

Epidemiology of Patients with Thymic Carcinoma in the United States: A Systematic Literature Review

Gagandeep Kaur¹, Ankita Sood¹, Barinder Singh²

¹Pharmacoevidence, Mohali, PB, India, ²Pharmacoevidence, London, UK

CONCLUSIONS

- Incidence of Thymic carcinoma is seen with an apparent epidemiologic trend in the United States, increasing from 0.191 to 0.277 cases per 100,000 between 1998 and 2015
- The disease shows a gender and racial gap in distribution with a higher prevalence in males than females, 54.6-60.1%. However, the racial distribution varies, with higher predominance in White populations followed by Asian/Pacific Islanders
- Notably, there has been a reassuring trend towards earlier diagnosis, with localized disease detection increased from 10.6% (1988-1991) to 32.6% (2012-2015), at the same time with a drastic reduction in unknown stage diagnoses
- All these findings seem to indicate the need for vigilant long-term follow-up and further refinement in diagnostics, though a more comprehensive analysis might be required to overcome the difficulties involved in the management of this rare malignancy

INTRODUCTION

- Thymic carcinomas (TCs) are rare, aggressive neoplasms that occur within the anterior mediastinum, and represent specific challenges to prognosis due to their tendency to present at advanced stages¹
- Despite being the most commonly reported anterior mediastinal tumors in adults over 20 years, their rarity and heterogeneous nature pose significant diagnostic and therapeutic challenges
- Understanding the epidemiological patterns of TC in the United States (US) is crucial for optimizing treatment strategies, healthcare resource allocation, and directing research priorities in this evolving oncological landscape
- With an overall annual incidence of 0.48 per million inhabitants and varying distribution across different demographic groups, systematic analysis of TC epidemiology becomes essential for developing targeted interventions and improving patient outcomes⁴

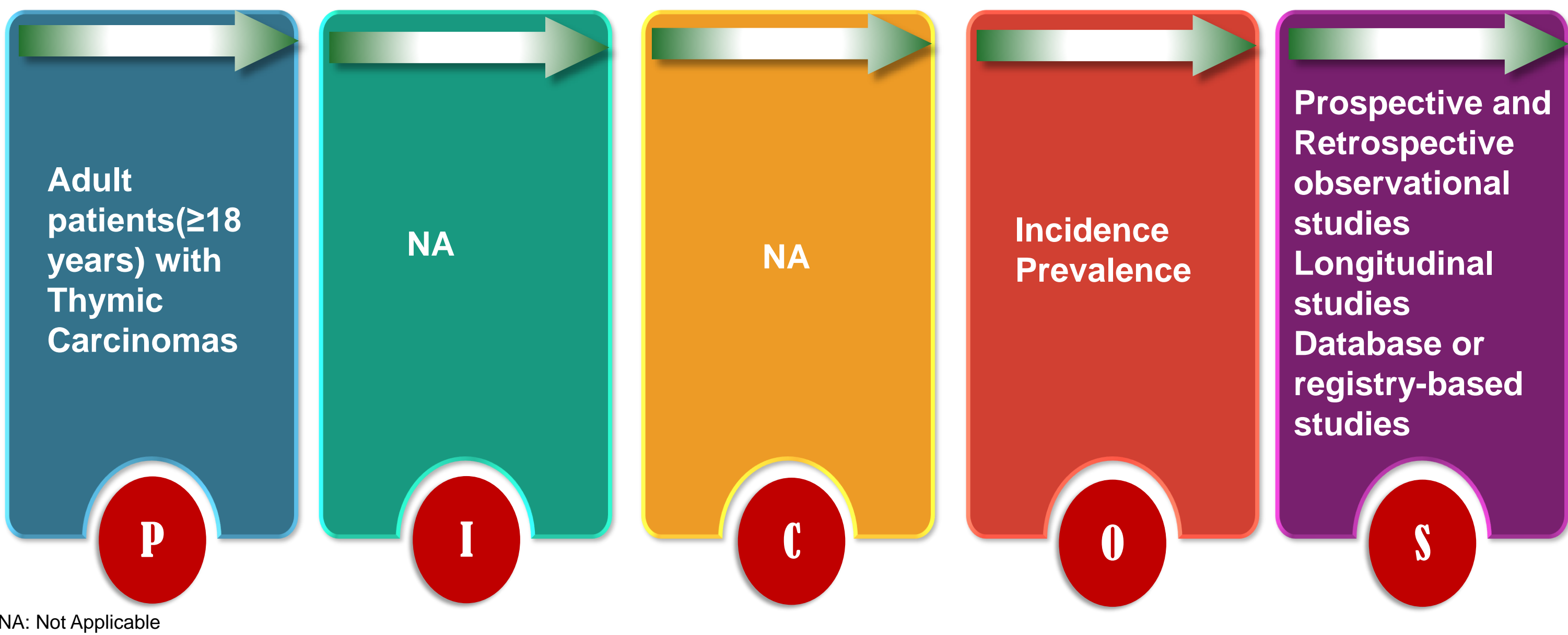
OBJECTIVE

- The current systematic literature review (SLR) aims to understand the epidemiology of TC across the US

METHODS

- This review followed the standard methodology for conducting a SLR as per guidelines provided by the National Institute for Health and Care Excellence (NICE)
- Electronic databases such as EMBASE[®] and MEDLINE[®], were searched using the combination of relevant keywords for epidemiology and TC. US-specific, English language articles with outcomes specific to epidemiology were included from the last 10 years
- The SLR encompassed a comprehensive range of study designs, including prospective and retrospective observational studies, cross-sectional analysis, case-control investigations, to gather epidemiological data pertaining to TC
- A standard two independent review and quality control process was followed during data collection. The prespecified eligibility criteria is presented in (Figure 1)

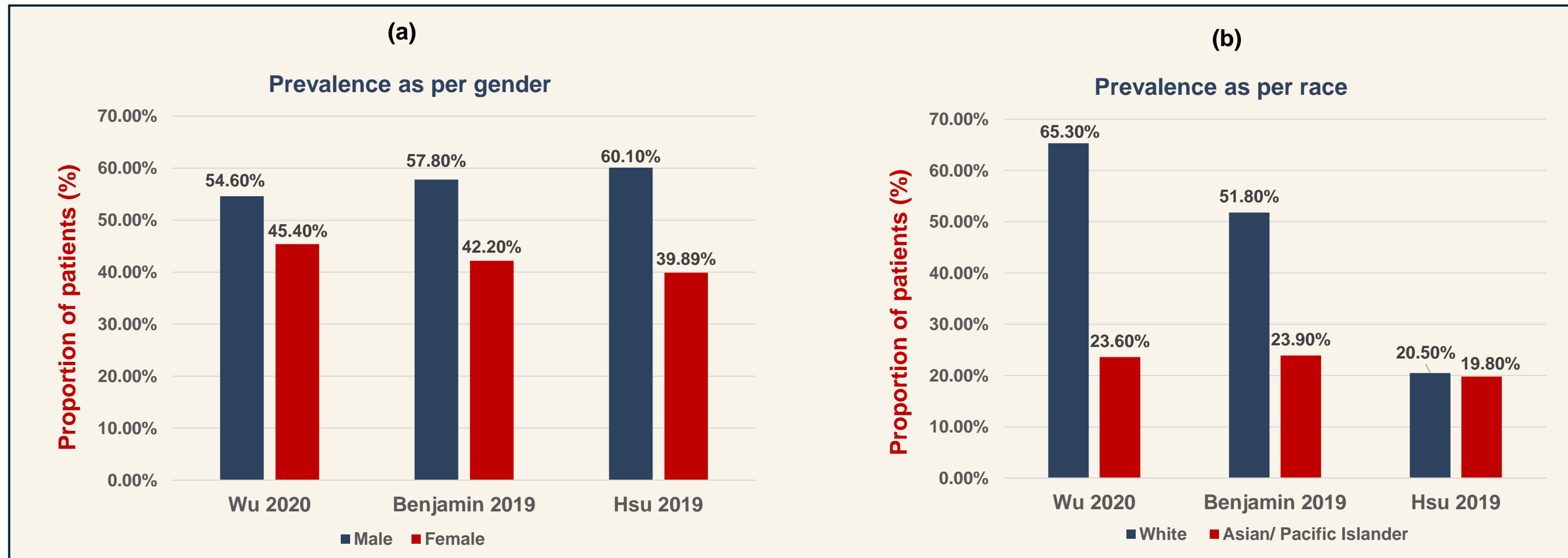
Figure 1: Prespecified PICOS eligibility criteria for selection of evidence



RESULTS

- In total five publications providing epidemiological data on TC in US were included. As per National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) database 1973-2015 and California Cancer Registry (1988-2015), the prevalence was reported to be higher in males vs females (54.6%-60.1% vs 39.8%-45.4%), while in terms of race, Whites exhibited the highest prevalence (20.5%-65.3%), followed by Asians (19.8%-23.9%) (Figure 3)

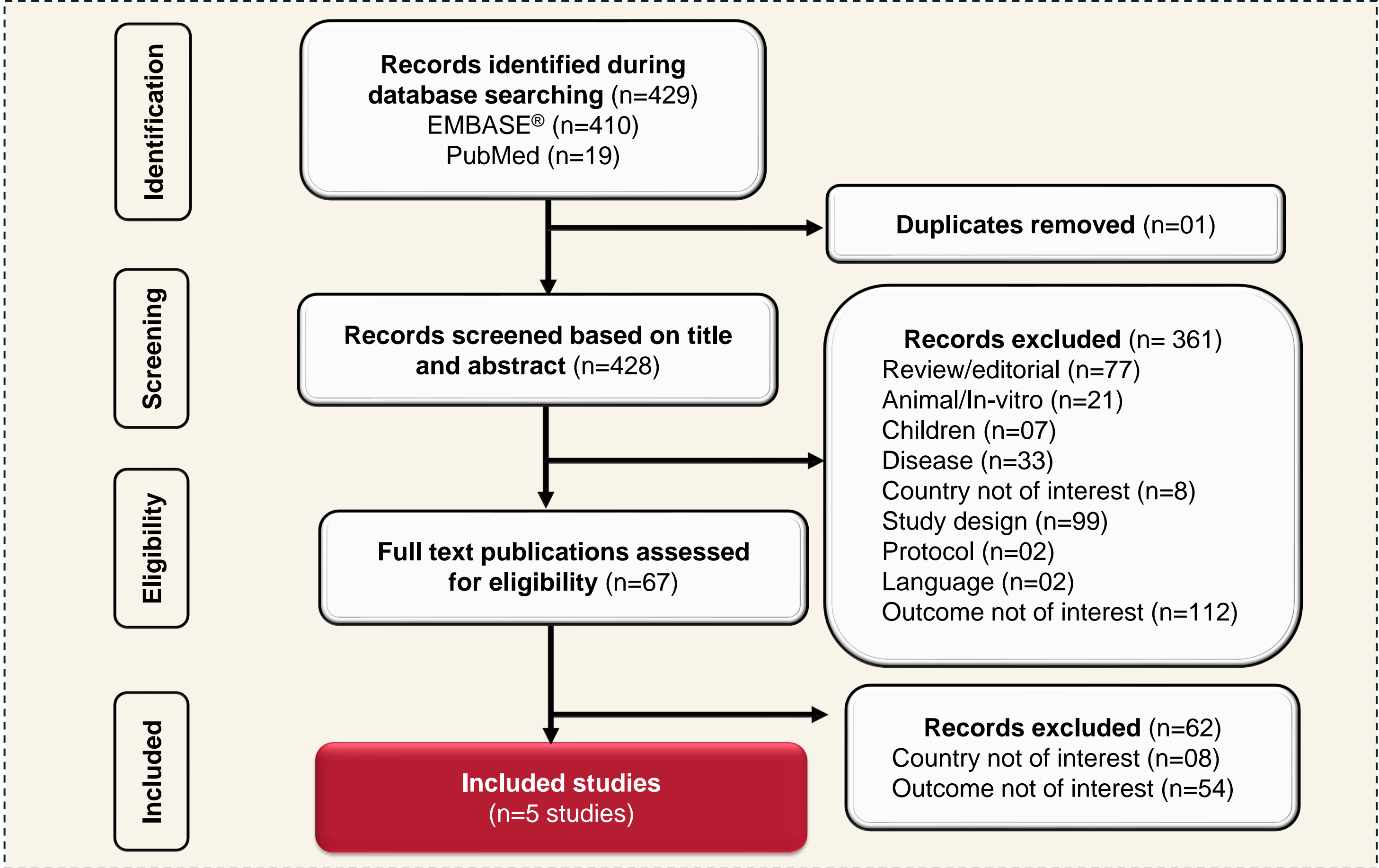
Figure 3: Prevalence of TC based on (a) Gender (b) Race



Source: Wu 2020²; Benjamin 2019³; Hsu 2019⁴

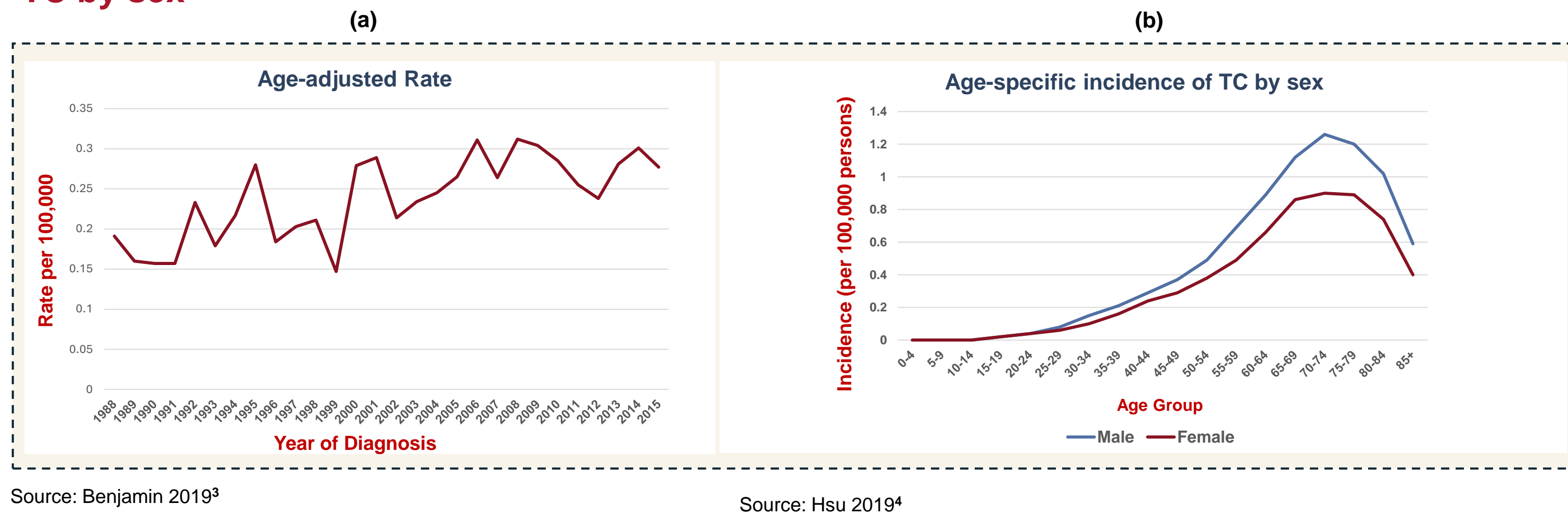
- As per SEER database (1999-2019), thymic epithelial tumors were the most commonly reported anterior mediastinal tumors in adults aged>20 years, with an overall annual incidence of 0.48 per million inhabitants for thymic carcinomas⁴

Figure 2: PRISMA diagram for the screening process



- The age-adjusted incidence rates of TC among adults aged 20 years and older significantly increased from 0.191 cases per 100,000 in 1998 to 0.277 cases per 100,000 in 2015 as per California Cancer Registry based on year of diagnosis³ (Figure 4 a)
- However, the age-specific incidence of TC continually increased in the 70-74-year-old age group, with a peak incidence at 1.06/100,000, and decreased in the older age groups. The age standardized rate was higher in men than in women⁴ (Figure 4 b)

Figure 4: (a) Age-adjusted incidence rates of thymus cancer (b) Age-adjusted incidence of TC by sex

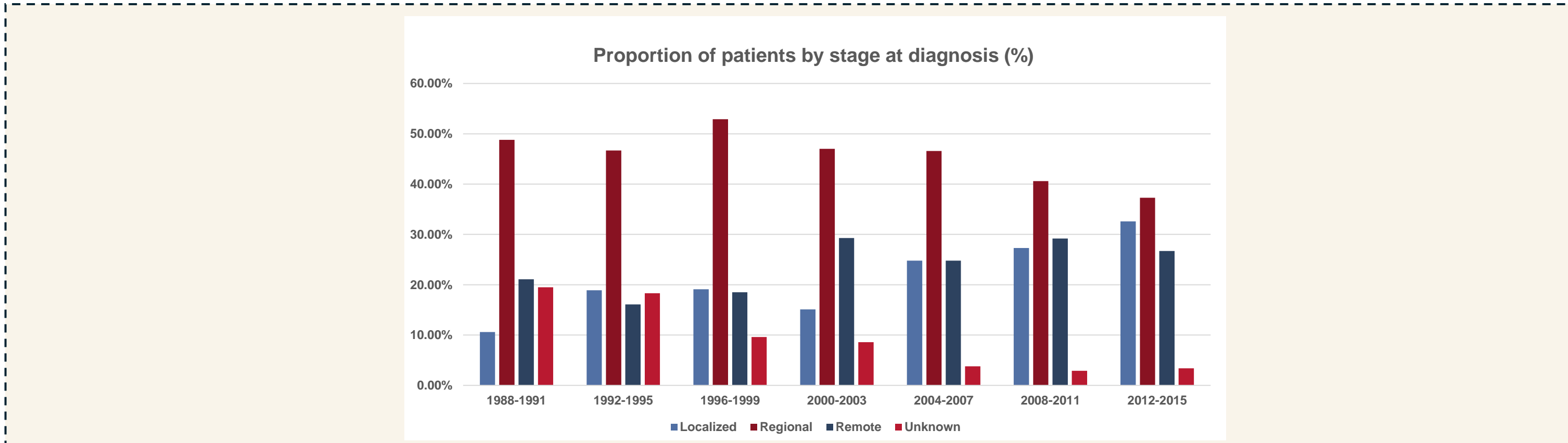


Source: Benjamin 2019³

Source: Hsu 2019⁴

- Further, as per SEER database 1973-2008, a total of 1,588 metastatic malignant thymoma were identified with 45.4 cases per year. The overall incidence has risen from 17 reported cases to 90 cases in 2008. In addition, the incidence was higher in males than in females (0.23 vs 0.17 per 100,000 persons)⁵
- The proportion of patients diagnosed with localized disease increased, from 10.6% between 1988-1991 to 32.6% between 2012-2015. This rise in early-stage diagnoses appeared to coincide with a notable decline in diagnoses of unknown stage, from 19.5% between 1988-1991 to 3.4% between 2012-2015³ (Figure 5)

Figure 5: Proportion of adults by stage at diagnosis



Source: Benjamin 2019³

- Further, among the 13,586 patients diagnosed with thymic cancer, regarding the histologic type, thymoma has the highest incidence (peak at 0.68 per 100,000 population in the 70-79-year-old age group), followed by thymic carcinoma (peak at 0.25 per 100,000 population in the 70-74-year-old age group) and then thymic neuroendocrine tumor (NET) (peak at 0.03 per 100,000 population in the 60-74-year-old age group)³

LIMITATIONS

- The studies were retrospective reviews; therefore, information bias exists, and there is a possibility of missing or ambiguous data

References

1. Thusen J, et al. *Histopathology*. 2024; 84:196-215
2. Wu J, et al. *Medicine*. 2021; 100(15):1-7
3. Benjamin D, et al. *Clin Lung Cancer*. 2019; 14 (12): 477-483
4. Hsu C, et al. *PLoS ONE*. 2019; 14(12): 1-13

5. Gerber T, et al. *Front. Oncol*. 2024; 13: 1-11
6. Helm J, et al. *World J Oncol*. 2017; 8(5): 147-150

Acknowledgments

The authors would like to thank Rubal Arora for her valuable contribution in making this poster.

Disclosures

Authors GK, AS, and BS have no conflict of interest