

# Young TAVI: Shifting Risk and Outcomes

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# Disclosure of Relevant Financial Relationships

I, [J. Hunter Mehaffey](#) DO NOT have any financial relationships to disclose.

# Young TAVI

- Current ACC/AHA guidelines recommend SAVR over TAVI for symptomatic severe AS in patients < 65 years of age
  - Unless life expectancy limited by significant comorbidities
- TAVI explant most rapid growing cardiac operation

## Circulation

### ACC/AHA CLINICAL PRACTICE GUIDELINE

#### 2020 ACC/AHA Guideline for the Management of Patients With Valvular Heart Disease: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines

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#### Cardiac Surgery After Transcatheter Aortic Valve Replacement: Trends and Outcomes

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##### ABSTRACT

**BACKGROUND** Reports of cardiac operations after transcatheter aortic valve replacement (TAVR) and early TAVR explantation are increasing. The purpose of this report is to document trends and outcomes of cardiac surgery after initial TAVR.

**METHODS** The Society of Thoracic Surgeons Adult Cardiac Surgery Database was queried for all adult patients undergoing cardiac surgery after a previously placed TAVR between January 2012 and March 2023. This identified an overall cohort and 2 subcohorts: nonaortic valve operations and surgical aortic valve replacement (SAVR) after previous TAVR. Cohorts were examined with descriptive statistics, trend analyses, and 30-day outcomes.

**RESULTS** Of 5457 patients who were identified, 2485 (45.5%) underwent non-SAVR cardiac surgery, and 2972 (54.5%) underwent SAVR. The frequency of cardiac surgery after TAVR increased 4235.3% overall and 144.6% per year throughout the study period. The incidence of operative mortality and stroke were 15.5% and 4.5%, respectively. Existing The Society of Thoracic Surgeons risk models performed poorly, because observed-to-expected mortality ratios were significantly >1.0, among those undergoing SAVR after TAVR, increasing preoperative surgical urgency, age, dialysis, need for SAVR, and concomitant procedures were associated with increased mortality, whereas type of TAVR explant was not.

**CONCLUSIONS** The need for cardiac surgery, including redo SAVR after TAVR, is increasing rapidly. Risks are higher, and outcomes are worse than predicted. These data should closely inform heart team decisions if TAVR is considered at lowering age and risk profiles in the absence of longitudinal evidence.

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Surgical aortic valve replacement (SAVR) has a long track record of consistent outcomes predicted by preoperative comorbid risk.<sup>1,2</sup> Transcatheter aortic valve replacement (TAVR) has been established as superior to medical

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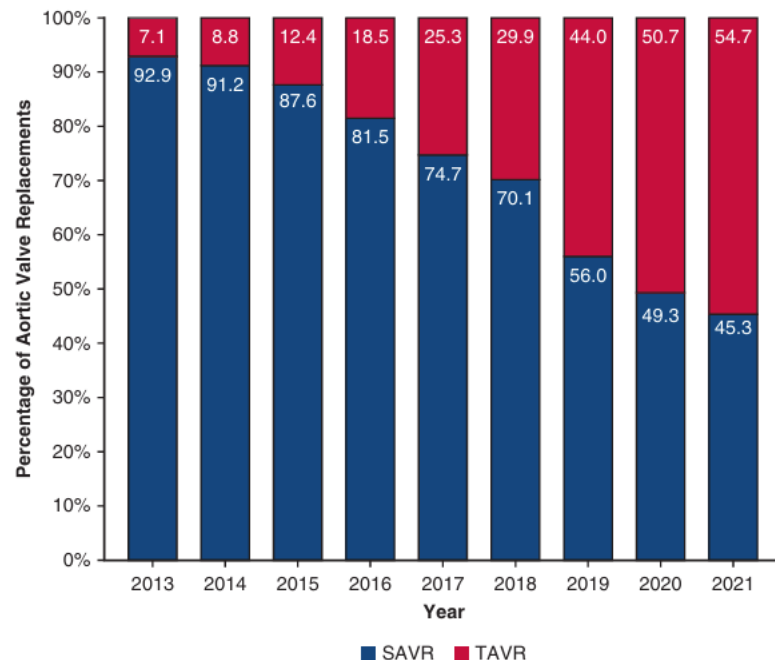
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# TAVI Trends

- Recent state-based registry reports up to **54.7%** of patients under 65 years of age underwent TAVR
- Hypothesized to be high-risk patients with limited life expectancy

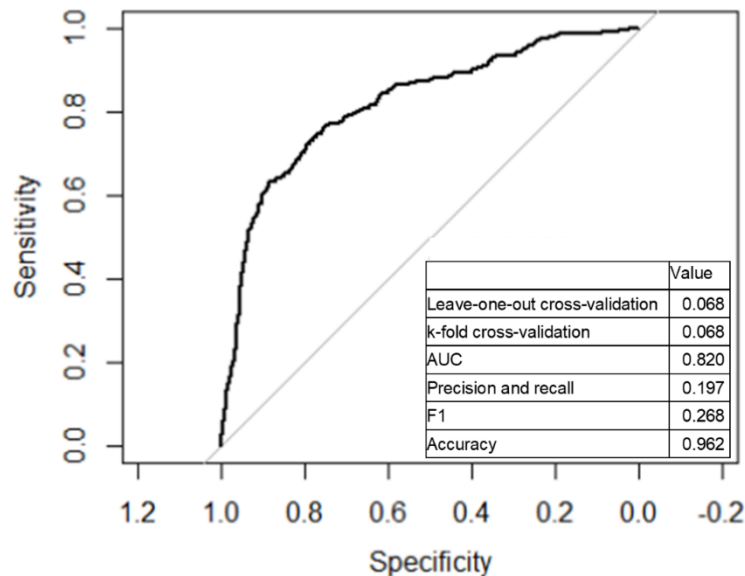


# Objective

- Evaluate risk and outcomes of patients  $\leq 65$  years who received TAVI outside of guidelines using a real-world contemporary dataset with longitudinal follow-up and cost

# Methods

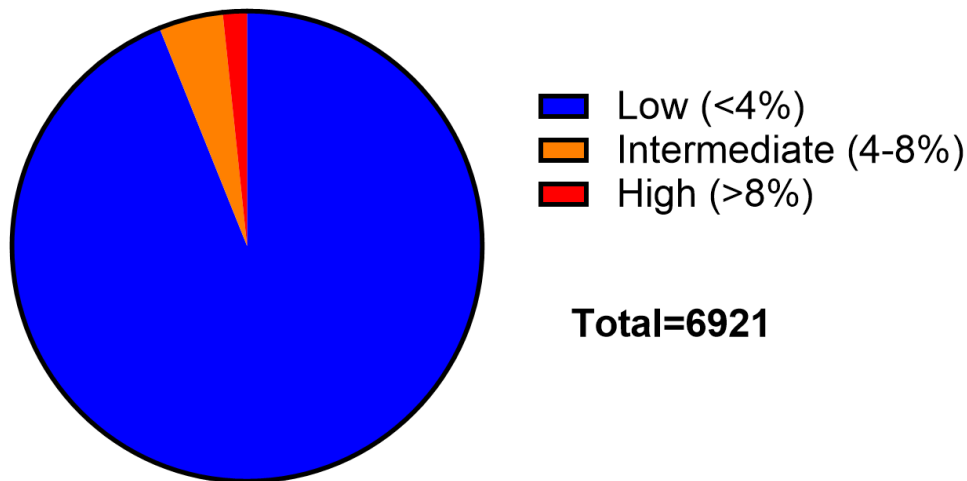
- The [PREMIER Healthcare Database](#) (PHD) was analyzed
  - nationally representative all-payer all-age health system-based database accounting for 25% of United States inpatient admissions
- CPT and ICD-10 procedure codes were used to develop a predicted risk of surgical aortic valve replacement simulating STS Risk Score including:
  - Age and Demographics
  - Medical Comorbidities
  - Preoperative Medications
  - Validated Frailty Metric
  - Procedural Details



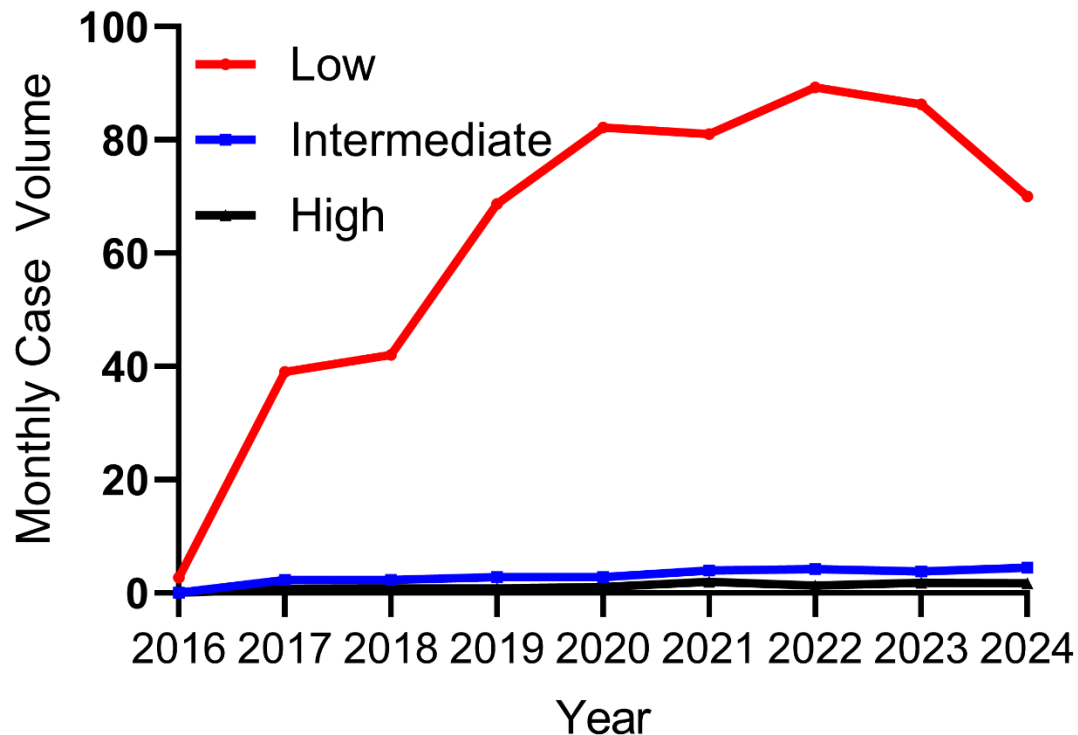
# Methods

- Patients aged  $\leq 65$  years undergoing TAVI between January 1, 2017, and September 30, 2024

- Stratified by predicted risk:
  - Low ( $<4\%$ )
  - Intermediate ( $4-8\%$ )
  - High ( $>8\%$ )
- Evaluated Outcomes Including:
  - Procedural Complications
  - Longitudinal Adverse Events
  - Healthcare Related Costs



# Trends in TAVI Stratified by Predicted Surgical Risk

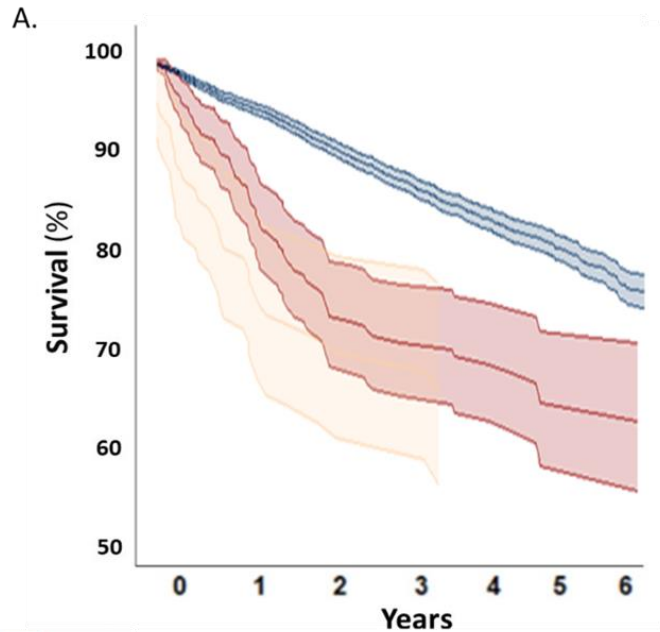




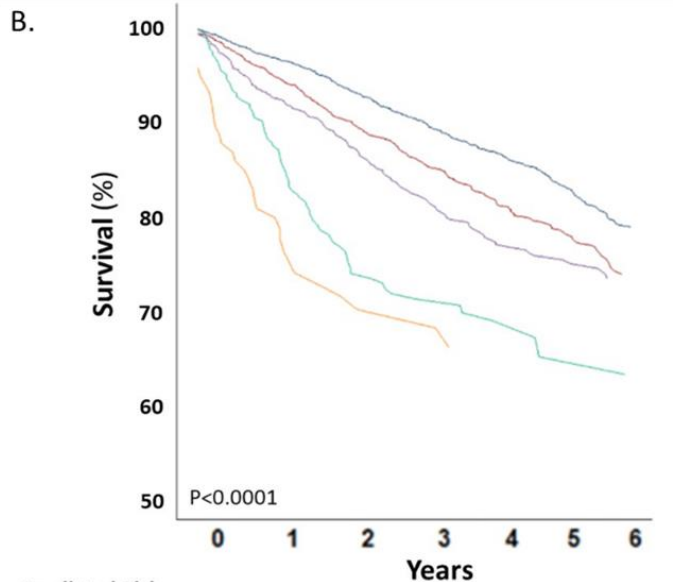
# Procedural Complications

	<b>&lt;4% (n=6,500)</b>	<b>4-8% (n=306)</b>	<b>&gt;8% (n=115)</b>
Total cost (\$)	54,573±30,091	63,245±41,691	72,260±56,159
Stroke	61 (0.938%)	0 (0%)	0 (0%)
New Pacemaker	263 (4.05%)	19 (6.21%)	3 (2.61%)
Unplanned PCI	170 (2.62%)	7 (2.29%)	5 (4.35%)
Unplanned CABG	38 (0.585%)	0 (0%)	1 (0.87%)
Conversion to SAVR	12 (0.185%)	1 (0.327%)	1 (0.87%)
Vascular Injury	29 (0.446%)	2 (0.654%)	1 (0.87%)
Death	28 (0.431%)	1 (0.327%)	5 (4.35%)

# Longitudinal Survival Stratified by Predicted Risk



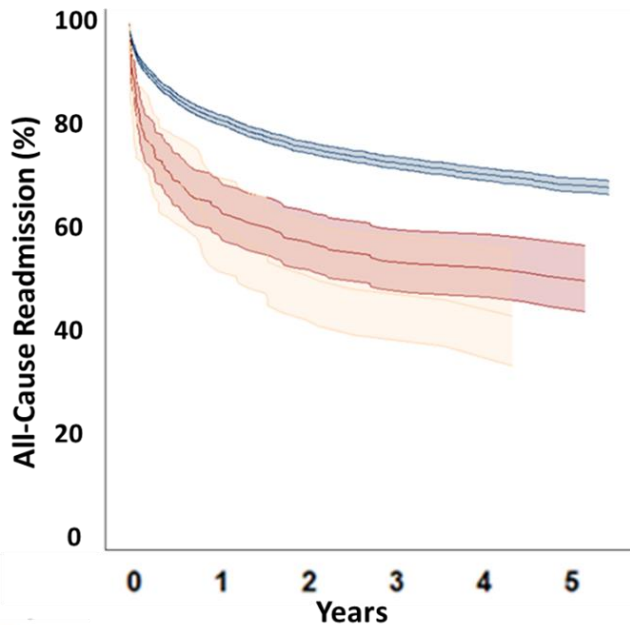
≤ 4	5974	4822	3663	2611	1744	905	692
4 to 8	269	195	142	122	80	65	34
≥ 8	94	63	52	32	NA	NA	NA



Predicted Risk							
< 1%	3154	2588	1955	1412	956	494	388
1.0-1.99%	1965	1544	1197	835	544	266	218
2.0-3.99%	875	696	526	393	244	148	135
4.0-7.99%	269	195	143	122	80	65	34
> 8%	94	63	52	32	NA	NA	NA

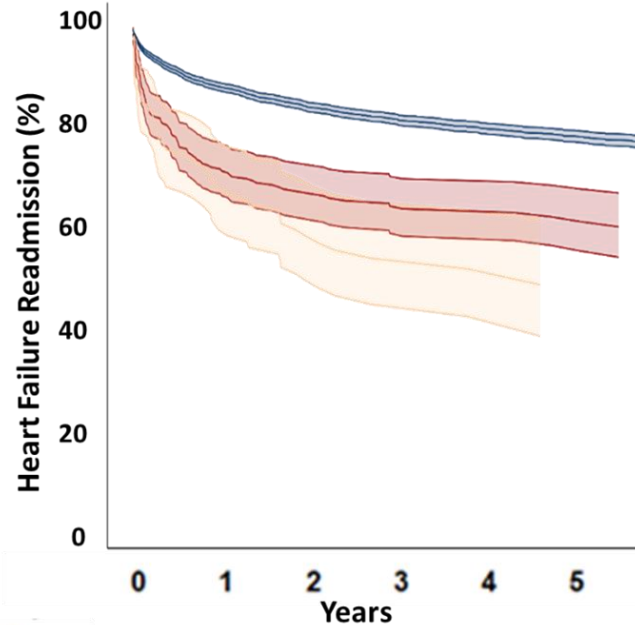
# Longitudinal Readmission Stratified by Predicted Risk

A.



<= 4	5185	3871	2888	2082	1368	1099
4 to 8	198	131	97	86	58	50
>= 8	74	46	31	22	14	NA

B.



<= 4	5185	3871	2888	2082	1368	1099
4 to 8	198	131	97	86	58	50
>= 8	74	46	31	22	14	NA

# Conclusion

- The majority of contemporary patients  $\leq 65$  years receiving TAVI outside of existing guidelines are of low surgical risk
- There is an important subgroup that has elevated medical comorbidities and prior sternotomy associated with a higher risk, with poor longitudinal survival that may be appropriate for TAVI
- The incidence of periprocedural complications is low overall but increases with increasing predicted risk

# Summary

- These findings in combination highlight the need for careful heart team discussions and guideline development for most young patients who are low surgical risk, who may have alternative options to optimize long-term outcomes.