

# Management of Salivary Gland Tumors: A 20-Year SEER Database Analysis



Christopher Stewart<sup>1</sup>, JB Eyring<sup>2</sup>, Brandy Gotti<sup>3</sup>, Abbigail Niewchas<sup>1</sup>, Karson M Ballard<sup>1</sup>, Alex Otto<sup>3</sup>, Randall Hansen<sup>3</sup>, Kent McIntire<sup>3</sup>

<sup>1</sup>Kansas City University, <sup>2</sup>University of Utah Department of Otolaryngology, <sup>3</sup>Freeman Health System Department of Otolaryngology

## Introduction

Salivary gland tumors represent a diverse group of neoplasms that vary in management. In light of advancing science and evolving treatment guidelines, this study assessed trends in therapeutic approach to these cancers, which is pivotal to optimizing patient outcomes, personalizing care, and ensuring evidence-based practices are implemented to improve survival rates and quality of life.

## Methods and Materials

- Conducted data analysis by utilizing case data of 21,579 cases (2000-2021) from the Surveillance, Epidemiology, and End Results (SEER) database
- Malignant tumors categorized by treatment: Surgery, alone, Chemotherapy alone, Radiation alone, Combinations of surgery, radiation, and chemotherapy.
- Staging of salivary gland neoplasms categorized as local, regional, or distant
- JoinPoint Regression was used to analyze trends in treatment strategies and staging

## Results

- Most common treatment modalities:
  - Surgery alone (40%)
  - Combination of surgery and radiation (40%)
- Significant increases in newer treatment approaches:
  - Chemotherapy alone: 5.80% APC,  $p < 0.05$
  - Surgery/chemotherapy/radiation combination: 3.58% APC,  $p < 0.05$
  - Chemotherapy/radiation combination: 2.66% APC,  $p < 0.05$
  - Radiation alone: 1.86% APC,  $p < 0.05$
- Increases in tumor staging observed:
  - Localized neoplasms: 1.72% APC,  $p < 0.05$
  - Regional neoplasms: 3.88% APC,  $p < 0.05$
- Changes in Distant Metastases

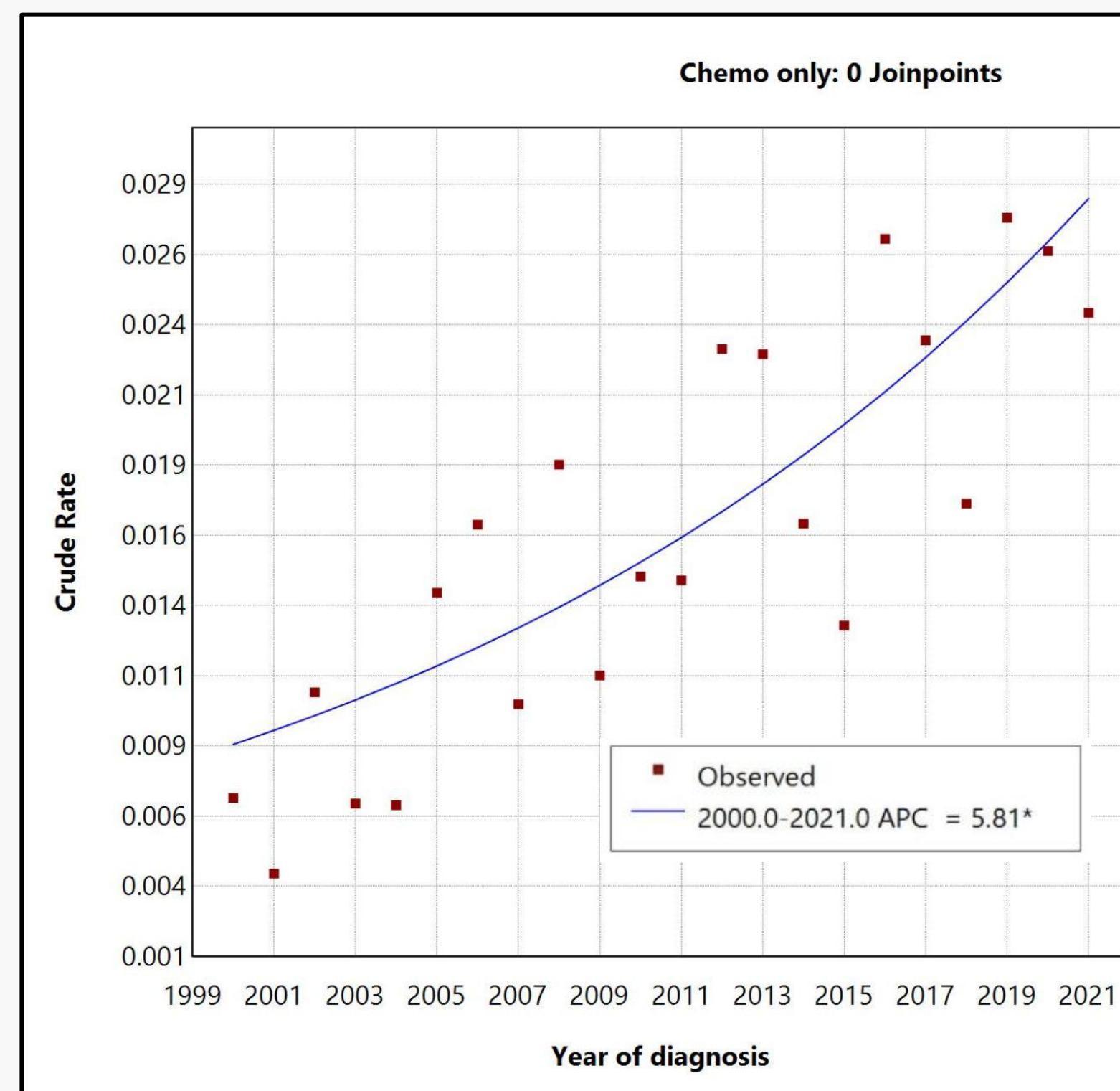


Figure 1: From 2000 to 2021, use of chemotherapy only treatment rates increased at an annual percentage change (APC) of 5.8%, with no significant change in trend. \* indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.

Table 1. Distribution of Cases According to the Clinical Demographic Variables.

Variable Category	N	Percent
<b>Gender</b>		
Male	14,040	58.43%
Female	9,989	41.57%
<b>Age At Diagnosis</b>		
0-9	48	0.20%
10-19	394	1.64%
20-29	838	3.49%
30-39	1391	5.79%
40-49	2331	9.70%
50-59	3948	16.43%
60-69	5142	21.40%
70-79	5169	21.51%
80+	4768	19.84%
<b>Seer Staging</b>		
Localized	10,958	45.60%
Regional	7,650	31.84%
Distant	3,718	15.47%
Unstaged	1,702	7.08%
Other/Unknown	1	0.00%
<b>Treatment</b>		
Surgery	8,713	36.26%
Chemotherapy + Radiation	704	2.93%
Surgery + Radiation	8,766	36.48%
Radiation	954	3.97%
Surgery + Chemotherapy + Radiation	1,911	7.95%
Chemotherapy	295	1.23%
Other	2,443	10.17%
<b>Race</b>		
White	19,538	81.31%
Asian or Pacific Islander	1,991	8.29%
Black	2,098	8.73%
American Indian/Alaska Native	153	0.64%
Unknown	249	1.04%

Table 1: Demographic, clinical, and treatment characteristics among 24,029 cases identified from a 20-year SEER database analysis.

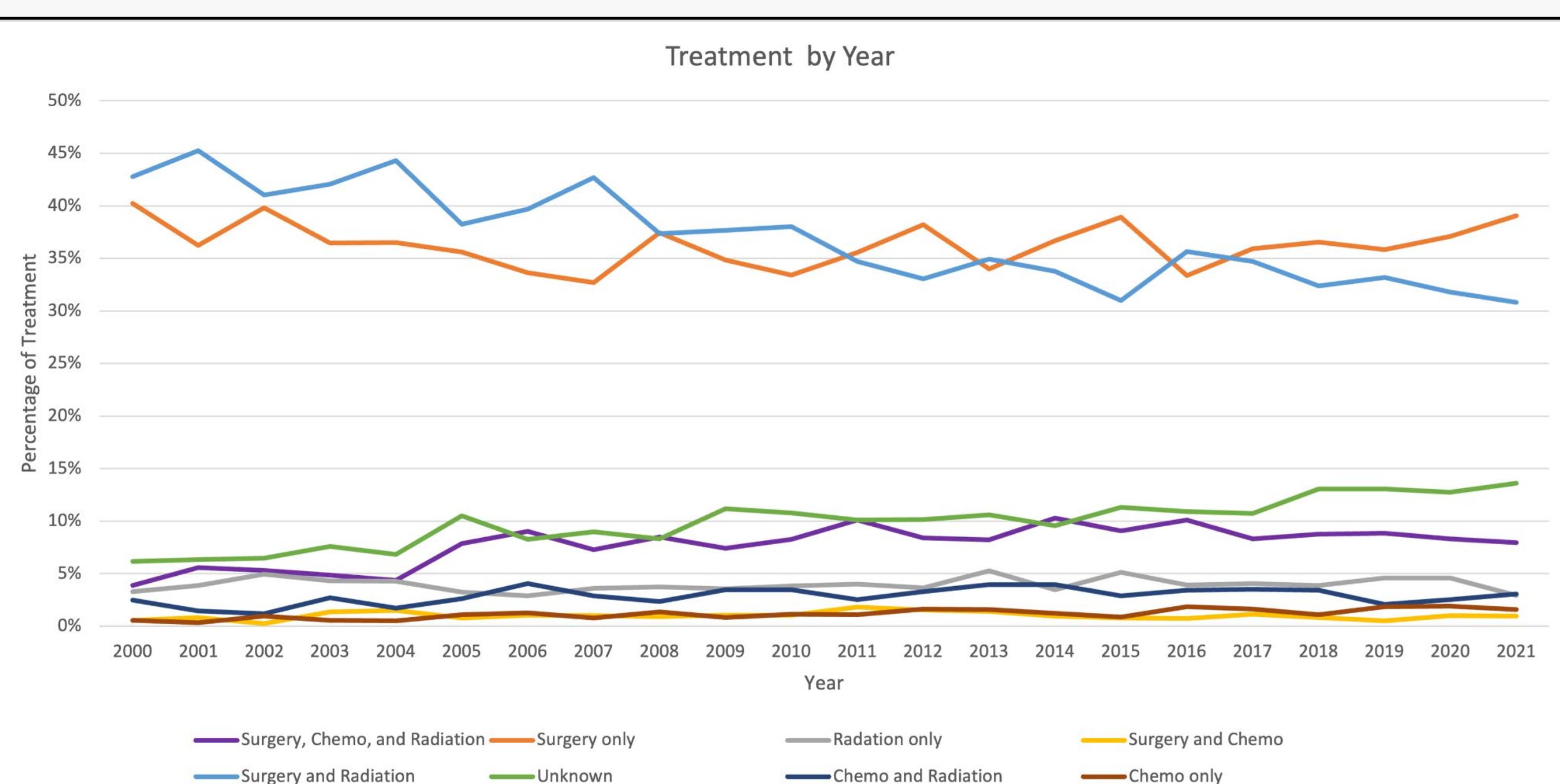


Figure 2: Changes in Treatment over time. From 2000 to 2021, use of chemotherapy only treatment rates increased at an annual percentage change (APC) of 5.8%, with no significant change in trend. The treatment modality of Surgery, Chemotherapy, and Radiation rates increased at a APC of 16.48% from 2000-2006; a change in trend occurs from 2006 to 2021 where the APC decreased to 1.50% per year. From 2000 to 2021, use of radiation only treatment rates increased at an APC of 1.86%, with no significant change in trend. From 2000 to 2013 the treatment modality of Chemotherapy and Radiation rates increased at a APC of 6.26%; from 2013 to 2021 the APC decreased to -3.00% per year.

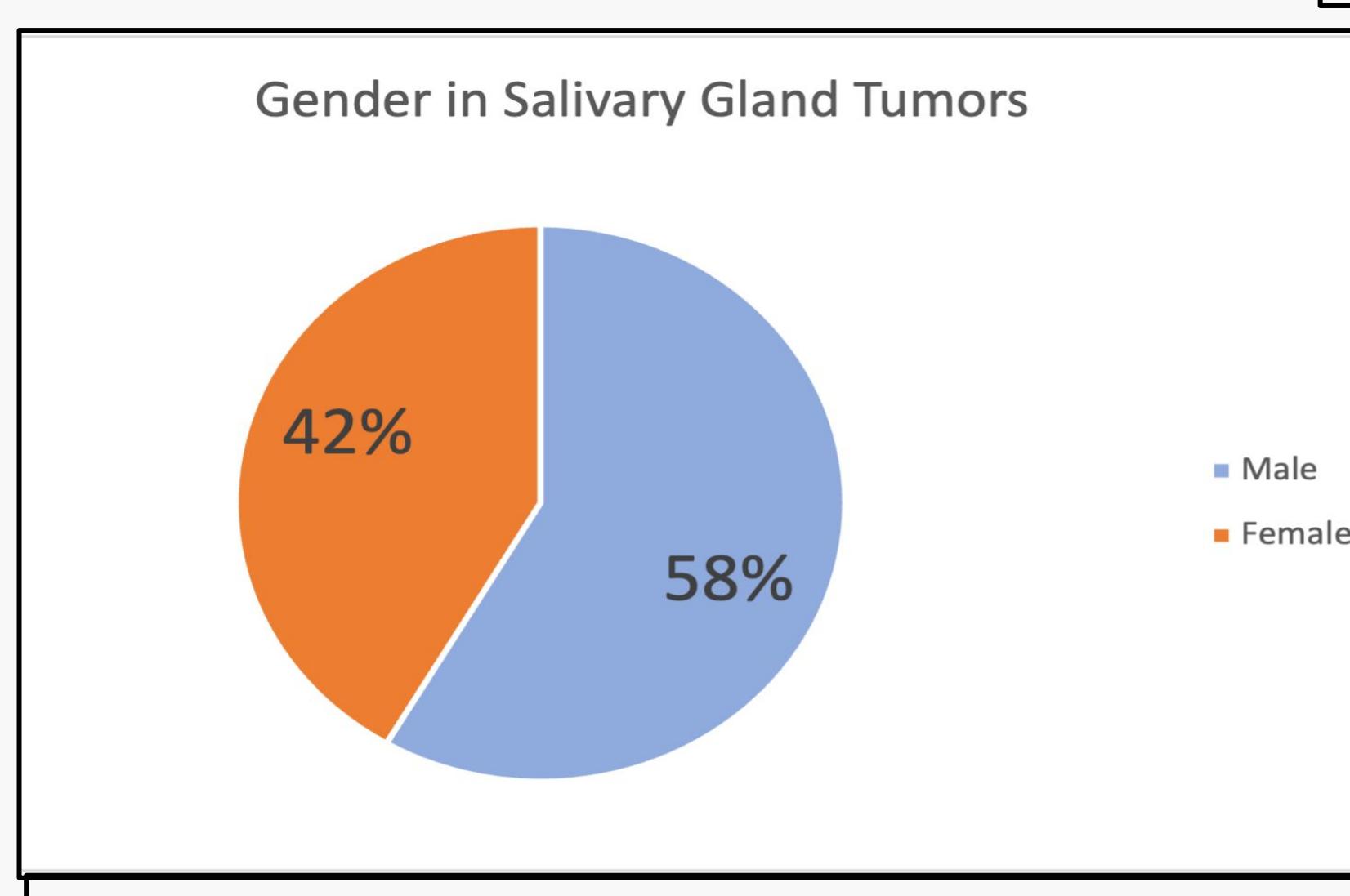


Figure 3: Gender in Salivary Gland Tumors.

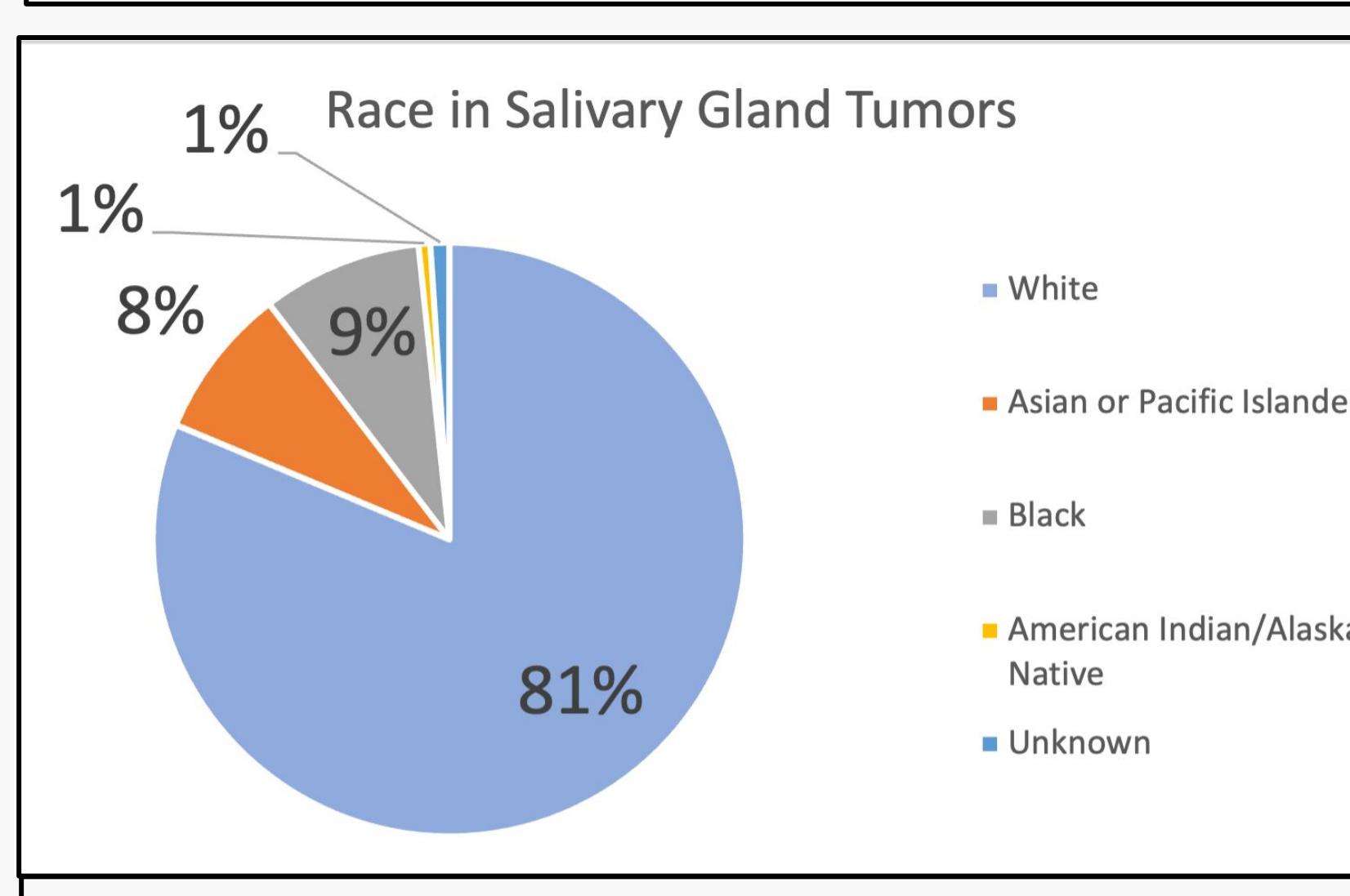


Figure 4: Race in Salivary Gland Tumors.

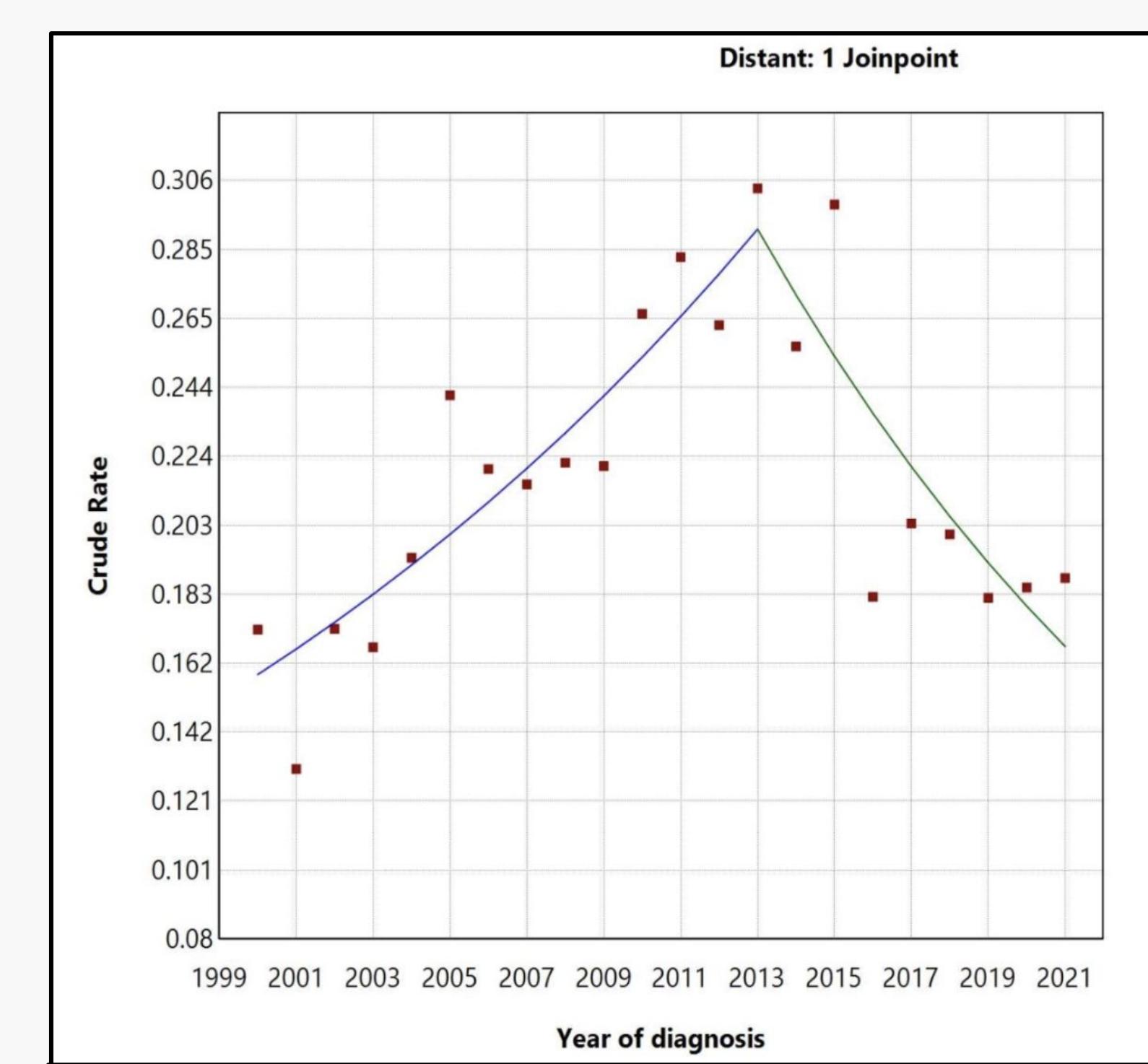


Figure 5: Change in Distant Metastases by Year. From 2000 to 2013, distant metastases increased at an average rate of 4.79 annual percentage change (APC) ( $p < 0.05$ ). However, from 2013 to 2021 distant metastases decreased at a rate of 6.71 APC ( $p < 0.05$ ).

## Conclusion

Surgery remains a cornerstone in the treatment of malignant salivary gland tumors; however, the use of combined modalities incorporating chemotherapy and radiation is increasing. This rise may be attributed to advancements in chemotherapy and radiation techniques, improved understanding of tumor pathophysiology, shifts in the presentation of regional and distant metastases as reflected in SEER data, and a growing focus on personalized, multidisciplinary treatment strategies. Understanding these trends is essential for enhancing outcomes in malignant salivary gland tumors.