

Delivery Mode, Intrapartum Antibiotics and Childhood Weight Gain

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Both Cesarean delivery and GBS IAP were associated with increased rate of weight gain during first 5 years of childhood

Introduction

- Both cesarean delivery (CD) and intrapartum antibiotic prophylaxis (IAP) administered to prevent neonatal infection with Group B Streptococcus (GBS) are associated with altered microbiome composition after birth and accelerated weight gain patterns in childhood.
- How these two common neonatal exposures interact to effect childhood weight gain is unclear.

- Our objective was to determine the association of CD and GBS IAP, separately and together, on childhood weight gain**

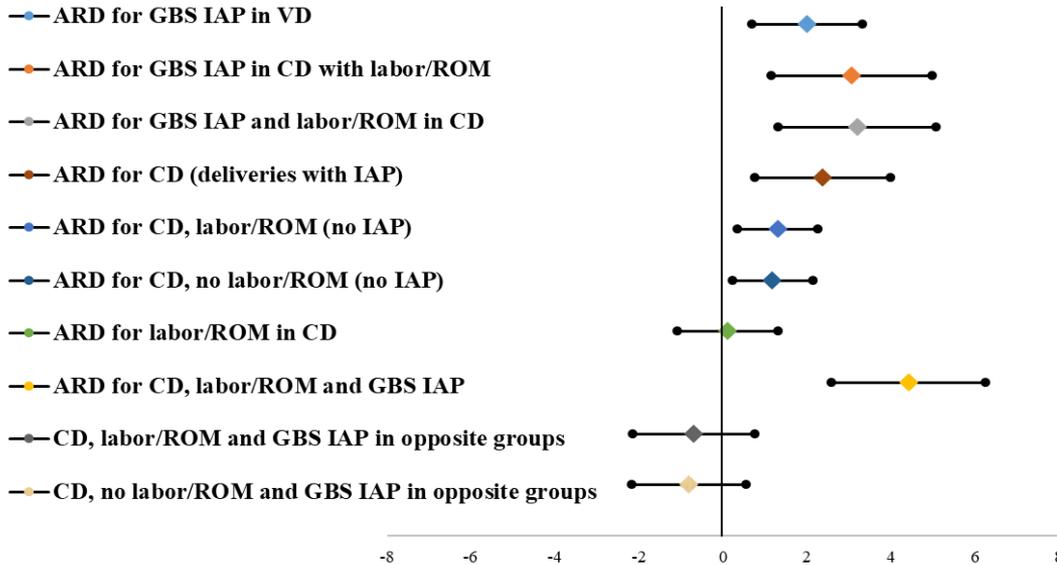
Methods

- Design:** Retrospective cohort study
- Date source:** Linked longitudinal database of 12,684 children born at ≥37 weeks' gestation between 2009-2012, and followed from birth to 5 years of age.
- Study definitions:** Delivery mode was categorized as CD (with and without onset of labor or rupture of membranes (ROM)) and vaginal delivery (VD). GBS IAP was defined as penicillin G, ampicillin, clindamycin, vancomycin or cefazolin administered ≥4 hours before delivery.
- Exclusions:** Intrapartum antibiotics outside the definition of GBS IAP; those delivered by CD and administered surgical skin prophylaxis were retained.
- Exposure:** We created a 5-level exposure:

	GBS IAP	Other Abx	No Abx
VD		⊗	
CD-no labor, no rupture	⊗		⊗
CD-after labor or rupture			⊗

Abx = antibiotics

- Outcome:** Rate of weight gain over time
- Analysis:** Differences in weight change was estimated using longitudinal rate regression, adjusting for key covariates. Comparison between exposure levels were pre-specified and done by changing the reference group to allow assessment of the effect of CD, labor or ROM in CD, and GBS IAP separately.



Adjusted Rate Difference (ARD) of Weight Gain in percent, 95% CI

Results

Characteristics	N = 12,684
Maternal age, years, mean (SD)	28 (6)
Maternal weight, pounds, median (IQR)	178 (156, 208)
Maternal height, inches, median (IQR)	64 (63, 66)
Maternal race/ethnicity, n (%)	
Black/non-Hispanic	7,268 (57.3)
White/non-Hispanic	3,404 (26.8)
Asian	903 (7.1)
Hispanic	432 (3.4)
Unknown/Other	677 (5.3)
Primipara, n (%)	5,727 (45.6)
GBS status, n (%)	
Negative	8,690 (68.5)
Positive	3,258 (25.7)
Unknown	736 (5.8)
Maternal chorioamnionitis, n (%)	373 (2.9)
Maternal diabetes, n (%)	555 (4.4)
Percent Black, median (IQR)	57 (8, 92)
Poverty ratio, median (IQR)	0.5 (0.2, 0.6)
Infant sex, male, n (%)	6,436 (50.7)
Gestational age, weeks, mean (SD)	39.4 (1.1)
Birth weight, grams, mean (SD)	3,317 (458)
Small for gestation, n (%)	1,185 (9.3)
Neonatal antibiotics, n (%)	806 (6.4)
Breastfeeding at 3 months, n (%)	5,409 (42.6)
Maternal antibiotics, n (%)	
No antibiotics	6,837 (53.9)
GBS antibiotics	2,437 (19.2)
Surgical skin prophylaxis only	3,410 (26.9)
Mode of delivery, n (%)	
Vaginal delivery	8,709 (68.7)
CD with labor or rupture	1,755 (13.8)
CD with no labor and no rupture	2,220 (17.5)

- On multivariable analysis, 10 comparisons were made between the 5 levels of exposure (Figure).
- GBS IAP was associated with increased weight gain trajectory in infants delivered by CD or VD.
- CD was associated with a higher rate of weight gain when compared to VD with no antibiotics.
- Presence of labor or ROM prior to CD did not significantly affect outcome in CD.

Conclusion

- Both CD and GBS IAP were associated with increased rate of weight gain during childhood.**
- For infants exposed to both CD and GBS IAP, the effect was greatest compared to infants with VD and no antibiotic exposure.**