Increased antibiotic utilization among pregnant women with asthma in a Medicaid population

Megan F. Patterson, MD[1], Tebeb Gebretsadik[2], Pingsheng Wu[1,2], Tan Ding[2], Brittney M. Snyder, PhD[1], Kedir N. Turi, PhD[1], Andrew Abreo, MD[3], Tina V. Hartert, MD, MPH[1]

[1]Department of Medicine, Vanderbilt University Medical Center, Nashville, TN, USA; [2]Department of Biostatistics, Vanderbilt University Medical Center, Nashville, TN, USA; [3]Department of Pediatrics, Louisiana State University Health Sciences, New Orleans, LA, USA

Background

Antibiotics are the most commonly prescribed medication in the prenatal period, accounting for 80% of all prescriptions during pregnancy.

Exposure to antibiotics in the prenatal period has been associated with increased risk of childhood asthma in epidemiological studies.

The role of maternal asthma status in prenatal antibiotic utilization has yet to be determined.

Objective

To evaluate whether mothers with asthma were more likely to be prescribed antibiotics during the prenatal period than mothers without asthma.

Study Population

Large population-based study of mothers who were pregnant between 1995 and 2003, and continuously enrolled in the Tennessee Medicaid program (TennCare).

Continuous enrollment requirement defined as ≤60 days of disenrollment in the program from 180 days prior to last menstrual period to date of delivery.

Methods

Study groups: Maternal asthma status was defined by ICD-9 codes and asthma medication utilization; those not meeting these criteria were defined as not having asthma.

Exposure: Antibiotics were classified as narrow- or broad- spectrum based on gram-positive and gram-negative antibacterial coverage using two published classification tables. All penicillins, without the addition of a beta-lactamase inhibitor, were categorized as narrow-spectrum based on current literature.

Outcome: Prenatal antibiotic prescription fills from medical claims data.

Analysis: Using multivariable linear regression analysis, we determined the association of women's asthma status with antibiotic fills adjusting for factors including mother's age at delivery, parity, maternal race, maternal education, maternal smoking and Group B streptococcus status.

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Results

Table 1. Baseline characteristics of mothers included in the study (n=84214)*†

		Mothers with asthma (n=3773)	Mothers without asthma(n=80441)
Age (years)	<15	47 (1%)	629 (1%)
	15-19	1306 (35%)	21476 (27%)
	20-29	1859 (49%)	49068 (61%)
	30-39	524 (14%)	8652 (11%)
	40-44	25 (1%)	477 (1%)
	>45	7 (0%)	10 (0%)
Prenatal antibiotics		3090 (82%)	51051 (63%)
Race	Black	1161 (31%)	36013 (45%)
	White	2518 (67%)	42707 (53%)
	Other	84 (2%)	1721 (2%)
Hispanic ethnicity		17 (0%)	597 (1%)
Maternal smoking during pregnancy		1399 (37%)	21839 (27%)
Infant's birth weight (g)		3260 (2977-3572)	3289 (3005-3600)
Other Children		1747 (46%)	57036 (71%)

*Data are presented as the number (%) for binary variables or median (interquartile range) for continuous variables.

Figure 1.

All-comers adjusted medians of number of prenatal courses of antibiotics by maternal asthma status from ordinal logistic regression. P<0.0001.

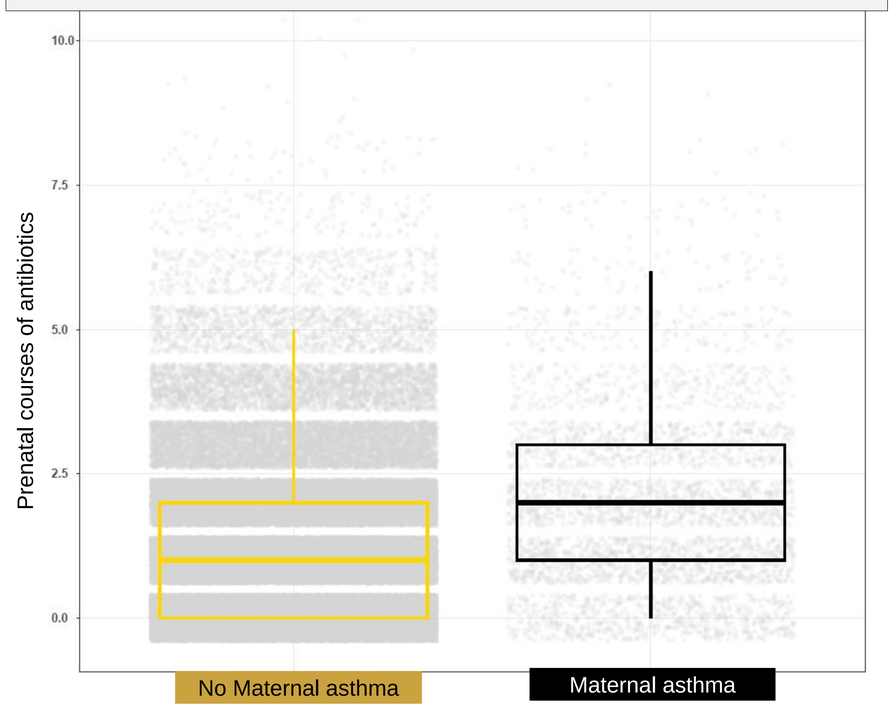
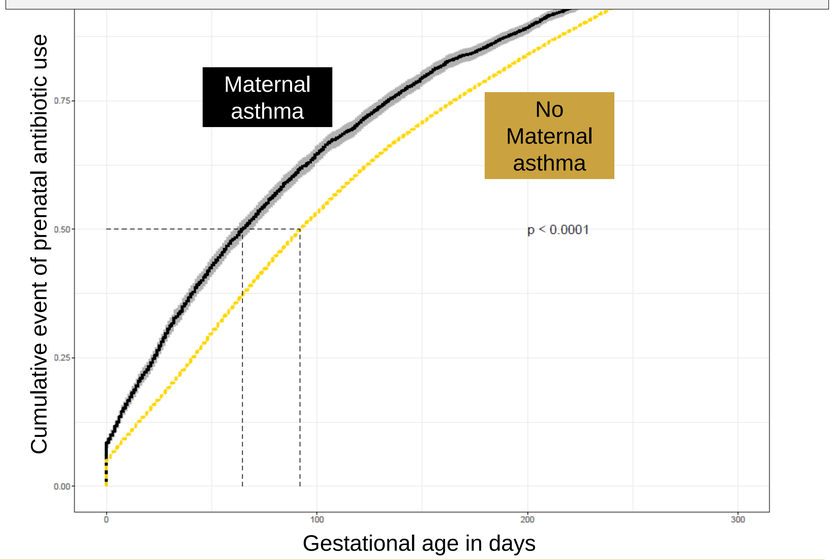


Figure 2.

Among antibiotic users, women with asthma had an earlier gestational age of first antibiotic use with a median of 64 days from LMP vs. women without asthma who had median of 92 days from LMP.



Summary of Results

- Among 84,214 pregnant women, 4.5 % had asthma.
- Overall, 64% received antibiotics during pregnancy: 82% among women with asthma, 63% among those without asthma.
- Women with asthma had a 2.5-fold increase in odds of filling antibiotics compared to those without asthma (adjusted OR: 2.46, 95%CI: 2.26, 2.67).
- Among antibiotic users, women with asthma were had increased odds of receiving a greater number of courses of antibiotics (aOR: 1.89, 95% CI: 1.77, 2.02) and earlier time during pregnancy to first antibiotic fill.
- Among the sub-group of all women prescribed only one course of antibiotics, women with asthma were 30% more likely to receive a broad spectrum versus narrow spectrum antibiotic compared to women without asthma (aOR: 1.30, 95%CI: 1.11, 1.53)

Conclusions

- Pregnant women with asthma have increased antibiotic utilization compared to pregnant women without asthma.
- Pregnant women with asthma also have higher cumulative antibiotic dose, earlier receipt during pregnancy, and are more likely to receive broad spectrum antibiotics, compared to women without asthma.
- Future assessment to determine whether pregnant asthmatics are at higher infection risk or whether antibiotics are being used to treat asthma exacerbations may inform clinical decision making.