

Optimal Timing to Minimize Complications of Alveolar Bone Grafting in Cleft Care

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Background

- Primary **goals** of alveolar bone grafting (ABG) are to promote **maxillary arch stabilization, oronasal fistulae closure, and nasal alar bases correction**
- Traditionally, ABG classified according to chronological age
 - Primary ABG (2-5 years)
 - Early secondary ABG (**4-7 years**)
 - Late secondary ABG (**8-12 years**)
 - Tertiary/delayed ABG (**12+ years**)
- Ideal timing of secondary ABG has yet to be standardized for patients with cleft lip and palate

Objectives

- To investigate the optimal timing of ABG based on different predictors using the **National Surgical Quality Improvement Program - Pediatric (NSQIP)** database

Methods

- Retrospective review of the **NSQIP database** of patients undergoing elective secondary ABG from **2012-2021**
- Patient **demographics, postoperative outcomes, and reoperation rates** were collected
- Patients with an **age of repair of less than 4 or greater than 12 years**, concurrent procedures, and current or history of cancer were excluded
- Receiver-Operating Characteristics (ROC) curve analysis → determine the appropriate **age cutoff values**
- Area Under the Curve (**AUC**)>**0.700** was the marker of adequate sensitivity and specificity

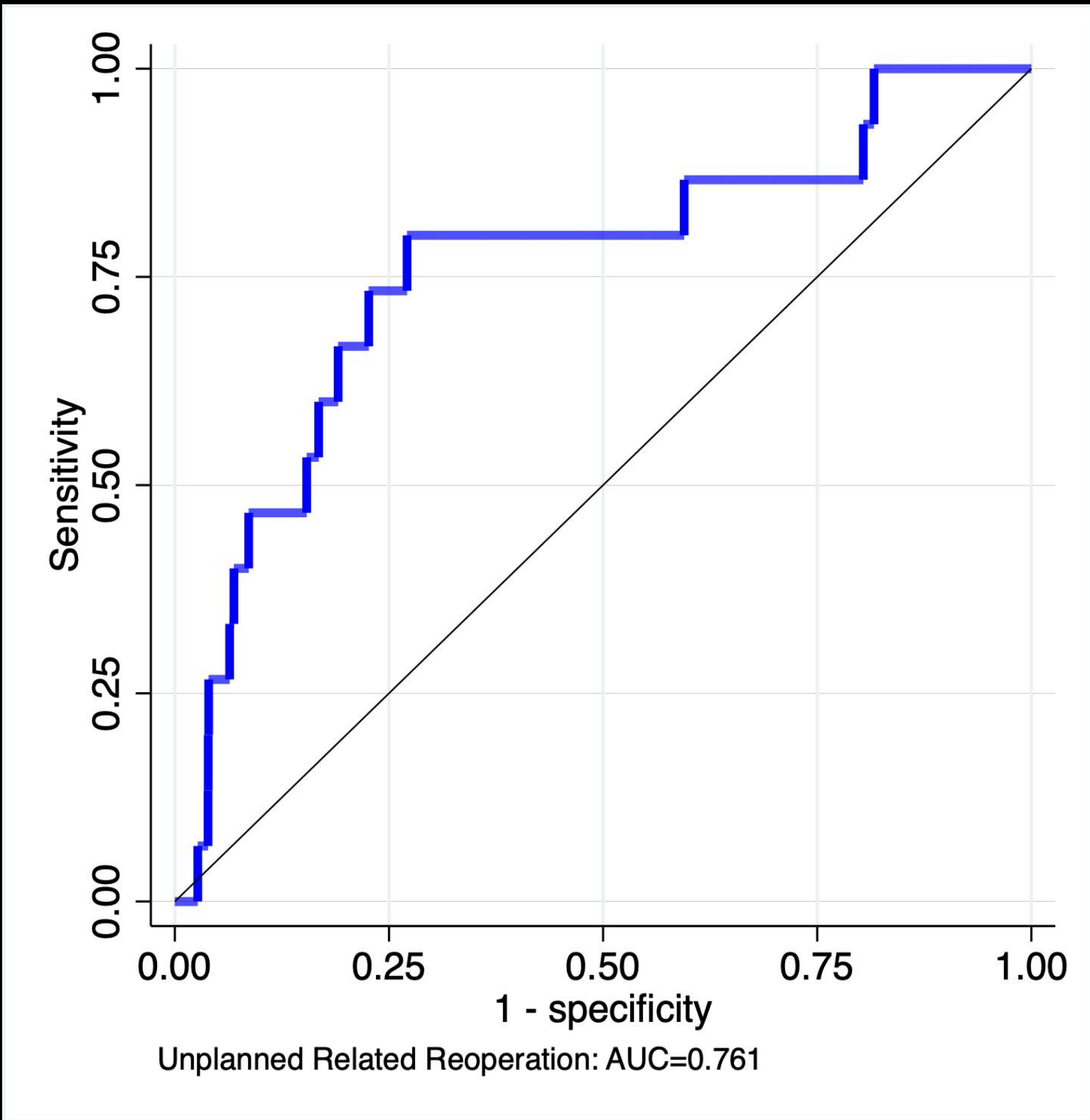


Figure 1. ROC analysis predicting unplanned related reoperation based on age of ABG

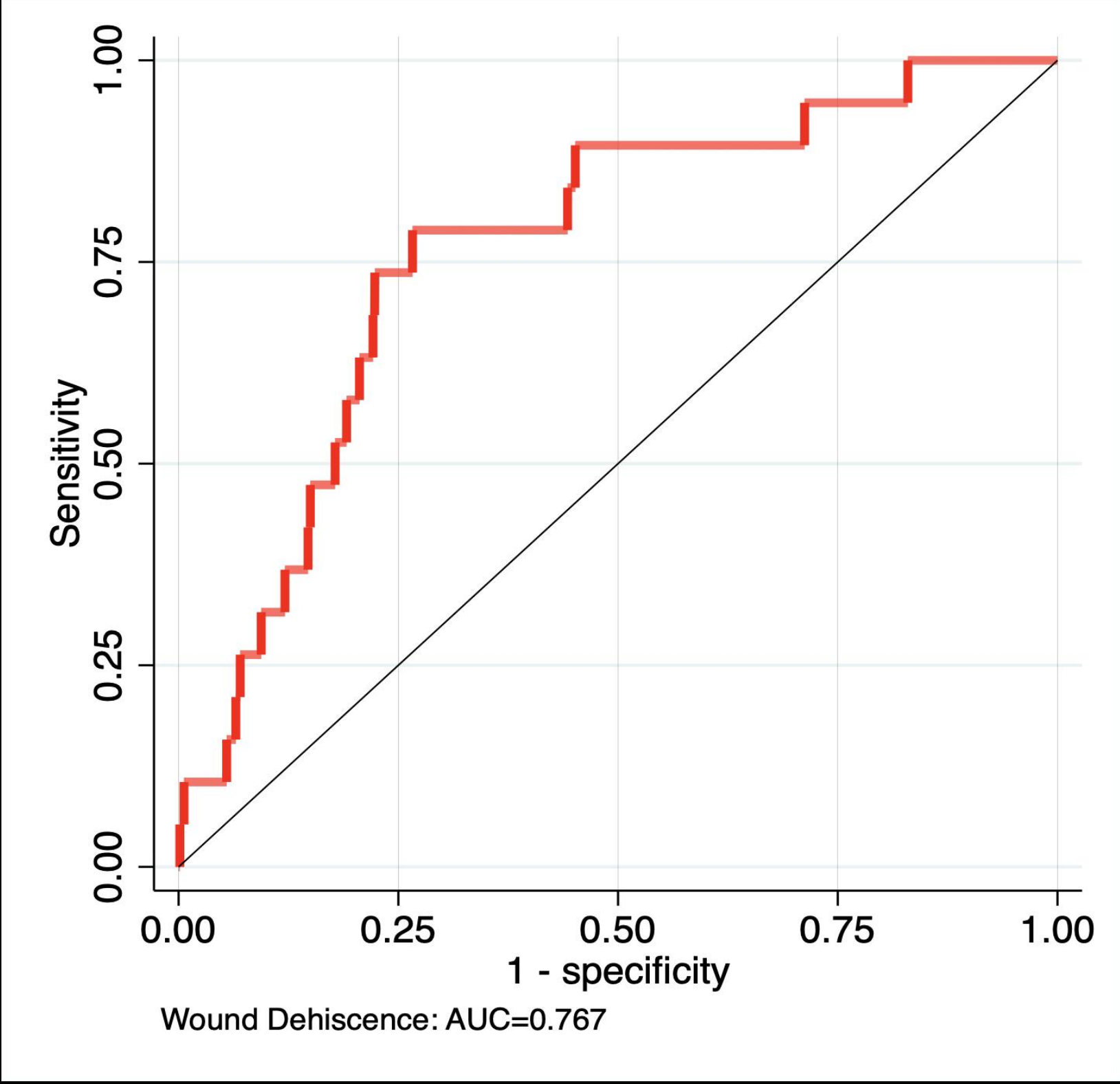


Figure 2. ROC analysis predicting wound dehiscence based on age of ABG

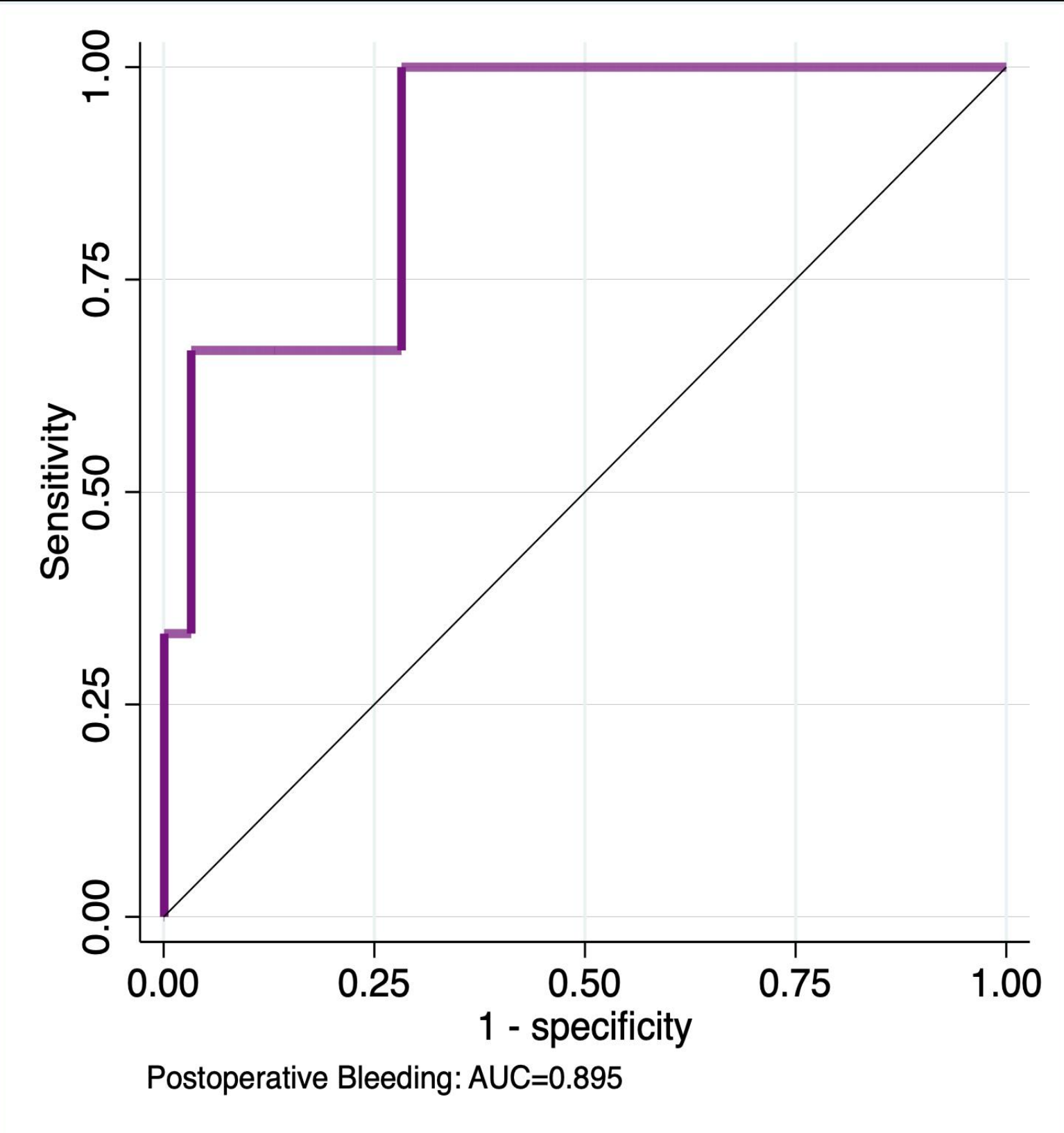


Figure 4. ROC analysis predicting postoperative bleeding based on age of ABG

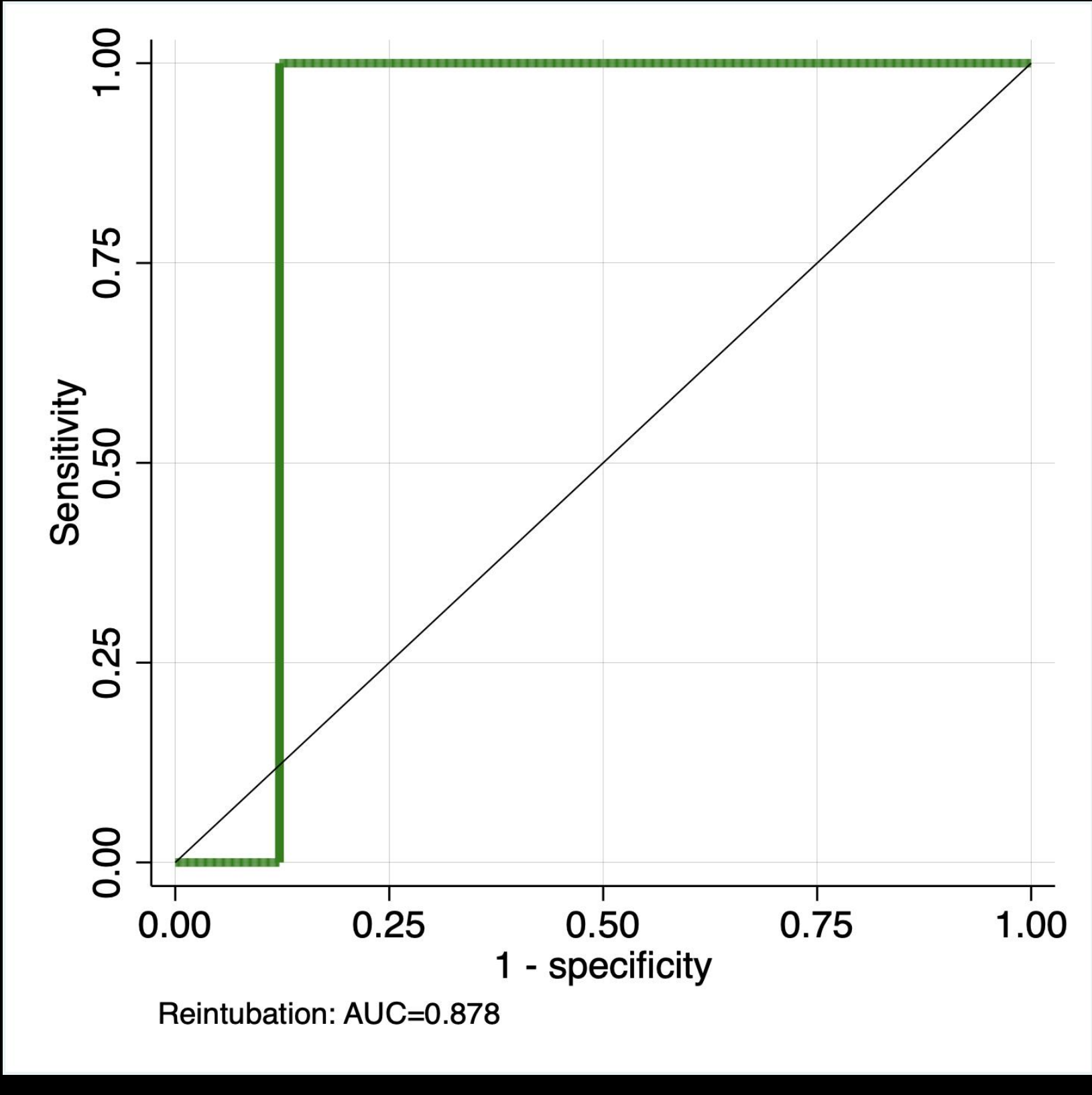


Figure 3. ROC analysis predicting reintubation based on age of ABG

	AUC	Sensitivity	Specificity	Age Cutoff
Any Adverse Event	0.641	54.5%	71%	8.5
Unplanned Related Reoperation	0.761	80%	73%	7.5
Wound Complications	0.666	44%	83%	8.9
Surgical Site Infection	0.676	68%	66%	9.9
Wound Dehiscence	0.767	79%	73%	10.3
Reintubation	0.878	100%	88%	7.7
Postoperative Bleeding	0.895	100%	72%	8.2
*All ROC analyses were adjusted for age, weight, sex, race, American Society of Anesthesiologists (ASA) classification, and wound classification				

Table 1. ROC analysis for predicting adverse postoperative events based on age of ABG

Results

- 5,719** patients underwent ABG of which **103 (1.8%)** had postoperative adverse complications
- Alveolar bone grafting was identified as strong predictor for specific postoperative variables
 - Unplanned related reoperation, wound dehiscence, reintubation, and postoperative bleeding had **AUC>0.700** demonstrating that the sensitivity and specificity are adequate
 - Range of areas were between **0.641-0.895**
 - Cutoff points of timing of the various risk factors were between **8.2-10.3 years**
 - ROC curve analysis predicting any adverse events indicated a cutoff age of around **8.5 years**

Conclusions

- Appropriate timing of secondary ABG** is essential for successful management of alveolar clefts
- A threshold of **8.5 years of age** was found to be the cutoff age to reduce the risk of postoperative adverse events
- Based on these NISQIP findings, **late secondary ABG** timing continues to be best practice