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## ***Measuring Pharmacy Access with Travel Time: Redefining Desert Definitions in Tennessee***

**Key words:** pharmacy deserts, access to care, travel time

**Introduction:** Pharmacy deserts, areas defined as lacking a pharmacy within a 10- to 15-mile radius, leave millions of Americans without access to essential services, including medications, immunizations, and pharmacist consultations. Rural communities have long faced access barriers due to clinic closures and declining populations; however, urban neighborhoods, particularly those with low-income or minority populations, are increasingly affected by pharmacy closures. At the Vanderbilt University School of Nursing Planetary Health Policy Innovation Lab, our project is focused on investigating the local pharmacy environment, developing a model for defining urban pharmacy deserts, and identifying potential local and state health policy solutions to improve access and reduce these disparities.

**Methods:** To address the primary aims, we examined the pharmacy environment in Tennessee and conducted a thorough literature review to develop strategies that address access barriers for vulnerable populations. Our analysis highlights key limitations in the current definition of pharmacy deserts, including inconsistent distance points and a lack of geographic context. We compared strategic models from previous studies used to define pharmacy deserts in comparable communities to the current environment in select Tennessee cities, developed an access map, and proposed innovative solutions to address accessibility.

**Results:** Building on existing national frameworks, this project proposed adapting pharmacy desert definitions in Tennessee by using travel time and local supermarket access as benchmarks, which better reflect regional transportation patterns and needs. Additionally, we utilized the Pharmacy Vulnerability Index (PVI) to identify key pharmacies in Tennessee census tracts that are most vulnerable to losing access. Project deliverables include a theoretical manuscript proposing state policy changes, an elaborate concept map, and a map of Davidson County in Tennessee, visualizing pharmacy vulnerability to inform targeted, evidence-based interventions.

**Conclusions:** In Nashville, traffic congestion significantly distorts travel time, making mileage-based definitions of pharmacy deserts misleading and inaccurate. By measuring access based on actual time spent commuting, rather than distance, we can more accurately identify underserved areas, even within urban centers. This approach highlights the growing impact of pharmacy deserts in cities like Nashville, providing policymakers with a clearer understanding of where interventions are most urgently needed.

