# Factors Affecting Chronic Rhinosinusitis Outcomes in Asian Patients: A Retrospective Study in Boston Chinatown

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## Introduction

- Chronic rhinosinusitis (CRS) is an inflammatory condition of the paranasal sinuses that affects approximately 12% of the adult population in the United States.[5]
- CRS is associated with significant burdens such as increased utilization of healthcare services, reduced quality of life, and general loss of productivity.[2]
- CRS can be categorized as chronic rhinosinusitis with nasal polyps (CRSwNP) or without nasal polyps (CRSsNP).
- Treatment options include oral and topical glucocorticoids and antibiotics, balloon sinuplasty, endoscopic sinus surgery, and biologics.
- Currently available biologics for CRSwNP target the Th2 inflammatory pathway[1]; there are no biologics for CRSwNP that suppress the Th1 pathway.[3]
- Several studies have found evidence that patients with CRSwNP from certain backgrounds, notably Asian patients who are Chinese or of Chinese descent, have a higher likelihood of having Th1-driven inflammation[1,3], and limited information is known about the course of the disease in this population.
- Given that the Asian population, and specifically the Chinese ethnic group therein comprises a significant percentage of the demographic at Tufts Medical Center[6], this study sought to identify factors affecting CRS outcomes in Asian patients compared to non-Asian patients to better inform their care.

**Figure 1:** Nasal polyp seen on nasal endoscopy

**Figure 2:** CT Scan showing sinus opacification, characteristic of CRS

Images are courtesy of ENT UK: https://www.entuk.org

## Methods

A retrospective observational study was performed using the Epic electronic medical record system at Tufts Medical Center.

**Inclusion Criteria:**

- Patients ages 18 and older
- Patients with medical records containing a procedure code, or CPT code, for nasal endoscopy (31231)
- Patient records with an ICD-10 diagnosis of CRS
- Patients who were evaluated in the otolaryngology clinic between April 2022 and June 2024

The cohort was divided into five groups based on the National Institutes of Health (NIH) defined recommendations for racial categories to be used for reporting purposes. The control group was comprised of patients who self-reported as White and was compared with Asian and specifically Chinese patients.[7]

## Results

### Patient Demographics and Background Variables

| NIH Racial Categories | Sex Distribution | Average Median Household Income | Past or Current Smoker |
|---|---|---|---|
| White (n = 44) | 59% male, 41% female | $110,899 | 30% of patients |
| Asian - All (n = 16) | 88% male, 12% female (p = 0.06) | $109,603 (p = 0.72) | 56% of patients (p = 0.07) |
| Asian - Chinese (n = 14) | 86% male, 14% female (p = 0.11) | $109,499 (p= 0.71) | 50% of patients (p = 0.20) |

**Table 1:** Analysis revealed no statistically significant differences between White and Asian patients or White and Chinese patients in terms of sex distribution or smoking history (Fisher's Exact Test), or average median household income (Mann Whitney U-Test).

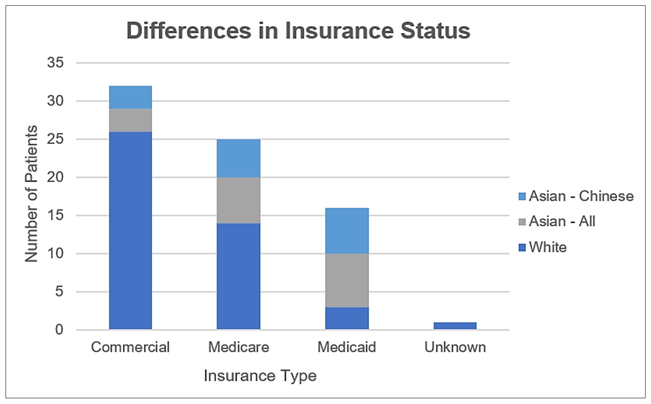


**Figure 3:** Analysis revealed statistically significant differences between White and Asian patients ($p < 0.05$), and White and Chinese patients ($p < 0.05$) with regards to insurance type. Most White patients were observed to have private insurance, while most Asian and specifically Chinese patients were observed to have Medicaid insurance.

### Otolaryngology Visits and Management of CRS

| NIH Racial Categories | Median Number of CRS Outpatient Visits | Patients with CRSwNP | Patients with CRSsNP | Loss to Follow Up |
|---|---|---|---|---|
| White (n = 44) | 3.39 | 55% | 45% | 39% |
| Asian - All (n = 16) | 4.94 ($p < 0.05$) | 56% | 44% | 69% ($p < 0.05$) |
| Asian - Chinese (n = 14) | 4.79 ($p = 0.08$) | 64% | 36% | 71% ($p = 0.06$) |

**Table 2:** Overall, Asian and specifically Chinese patients had a higher median number of office visits compared to White patients. Analysis performed using the Chi-square test showed no significant differences in the distribution of CRSwNP or CRSsNP for White compared to Asian patients ($p = 1$) or White compared to Chinese patients ($p = 0.74$). Analysis performed using the Mann Whitney U-Test revealed a statistically significant difference in loss to outpatient follow up for White compared to Asian patients, but no such statistically significant difference between White and Chinese patients.

## Results

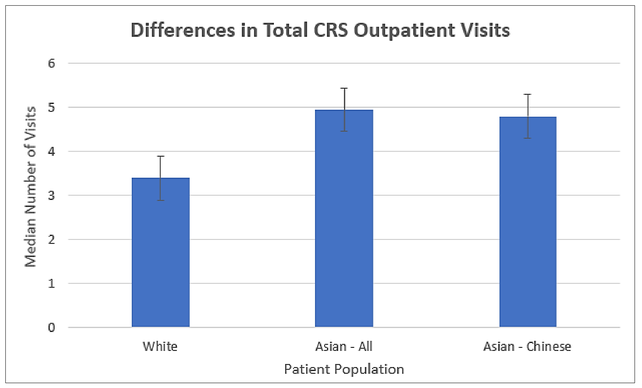


**Figure 4:** There was a significant difference in the total number of outpatient CRS visits noted for White compared to Asian patients ($p < 0.05$), but no significant difference in the number of outpatient visits for White compared to Chinese patients specifically ($p = 0.08$)

| NIH Racial Categories | Operative Patients | Non-Operative Patients |
|---|---|---|
| White (n = 44) | 68% | 32% |
| Asian - All (n = 16) | 63% | 37% |
| Asian - Chinese (n = 14) | 57% | 43% |

**Table 3:** Analysis using the Chi-square test showed no significant difference in the distribution of operative vs. nonoperative patients for White compared to Asian patients ($p = 0.92$), or White compared to Chinese patients ($p = 0.66$).

## Discussion

- Asian and specifically Chinese patients had higher median numbers of outpatient visits compared to White patients. This suggests a more prolonged disease course which may be linked to health disparities in the Boston Chinatown area. Asian and Chinese patients also had greater loss to follow up compared to White patients, which may be due to several factors.
- Limitations of this study include the sample size, retrospective nature of the data, and lack of standardized patient-reported data regarding symptom severity such as Sino-Nasal Outcome Test-22 scores.
- Future studies that directly assess patients' perspectives about their disease course and treatment can further elucidate how to address health inequities in CRS care.

## Conclusions

Our study identified differences in CRS disease course in White patients compared to Asian and Chinese patients that may reflect a greater need for healthcare services for the latter group and subgroup. This may be linked to barriers in access to care and can better inform the CRS management of these patients in Boston Chinatown and other similar communities.

## Contact

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## References

1. Chitsuthipakorn, W., Seresirikachorn, K., Sommer, D.D. et al. Endotypes of Chronic Rhinosinusitis Across Ancestry and Geographic Regions. Curr Allergy Asthma Rep. 2018; 18(9):46. doi: 10.1007/s11882-018-0800-z.
2. Ma C, Mehta NK, Nguyen SA, Gudis DA, Miglani A, Schlosser RJ. Demographic Variation in Chronic Rhinosinusitis by Subtype and Region: A Systematic Review. Am J Rhinol Allergy. 2022; 36(3):367-377. doi: 10.1177/19458924211056294.
3. Yao Y, Zeng M, Liu Z. Revisiting Asian chronic rhinosinusitis in the era of type 2 biologics. Clin Exp Allergy. 2022;52(2):231-243. doi: 10.1111/cea.14065.
4. Mahdavinia M, Suh LA, Carter RG, Stevens WW, Norton JE, Kato A, Tan BK, Kern RC, Conley DB, Chandra R, Lavin J, Peters AT, Grammer LC 3rd, Schleimer RP. Increased noneosinophilic nasal polyps in chronic rhinosinusitis in US second-generation Asians suggest genetic regulation of eosinophilia. J Allergy Clin Immunol. 2015;135(2):576-9. doi: 10.1016/j.jaci.2014.08.031.
5. Zhang Y, Gevaert E, Lou H, Wang X, Zhang L, Bachert C, Zhang N. Chronic rhinosinusitis in Asia. J Allergy Clin Immunol. 2017 Nov;140(5):1230-1239. doi: 10.1016/j.jaci.2017.09.009.
6. Robbel C, Vesel L, Ernst E, He Y, Vesel T. Community Member and Health Care Provider Perspectives on Communication With Chinese American Patients With Cancer: A Qualitative Study. JCO Oncol Pract. 2022 Dec;18(12):e1927-e1934. doi: 10.1200/OP.22.00047.
7. Mahdavinia M, Benhammuda M, Codispoti CD, Tobin MC, Losavio PS, Mehta A, Jeffe JS, Bandi S, Peters AT, Stevens WW, Landay A, Keshavarzian A, Schleimer RP, Batra PS. African American Patients with Chronic Rhinosinusitis Have a Distinct Phenotype of Polyposis Associated with Increased Asthma Hospitalization. J Allergy Clin Immunol Pract. 2016;4(4):658-664.e1. doi: 10.1016/j.jaip.2015.11.031.
8. Meltzer EO, Hamilos DL, Hadley JA, Lanza DC, Marple BF, Nicklas RA, Bachert C, Baraniuk J, Baroody FM, Benninger MS, Brook I, Chowdhury BA, Druce HM, Durham S, Ferguson B, Gwaltney JM, Kaliner M, Kennedy DW, Lund V, Naclerio R, Pawankar R, Piccirillo JF, Rohane P, Simon R, Slavin RG, Togias A, Wald ER, Zinreich SJ; American Academy of Allergy, Asthma and Immunology (AAAAI); American Academy of Otolaryngic Allergy (AAOA); American Academy of Otolaryngology--Head and Neck Surgery (AAO-HNS); American College of Allergy, Asthma and Immunology (ACAAI); American Rhinologic Society (ARS). Rhinosinusitis: establishing definitions for clinical research and patient care. J Allergy Clin Immunol. 2004;114(6 Suppl):155-212. doi: 10.1016/j.jaci.2004.09.029.