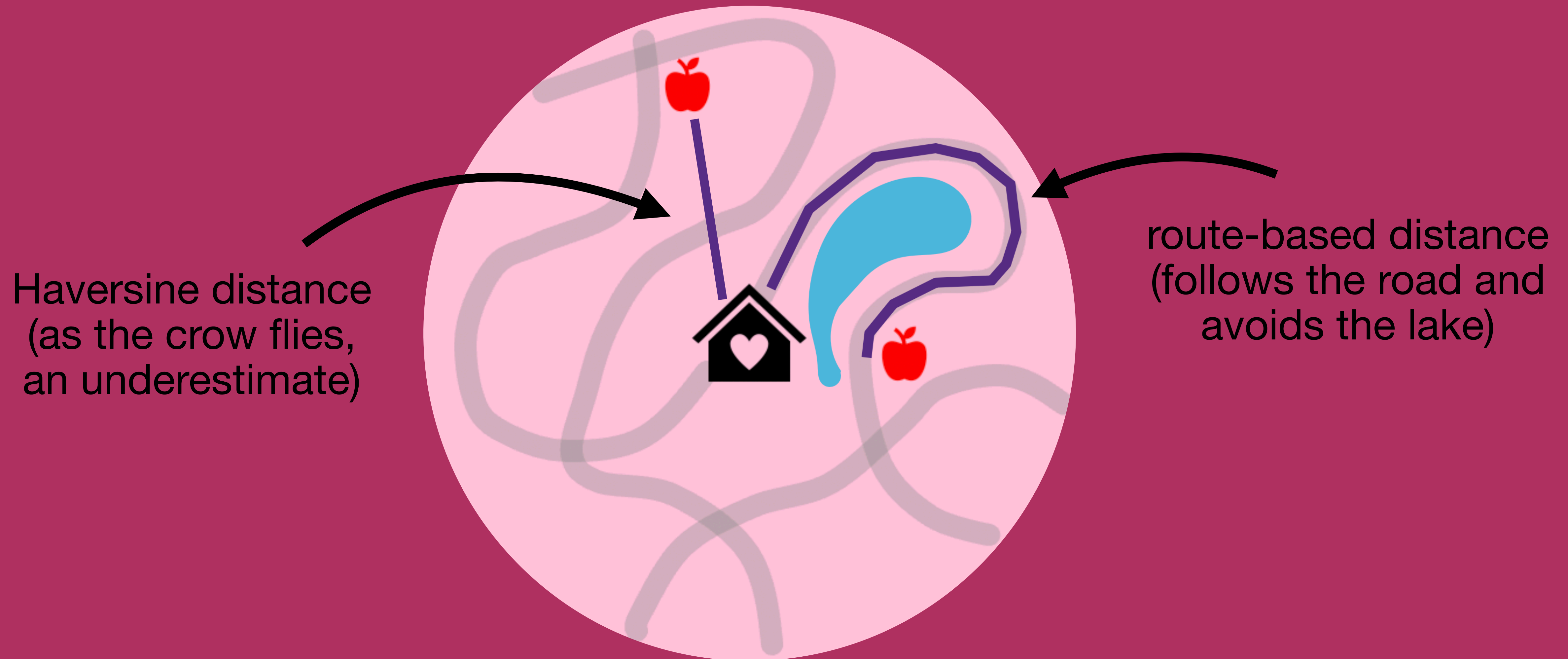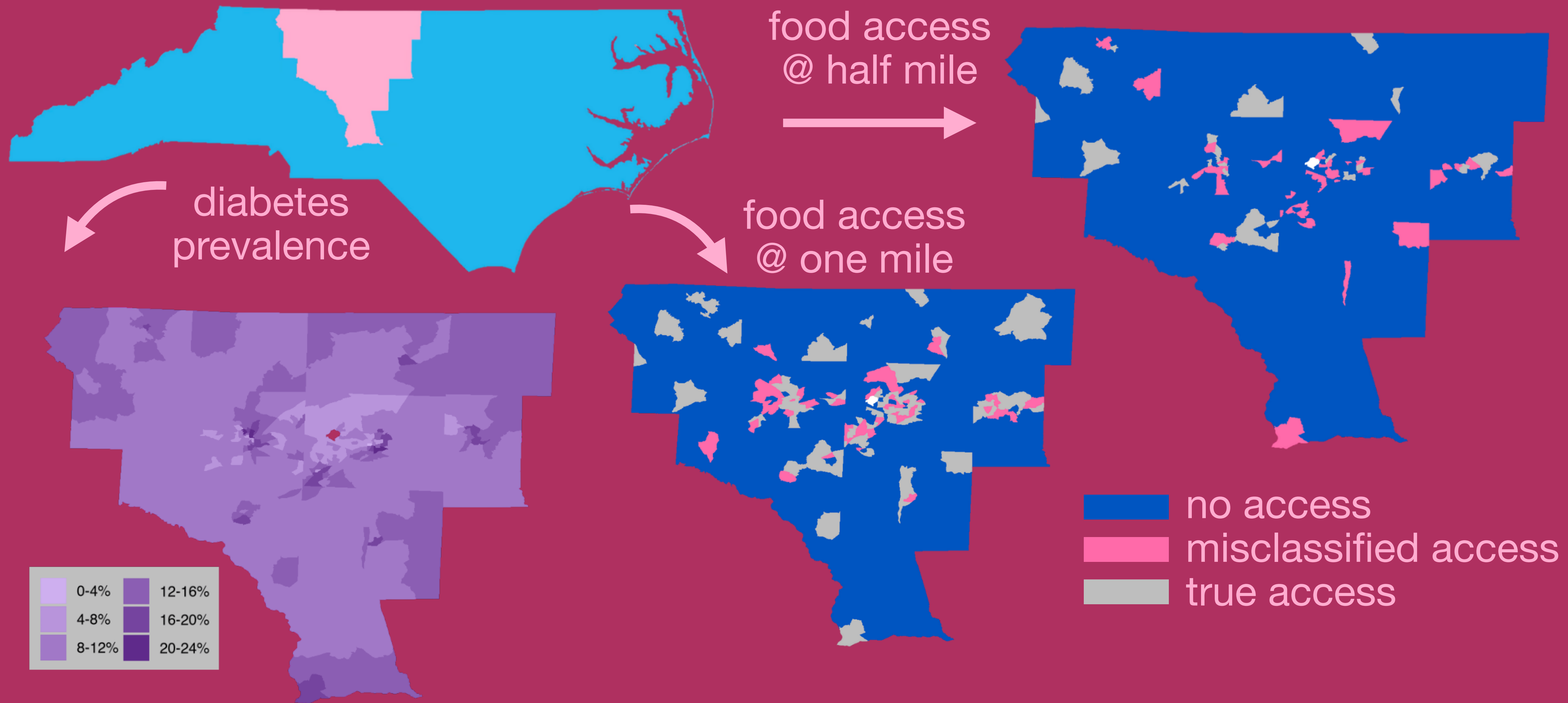# Linking Potentially Misclassified Healthy Food Access to Diabetes Prevalence

JSM 2025 - Nashville, TN
Speed Session 7

AE Mullan (presenting), PDA Nguyen, and SC Lotspeich

Haversine distance
(as the crow flies,
an underestimate)

route-based distance
(follows the road and
avoids the lake)

We define **food access** with an indicator of whether a census tract
has a healthy foods retailer within some radius, measured with either
error-prone Haversine distance or **accurate** route-based distance.

food access
@ half mile

diabetes
prevalence

food access
@ one mile

no access
misclassified access
true access
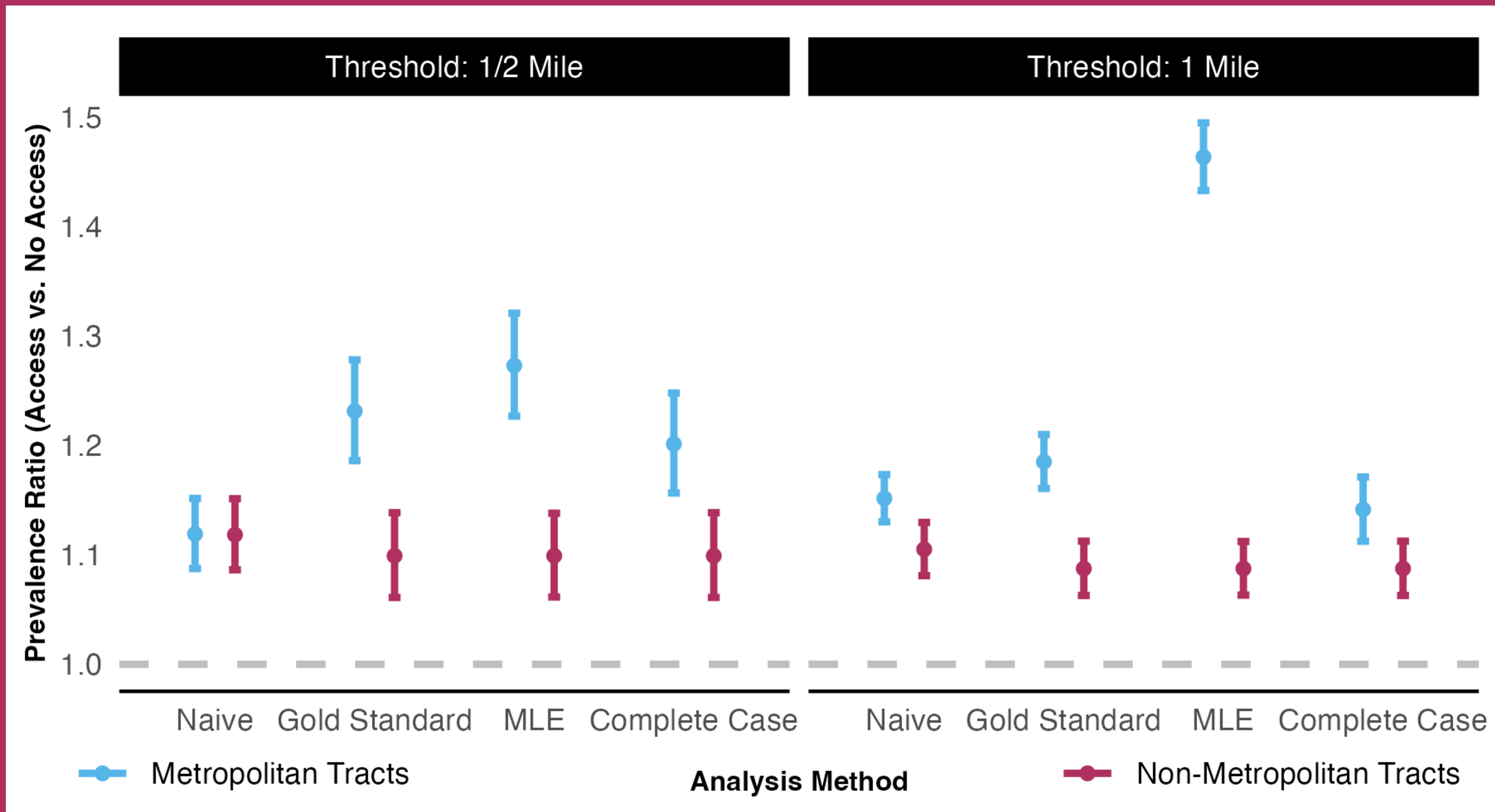
0-4%   12-16%
4-8%   16-20%
8-12%   20-24%

We explore the **prevalence ratio of diabetes** when comparing tracts with
and without access to healthy food in the Piedmont Triad of North Carolina.
Potentially **misclassified tracts** may bias the estimated prevalence ratio!

possum

We always have the potentially misclassified access indicator but not necessarily the true access, so we **derive** and **implement** a maximum likelihood estimator for **Poisson regression** with a misclassified exposure.
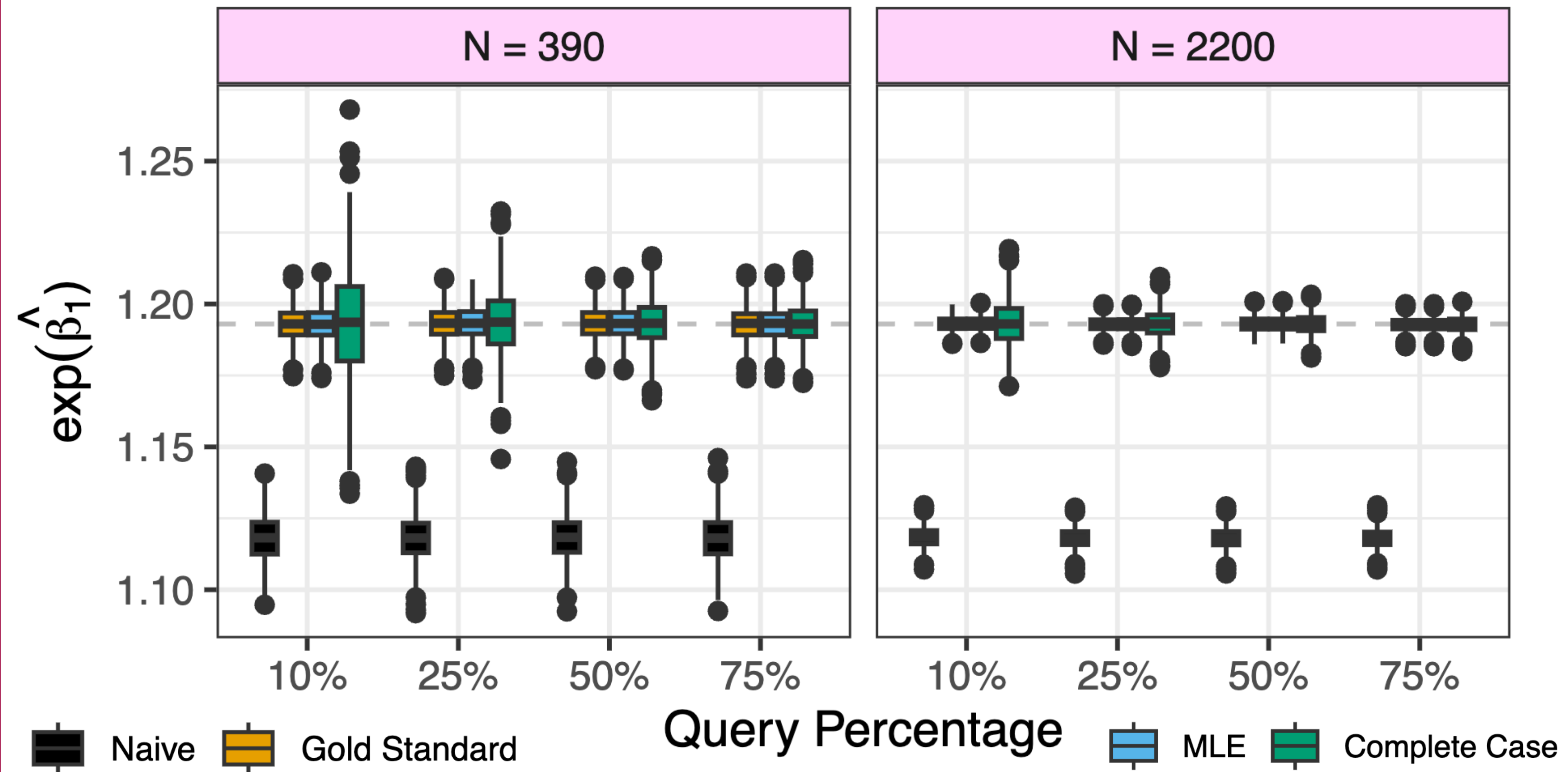
We demonstrate the **low bias** and **high relative efficiency** of the maximum likelihood estimator through **simulation studies** across different misclassification and query settings and **apply** it to the Piedmont data.

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