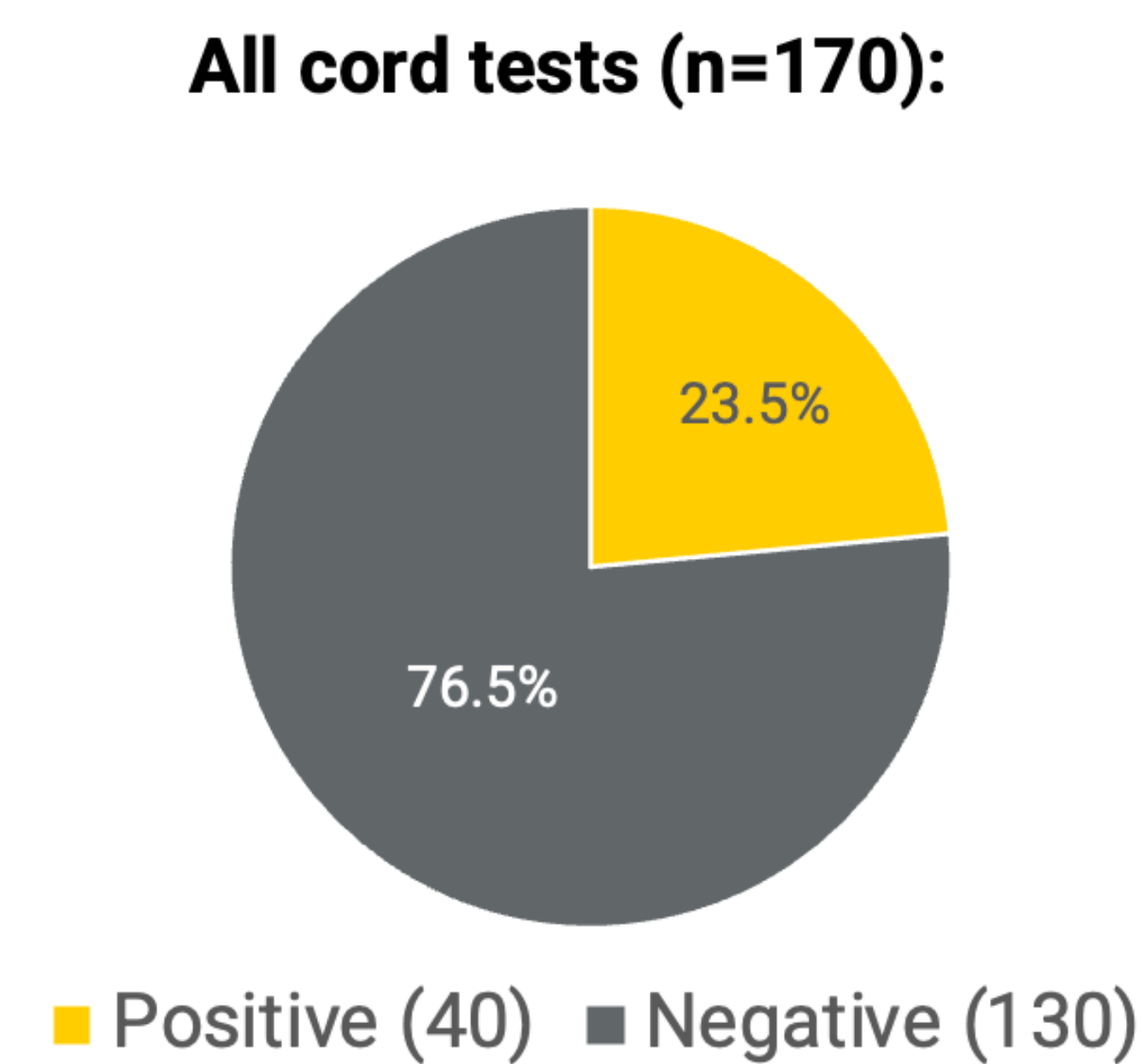


Figure 2. Percent Positive Cord Tests. 40 of the 170 umbilical cords tested in the cohort (23.5%) were positive for substances. 130 cords (76.5%) were negative.

PHQ-9 Scores

Statistically significant results:

- Those with positive umbilical cord tests had:
- Higher mean PHQ-9 scores at NOB visit and 3rd trimester visits.
 - Higher occurrence of positive PHQ-9 screenings (score ≥ 10) at 3rd trimester visit.

(A) New OB Visit

	Positive Cord Test	Negative Cord Test	p-value
Mean PHQ Screen	6.2±4.3 (Median 7, 0-18)	4.15±4.0 (Median 3, 0-6)	0.02 *
Positive PHQ Screen (≥ 10)	5 (18.5%), n=30	9 (10.7%), n=84	0.23

(C) In-Patient (Labor & Delivery)

	Positive Cord Test	Negative Cord Test	p-value
Mean PHQ Screen	4.5±4.7 (Median 3, 0-20)	3.7±3.7 (Median 3, 0-14)	0.39
Positive PHQ Screen (≥ 10)	5 (13.5%), n=37	12 (11.1%), n=128	0.44

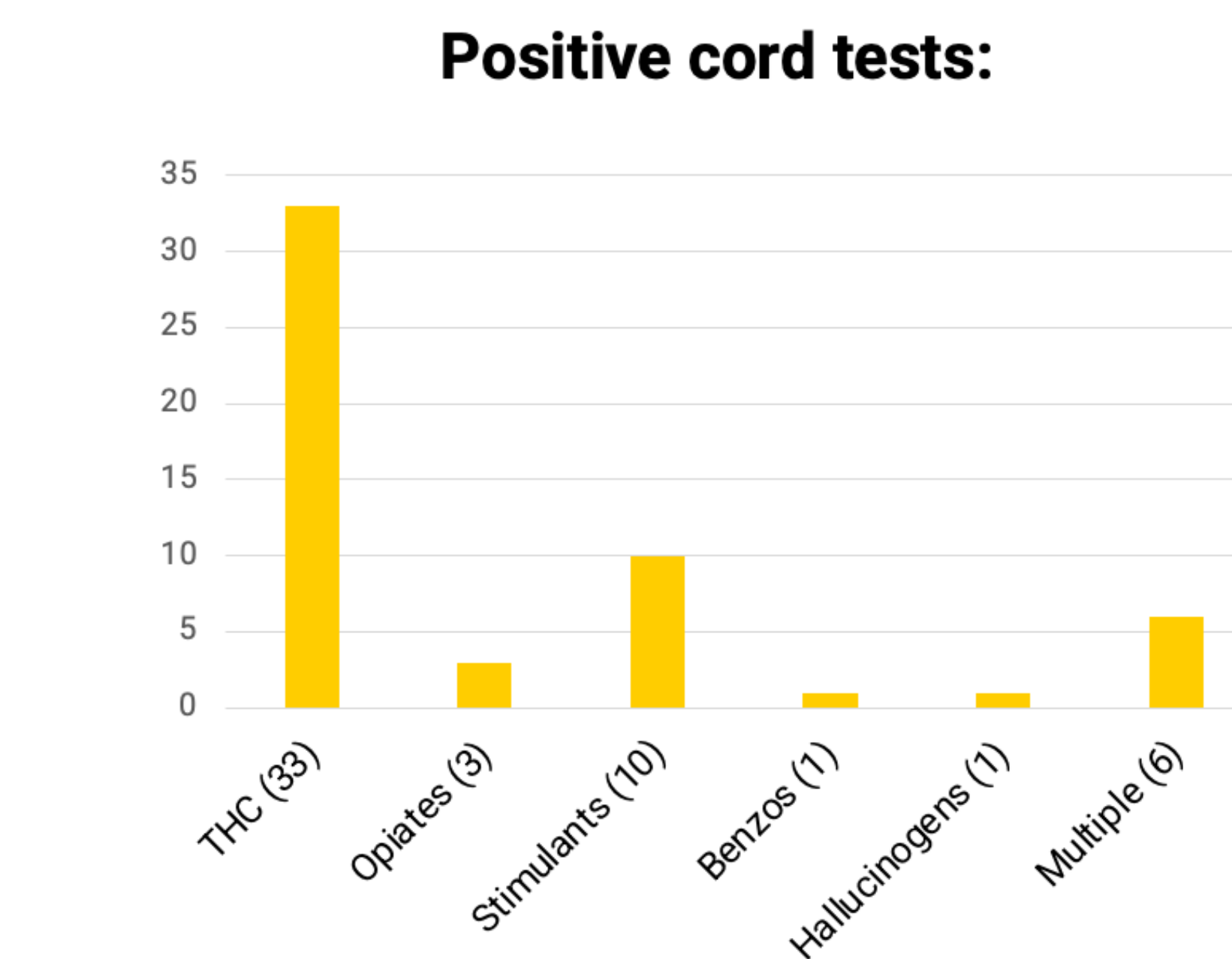


Figure 3. Substances Present in positive Cords. 33 of the 40 positive cords were identified to have THC present, 3 were positive for opiates including MAT, 10 were positive for stimulants, 1 was positive for benzodiazepines, 1 was positive for hallucinogens, and 6 cords were positive for more than one substance.

Trends (not statistically significant):

- Across all four time points – those with positive umbilical cord tests had:
- Higher PHQ-9 scores
 - Higher occurrence of positive PHQ-9 screenings (score ≥ 10)

(B) 3rd Trimester

	Positive Cord Test	Negative Cord Test	p-value
Mean PHQ Screen	8.4±6.4 (Median 7, 0-24)	4.3±4.2 (Median 3, 0-19)	0.0007 *
Positive PHQ Screen (≥ 10)	7 (36.8%), n=32	9 (10.3%), n=122	0.008 *

(D) Post-Partum

	Positive Cord Test	Negative Cord Test	p-value
Mean PHQ Screen	5.2±5.5 (Median 4.5, 0-18)	3.7±4.9 (Median 2, 0-22)	0.18
Positive PHQ Screen (≥ 10)	5 (19.2%) n=26	9 (9.6%), n=109	0.078

Table 3. (A) New OB Visit, (B) 3rd Trimester, (C) In-Patient: Labor and Delivery, (D) Post-Partum Visit. PHQ-9 scores obtained at all points in the antepartum and postpartum period tended to be higher among pregnant persons whose babies had *positive* umbilical cord drug screenings.

Discussion

Mental Health Concerns in Patients Using Substances while Pregnant

- Fewer than one-fourth of the umbilical cord tests in this study were positive for any substance.

Possible Bias in Ordering Umbilical Cord Drug Tests

- 20% of the cohort identified as Black → people identifying as Black only make up about 4% of Iowa’s population.
- 66.5% of the cohort was covered by public insurance → approximately one-third of Iowans have publicly funded insurance.

Potential Harms of Over-Testing

- Attempt to avoid detection from healthcare providers (avoiding prenatal care, attempting to deliver babies outside the hospital, etc.) → negatively impacts the health of patients and their babies
- In Iowa: positive cord drug test = automatic child abuse report to Iowa DHS (even for THC) → can be traumatic for families, inequitable for patients of color and lower socioeconomic status

Conclusions

- Patients who endorse current or a history of substance use could benefit from additional mental health screening and intervention.
- Black and publicly insured pregnant patients are likely being over-tested for substance use.
- It is imperative that umbilical cord drug testing be conducted in a trauma-informed manner that upholds the bioethical principles of respect for persons and justice.

Future Directions

- Continue chart reviews, gather more data
- February 2023: shorter, more focused list of indications for providers ordering umbilical cord drug tests → compare cord test results and provider ordering indications before and after the change

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References:

