

Evaluating Measurement Challenges and Methods in Rural Areas: Implications for Sunscreen Desert Definitions in New England

References:



¹Nikolas G. Hernandez, ²Jonathan S. Glass, MD, ^{1,2}Lynn Foster-Johnson, PhD

¹Geisel School of Medicine at Dartmouth, Hanover NH; ²Department of Dermatology, Dartmouth-Hitchcock Medical Center, Lebanon, NH



BACKGROUND

RESULTS

CONCLUSIONS

- **Geographic access** to retail products plays a critical role in health outcomes. Concepts like “**food deserts**” and “**pharmacy deserts**” have been widely studied to characterize disparities in access, using sometimes conflicting measurement methods.
- “**Sunscreen deserts**” are areas with limited sunscreen availability, potentially increasing skin cancer risk.
- Existing desert studies highlight the **variability in definitions**, ranging from an adaptation of the USDA ‘Food Desert’ definition to more complex indices incorporating retailer density.
- Our study identifies **methods and challenges** in measuring sunscreen access in rural areas.

STATE	County Classification	Retailer Count	County Pop. (Mean, Median)	Total # of Desert Tracts
Vermont	3 Urban 11 Rural	400 retailers*	(46,089, 37,404)	34**
New Hampshire	3 Urban 7 Rural	746 retailers*	(138,783, 84,352)	91**

Table 1. *Descriptive statistics by state.* *retailers sourced from the USDA Food Access Atlas and D&B Hoovers Pharmacy Databases, **desert tracts identified via adapted USDA ‘food desert’ definition

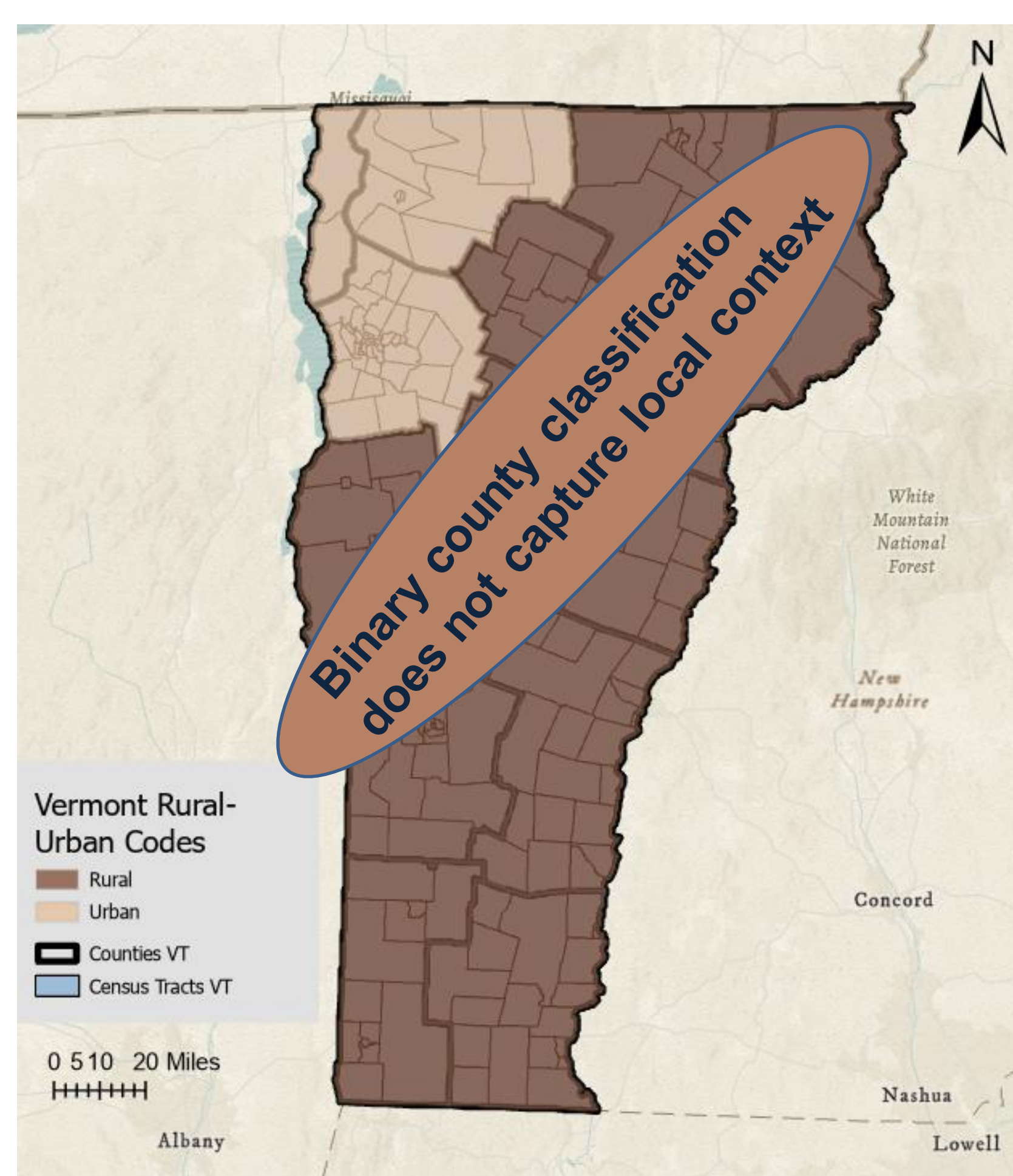


Fig 1. **Vermont.** Closest Sunscreen Retailer by Census Tract, Rural vs Urban Classification (Source: Esri, GIS)

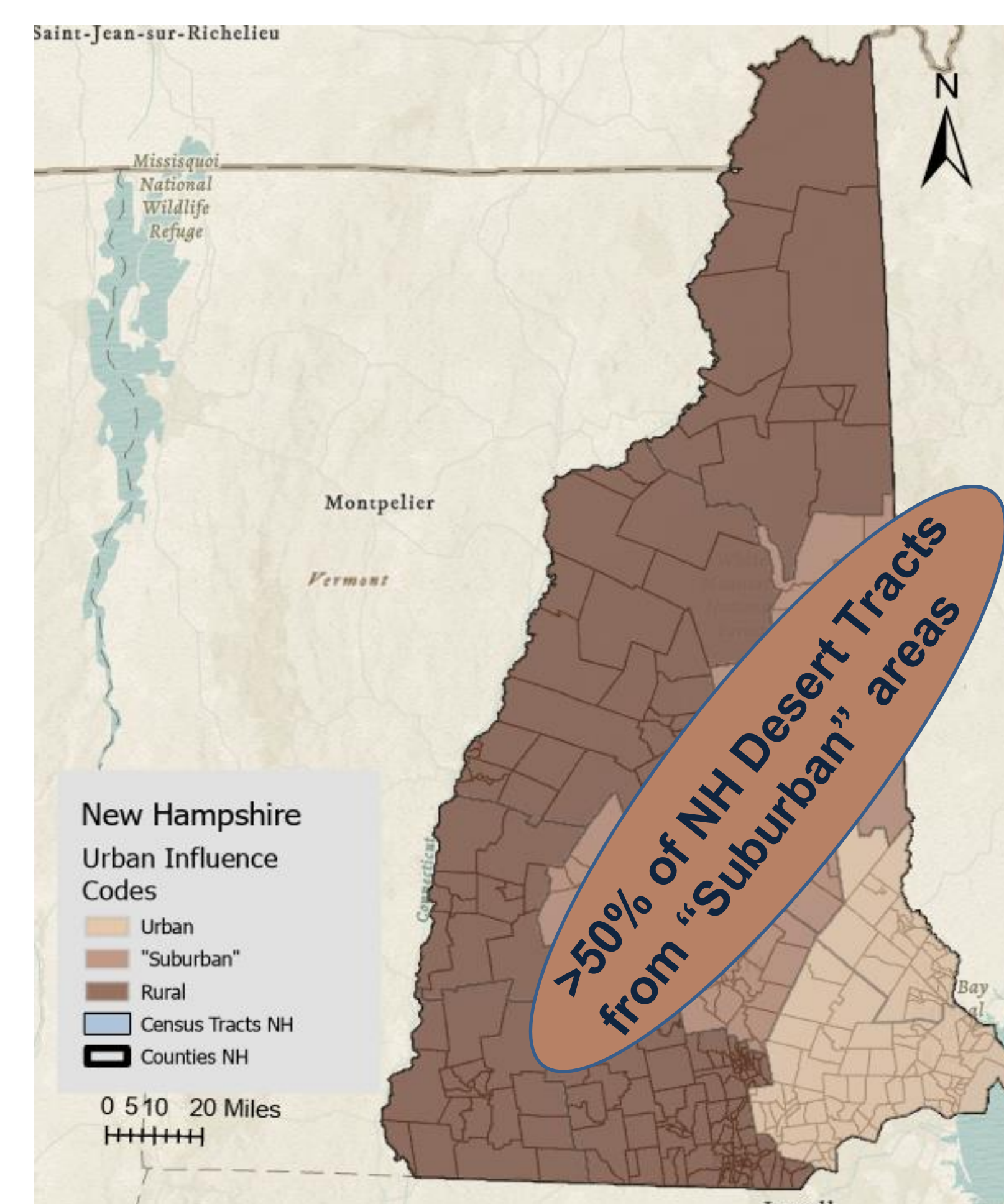


Fig 1. **New Hampshire.** Closest Sunscreen Retailer by Census Tract, Rural vs Urban Classification (Source: Esri, GIS)

Rigid binary rural-urban classifications fail to capture nuanced county characteristics, possibly misrepresenting access in suburban or semi-rural areas.

- Using RUCA/UIC codes to classify counties as urban or rural can **misclassify suburban areas**, skewing desert status..
- **Socioeconomic and community behavioral factors** (e.g., car ownership, affordability, sunscreen habits) are **not captured** by retailer density metrics.
- The “food desert” approach uses **median income** as a socioeconomic measure, but this **may overlook factors** like household size and composition, leading to incomplete assessments of financial vulnerability.

County-level aggregation may obscure finer patterns seen at the census tract scale and fail to capture the lived experience of individuals.

Distance vs. Travel Time: Use of **distance from tract centroids** may underestimate real travel distances, especially in rural or mountainous areas.

METHODS

EMERGING THEMES

- 1) A literature search was conducted to identify studies on sunscreen access and related concepts.
 - Search was performed in **Scopus** and **PubMed** databases using keywords like sunscreen, sunblock, access, desert, availability, affordability, and cost.
 - The search retrieved **356 results** in Scopus. Additional sources on **food deserts, pharmacy deserts, and access metrics** were included to inform the comparative analysis.
- 2) Compilation of theorized “sunscreen retailers,” population data, and rural-urban status for Vermont and New Hampshire

Rural/urban classification using RUCA codes may oversimplify access patterns, especially in areas that are “suburban” or near-metro.

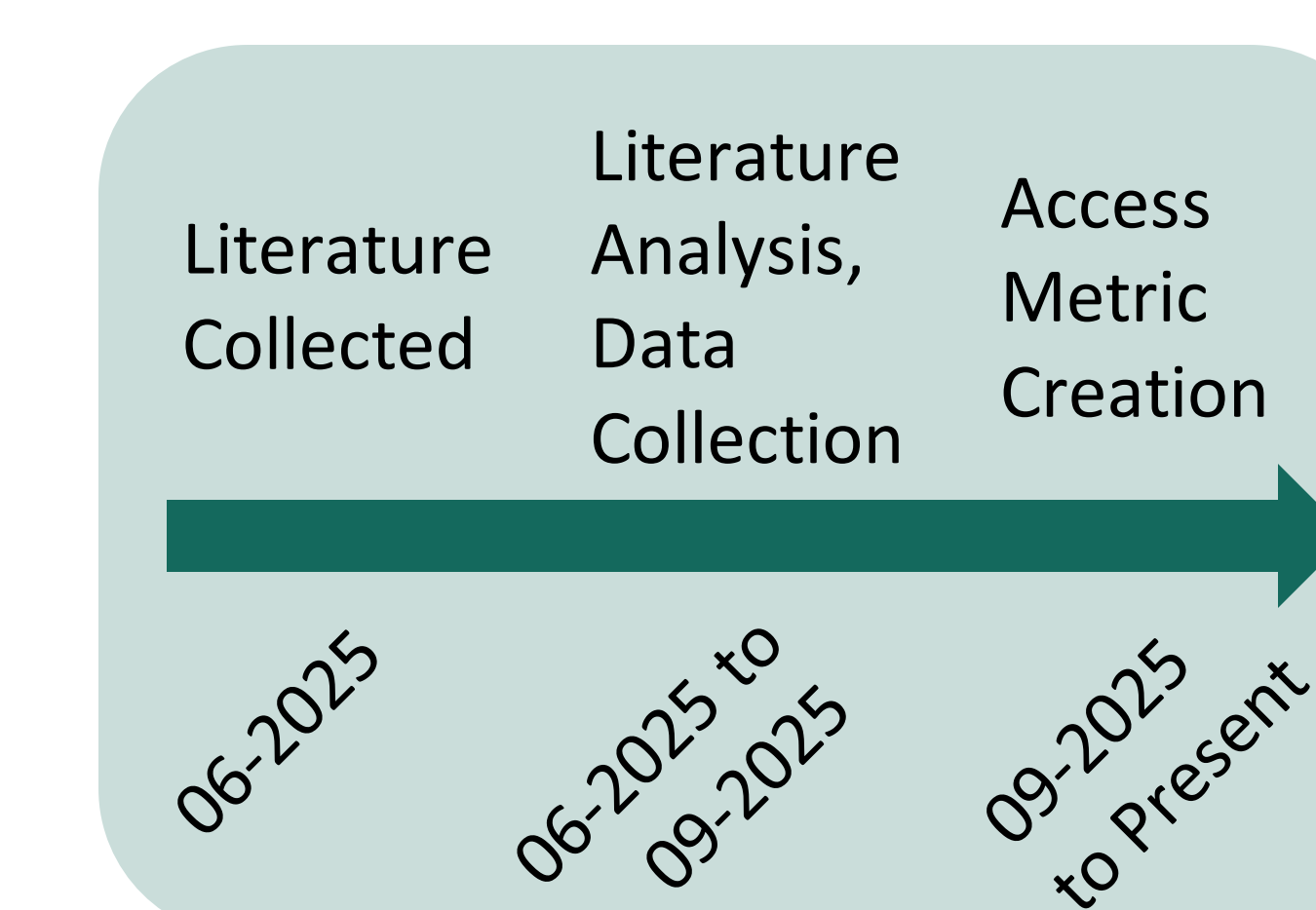
Expanding ‘sunscreen retailer’ definition can improve the accuracy of access data. However, it may also skew access estimates depending on local context

Having access to sunscreen does not ensure affordability, necessary SPF, or product quality, which are important factors in effective protection.

Aggregating data at the county level can mask important local variations in sunscreen access and community vulnerability.

NEXT STEPS

Timeframe



Quantitative Data

Develop a sunscreen desert definition that more accurately reflects access needs in New England.