

# Impact of surgical experience on revision sinus surgery rate

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## INTRODUCTION

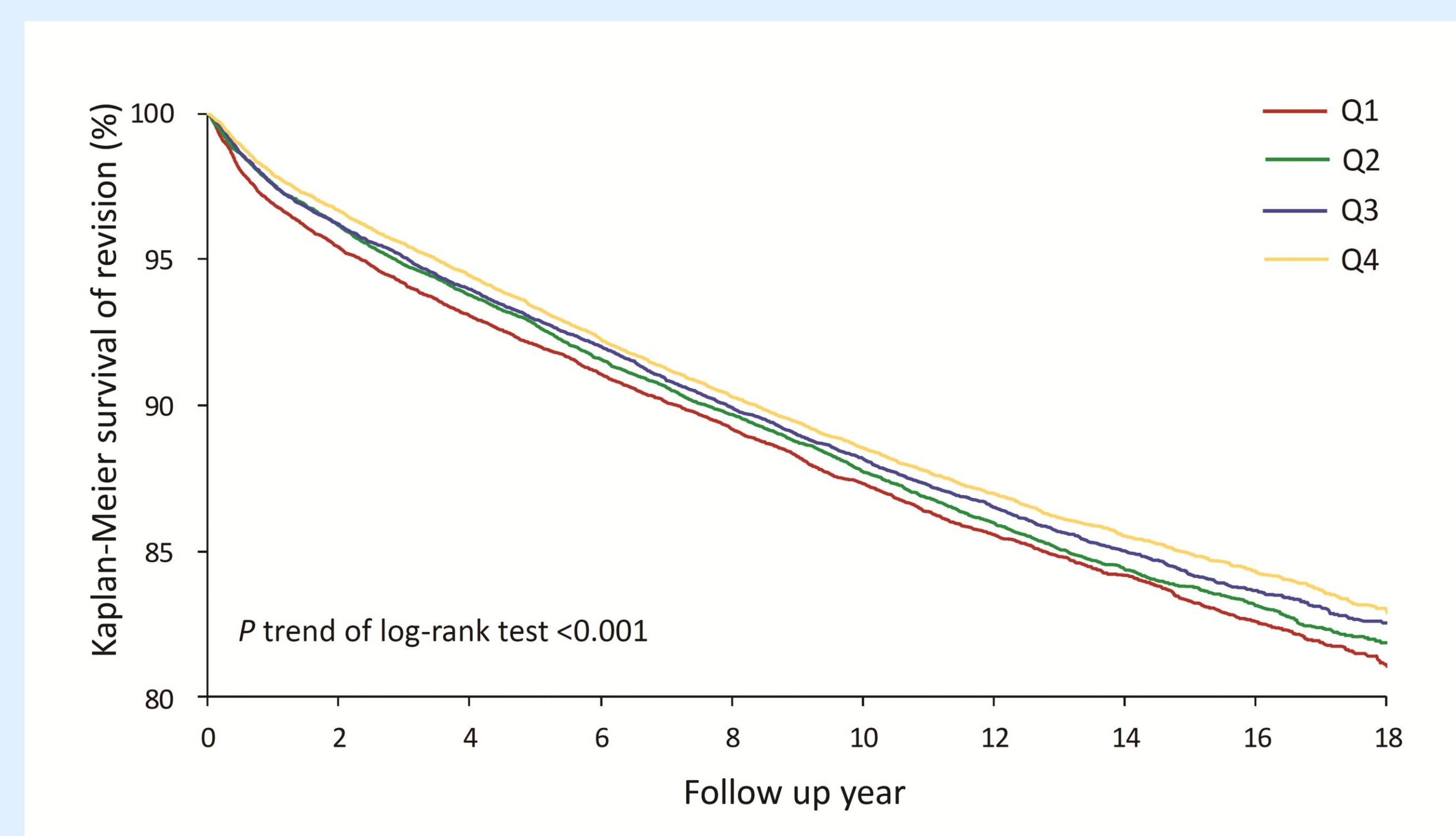
The relationship between a surgeon's cumulative experience and the outcomes of endoscopic sinus surgery (ESS) revisions remains a topic of uncertainty. Numerous factors can influence the results of medical procedures, and understanding how the volume of surgeries a surgeon has performed impacts the need for subsequent revisions is crucial. This is particularly significant for procedures like ESS, which are delicate and require precise skill. In this context, we aim to delve deeper into this relationship, focusing on the Taiwanese medical landscape. Our study is designed to assess whether there's a connection between the number of ESS procedures a surgeon has carried out and the frequency of revision surgeries thereafter. By understanding this association, we hope to shed light on the importance of experience in achieving optimal surgical outcomes in Taiwan.

## METHODS AND MATERIALS

A nationwide population-based retrospective study was conducted, collating data from adult inpatients (age >18 years) who underwent ESS between the years 2000 and 2008. This data was acquired from the Taiwan National Health Insurance Research Database (NHIRD), with patients being followed up until 2018. Cumulative surgical volume was divided into four quartiles: very low volume (Quartile 1, cumulative volume: 1-137 cases), low volume (Quartile 2, cumulative volume: 138-328 cases), high volume (Quartile 3, cumulative volume: 329-643 cases), and very high volume (Quartile 4, cumulative volume >644 cases).

Variables	Total (n = 68,282)	Q1 (n = 17,083)	Q2 (n = 16,856)	Q3 (n = 17,337)	Q4 (n = 17,006)	p-trend
Range of cumulative surgeon volume		1-137	138-328	329-643	> 644	
Age, years	45.6 ± 15.6	45.3 ± 16.0	45.3 ± 15.6	46.1 ± 15.3	45.7 ± 15.5	<0.001
Gender						<0.001
Female	26,133 (38.3)	6,071 (35.5)	6,406 (38.0)	6,805 (39.3)	6,851 (40.3)	
Male	42,149 (61.7)	11,012 (64.5)	10,450 (62.0)	10,532 (60.7)	10,155 (59.7)	
Hospital level (missing=344)						<0.001
Medical center	36,430 (53.6)	7,881 (46.4)	7,431 (44.1)	9,484 (54.7)	11,634 (68.6)	
Regional hospital	27,151 (40.0)	7,331 (43.1)	8,504 (50.5)	6,708 (38.7)	4,608 (27.2)	
District hospital + Clinics	4,357 (6.4)	1,790 (10.5)	774 (4.6)	1,074 (6.2)	719 (4.2)	
Comorbidity						
Allergic rhinitis	24,708 (36.2)	5,769 (33.8)	5,776 (34.3)	6,895 (39.8)	6,268 (36.9)	<0.001
Asthma	6,628 (9.7)	1,546 (9.0)	1,636 (9.7)	1,770 (10.2)	1,676 (9.9)	0.003
Nasal polyposis	21,768 (31.9)	5,325 (31.2)	5,946 (35.3)	5,032 (29.0)	5,465 (32.1)	0.035

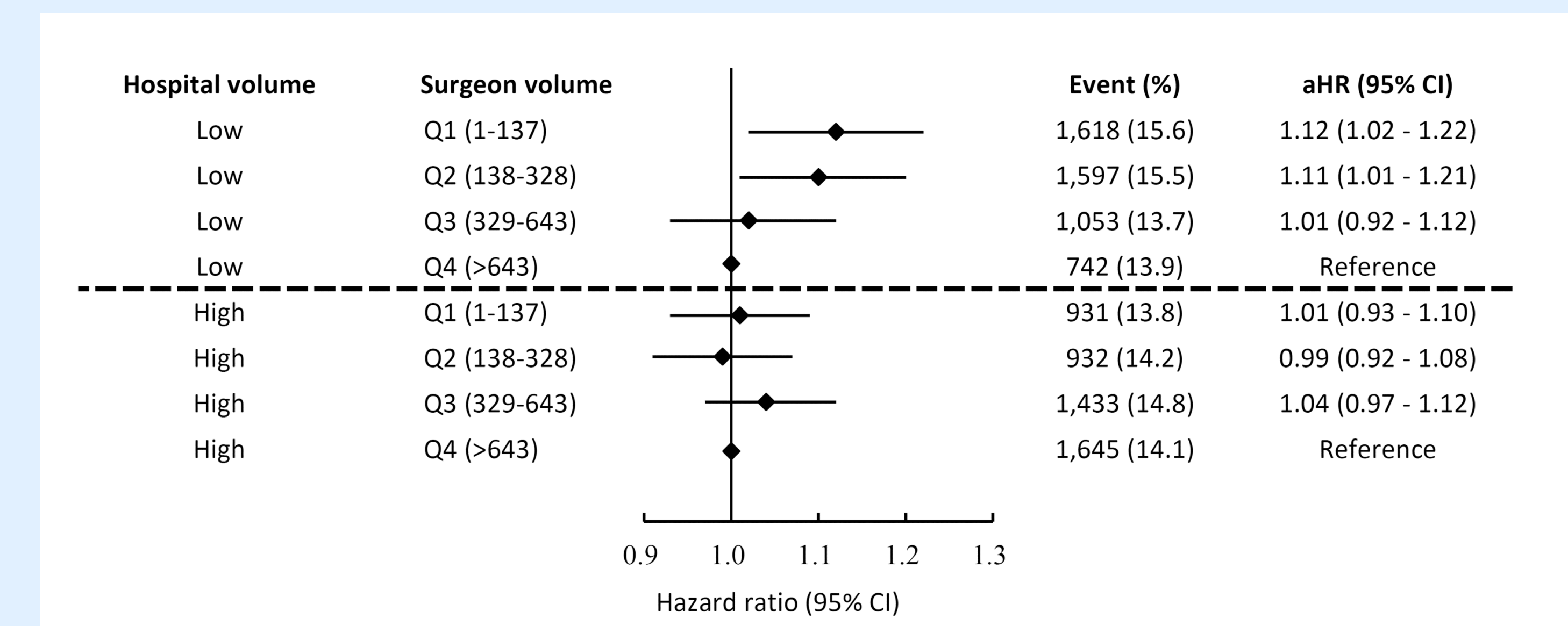
**Table 1.** Demographic data of cumulative surgeon volume



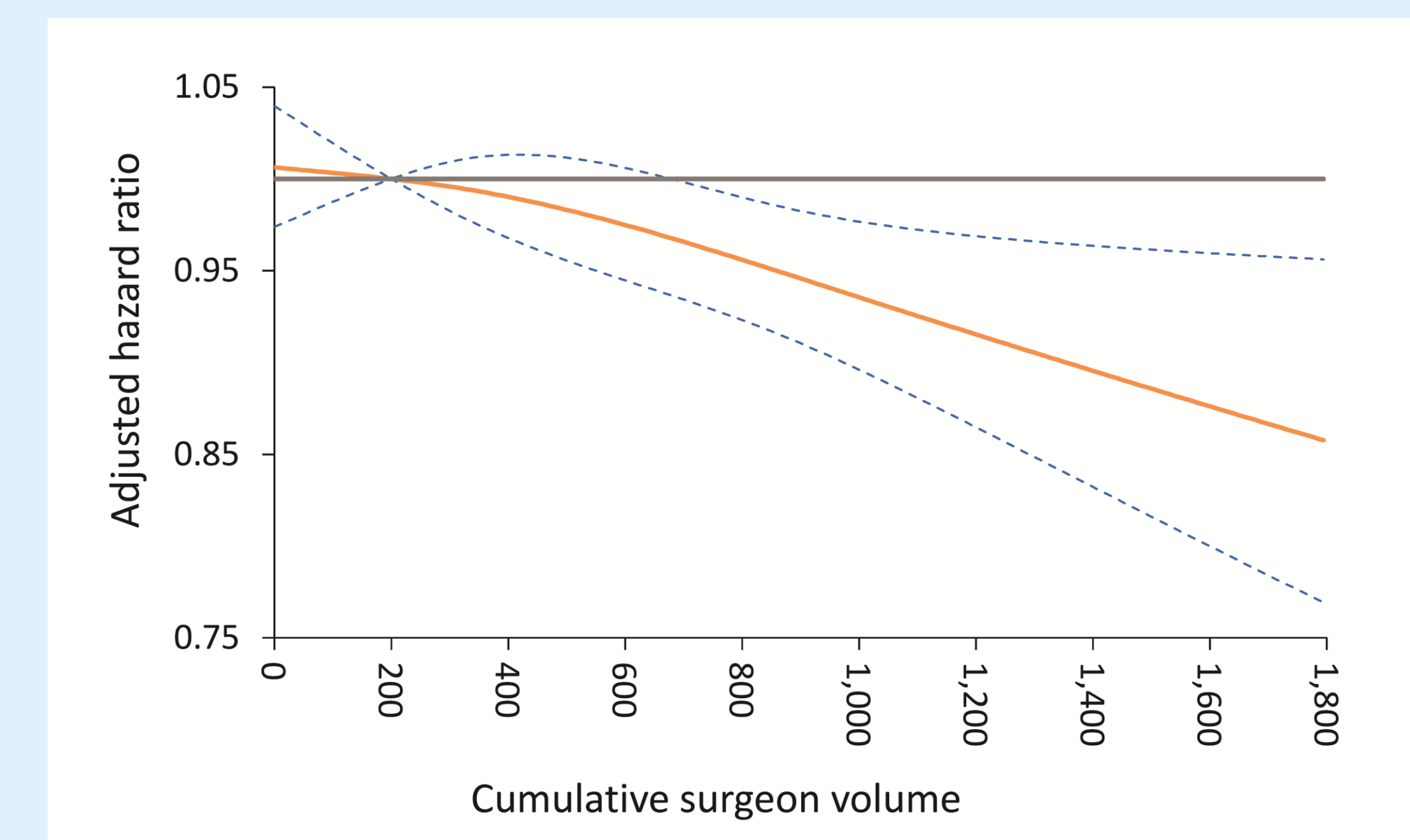
**Figure 1.** Kaplan–Meier survival curves of revision endoscopic sinus surgery according to cumulative surgeon volume.

## RESULTS

The study included 68,282 adults (mean age, 45.6 years; 62% men). The initial revision rate stood at 14.6% (9951/68282), and the secondary revision rate at 2.9% (1989 /68282). There was a significant association between lower surgical volume and an increased first revision rate (very low volume: 14.9%; low volume: 15%; high volume: 14.3%; very high volume: 14.0%, p for trend = 0.006). However, there was no significant correlation with the second revision rate (p for trend = 0.11). A subgroup analysis highlighted the effect of cumulative surgical volume on revision ESS as being more pronounced in hospitals with low surgical volume as compared to high surgical volume hospitals (p for interaction = 0.049). Restricted cubic spline modeling revealed a linear, inverse correlation between cumulative surgical volume and revision ESS (p for linearity < 0.001).



**Figure 2** Risk of revision endoscopic sinus surgery stratified by hospital volume



**Figure 3** Restricted cubic spline modeling for association between cumulative surgeon volume and risk of revision endoscopic sinus surgery

## CONCLUSIONS

The data suggests that lower cumulative surgical volume is associated with a higher propensity for a first ESS revision in adult patients. The correlation between low cumulative surgical volume and increased revision ESS is particularly noticeable in lower volume hospitals.

## REFERENCES

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2. Kang KT, et al. Epidemiology of pediatric tracheotomy in Taiwan. *Int J Pediatr Otorhinolaryngol.* 2022 Jan;152:110989.