In exploring determinants of obesity in the U.S., recent research has often noticed a relationship between obesity, less-healthy diets, and a lack of access to stores with healthier food options. Using this research, the federal government as well as some state and city governments have implemented policies to increase access to food stores in neighborhoods deemed in need. There is, however, little causal evidence on the relationship between geographic access and shopping patterns. Studies that estimate a plausibly causal relationship do so with geographically coarse measures of access and higher-income households. We use novel administrative data from a state Supplemental Nutrition Assistance Program to investigate the relationship between household-level geographic access and shopping at grocery stores in a policy-relevant low-income population. We find that when controlling for access, household demographics remain significant predictors of shopping at grocery stores, suggesting that preferences or prices are also important for a household’s food choices. However, we are able to identify an impact of changes in the household’s retail environment on changes in the monthly budget allocated to grocery stores.