Background: The infant gut microbiome is important for immune system development and the progression of disease. Exposure to antibiotics during infancy has been shown to cause microbial perturbations that current research has linked with various disease processes, such as obesity, asthma, and eczema. Additionally, antibiotics given to pregnant women around the time of delivery, particularly for the prophylactic treatment of Group B Streptococcus colonization, has been shown to affect the newborn's microbiome. This occurs specifically in relation to microbial diversity and the relative abundances of *Bifidobacteriaceae, Bacteroidaceae,* and *Enterobacteriaceae.*

Objective: The purpose of this project was to study the effects of maternal antibiotic exposure during pregnancy, prior to delivery, on the infant gut microbiome. Based on previous research, *Bifidobacteriaceae, Bacteroidaceae,* and *Enterobacteriaceae* were the bacterial families of focus for this project, with the hypothesis that the relative abudnacnes of *Bifidobacteriaceae* and Bacteroidaceae would decrease and that of *Enterobacteriaceae* would increase in the infants who were exposed to antibiotics in-utero compared to the those not exposed.

Methods: Pregnant women were recruited during the third trimester from the University Hospital (UCH) prenatal clinic, following their screening for GBS colonization at 35-37 weeks gestation. Eligibility criteria included women aged 18-34 years old, with a singleton pregnancy, a pre-pregnancy BMI of 18.5-30, without significant health issues including gestational diabetes and pre-eclampsia, no smoking, alcohol, or other drug use during pregnancy, and who planned to deliver vaginally at UCH. Based on previously published data, the sample size for this project was determined to be 80 women-baby pairs, 40 pairs in each group. Participants were considered exposed if they had a history of systemic antibiotic use during the second or third trimesters of the index pregnancy.

Progress to date: Critical steps completed thus far include: 1)Development of a collaborative mentorship between Dr. Daniel Frank, a basic scientist with expertise in the relationship between the microbiome and infectious diseases, and Dr. Sunah Hwang, a neonatologist with expertise in clinical research study design; 2) Identification of inclusion criteria for the study cohort, balancing the need to minimize confounders between control and exposed groups with expediency; 3) Development of the analytic plan given the complexity of measuring and reporting differences in species of the microbiome; 4) Development of the study design; 5) Recruitment phase has begun and is currently at 1/4th the needed enrollment.

Implications: With the rise in non-communicable diseases, it is important to understand how exposures during pregnancy, such as antibiotics, can affect this risk. The result obtained from this study will help elucidate how antibiotics during pregnancy change the infant gut microbiome, and thus, potentially the risk of developing diseases later in life.