

Comparison of Disease Outcomes in White, African American and Latino Patients with Chronic Rhinosinusitis (CRS)

Rush University Medical Center

May 1, 2022

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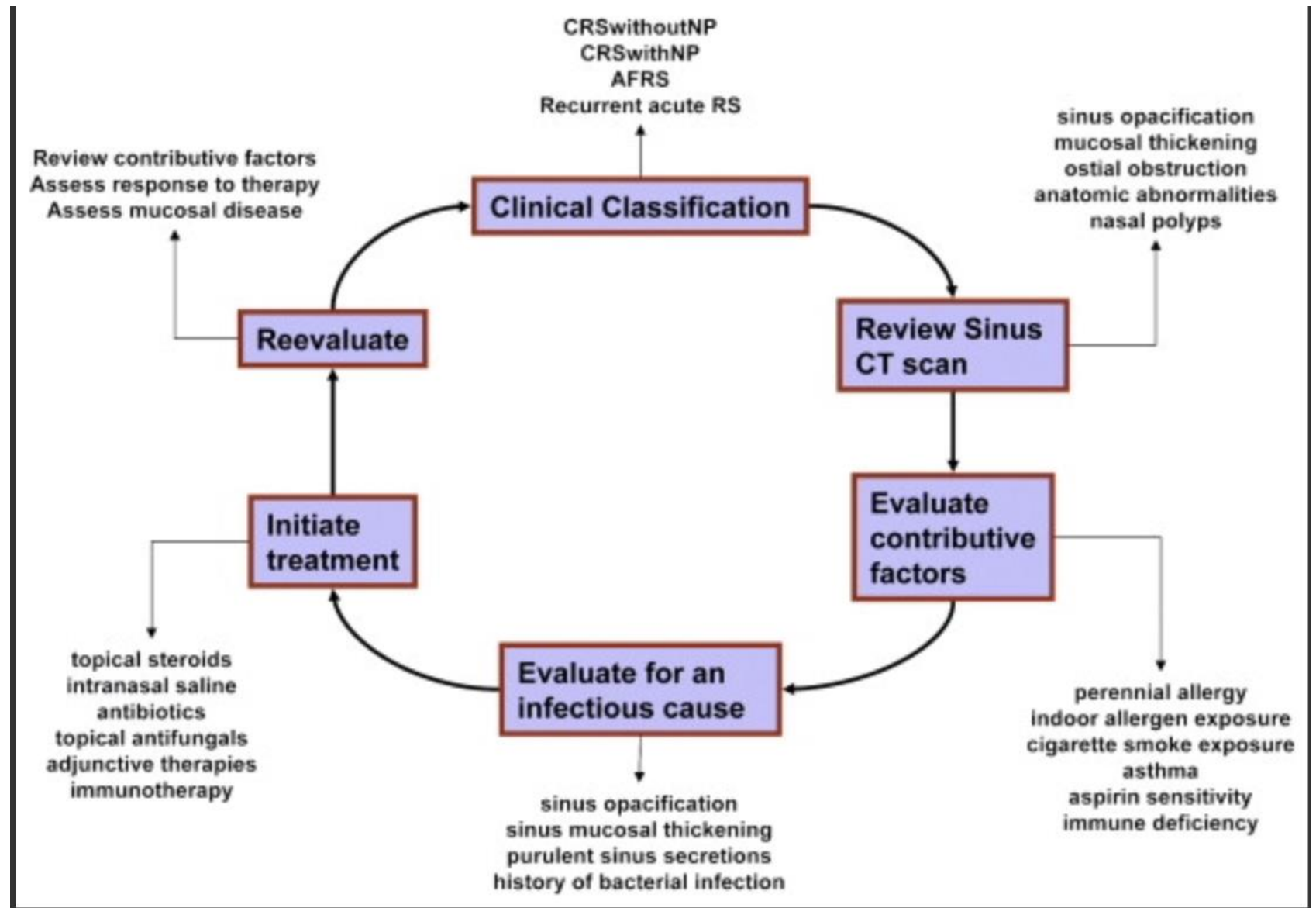
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For how long must a patient have symptoms of sinusitis before it can be called chronic rhinosinusitis?

- A. 10 days
- B. 6 weeks
- C. 12 weeks
- D. 6 months

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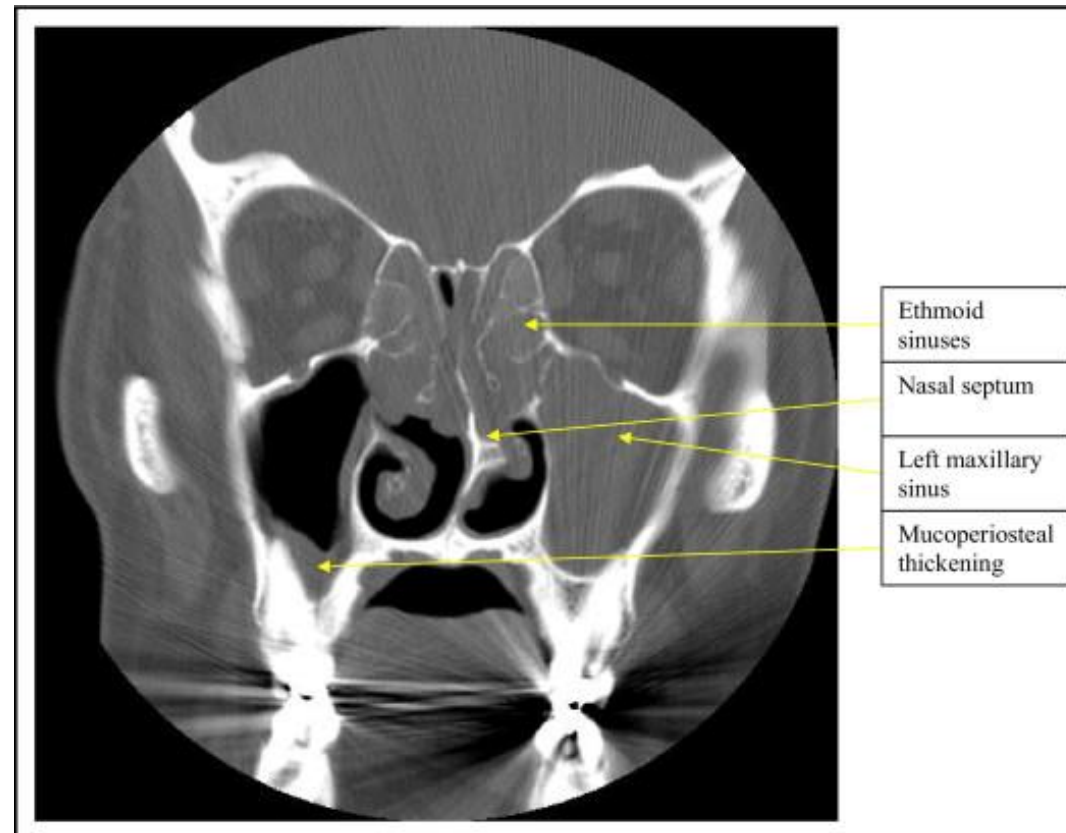
1 Introduction

CRS (Chronic Rhinosinusitis)

- Common inflammatory disease of the upper airways
- A significant health burden in all racial groups in the United States
- Affects 1% - 5% of the U.S. population

CRS (Chronic Rhinosinusitis)

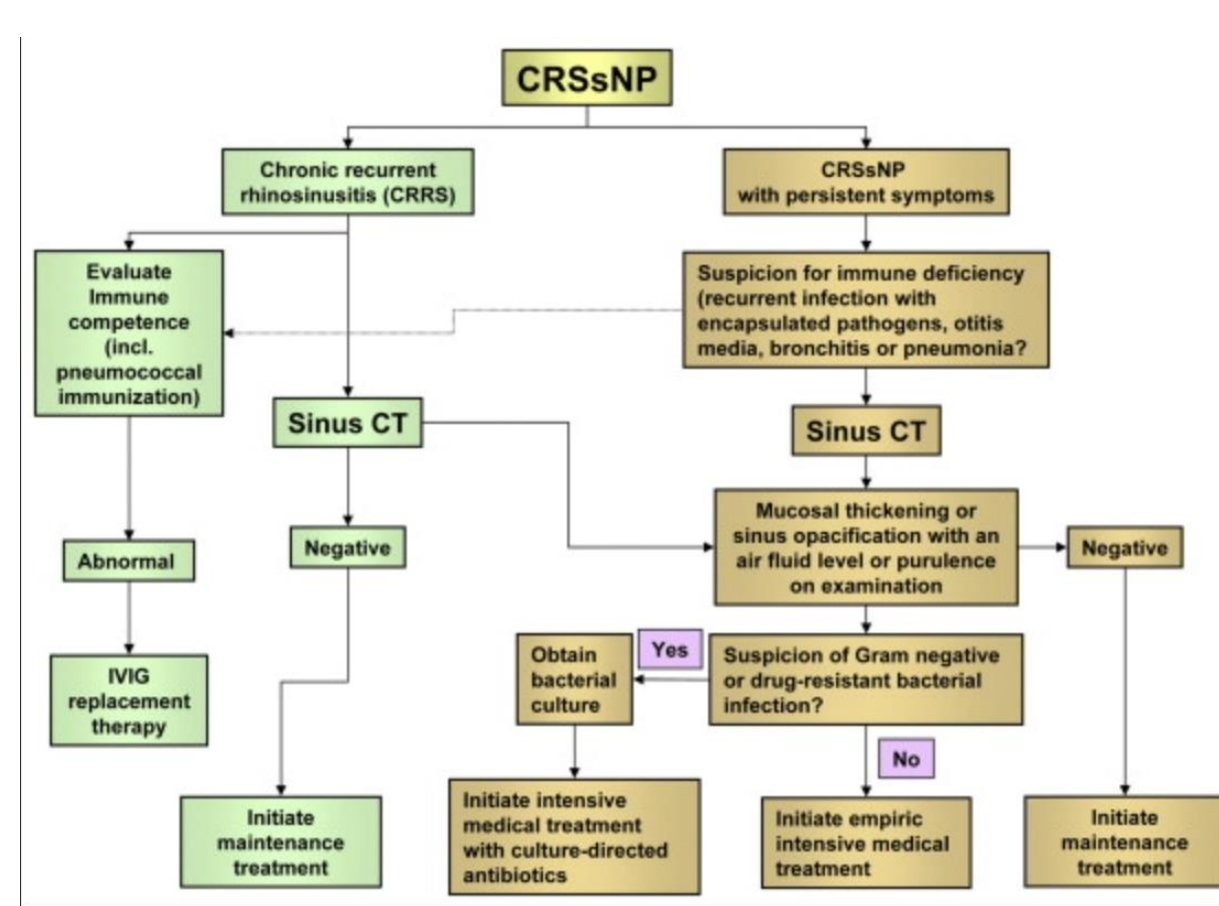
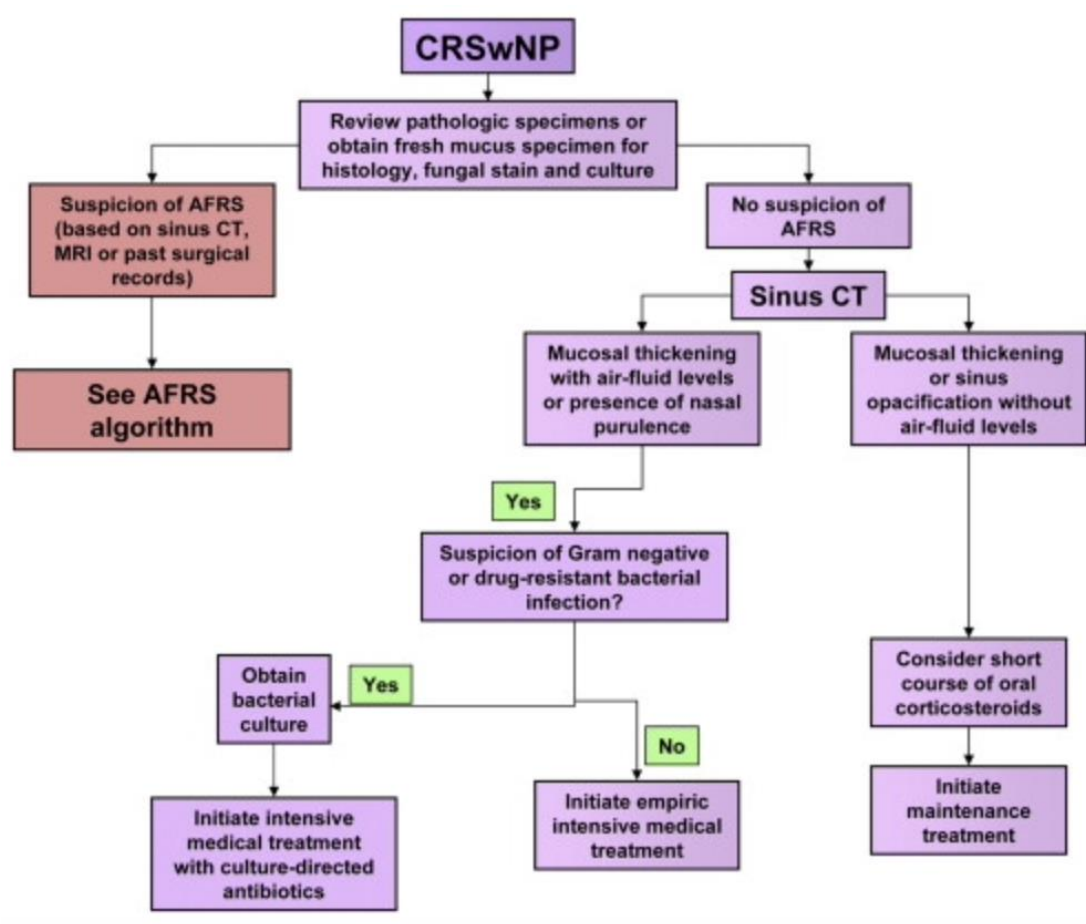
- Clinically defined as inflammation of the nose and the paranasal sinuses characterized by sinonasal symptoms that persist for more than 12 weeks combined with objective signs of disease identified by endoscope or CT scan



Hamilos DL. Chronic rhinosinusitis: epidemiology and medical management. *J Allergy Clin Immunol.* 2011 Oct;128(4):693-707; quiz 708-9. doi: 10.1016/j.jaci.2011.08.004. Epub 2011 Sep 3. PMID: 21890184.

CRS (Chronic Rhinosinusitis)

- Managed medically and/or surgically and requires ongoing medical treatment



Ethnic and Racial Categories

National Institute of Health recommendation for reporting of racial and ethnic categories (policy notice no. NOT-OD-15-089).

Two ethnic categories:

- Latinx or Hispanic
- Non-Latinx

Five racial categories:

- American Indian or Alaska Native
- Asian
- Black or African American
- Hispanic or Latinx,
- Native Hawaiian or Other Pacific Islander,
- White

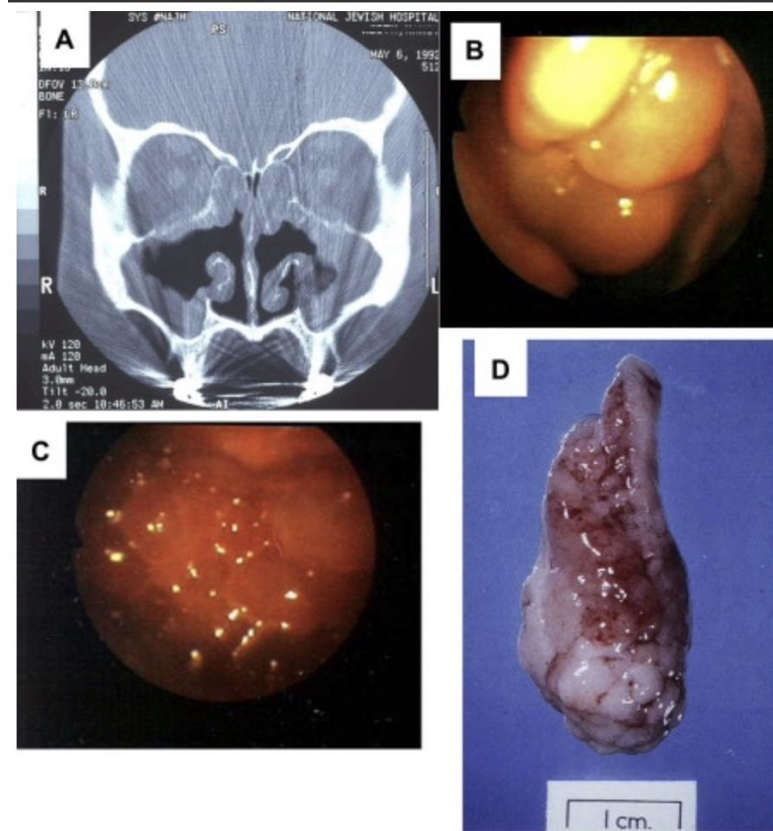
Findings of Previous Studies

- AA and patients covered by Medicaid had more severe CRS disease by histopathology and SNOT-22 scores
- Low socioeconomic conditions could be the underlying cause of increased risk for CRS severity
- CRS may be disproportionately under-diagnosed or diagnosed late in populations that are under-insured
- AA patients with refractory CRS have a higher severity of CRS on CT scan, higher rate of nasal polyposis, and more frequently have hyposmia compared white patients with refractory CRS
- AA CRS patients with comorbid asthma and nasal polyps were associated with more hospitalizations for asthma exacerbations compared to whites

2 Objective

Objective

- To evaluate if AA, Latinxs, and non-Latinx White patients have different CRS outcomes. We sought to identify the associated demographic, management related, and clinical factors that might impact these outcomes



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3 Methods

Methods

- Large prospective cohort study of CRS patients
- Patients from Allergy and/or Otolaryngology Clinics at a tertiary care center in Chicago, Illinois
- Study Period: January 2015 to January 2020
- Approved by IRB: Rush Medical Center
- Evaluated at the initial encounter and after management of CRS for a minimum of 36 months, mean of 40 months

Patient Population

- >age of 18
- Continuous symptoms of rhinosinusitis for more than 12 weeks +objective findings of sinusitis on the sinus CT scan
- Non-Latinx White, Non-Latinx African American (AA), and Latinx patients were compared
- All patients with sinonasal malignancies were excluded from the study

What is a validated tool used to assess symptom severity of patients with CRS?

- A. Lund MacKay Score
- B. SNOT-22 Score
- C. ACT Score
- D. CRS Score

What is a validated tool used to assess symptom severity of patients with CRS?

A. Lund MacKay Score

➔ **B. SNOT-22 Score**

C. ACT Score

D. CRS Score

Methods

- Clinical characteristics, demographic information
- Initial severity of disease prior to management was calculated by the Lund Mackay Score (LMS) via a sino-nasal CT scan analysis
- SNOT-22 total scores and domain scores at baseline and after medical/surgical management of CRS were compared between the two races
- # of outpatient visits with otolaryngology and allergy
- # of treatments related to CRS, need for rescue antibiotics and CRS exacerbations
- # of sinus surgeries

Figure 1: SNOT-22 QUESTIONNAIRE

1. Need to blow nose	0	1	2	3	4	5
2. Nasal Blockage	0	1	2	3	4	5
3. Sneezing	0	1	2	3	4	5
4. Runny nose	0	1	2	3	4	5
5. Cough	0	1	2	3	4	5
6. Post-nasal discharge	0	1	2	3	4	5
7. Thick nasal discharge	0	1	2	3	4	5
8. Ear fullness	0	1	2	3	4	5
9. Dizziness	0	1	2	3	4	5
10. Ear pain	0	1	2	3	4	5
11. Facial pain/pressure	0	1	2	3	4	5
12. Decreased Sense of Smell/Taste	0	1	2	3	4	5
13. Difficulty falling asleep	0	1	2	3	4	5
14. Wake up at night	0	1	2	3	4	5
15. Lack of a good night's sleep	0	1	2	3	4	5
16. Wake up tired	0	1	2	3	4	5
17. Fatigue	0	1	2	3	4	5
18. Reduced productivity	0	1	2	3	4	5
19. Reduced concentration	0	1	2	3	4	5
20. Frustrated/restless/irritable	0	1	2	3	4	5
21. Sad	0	1	2	3	4	5
22. Embarrassed	0	1	2	3	4	5

Figure 1: The SNOT-22 questionnaire includes 22 domains which assess quality of life related to CRS. Each domain is scored 0-5 where 0 = no symptoms and 5 = severe symptoms.

Figure 2: LUND-MACKAY CT SCORING SYSTEM

Sinus	Right sinus	Left sinus
Frontal	0-2	0-2
Anterior ethmoids	0-2	0-2
Posterior ethmoids	0-2	0-2
Maxillary	0-2	0-2
Sphenoid	0-2	0-2
Ostiomeatal complex	0 or 2	0 or 2

Figure 2: The Lund-Mackay Score is a radiographic scoring system taken during a CT read. Each sinus on both the right and left (total of 12 sinuses) is given a score of 0-2. 0 = no inflammation. 1 = partial inflammation. 2 = complete inflammation. For the ostiomeatal complex: 0 = not occluded, 2 = occluded. The total score ranges from 0-24.

Statistical Analysis:

- **SPSS version 21** (IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY) and GraphPad Prism version 6.00 for Windows were used (GraphPad Software, La Jolla, Calif; www.graphpad.com)
- **Chi-squared test or ANOVA and Newman-Keuls multiple comparison tests:**
Comparisons between groups
- **Logistic regressions adjusting for the covariates:** Comparison of follow up, SNOT-22 data, and subgroup analyses (to explore further findings)
- Differences were considered statistically significant at **P <0.05**

4 Results

Table 1: Demographic and clinical characteristics of 977 patients with chronic rhinosinusitis from different ethnic/race groups at rush university medical center enrolled in the cohort study

Ethnic/racial group		White	African American (AA)	Latinx
		n=615	n=235	n=127
Gender (%)	Male	270 (44.3)	79 (33.6)	53 (41.7)
	Female	340 (55.7)	155 (66.4)	74 (58.3)
Age (y), (Mean±SD)		51.60 ± 16.84	50.05 ± 15.56 p=0.234	46.1 ± 17.88 p=0.034Ω
Medicaid Insurance (%within race)		20 (3.3)	43 (18.3) p=0.00*	17 (45.9) p=0.221
BMI, (Mean±SD)		28.48 ± 6.35	32.77 ± 8.31 p= 0.00¥	31.5±10.11 p=0.135
Nasal Polyp (% within race)		238 (41.5)	105 (48.2) p=0.089	44 (34.6) p=0.288
GERD (% within race)		188 (30.7)	64 (27.2) p=0.762	32 (28.6) p=0.615
Asthma (% within race)		212 (37.3)	96 (44.0) p=0.084	35 (31.9) p=0.448
Allergic rhinitis (% within race)		241 (39.4)	95 (40.4) p=0.377	39 (30.9) p=0.18
Eczema (% within race)		58 (9.5)	18 (7.7) p=0.818	8 (6.3) p=0.723
Loss of Smell (% within race)		75 (12.2)	29 (12.3) p=0.977	19 (13.9) p=0.83



Table 2: Follow up data of patients with chronic rhinosinusitis from different ethnic/race groups at Rush University medical center enrolled in the cohort study

Ethnic/racial group	White	African American (AA)	Latinx
Duration of follow up in Months (Mean±SD)	38.7 ± 30.0 n=548	41.6 ± 32.1 n=202 p=0.241	39.2 ± 29.2 n=102 p=0.205
Number of CRS related Visits During Follow Up (Mean±SD)	16.8 ± 13.9 n=548	13.3 ± 14.8 n=202 p=0.031*	14.6 ± 14.3 n=102 p=0.221
Evaluated by allergist (percentage)	62.60% n=514	54.90% n=195 0.043*	44.50% n=102 0.036*
Number of Allergy Visits During Follow Up (Mean±SD)	2.5 ± 3.4 n=514	1.8 ± 2.5 n=195 p=0.031*	1.96 ± 2.7 n=102 p=0.14
Time from 1st to 2nd visit for CRS (Mean±SD)	13.3± 12.7 n=548	29.4± 21.2 n=202 p=0.011*	15.1± 13.2 n=128 p=0.41
Number of FESS During Follow Up (Mean±SD)	0.9 ± 1.3 n=548	0.8 ± 0.8 n=202 p=0.085	0.81 ± 0.99 n=102 p=0.138
Number of treated CRS Exacerbations During Follow Up (Mean±SD)	5.2 ± 4.5 n=487	4.5 ± 3.9 n=188 p=0.064	3.7 ± 3.4 n=102 p=0.093
Number of Antibiotics for CRS Exacerbations (Mean±SD)	3.5 ± 1.8 n=486	3.1 ± 1.7 n=188 p=0.003*	2.7 ± 1.9 n=102 p=0.042*

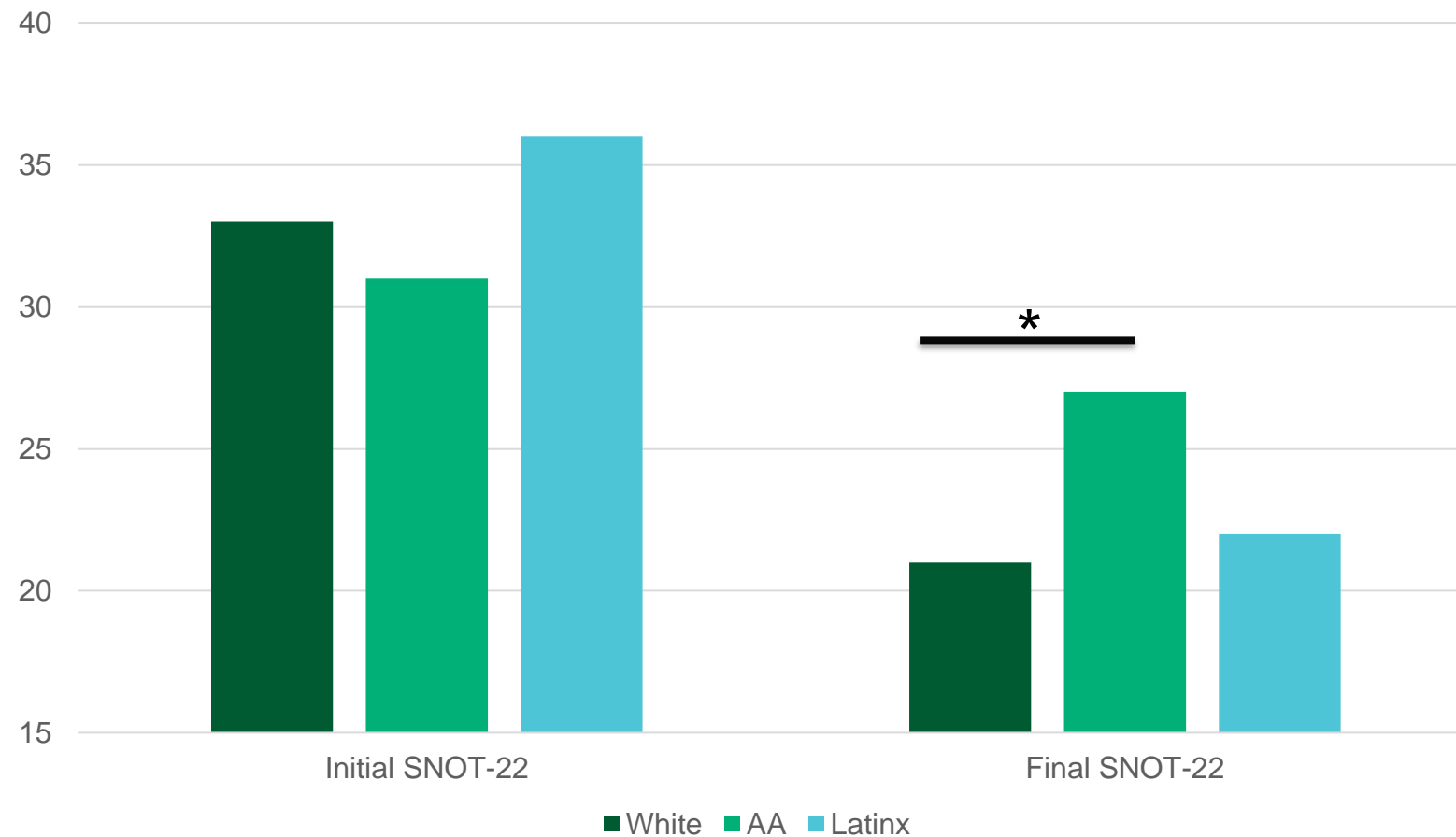


Table 3: Severity assessments by SNOT-22 and LMS, of patients with chronic rhinosinusitis from different ethnic/race groups at Rush University Medical Center at the initial visits and the end of follow up period

Ethnic/racial group	African American		
	White	(AA)	Latinx
Lund Mackay Score (LMS) initial [#] (Mean±SD)	8.69 ± 5.77 n=523	9.36 ± 6.74 n=197 p=0.187	7.82 ± 6.60 n=114 p = 0.74
SNOT-22 Initial (Mean±SD)	33.1 ± 24.7 n=612	31.4 ± 28.2 n=235 p=0.367	36.93 ± 28.01 n=112 p = 0.83
SNOT-22 Final (Mean±SD)	21.62 ± 19.68 n=549	26.9 ± 25.9 n=203 p=0.013*	22.31 ± 22.74 n= 89 p = 0.51



- In all groups, SNOT-22 improved after follow up
- However AA patients had worse CRS scores (higher values) measured by SNOT-22 when compared to White patients at the end of follow up period



5 Conclusion/Discussion

Results review

- AAs had worse outcomes when compared to Whites

- Prior to medical and/or surgical management:

White, AA and Latinx showed similar clinical characteristics and disease burden

- During follow up:

AA patients had less frequent visits and treatments

- After a mean 40 months:

AA patients had worse CRS symptoms and higher quality of life scores measured by SNOT-22 when compared to White patients

Disparity in follow up visit

- Multiple factors may contribute to less optimal outcomes in AAs with CRS as evidenced by:
 - less frequent follow up visits
 - lower number of surgical interventions
 - lack of or infrequent follow up with an allergist
 - lower rate of proper exacerbation treatments
 - the higher likelihood of having Medicaid insurance compared to White patients

Discussion

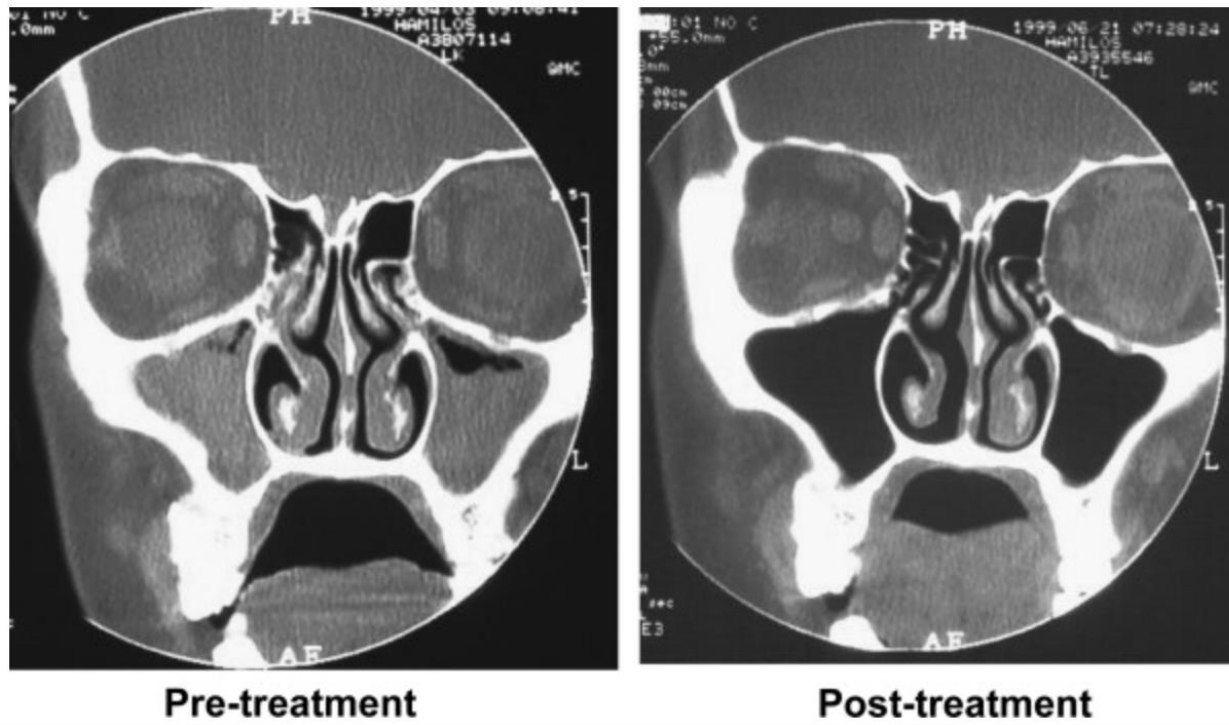
- CRS is a complex disease of the upper airways
- Often requires multidisciplinary care - surgical and chronic medical care
- Regular follow up is important in chronic disease management and outcomes
- CRS often needs subspecialty care of allergic, inflammatory and immunodeficiency comorbidities



<https://www.healthcareers.com/binaries/content/gallery/healthcareers-us-en/article-features/april-2017/team-healthcare.jpg>

Discussion; importance of maintenance visits

The observed poorer outcomes of CRS in AAs may be due to inadequate follow up or management of their CRS and its comorbidities during this period as evidenced by fewer health maintenance visits



Discussion; Less Efficient Access to Providers?

- AA patients had a significantly:
 - Lower number of CRS exacerbations treated with antibiotics
 - Lower number of CRS related visits
 - Longer length of time between 1st and 2nd visit for CRS during follow up
- Access to care is a major obstacle for patients with chronic diseases

Discussion; disparity in surgical management

- Our results showed a trend towards lower number of functional endoscopic sinus surgery (FESS) among AAs
- All otolaryngology visits of a random subgroup of patients from all three groups (100 from each ethnic/racial group)
 - Showed that the percentage of patients who were offered to have surgery was similar among all groups (82.2%, 76.1% and 71.2% ; $p=0.21$ in AA, white, and Latino CRS patients respectively)
 - AAs had a significantly lower number of surgical interventions during the follow up

Discussion; role of insurance

- While almost half of AAs were insured by Medicaid, only 3.3% of White and 18.3% of Latino patients were on Medicaid
- Medicaid population is in worse health in comparison to those adults insured by private insurances and have shown lower outcomes in other conditions.
 - This is multifactorial; higher risk for financial difficulties, other comorbidities, and disabilities among Medicaid population.

Discussion;

- Enrolled from the same clinics and followed by the same group of providers: **decreased chance of provider related factors**
- The worse SNOT-22 at the end of follow up period cannot be due to more severe nature of CRS condition in AAs due to phenotypic variation

Limitations

- **Unequal sample size among different races and ethnicities**
- **Single center data**
- **Lack of control group**
- **Our results might not apply to all CRS patients of different severity**



Clinical Implications

- Our results call for development of more efficient and sensitive treatment plans for CRS tailored toward those with higher needs



Future Directions

Interventions to address possible barriers and stressors in patients with CRS

- Assignment of case managers
- Medication shipments to the home
- Telephonic/virtual medical visits

Thank you.



Rush University Medical Center

Excellence is just the beginning.