



No Evidence That Magnesium Sulfate Increases Postpartum Hemorrhage Risk by Dose or Timing

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PGA PostGraduate Assembly in Anesthesiology

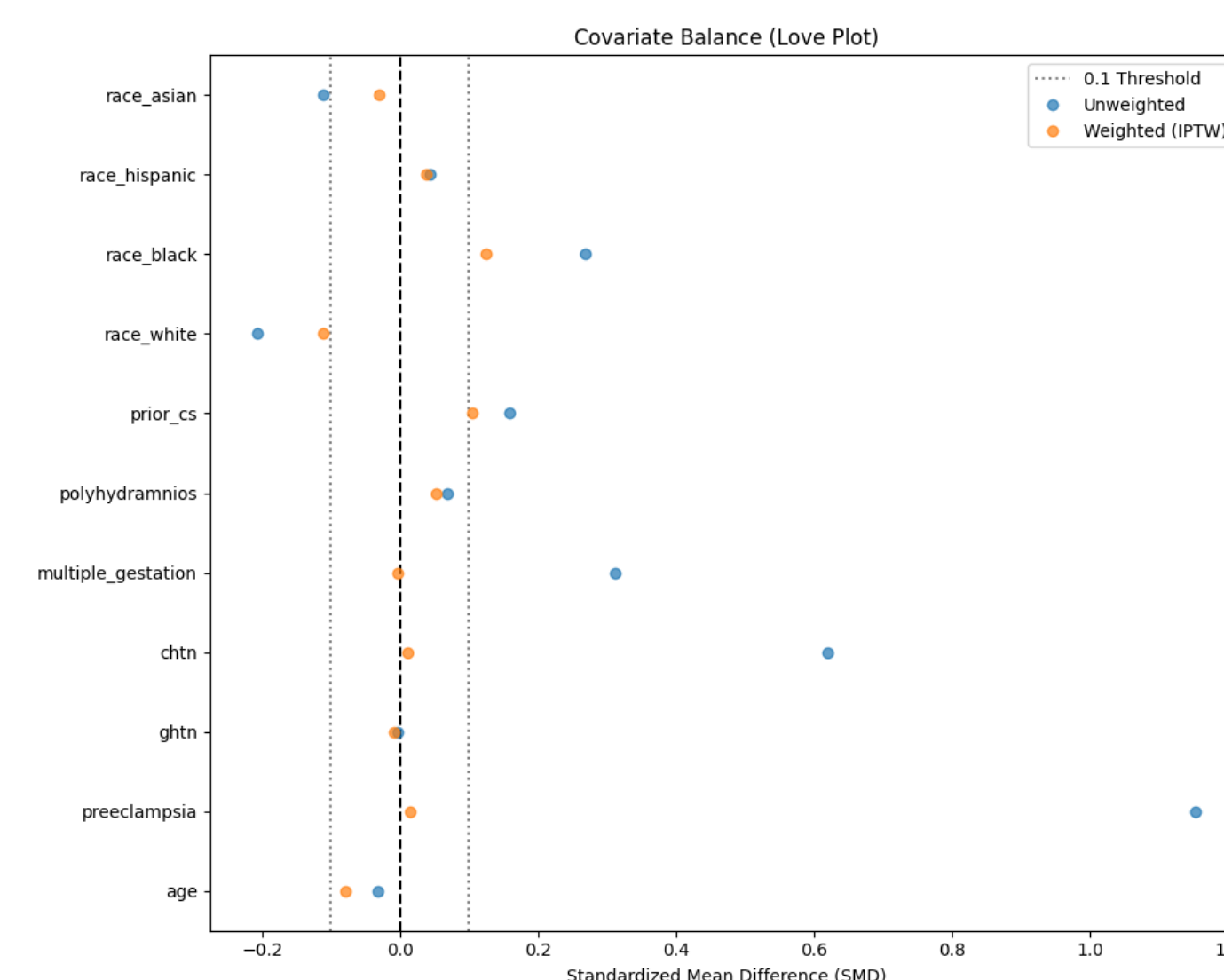
Fri. - Mon. Dec. 12 -15, 2025 Marriott Marquis

BACKGROUND

- Research examining magnesium sulfate administration during labor and its association with postpartum hemorrhage (PPH) has yielded mixed results.
- Some observational studies report a significant increase in PPH, particularly among vaginal deliveries, while other studies cite confounding for explaining this relationship
- Conversely, systematic reviews and meta-analyses have found differing outcomes, with the most recent meta-analysis indicating a non-significant trend toward increased risk (odds ratio 1.82).
- Given these conflicting data, further investigation using detailed clinical data is warranted.

METHODS

- Using MIMIC IV, we assembled a longitudinal cohort of peripartum ICU admissions at Beth Israel Deaconess, pinpointing magnesium sulfate exposure, delivery timing, and related interventions among patients with preeclampsia.
- Baseline differences were summarized with standardized mean difference statistics, and a time varying cox model estimates the hazard of postpartum hemorrhage as a function of magnesium timing relative to delivery.
- We defined delivery timing as a proxy by switch to high dose oxytocin infusion, oxytocin bolus, misoprostol high dose, or last oxytocin dose



RESULTS

Characteristic	Overall (N=22175)	No Magnesium (N=21713)	Magnesium (N=462)
Age (mean ± SD)	30.1 (6.2)	30.1 (6.2)	29.9 (8.1)
Preeclampsia	830.0 (3.7%)	619.0 (2.9%)	211.0 (45.7%)
Gestational HTN	976.0 (4.4%)	956.0 (4.4%)	20.0 (4.3%)
Chronic HTN	670.0 (3.0%)	568.0 (2.6%)	102.0 (22.1%)
Multiple Gestation	258.0 (1.2%)	225.0 (1.0%)	33.0 (7.1%)
Polyhydramnios	179.0 (0.8%)	172.0 (0.8%)	7.0 (1.5%)
Prior CS	1630.0 (7.4%)	1575.0 (7.3%)	55.0 (11.9%)

Table 1. Cluster characteristics and outcomes showing distinct phenotypes with differential qualities and survival

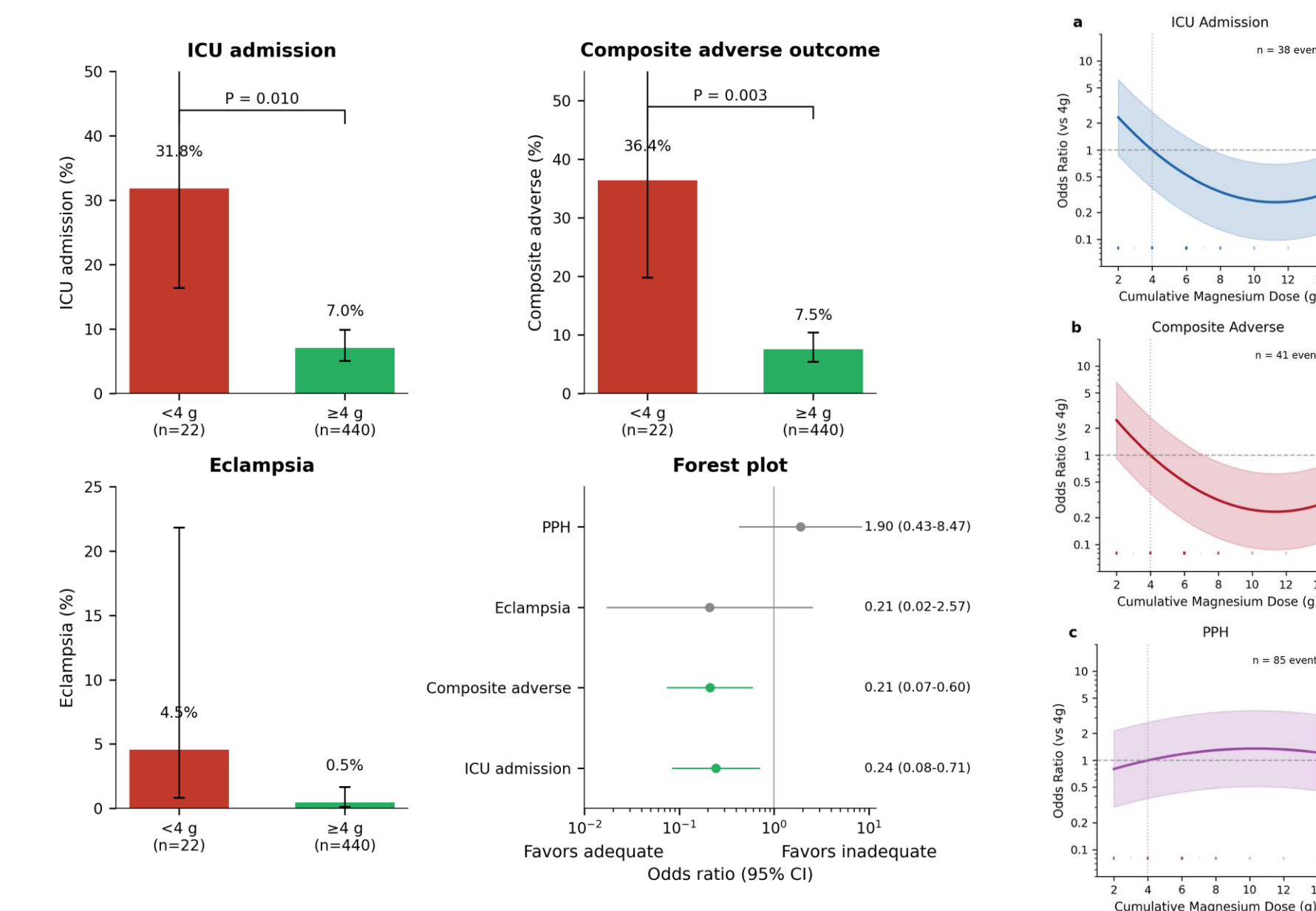


Figure 2. Observed Expected Beneficial Effects of Magnesium Administered in the L&D Unit

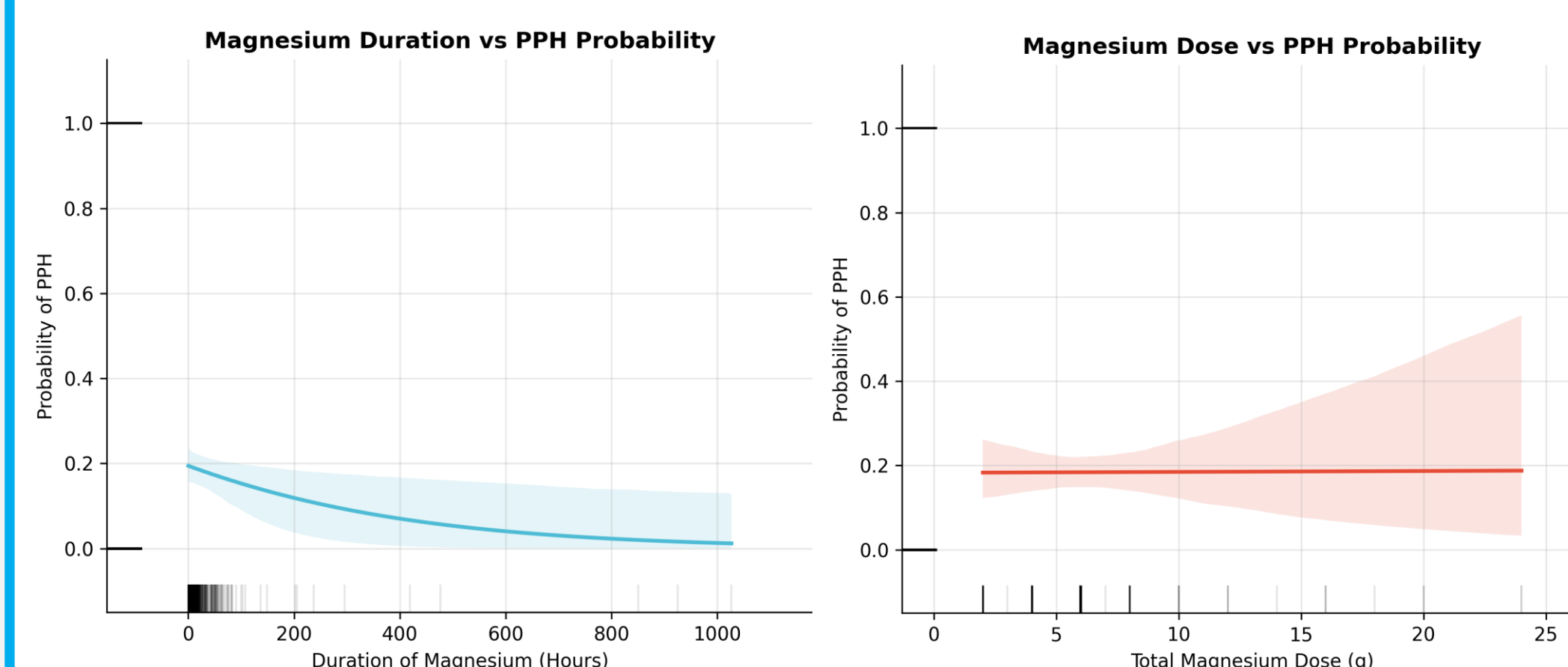
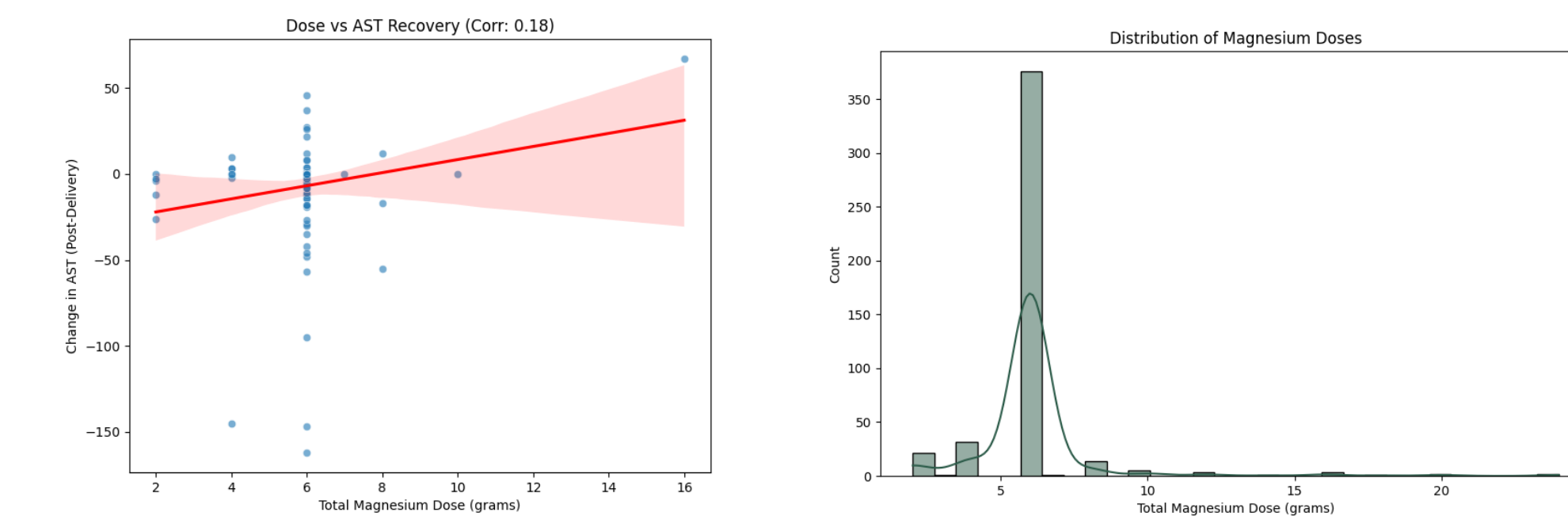


Figure 2. Predicted Probability of Postpartum Hemorrhage Across Magnesium Duration and Dose

RESULTS

- We analyzed 22,174 deliveries in MIMIC-IV to determine if Magnesium Sulfate exposure increases the risk of PPH.
- Magnesium appears to increase Risk Factor: Exposure increases PPH risk by 3.3-fold (IPTW OR: 3.27), but still concerning for confounding
- Threshold Effect: Within the exposed group, higher doses did NOT further increase risk (OR per gram: 1.00, p=0.99). The risk appears to be driven by any exposure
- Several beneficial effects are noted with increasing cumulative dosage throughout hospital stay: decreased ICU admissions, decreased mortality, and eclampsia progression



CONCLUSIONS

- This study uses a large, high-resolution dataset to better understand the relationship between magnesium sulfate administration and PPH
- The peripartum population receiving magnesium appears drastically different in comorbidities, possibly leading to residual confounding in retrospective studies
- When selecting for patients receiving magnesium, no relationship appears between dose or timing and PPH
- Several beneficial effects of magnesium are observed, including reduced ICU admissions, eclampsia progression, and mortality.

REFERENCES

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