



Introduction

- Chronic rhinosinusitis with nasal polyps (CRSwNP) accounts for 20-33% of cases of chronic rhinosinusitis (CRS)¹
- Healthcare burden associated with CRS is well-documented¹⁻⁵, and may be more intense for CRSwNP
- Evidence regarding the added burden of nasal polyps compared to CRS without nasal polyps (CRSsNP) is mixed^{6,7}, but suggests a relatively high frequency of extensive sinus surgeries⁸; further investigation of CRSwNP-related burden in relation to surgical procedures using newer data is needed

Objective

To compare characteristics of sinus surgery visits associated with CRSwNP vs. CRSsNP

Methods

Study Design and Data Source

- Retrospective, cross-sectional analysis of administrative data from 7 states in the State Ambulatory Surgery and Services Databases (SASD)* from 2012-2015
 - Visit-level data from outpatient and hospital-owned ambulatory surgery facilities in Colorado (CO), Florida (FL), Iowa (IA), Kentucky (KY), North Carolina (NC), New York (NY), and Wisconsin (WI)
 - All payer types represented in data

Patient Population

- Visits for patients ≥18 years old were included if they:
 - Had a diagnosis of CRSwNP (ICD-9-CM: 471.x; ICD-10-CM: J33.x) or CRSsNP (ICD-9-CM: 473.x; ICD-10-CM: J32.x and without a code of ICD-9-CM: 471.x; ICD-10-CM: J33.x)
 - Received a selected surgical procedure according to Current Procedural Terminology® (CPT) code for commonly performed interventions⁸
 - Endoscopic sinus surgery (ESS): 31233, 31235, 31254, 31255, 31256, 31267, 31276, 31287, 31288, 31295, 31296, 31297
 - Maxillary antrostomy (MA): 31256, 31267
 - Ethmoidectomy: 31200, 31201, 31205, 31254, 31255
 - Sphenoidotomy: 31287, 31288
 - Frontal sinusotomy (FS): 31276
 - Septoplasty: 30520

- Visits were excluded for
 - Patients <18 years old
 - Patients with a diagnosis of cystic fibrosis

Measures

- Healthcare resource utilization, by CRS subtype
 - Proportions of visits involving above selected surgical procedures
 - Number of operated sinus types (1-4; maxillary, ethmoid, sphenoid, or frontal) per surgery visit
 - Proportion of peri-operative complications (indicated by ICD-9/10-CM or CPT code)
 - Orbital hemorrhage, orbital edema, cerebrospinal fluid (CSF) leak, blood transfusion
 - Length of stay (LOS), days
 - Ambulatory follow-up visits
 - Discharge status
- Baseline measures, by CRS subtype
 - Demographic characteristics
 - Age, sex, race
 - Primary payer (Medicare, Medicaid, Private, Self-pay, No charge, Other or Missing)
 - Comorbidities
 - Chronic Condition Indicator (number of chronic conditions) *

Statistical Analysis

- Descriptive statistics generated for all measures for visits associated with CRSwNP vs. CRSsNP
- Means and standard deviations (SD) used to summarize continuous variables; frequencies and percentages summarized categorical variables

* SASD and the Chronic Condition Indicator are part of the family of databases and software tools developed for the Healthcare Cost and Utilization Project (HCUP) and sponsored by the Agency for Healthcare Research and Quality (AHRQ).

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Results

Demographics and Comorbidities

- A total of 142,313 visits associated with CRSwNP (n=41,346) or CRSsNP (n=100,967) and involving a selected surgical procedure were identified
- Visits were located in the following states: NY (32.9%), NC (14.2%), KY (6.2%), FL (30.1%), WI (11.8%), CO (1.1%), and IA (3.8%) (**Figure 1**)
- Mean [SD] age was higher for visits associated with CRSwNP vs. CRSsNP (49.9 [15.6] vs. 47.8 [15.9]; p<0.001) (**Table 1**)
- Patients with visits associated with CRSwNP (vs. CRSsNP) were predominantly male (59.1% vs. 45.0%), White (74.8% vs. 77.8%) and privately-insured (65.9% vs. 67.6%) (p<0.0001 for all) (**Table 1**)
 - Other payer types used to cover visits (CRSwNP vs. CRSsNP) included Medicare (19.0% vs. 18.6%), Medicaid (8.3% vs. 8.4%), Self-pay (1.5% vs. 1.4%), No charge (0.2% vs. 0.1%), and Other or Missing (3.9% vs. 3.9%) (**Table 1**)
- Mean [SD] number of chronic conditions was similar for CRSwNP visits vs. CRSsNP (2.1 [1.7] vs. 2.2 [1.7]; p=0.2102)

Figure 1: States Represented, 2012 – 2015

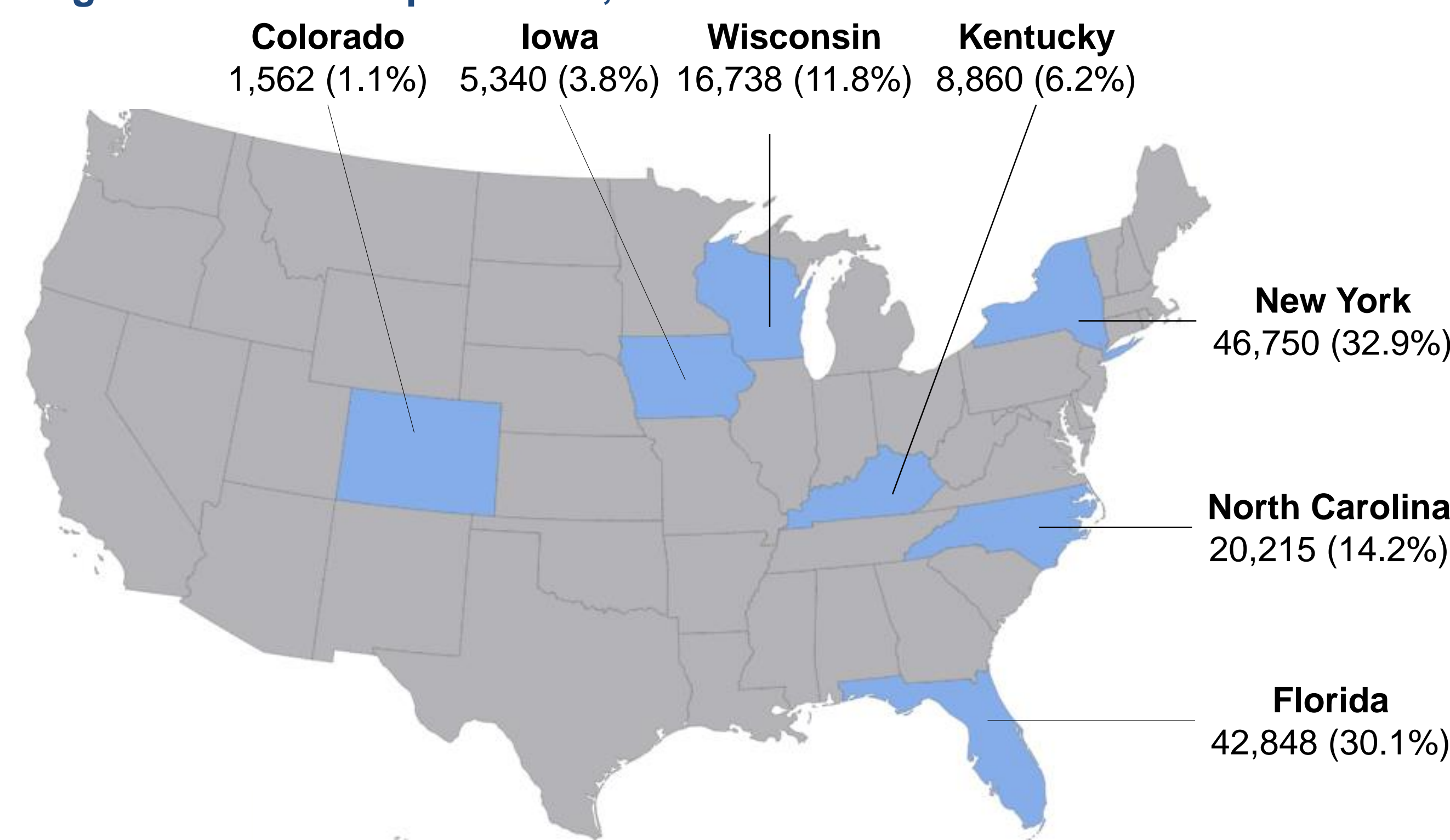


Table 1: Baseline Demographic Characteristics

	Surgery Visits With a Diagnosis of CRS		
	CRSwNP	CRSsNP	p-value
No. of visits	41,346	100,967	
Age at admission (years), mean (SD)	49.9 (15.6)	47.8 (15.9)	<0.001
Age category at admission, n (%)			<0.0001
18-34	7,900 (19.1)	23,957 (23.7)	
35-44	7,287 (17.6)	19,516 (19.3)	
45-54	9,456 (22.9)	21,640 (21.4)	
55-64	8,594 (20.8)	18,800 (18.6)	
65 or older	8,109 (19.6)	17,054 (16.9)	
Sex (male), n (%)	24,429 (59.1)	45,457 (45.0)	<0.0001
Race, n (%)			<0.0001
White	30,905 (74.8)	78,554 (77.8)	
Black	3,351 (8.1)	5,503 (5.5)	
Hispanic	3,229 (7.8)	6,490 (6.4)	
Asian or Pacific Islander	809 (2.0)	1,547 (1.5)	
Native American	122 (0.3)	344 (0.3)	
Other	2,342 (5.7)	7,127 (7.1)	
Missing	588 (1.4)	1,402 (1.4)	
Primary payer, n (%)			<0.0001
Medicare	8,288 (20.1)	18,799 (18.6)	
Medicaid	3,440 (8.3)	8,475 (8.4)	
Private insurance	27,265 (65.9)	68,262 (67.6)	
Self-pay	636 (1.5)	1,389 (1.4)	
No charge	94 (0.2)	107 (0.1)	
Other/Missing	1,623 (3.9)	3,935 (3.9)	

CRS: chronic rhinosinusitis; CRSwNP: chronic rhinosinusitis with nasal polyps; CRSsNP: chronic rhinosinusitis without nasal polyps; SD: standard deviation.

Healthcare Resource Utilization

- CRS-related surgery visits (CRSwNP vs. CRSsNP) involving a selected procedure were most commonly for ESS (95.0% vs. 93.8%), MA (83.1% vs. 77.5%), and ethmoidectomy (85.1% vs. 72.7%), followed by septoplasty (39.4% vs. 53.7%), frontal sinusotomy (46.2% vs. 33.8%), and sphenoidotomy (45.2% vs. 26.5%) (**Figure 2**)
 - Visits associated with polyps vs. without polyps had higher proportions of selected procedures in all categories except septoplasty
- Visits associated with CRSwNP more frequently involved surgeries on 3 or 4 sinus types than those for CRSsNP (59.3% vs. 41.4%) (**Figure 3**)
- Visits associated with either CRS subtype were mostly elective (>99%, not shown), had routine discharges (91.9%), and mean LOS of less than one day (**Table 2**)
- Most procedures were without peri-operative complications (>99%) in either subtype (**Table 2**)
- Less than 15% of visits associated with either subtype (CRSwNP vs. CRSsNP) had follow-up visits within 30 days (14.9% vs. 13.9%) (**Table 2**)

Figure 2: Proportions of Visits with Selected Surgical Procedures

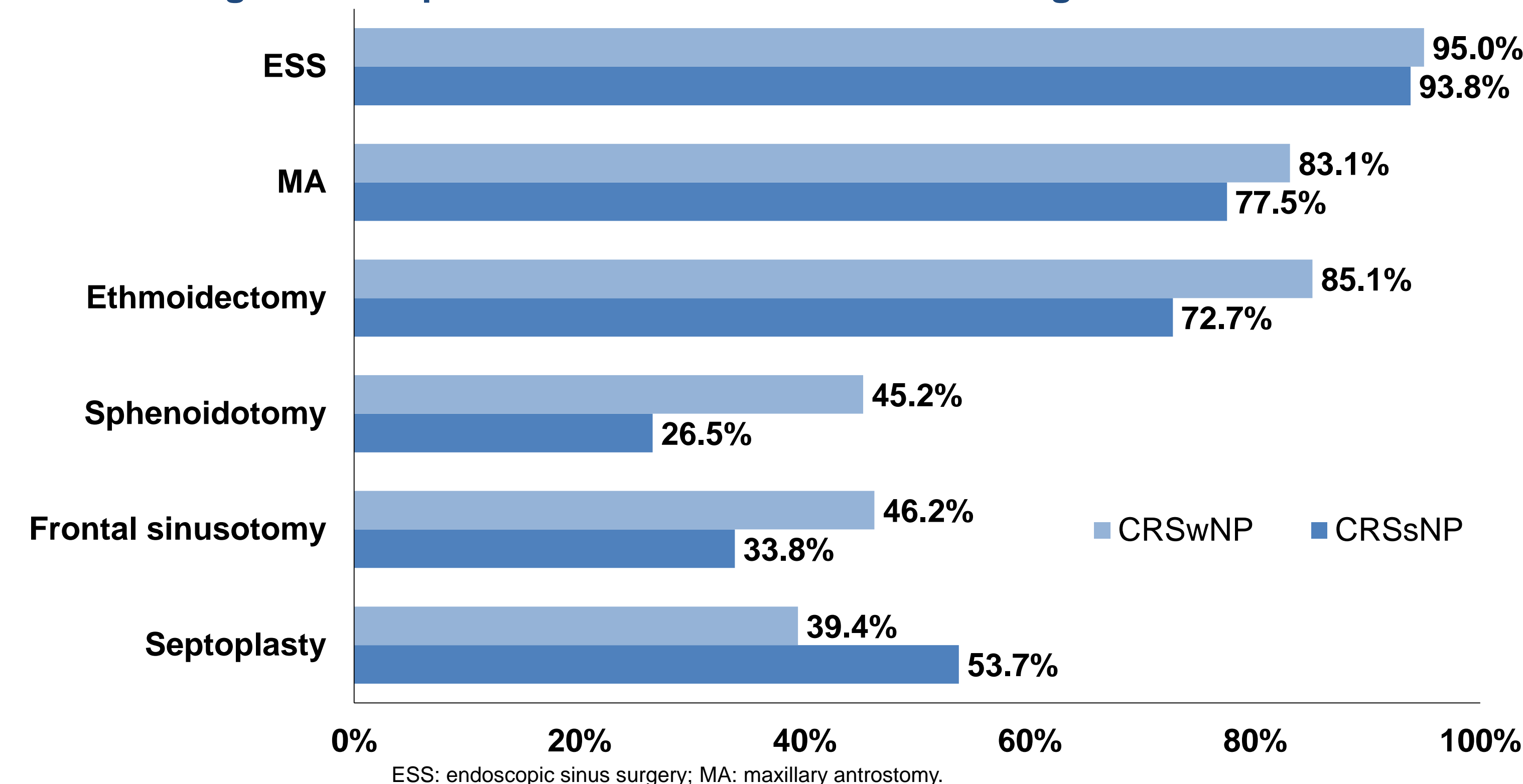


Figure 3: Proportions of Visits by Number of Operated Sinus Types

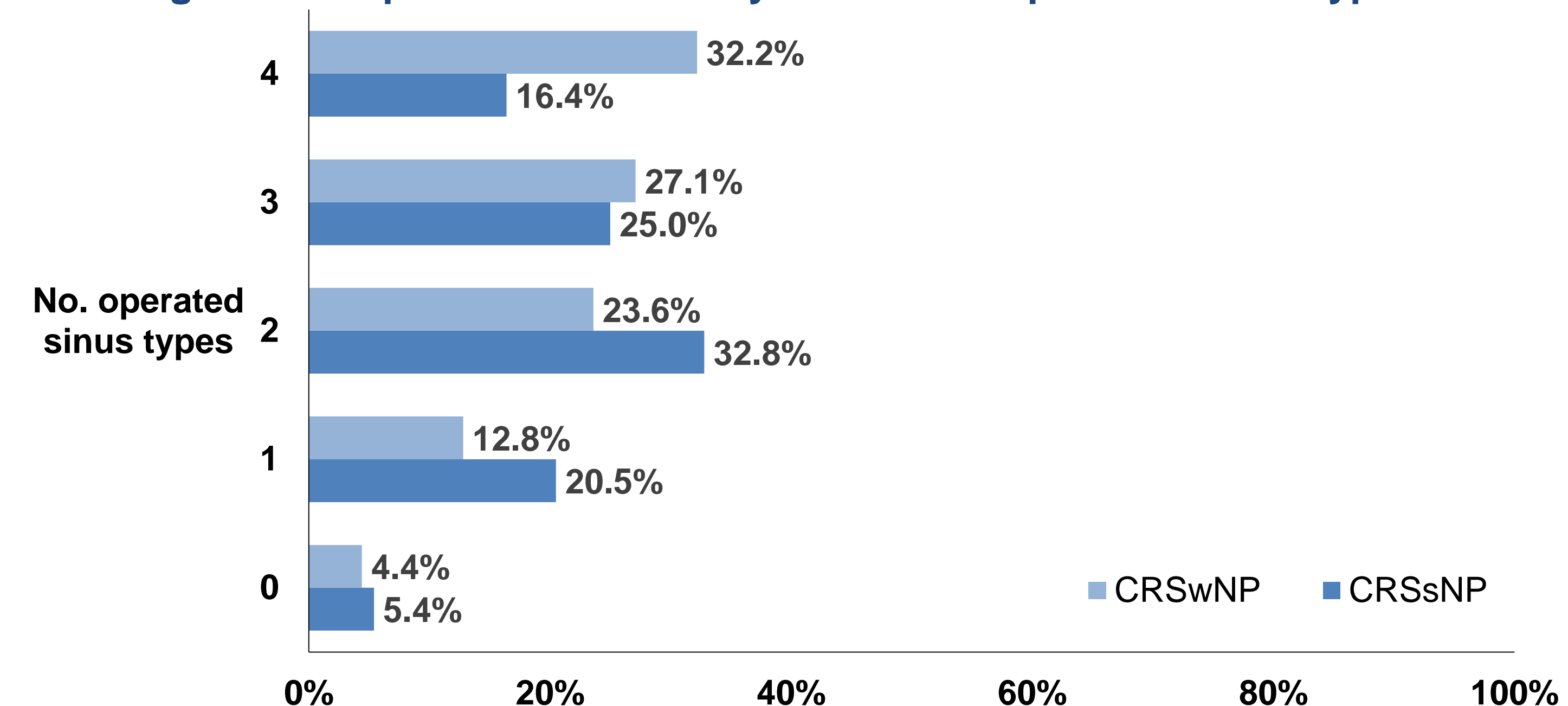


Table 2: Characteristics of Visits with a Diagnosis of CRSwNP or CRSsNP

	Surgery Visits With a Diagnosis of CRS		
	CRSwNP	CRSsNP	p-value
No. of visits	41,346	100,967	
Length of stay (days), mean (SD)	0.06 (0.3)	0.05 (0.3)	<0.0001
Discharge status, n (%)			0.4894
Routine	38,009 (91.9)	92,735 (91.9)	
Transfer to short-term hospital	38 (0.1)	90 (0.1)	
Transfer other	24 (0.1)	40 (0.04)	
Home health care	30 (0.1)	72 (0.1)	
Against medical advice	- ^a	- ^a	
Died in hospital	- ^a	- ^a	
Missing	3,242 (7.8)	8,012 (7.9)	
Peri-operative complications, n (%)			
Orbital hemorrhage	- ^a	- ^a	- ^a
Orbital edema	- ^a	- ^a	- ^a
Cerebrospinal fluid leak	38 (0.1)	99 (0.1)	0.7343
Blood transfusion	- ^a	- ^a	- ^a
No. chronic conditions, mean (SD)	2.1 (1.7)	2.2 (1.7)	0.0136
Ambulatory follow-up^b visits within 30 days, n (%)	2,661 (14.9)	5,935 (13.9)	0.0009

CRS: chronic rhinosinusitis; CRSwNP: chronic rhinosinusitis with nasal polyps; CRSsNP: chronic rhinosinusitis without nasal polyps; SD: standard deviation.

^a Frequencies <11: reported in accordance with AHRQ confidentiality statute.

^b Total no. visits with data for follow-up visits: CRSwNP: 17,813, CRSsNP: 42,696; All: 60,509. Available for Florida, Iowa, and Wisconsin (excluding Wisconsin 2012).

Limitations

- SASD are a collection of encounter-level data. Reported counts and proportions for any SASD database are for visits and do not necessarily reflect individual patients; hence, individuals may have multiple visits recorded in the databases

Conclusion

- Surgical visits associated with chronic rhinosinusitis with nasal polyps involved more of the selected sinus surgery procedures (known to be common surgical interventions) vs. visits without polyps
- Visits associated with CRSwNP involving the selected surgical procedures also involved more sinus types vs. those for CRSsNP

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