

Maternal Hypertensive Disorders and Sudden Infant Death Syndrome in American Infants: A Case-control Study



National Student Data Corps
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Background

- Despite recent reductions in Sudden Infant Death Syndrome (SIDS) mortality, 3,400 infants die of SIDS in the U.S. annually.¹
- Though SIDS is poorly understood, a triple-risk model proposes that development, physiological vulnerability, and an external stressor coalesce to trigger SIDS.²
- Maternal hypertension is significantly associated with infant morbidity, mortality, and potentially with SIDS.³
- The relation between pre-existing maternal hypertension and SIDS is unknown

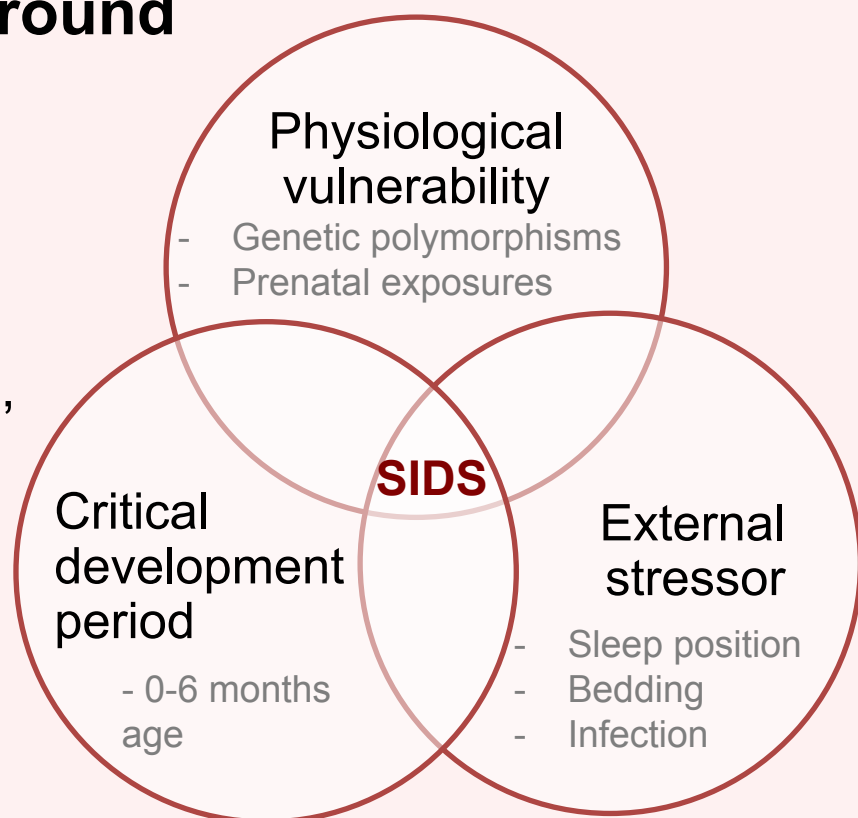
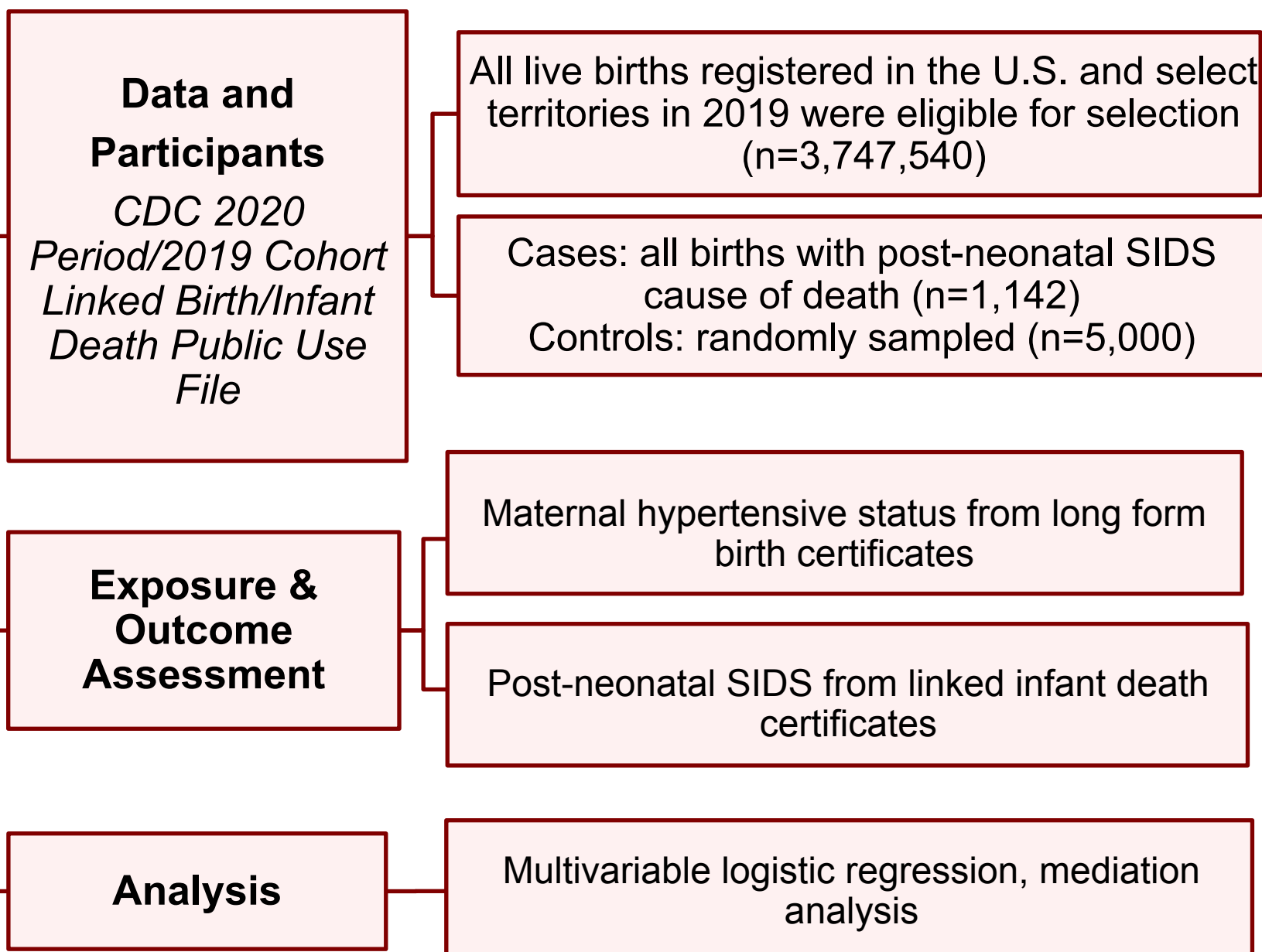


Figure 1: Triple-risk model for SIDS pathophysiology

Objective

Assess the association between maternal hypertensive conditions and post-neonatal SIDS

Study design



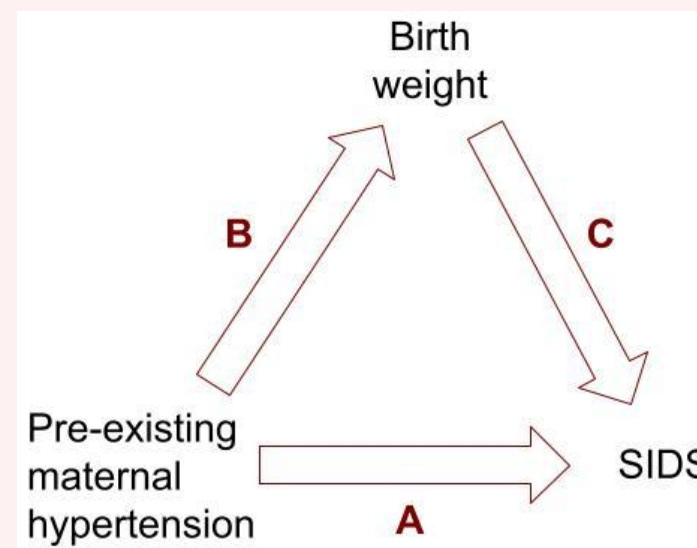
Results

Table 1: Relations of maternal hypertension on odds of post-neonatal SIDS. Models show significant association between pre-existing maternal hypertension and post-neonatal SIDS, but not gestational hypertension

Predictor	Expanded Model [#]		
	B±SE	P	OR (95% CI)
Pre-existing maternal hypertension	0.24 ± 0.10	0.02	1.62 (1.09, 2.41)
Gestational hypertension	0.04 ± 0.07	0.58	1.08 (0.83, 1.39)

[#]Expanded models adjusted for maternal age, maternal smoking, maternal race, maternal Hispanic origin, maternal education level, WIC usage, parity (log transformed), infant sex, maternal BMI, breastfeeding on discharge, plurality

Figure 2: Mediation effect of pre-existing maternal hypertension on post-neonatal SIDS via birthweight. Significant direct and indirect mediation effects



Measures	Path	Effect ± SE	95% CI
Total Effect		0.24 ± 0.10	0.09, 0.89
Direct Effect	A	0.44 ± 0.20	0.05, 0.84
Indirect Effect	B*C	0.19 ± 0.04	0.12, 0.27

Effect size ± bootstrapped SE and bias-corrected bootstrapped 95% confidence intervals are reported for all paths. Model adjusted for maternal age, maternal smoking, maternal race, maternal Hispanic origin, maternal education level, WIC usage, parity (log transformed), infant sex, maternal BMI, breastfeeding on discharge, plurality

Conclusion

- Pre-existing maternal hypertension is associated with increased odds of post-neonatal SIDS
- Non-differential misclassification bias suggests that results likely underestimate the true effect.
- Novelly demonstrated significant partial mediation by infant birth weight

References

- Kinney, H. C., & Thach, B. T. (2009). Medical Progress: The Sudden Infant Death Syndrome. *The New England Journal of Medicine*, 361(8), 795–805.
- Horne, R. S. C. (2019). Sudden infant death syndrome: Current perspectives. *Internal Medicine Journal*, 49(4), 433–438.
- Friedmann, I., Dahdouh, E. M., Kugler, P., Mimran, G., & Balayla, J. (2017). Maternal and obstetrical predictors of sudden infant death syndrome (SIDS). *The Journal of Maternal-Fetal & Neonatal Medicine*, 30(19), 2315–2323.