

Longitudinal Trends in Early-Onset Cancer Incidence among Hispanic Adults in the Gulf Coast Region of Texas

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BACKGROUND

- Early-onset (EO) cancers** - historically observed in those >50 years that are increasingly diagnosed in adults <50 years
 - o ↑ U.S. and ↑ globally over the past two decades^{1,2}
- EO cancer incidence varies across race/ethnicity in Texas and U.S. Yet, the impact of **unique demographic, social, and environmental characteristics** of the Houston Methodist Neal Cancer Center catchment area (HMNCC-CA) remains unexamined.
- The **HMNCC-CA**, an **8-county Gulf Coast region**, is characterized by: 1) High racial and ethnic diversity, with the Hispanic population experiencing the fastest growth from 2010–2020,³ 2) Distinct environmental exposures (e.g., petrochemical, oil facilities)⁴, 3) Climate vulnerability (e.g., recurrent flooding, hurricanes)⁴ and 4) Persistent poverty → increased risk factors and barriers to cancer prevention and screening⁵
- The purpose of this study was to examine trends in EO cancer incidence among the Texas Gulf Coast Hispanic population to delineate ecological correlates of cancer burden.

GOALS

1. Quantify longitudinal trends in early-onset cancer incidence among Hispanic adults residing in the HMNCC-CA from 2000– 2022
2. Comparing EO Hispanic Cancer rates among three geographical regions: HMNCC-CA, Texas, and the United States
3. To identify specific cancer sites with the largest increases or decreases among Hispanic residents in our HMNCC-CA to inform cancer prevention and control priorities

METHODS

- Study Design:** Population-based retrospective cohort study
- Data Source:** Surveillance, Epidemiology, and End Results Research Plus Limited-Field Database (21 registries), National Cancer Institute
- Eligibility criteria:** Hispanic adults with cancer ages 20–49, 2000–2022.
- Study Setting:** HMNCC-CA (Brazoria, Chambers, Fort Bend, Galveston, Harris, Jefferson, Liberty, Montgomery counties) vs TX vs US.
- Outcome:** Cancer Incidence
- Statistical and Geospatial Analysis**
 - o **Age-adjusted incidence rates:** Standardized to the 2000 U.S. population.
 - o **Trend analysis:** Joinpoint Regression Program, National Cancer Institute, used to estimate Average Annual Percent Change (AAPC), 95% CI and p-values.
 - o **ArcGIS: census tract–level mapping of:**
 - o percent Hispanic population (2016–2020) using the American Community Survey (ACS) 5-year estimates (U.S. Census Bureau)
 - o lifetime excess cancer risk from hazardous air pollutants using the Environmental Justice Index (EJI) (CDC/ATSDR), including U.S. Environmental Protection Agency(EPA) air toxics cancer risk estimates and interpretation of “cancer risk” followed EPA definitions as the probability of contracting cancer over a lifetime assuming continuous exposure for 70 years
 - o race/ethnicity distribution (2010 vs 2020) using the Decennial Census (U.S. Census Bureau).

RESULTS

Figure 1. Early Onset Cancer Incidence from 2000-2022 across HMNCC-CA, TX, and U.S.

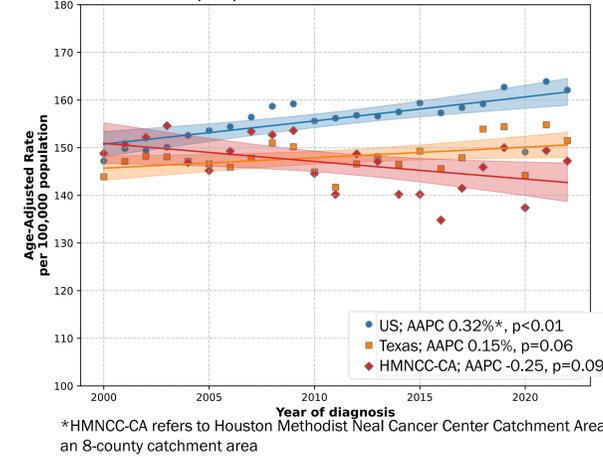
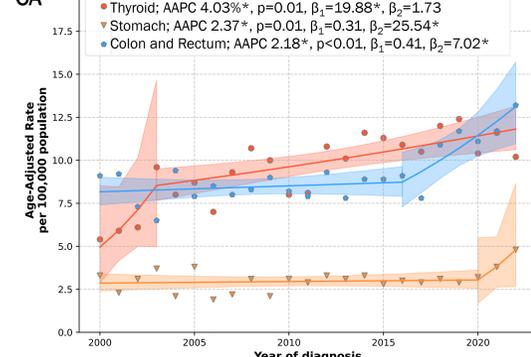
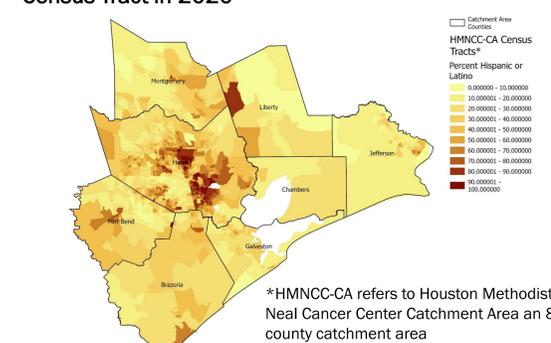


Figure 3. Hispanic Early Onset Cancer Incidence Rate from 2000-2022 across Primary Cancer Sites in HMNCC-CA



*HMNCC-CA refers to Houston Methodist Neal Cancer Center Catchment Area an 8-county catchment area

Figure 5. Percentage Hispanic expressed in deciles by Census-Tract in 2020



Key Insights

- Fig 3. and Fig 4. The top 3 EO rising among Hispanics are Thyroid Ca, Corpus Uteri Ca and Testicular Ca.
- Fig 4. EO cancer incidence among Hispanics is decreasing for Liver and Intrahepatic Bile Duct Ca, and Lung and Bronchus Ca.
- Fig 5. and Fig 6. show Census tracts with the highest air toxic risks overlap with census tracts with higher percent Hispanic populations,
- Figure 7. The Hispanic population is one of the fastest growing in our region

Figure 2. Hispanic Early Onset Cancer Incidence from 2000-2022 across HMNCC-CA, TX, and U.S.

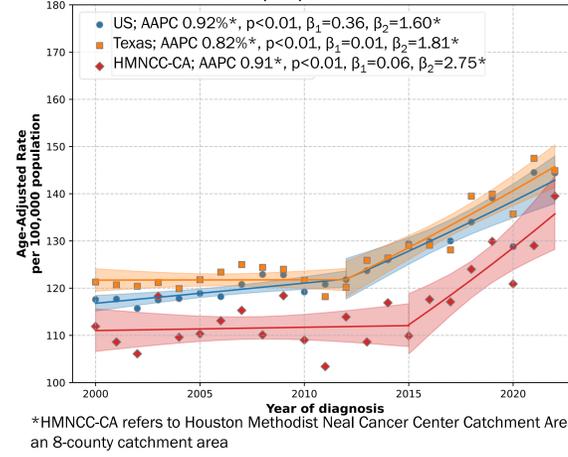


Figure 4. Hispanic Early Onset Cancer Incidence Rate from 2000-2022 across Primary Cancer Sites in HMNCC-CA

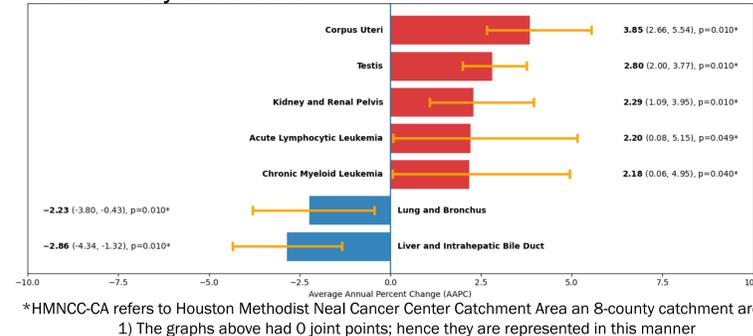


Figure 6. Census Tract–Level Lifetime Excess Cancer Risk from Hazardous Air Pollutants expressed in Deciles across the HMNCC-CA

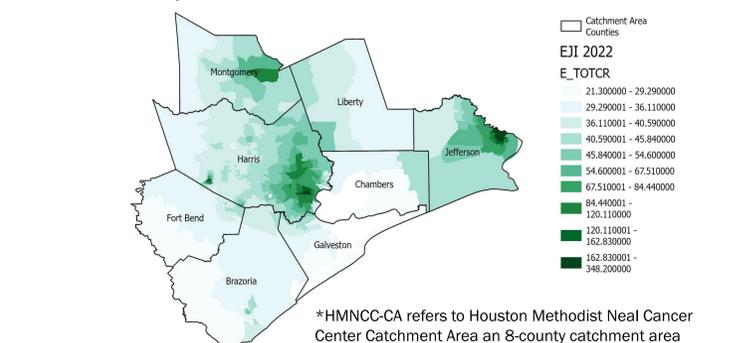
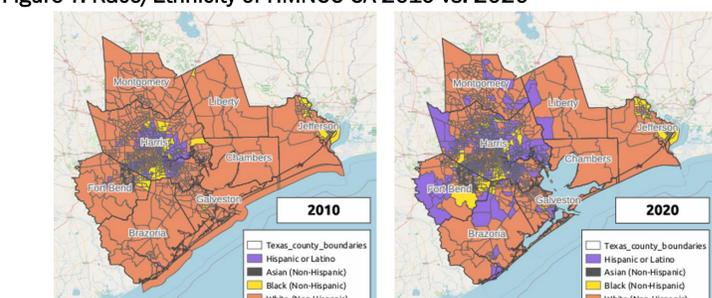


Figure 7. Race/Ethnicity of HMNCC-CA 2010 vs. 2020



*HMNCC-CA refers to Houston Methodist Neal Cancer Center Catchment Area an 8-county catchment area

HIGHLIGHTS

- U.S.: stability in EO (AAPC=0.32%*(0.15,0.49), p<0.01)
- TX: stability in EO (AAPC 0.15% (-0.01,0.31) p=0.06)
- HMNCC-CA :stability in EO (AAPC -0.25 (-0.55,0.05) p=0.09)
- Hispanic adults, (AAPC's: US[0.92%*]: TX [0.82%*], HMNCC-CA [+0.91%*]) had significant increases in EO cancer incidence
- Specifically, for Hispanics in HMNCC-CA:
 - o ↑ Thyroid cancer(AAPC 2.80%, 95% CI 2.00–3.77, p<0.05)
 - o ↑ Testicular cancer (AAPC 4.03%, 95% CI 1.10-7.82 , p<0.05)
 - o ↑ Kidney and Renal Pelvis cancers (2.29%, 95% CI 1.09–3.95 , p<0.05)
 - o ↑ Stomach cancer (2.37%, 95% CI 0.94–3.49 , p<0.05).
 - o ↓ Liver and Intrahepatic Bile Duct cancer: decline (AAPC –2.86%, 95% CI –4.34 to –1.32 , p<0.05).
- Fig 5 and Fig 6: Geospatial overlap between with high Hispanic population density-census tracts and elevated lifetime excess cancer risk from hazardous air pollutants

CONCLUSIONS

- Unique Characteristics of HMNCC-CA :
 - o Substantial Hispanic population growth and structural vulnerability (including persistent poverty)
 - o Environmental burden and climate vulnerability
- EO cancer incidence is rising among Hispanic adults in HMNCC-CA
 - o Testicular cancer: antiandrogenic endocrine-disrupting chemicals?
 - o Kidney/Renal Pelvis cancers: obesity and type 2 diabetes?
 - o Stomach cancer: changes in coding/reportability changes OR Helicobacter pylori infection?
- Declining EO liver and intrahepatic bile duct ca incidence: reductions due to vaccinations and treatment of hepatitis B/C among Hispanics?

FUTURE DIRECTIONS

- Need for census tract-level multivariable analyses that integrate EO cancer outcomes from Texas Cancer Registry with social and environmental metrics from EPA's Risk-Screening Environmental Indicators will allow:
 - o identification of high-burden neighborhoods
 - o prioritization of cancer prevention and screening interventions in partnership with the Office of COE

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