Gestational diabetes (GDM) rates in the U.S. and in Michigan have increased over the past several decades, along with the increases in Type 2 Diabetes Mellitus and obesity. GDM is associated with adverse health outcomes for mothers and their offspring. Many current maternal-infant health (MIH) programs in Michigan do not target women with GDM. This study aims to assess state-level rates of GDM in pregnancy with a combination of statistical and spatial analyses using Geographic Information Systems (GIS) for the purpose of informing content and location of public health interventions.

Existing data from 2013 Michigan birth records (107,743 births) were analyzed using basic descriptive statistics, proportions with confidence intervals and logistic regression models using SPSS v.22 to explore GDM risk and breastfeeding behavior among Michigan mothers. Mapping analyses
using the kernel density estimation technique were conducted using ArcGIS v. 10.3.1 to identify hotspots of GDM and compare these with the population distribution of maternal risk factors in the state overall and, by census tract, in Kalamazoo County, Michigan. MIH program enrollment for Kalamazoo County was also explored.

The rate of GDM in Southwest Michigan was 7.5%; higher than the state average of 5% and the rate in any of the other regions of Michigan. The largest contiguous hotspot of both high rate (14%) and high numbers of women with GDM was located in Kalamazoo County. Logistic regression of maternal characteristics associated with GDM risk in Michigan findings indicated that, highest rates by race-ethnicity were among Asian Indian women, increasing rates of GDM occurred with inadequate or adequate-plus prenatal care adequacy, and there was a lack of difference in GDM risk by Medicaid status.

With respect to breastfeeding after GDM, analyses revealed maternal differences by race-ethnicity and income level. Two of the maternal demographic groups least likely to breastfeed (Non-Hispanic Black mothers and Medicaid-recipient mothers), were, however, more likely to breastfeed when diagnosed with GDM compared to Non-Hispanic Black mothers and Medicaid-recipients without GDM. Women living in areas of Michigan with high rates of GDM and high total numbers of GDM may benefit from joint interventions designed to promote both improved birth outcomes after GDM and breastfeeding.

For Kalamazoo County, a greater proportion of mothers received both the highest level and lowest level of prenatal care in 2013 compared to the state average for these categories for the same year and the U.S. average for the period 2009-2013. In both the state and Kalamazoo County, mothers at either extreme of the prenatal care spectrum had an increased likelihood of a GDM diagnosis. Enrollment of mothers in existing MIH programs was clustered in urban census tracts with some of the lowest GDM rates.

This study demonstrates the use of GIS analyses of birth records to assess maternal health and public health resources, and to identify geographic areas of need. Evidence supports existing MIH program using GDM as an additional indicator of risk and the potential need for a Michigan program dedicated to serving women with GDM, regardless of their income level.