

Vellora Research Overview

Agamvir Singh — Independent Researcher & Founder of Vellora

Review page: vellora-health.pages.dev/research/review/ · PDF: vellora-health.pages.dev/reports/vellora-research-overview.pdf

Purpose and scope

Vellora is an independent public health education and research site covering all 254 Texas counties: a health profile and PDF report for every county, interactive maps and comparisons, and three exploratory research reports. The reports are secondary analyses of public county data from CDC PLACES (2025 release, BRFSS 2023), CDC heart disease mortality (adults 35+, 2022–2024), State Cancer Profiles (Texas Cancer Registry, 2019–2023) and USDA Rural-Urban Continuum Codes 2023. Each is ecological and cross-sectional: it describes differences between counties, not their causes, and not individuals. Each publishes its inputs, results, code and an independent recomputation in Python (SciPy, NumPy).

1. Geographic Variation in Cardiovascular Health Across Texas Counties

Published 2026-10-23 · Version 1.2 · vellora-health.pages.dev/research/reports/cardiovascular-disparities-texas/

How do county estimates of cardiovascular conditions, their risk factors and heart disease death rates vary across Texas, do they cluster geographically or differ between metropolitan and nonmetropolitan counties, and how strongly do the risk factors track the outcomes?

- All 8 measures were geographically clustered (global Moran's I 0.35 to 0.57; permutation $p = 0.0001$ for each, the smallest attainable).
- Every measure was higher in nonmetropolitan counties; the median heart disease death rate was 415.1 against 361.2 per 100,000 (BH-adjusted $p < 0.0001$).
- Of five risk factors, current smoking had the strongest association with the heart disease death rate (Spearman $\rho = 0.54$, 95% CI 0.44 to 0.63); diagnosed diabetes showed no clear association ($\rho = 0.09$, adjusted $p = 0.132$).

Data. CDC PLACES 2025 release, age-adjusted prevalence (BRFSS 2023) for five risk factors and two conditions; CDC heart disease death rates, adults 35+, 2022–2024; USDA Rural-Urban Continuum Codes 2023. **Sample.** 253 of 254 counties (Loving County withheld by CDC in every source).

Methods. Distributions; global Moran's I with 9,999 permutations; Mann–Whitney tests by metropolitan status; Spearman correlations with Fisher z intervals; Benjamini–Hochberg adjustment within each table; crude prevalence as a sensitivity analysis.

Limitations. Ecological and cross-sectional; PLACES risk factors and conditions come from one model, so their high correlations are partly built in; spatially smoothed death rates; unweighted counties; no adjustment for confounders.

PDF vellora-health.pages.dev/reports/vellora-cardiovascular-disparities-texas.pdf · Results vellora-health.pages.dev/data/research/cardio-disparities-results.v1.json · Verifier vellora-health.pages.dev/data/research/code/verify-cardio-study.py

2. Smoking Prevalence and Lung Cancer Incidence Across Texas Counties

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Is age-adjusted adult current cigarette smoking prevalence associated with age-adjusted lung and bronchus cancer incidence across Texas counties?

- Age-adjusted adult smoking prevalence and age-adjusted lung cancer incidence were positively associated across counties (Spearman $\rho = 0.44$, 95% CI 0.32 to 0.55, $p < 0.0001$, $n = 203$).
- Exploratory: the association was stronger among metropolitan ($\rho = 0.68$) than nonmetropolitan counties ($\rho = 0.32$); removing any one county left ρ between 0.43 and 0.46.
- All 51 excluded counties are small counties whose lung cancer rate is suppressed (fewer than 16 cases over 2019–2023).

Data. CDC PLACES 2025 release, current cigarette smoking among adults, age-adjusted (BRFSS 2023); State Cancer Profiles lung and bronchus cancer incidence, age-adjusted, 2019–2023 (Texas Cancer Registry); USDA RUCC 2023. **Sample.** 203 of 254 counties with both values; 51 excluded.

Methods. One prespecified confirmatory test: Spearman's ρ with a Fisher z interval (Bonett–Wright standard error). Exploratory: Pearson's r , metropolitan and nonmetropolitan subgroups, leave-one-out influence, crude smoking prevalence and the profile of excluded counties.

Limitations. Ecological and cross-sectional; smoking (2023) and incidence (2019–2023) differ in period and lung cancer has long latency; model-based smoking estimates; suppression removes the smallest counties; no confounder adjustment; the two measures use different age adjustments.

PDF vellora-health.pages.dev/reports/vellora-smoking-lung-cancer-texas.pdf · Results vellora-health.pages.dev/data/research/lung-smoking-results.v1.json · Verifier vellora-health.pages.dev/data/research/code/verify-lung-study.py

3. Rural vs. Metropolitan Health Disparities Across Texas Counties

Published 2026-10-24 · Version 1.2 · vellora-health.pages.dev/research/reports/rural-metropolitan-texas/

How do selected health outcomes and risk factors differ between metropolitan and nonmetropolitan Texas counties?

- Heart disease death rates were higher in nonmetropolitan counties: Hodges–Lehmann shift +45.4 per 100,000 (95% CI +25.7 to +65.0), BH-adjusted $p < 0.0001$.
- Lung cancer incidence showed no clear difference (shift +3.5, 95% CI -0.9 to +7.9 per 100,000, adjusted $p = 0.134$); its rate is suppressed in 43 of 168 nonmetropolitan and 8 of 86 metropolitan counties, so the result is inconclusive.
- All six CDC PLACES age-adjusted estimates were higher in nonmetropolitan counties (probability of superiority 0.61 to 0.73; adjusted $p \leq 0.0033$).

Data. USDA RUCC 2023 (re-verified against the USDA file); CDC heart disease death rates, adults 35+, 2022–2024; State Cancer Profiles lung cancer incidence, 2019–2023; CDC PLACES 2025 age-adjusted estimates (BRFSS 2023). **Sample.** 86 metropolitan and 168 nonmetropolitan counties; per-indicator sample sizes reported separately (lung cancer: 78 and 125).

Methods. Prespecified primary family (two observed rates) and secondary family (six PLACES estimates); medians, Hodges–Lehmann shifts with distribution-free 95% CIs, probability of superiority, Mann–Whitney tests with Benjamini–Hochberg adjustment within each family; Fisher's exact test for suppression; exploratory crude, gradient and adjacency analyses.

Limitations. Ecological and cross-sectional; county classification masks within-county variation; confounding; model-based PLACES estimates; suppression concentrated in nonmetropolitan counties; unweighted counties; different reporting periods and age adjustments.

PDF vellora-health.pages.dev/reports/vellora-rural-metropolitan-texas.pdf · Results vellora-health.pages.dev/data/research/rural-metro-results.v1.json · Verifier vellora-health.pages.dev/data/research/code/verify-rural-study.py

Research status and where review would help

Independent exploratory research — not peer reviewed. The studies have been checked computationally, not by independent scientists. Expert review would be most useful on: ecological inference; confounding; spatial dependence; uncertainty in county estimates; suppression and selection; model-based estimates; statistical methods.

Reproducibility

Package: vellora-health.pages.dev/reports/vellora-research-package-v1.2.zip. It contains the verified inputs, results files, analysis code, analysis plans, download scripts and Python verifiers. From a clean folder, each `scripts/verify-*--study.py` (SciPy 1.18.1, NumPy 2.5.4) recomputes every reported statistic, and `npx tsx regenerate.ts` regenerates each results file with identical content. Agencies may revise their data; the package fixes the versions used. Versions and corrections: vellora-health.pages.dev/research/corrections/.

AI assistance

Anthropic's Claude, used through Claude Code, produced most of Vellora's software and research materials under the author's direction: the site's code and architecture; the scripts that download, validate and process the source data; the statistical analysis code and the separate Python verification scripts; the charts and maps; the PDF generation; the analysis plans; the drafting and editing of the report text; and the documentation and reproducibility package. No other AI tools were used. Computational results were checked by reproducible scripts, including an independent Python re-implementation of each study's statistics, which was itself AI-written. These checks show that the reported numbers follow from the code and data; they are not independent scientific peer review. Claude is a tool, not an author. Agamvir Singh set the research questions and requirements, has read and reviewed each published report, and is responsible for reviewing the published work and its interpretations. The research is independent and exploratory and has not been peer reviewed.

Vellora is not affiliated with any university, government body or medical institution. The data providers have not reviewed or endorsed these analyses. Not medical advice.