Temporal Trends in Stage at Diagnosis for Screening Amenable Cancers in the Houston Methodist Neal Cancer Center Catchment Area

Erin Gardner, MPH; Anil Vadathya, MS; Ali Rizvi, MS; Dimpy Shah, MD, PhD; Hung N. Luu, MD, PhD; Arica Brandford, PhD, JD, RN; Monica Hernandez, PhD, MPH; Nestor Esnaola, MD; Jennifer Cullen, PhD, MPH

Background/Introduction

- Screening amenable cancers are defined as those in which patient outcomes, including survival, can be improved through early stage and/or presymptomatic detection.
- In the United States (U.S.), the 5-year relative survival rate for female breast cancer is greater than 99 percent when diagnosed at the local stage. In contrast, the 5-year relative survival rate for female breast cancers diagnosed at a distant/metastatic stage is 33 percent[1].
- Female breast cancer can be detected during routine recommended screening, along with cancers of the lung and bronchus, colon and rectum, and cervix **(Table 1)**.
- Early onset (E.O.) cancers are also of increasing concern in the cancer community, and screening recommendations currently restricted to certain age groups may not be optimal for early detection in younger adults.
- The Houston Methodist Neal Cancer Center catchment area (HMNCC-CA) in the Gulf Coast region of Texas has a large and diverse population with a complex set of factors associated with cancer risk, and U.S. Census projections show continued diversification of our region's population **(Table 2)**.

Goals

Our primary goal was to estimate the proportion of screening amenable cancers diagnosed at an early versus late stage in the Houston Methodist Neal Cancer Center catchment area (HMNCC-CA). We compared these proportions to those at the national level (U.S.). In addition to metrics for all adults, we examined stage at diagnosis among E.O. screening amenable cancers.

Methods

Definitions: We categorized four screening amenable cancers into early (in situ and localized tumors) and late stage (regional and distant tumors) **(Table 3)**. Tumors of unknown stage were excluded, and it is important to note that carcinomas in situ of the cervix are not reportable to central cancer registries. We examined two different age groups: all adults (diagnosed at 20 years and older) and E.O. adults (diagnosed at 20-49 years).

Timeframe: We compared grouped diagnosis years 2015-2019 to 2018-2022 to ascertain any change over time, considering the well-documented decrease in cancer diagnoses in 2020 due to delays in screening and decreased access to healthcare during the COVID-19 pandemic.

Metrics: We used SEER*Stat software to collate tumor counts in each category and then calculated proportions.

Data Sources: For HMNCC-CA metrics, we used the *SEER Research Plus Limited-Field Database (2000–2022)*, and for U.S. metrics, we used the *U.S. Cancer Statistics Public Use Research Database, 2024 Submission (2001-2022)*.

Results

Table 1. Screening Amenable Cancers and Screening Recommendations

Site	Age	Test or Procedure	Screening Recommendation (USPSTF)
Female Breast	40-74 years	Mammography	Biennial (every 2 years) screening.
Lung & Bronchus	50-80 years	Low-dose helical CT	Annual screening for those who have a 20 pack-year smoking history and currently smoke or have quit within the past 15 years.
Colon & Rectum	45-75 years	Multiple, including FIT and colonoscopy	Regular screening for all adults.
Cervix Uteri	21-65	Pap test and/or HPV test	**Ages 21–29:** Cervical cytology (Pap test) alone every 3 years. **Ages 30–65:** HPV testing alone every 5 years, or HPV with Pap test every 5 years, or Pap test alone every 3 years.

Source: U.S. Preventive Services Taskforce, American Cancer Society • Created with Datawrapper

Table 2. Demographic and Cancer Risk Factor Comparison of HMNCC-CA vs. the U.S.

	HMNCC-CA	U.S.
Hispanic or Latino (any race)	38%	18%
Non-Hispanic Black/African American	21%	13%
Non-Hispanic Asian	9%	5%
Living in poverty (<200%)	31%	30%
Obese (>=30 kg/m2)	37%	33%
Uninsured	19%	9%
Less than high school graduate	15%	12%

Created with Datawrapper

Table 3. Study Staging Definitions

Stage Definition	Summary Stage
Early	In situ, Localized
Late	Regional, Distant
Excluded	Unknown

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Table 4. Proportion of Screening Amenable Cancers Diagnosed Early and Late Stage in HMNCC-CA vs U.S.

1. All Adult (20+) Cancers, 2018-2022

	Female Breast		Lung & Bronchus		Colon & Rectum		Cervix Uteri	
	HMNCC-CA	U.S.	HMNCC-CA	U.S.	HMNCC-CA	U.S.	HMNCC-CA	U.S.
Early	70.3%	74.0%	25.8%	30.6%	33.7%	36.8%	43.5%	43.9%
Late	29.7%	26.0%	74.2%	69.4%	66.3%	63.2%	56.5%	56.1%

2. All Adult (20+) Cancers, 2015-2019

	Female Breast		Lung & Bronchus		Colon & Rectum		Cervix Uteri	
	HMNCC-CA	U.S.	HMNCC-CA	U.S.	HMNCC-CA	U.S.	HMNCC-CA	U.S.
Early	71.3%	73.4%	25.3%	27.8%	36.7%	39.7%	46.0%	47.0%
Late	28.7%	26.6%	74.7%	72.2%	63.3%	60.3%	54.0%	53.0%

3. Early Onset (20-49) Adult Cancers, 2018-2022

	Female Breast		Lung & Bronchus		Colon & Rectum		Cervix Uteri	
	HMNCC-CA	U.S.	HMNCC-CA	U.S.	HMNCC-CA	U.S.	HMNCC-CA	U.S.
Early	61.9%	65.8%	20.7%	21.0%	28.4%	33.0%	52.6%	55.0%
Late	38.1%	34.2%	79.3%	79.0%	71.6%	67.0%	47.4%	45.0%

- Among all adult screening amenable cancer cases in diagnosis years 2018-2022, there is a higher proportion of late-stage diagnoses in HMNCC-CA than in the U.S. overall **(Table 4, Section 1)**.
- Among cancers diagnosed between 2018-2022 in HMNCC-CA, excepting cervical cancer, E.O. cancers were more often diagnosed at a late stage than diagnoses among all adults **(Table 4, Sections 1 and 3)**.
- When compared to diagnosis years 2015-2019, excepting lung cancer, a higher proportion of screening amenable cancers in HMNCC-CA were diagnosed at a late stage in 2018-2022, suggesting a possible impact of the COVID-19 pandemic on the stage of diagnosis of these cancers **(Table 4, Sections 1 and 2)**.
- This pattern was the same for the U.S., except a slightly higher proportion of female breast cancers were diagnosed at a late stage in 2015-2019 in the U.S **(Table 3, Sections 1 and 2)**.

Conclusions/Future Direction

- **HMNCC-CA consistently lags behind the U.S. on early-stage detection.** If HMNCC-CA had the same early-stage diagnosis metrics as the U.S. for female breast cancer, this would translate to **1,000 patients** being diagnosed at an early rather than late stage in our catchment area.
- **Younger adults present at a later stage** for female breast, lung and bronchus, and colorectal cancers. A **continued emphasis on risk-based assessment and symptom-driven pathways** (even outside routine screening ages) is warranted.
- **Late-stage diagnoses were more common in and around the COVID-19 pandemic.**
- The HMNCC Cancer Prevention and Control program will continue to evaluate temporal trends at varying geographic levels in the coming years as new data are available to further assess any temporal or geospatial patterns.

References

[1]American Cancer Society. *Cancer Facts & Figures 2026*. Atlanta: American Cancer Society; 2026

Contact Info

Erin Gardner:
emgardner@houstonmethodist.org