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A Geospatial Analysis of the Association between Food Insecurity and Academic Performance among Elementary Schools in Davidson County, Tennessee



Introduction: In 2022, Tennessee began to require third grade students to score above 300 on the English Language Arts (ELA) portion of the Tennessee Comprehensive Assessment Program (TCAP) to advance grade levels; however, most students in Davidson County are not meeting this requirement. Although school-based factors contribute to this outcome, external factors can impact students' academic performance (AP) as well. For this project, associations between AP and one such factor, food insecurity (FI) are examined.

Methods: The percentage of third grade students at each elementary school in Davidson County who scored below the required ELA score in the 2020-2021 school year, reported by the Tennessee Department of Education, and the percentage of households experiencing FI in each zip code in the county, from the 2020 Feeding America Meal Gap Report, were mapped using ArcGIS to geospatially assess the associations between AP and FI.

Results: Over 75% of students did not meet the ELA requirement to advance to the fourth grade. The frequency of household FI in 13 (59%) of 22 zip codes in Davidson County containing an elementary school exceeded the 2021 national average of 10%, ranging from 10.3% to 18.5%. Within the 52 schools in these 13 zip codes, 82.4% of students scored below the required ELA score. In comparison, 55.7% of students scored below the required score in the 20 schools within the 9 zip codes with household FI frequency below the 2021 national average (3.4% to 8.4%).

Conclusions: These results suggest that students attending schools in zip codes with a higher proportion of households with FI may be less likely to meet ELA requirements than students in zip codes with lower FI. By failing to consider neighborhood level inequities and external factors, such as FI, that may impact AP, the current legislation threatens to further exacerbate inequities in educational performance.