NC Prenatal Care Access Analysis
Mapping Maternal Health Deserts Across North Carolina's 100 Counties

John Apel Jr. · February 2026 · github.com/JohnApelJr/nc-prenatal-care-access

KEY FINDINGS

27 of 100 NC counties have zero OB/GYN providers. Statewide median is 0.9 providers per 10,000 women of reproductive age.

96 of 100 counties carry active maternity care HPSA designations — near-universal shortage status predating Hurricane Helene.

All 23 Western NC counties are suppressed in CDC WONDER. The federal surveillance system is blind to the region most at risk — itself a policy-relevant finding (Runkle & Sugg, 2025, *NC Medical Journal*).

WNC's crisis is not explained by standard SDOH. Mann-Whitney U tests show no significant regional difference in provider density, poverty, or vehicle access. Only insurance coverage ($p<0.001$) and broadband ($p=0.03$) differ — both in WNC's favor. Geographic isolation and infrastructure loss are the more likely drivers.

Watauga County tops the composite burden index (0.90/1.0) — high uninsured rates among a large student-age population and zero OB/GYN subspecialists.

METHODS

Five federal sources integrated into a 100-county FIPS-keyed master dataset. Regional comparison via Mann-Whitney U. Composite burden index from MinMax-normalized provider density, uninsured rate, and poverty (all 100 counties). OLS regression on 28-county CDC WONDER subset: $R^2=0.436$, $p=0.025$.

DATA SOURCES

Source	Counties
Census ACS 2023 (5-yr) Insurance, poverty, vehicles, broadband	100/100
HRSA AHRF 2024–2025 OB/GYN provider counts	100/100
HRSA HPSA Primary Care Maternity care shortage scores	96/100
USDA RUCC 2023 Rural-urban classification	100/100
CDC WONDER 2016–2024 Prenatal care utilization	28/100*

* CDC suppresses cells <10 births. All 23 WNC counties fall below this threshold.

TOOLS & SKILLS

Python · GeoPandas · pygris · Statsmodels · scikit-learn · Matplotlib · Census API · HRSA pipeline · Composite index · Mann-Whitney U · OLS + VIF

RELATED WORK

NC Pediatric Access Pipeline — Specialist supply vs. child population, NC 100 counties

Chronic Disease Geospatial Pipeline — Triple-burden counties, 2,956 U.S. counties

CITATION

Runkle & Sugg (2025). Rebuilding Maternal Health Access in Western NC. NC Medical Journal, 86(1), 8–11. doi:10.18043/001c.137497
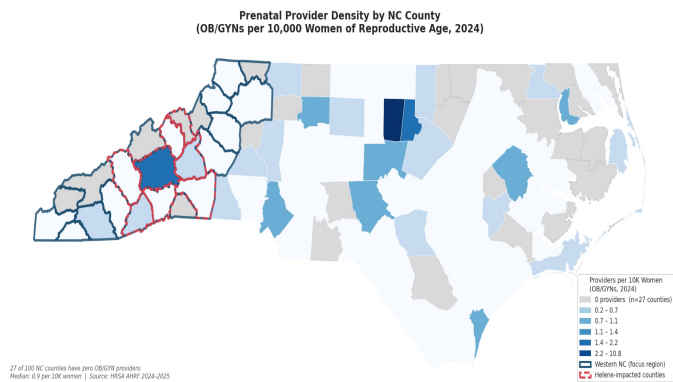
MAPS

Fig. 1: Provider density by county. Gray = zero providers (n=27). Navy border = WNC; red dashed = Helene-impacted.
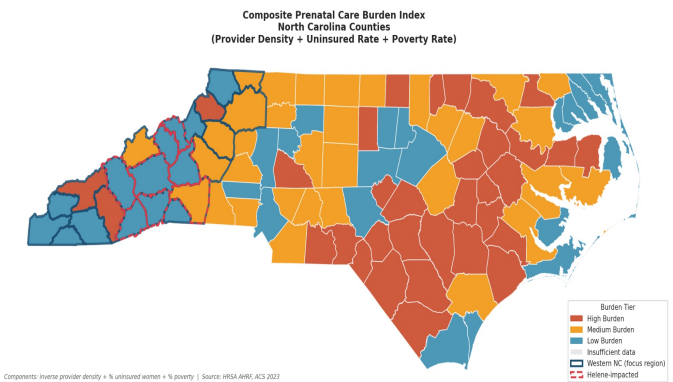

Fig. 2: Composite burden index (inverse provider density + uninsured rate + poverty). All 100 counties.

John Apel Jr. · M.S. Applied Data Science (2025) · johnapeljr@gmail.com · johnapeljr.github.io · LinkedIn · GitHub