# Outcomes of Patients With New LBBB After TAVR: Insights From the NCDR STS/ACC TVT Registry

Nickpreet Singh, MD MS

New York-Presbyterian/Weill Cornell Medical Center

STS/ACC TVT Registry™

The Society of Thoracic Surgeons

AMERICAN COLLEGE of CARDIOLOGY

# Disclosures, Funding Support, and Disclaimer

I, Nickpreet Singh, DO NOT have any relevant financial relationships to disclose.

This research was supported by the American College of Cardiology Foundations National Cardiovascular Data Registry (NCDR) and The Society of Thoracic Surgeons National Database. The views expressed in this presentation represent those of the author(s), and do not necessarily represent the official views of either organization. Learn more about the STS/ACC TVT Registry at *www.tvtregistry.org*.

Faculty disclosure information can be found on the app.

# Background

- Conduction disturbances (high degree AVB and LBBB) remain most frequent complication after TAVR
- Clinical implications for mortality unclear, with varying results depending on follow-up length, study size, and surgical risk
  - Meta-analysis suggests new LBBB associated with increased death and heart failure hospitalization at 1-year follow-up
- New LBBB associated with reduced recovery of LVEF and higher PPM implantation



Rodés-Cabau et al. *J Am Coll Cardiol.* 2019;74(8):1086-1106
Faroux et al. *Eur Heart J.* 2020;41(29):2771-2781

# Methods: Study Design

## Design

- **DESIGN:** Retrospective study of patients undergoing TAVR who develop new LBBB compared with those without new LBBB in TVT registry
- **OBJECTIVE:** Examine the association between new LBBB without pacemaker requirement with all-cause mortality (and other outcomes) at 1 year after TAVR

| Inclusion | Key Exclusion Criteria |
|---|---|
| Patients in TVT registry undergoing elective TAVR:<br>• For native AS<br>• Between 1/1/2016 – 9/30/2022 | • Pacemaker or conduction defect prior to TAVR<br>• Unsuccessful TAVR, emergency surgery, or death during index hospitalization<br>• Anticipated life expectancy of less than 1 year |

# Methods: Outcomes

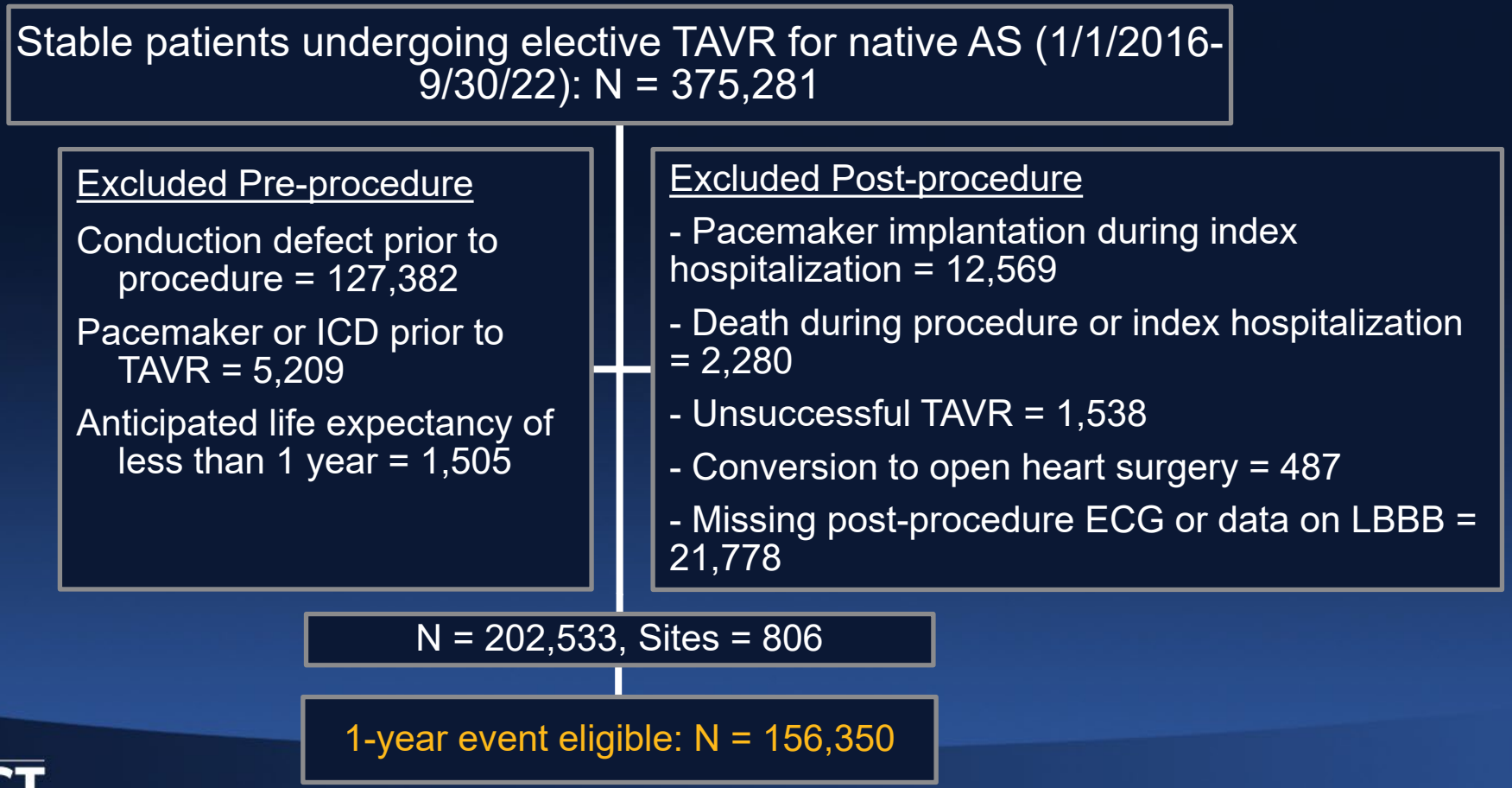
- *Primary*:
  - Mortality
- *Key Secondary:*
  - All-cause readmission
  - PPM/ICD implantation
  - KCCQ12
  - LVEF

All endpoints assessed at 1 year, unless otherwise noted

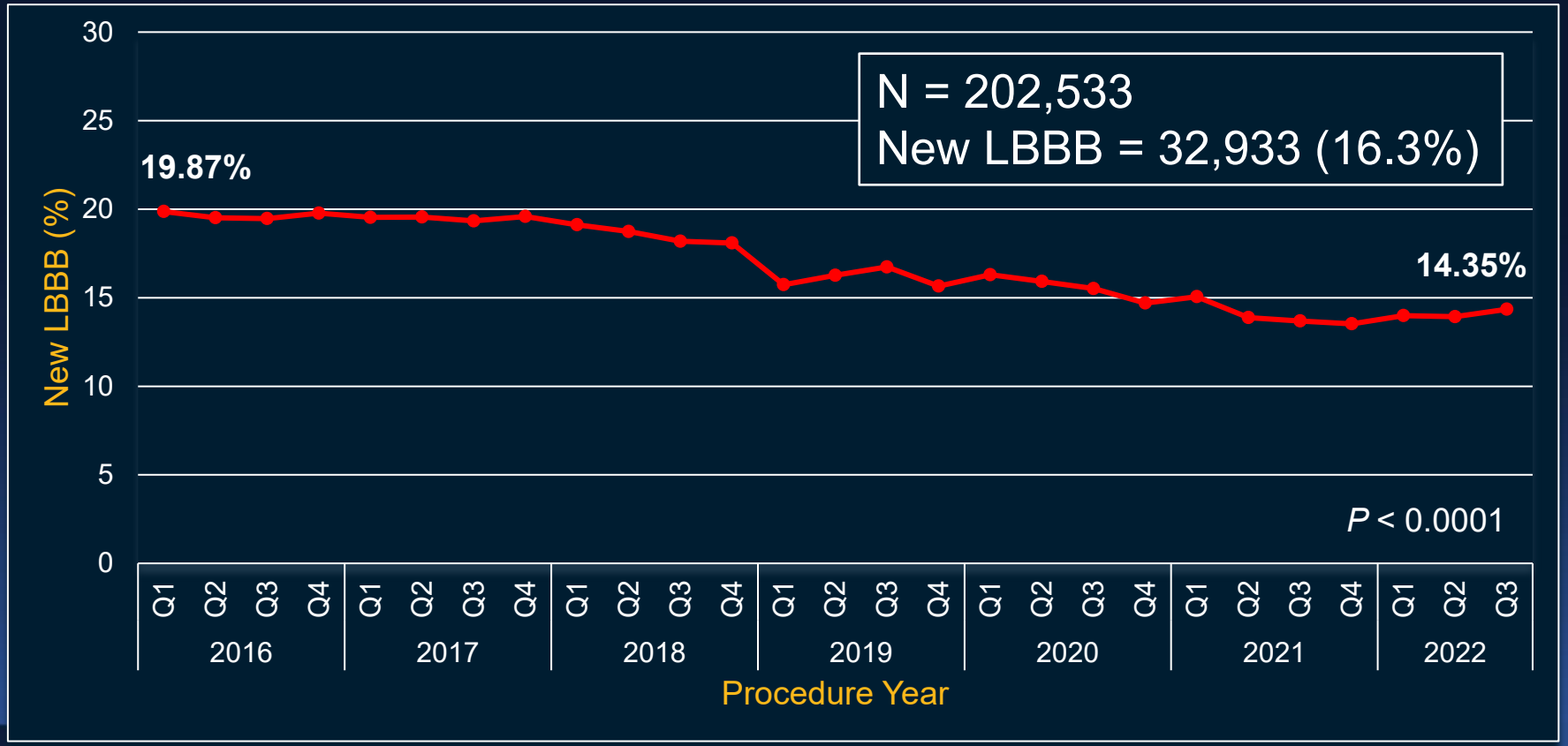
# Statistical Methods

- All endpoints assessed using Cox-proportional hazards regression models accounting for within-site clustering
  - Models adjusted for clinical, laboratory, echocardiographic, and procedural factors as well as immediate post-procedure complications
- IPW used for 1-year outcomes to account for missingness
- KCCQ-12 analyses restricted to sites with > 50% data completeness; LVEF to those with > 70% completeness

# Results: Study Consort Diagram



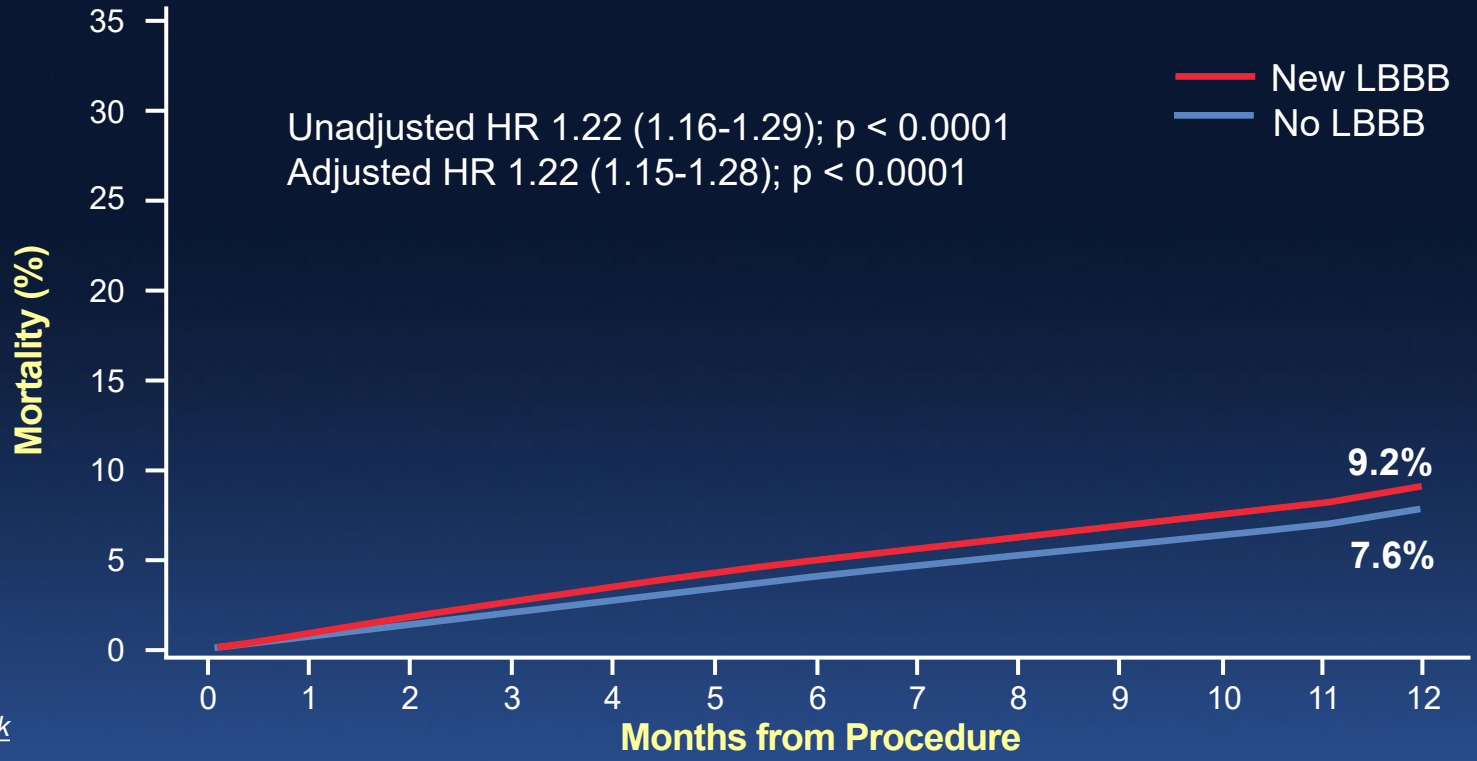
# Results: Rates of New LBBB Over Time



# Results: Selected Baseline Characteristics and Complications

| Variable | New LBBB, N = 32,933 | No LBBB, N = 169,600 | Std Diff Score |
|---|---|---|---|
| Age | 78.4 ± 8.5 | 78.5 ± 8.5 | 0.01 |
| Female sex | 52.1% | 48.0% | 0.08 |
| LVEF category | | | 0.02 |
| ≥ 50% | 86.3% | 85.7% | |
| 36-49% | 6.0% | 6.0% | |
| ≤ 35% | 7.9% | 8.3% | |
| Bicuspid valve | 5.5% | 5.5% | 0.04 |
| Baseline KCCQ-12 score | 51.8 ± 24.8 | 51.6 ± 25.0 | 0.01 |
| Site-assigned surgical risk | | | 0.08 |
| High | 42.5% | 39.2% | |
| Intermediate | 38.3% | 38.9% | |
| Low | 18.9% | 21.5% | |
| In-hospital stroke | 1.7% | 1.3% | 0.03 |
| VARC-3 in-hospital bleeding | | | 0.06 |
| Type 2 (major) | 3.0% | 2.4% | |
| Type 3 (life-threatening) | 1.3% | 1.0% | |

# Results: Primary Outcome (All-Cause Mortality)

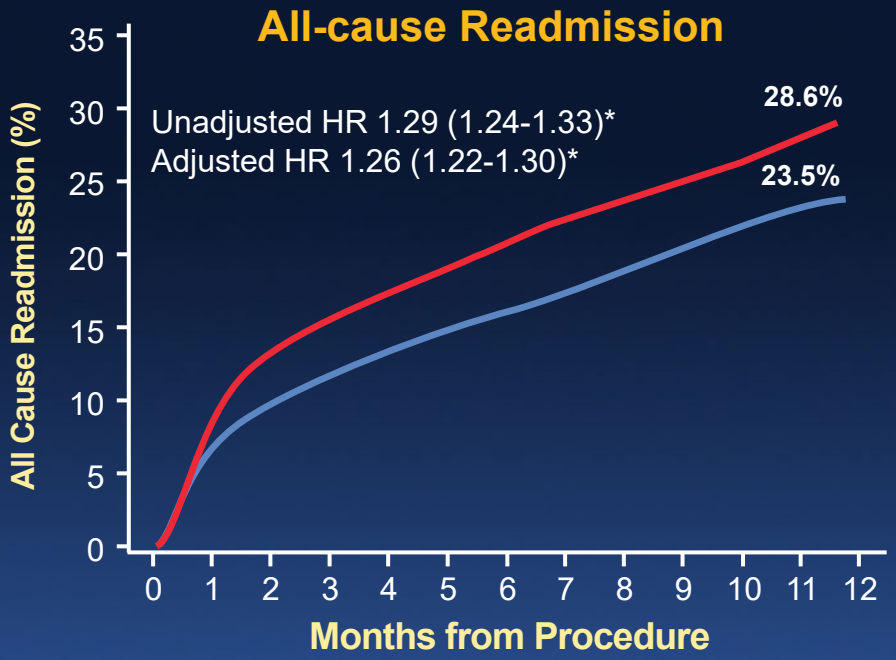


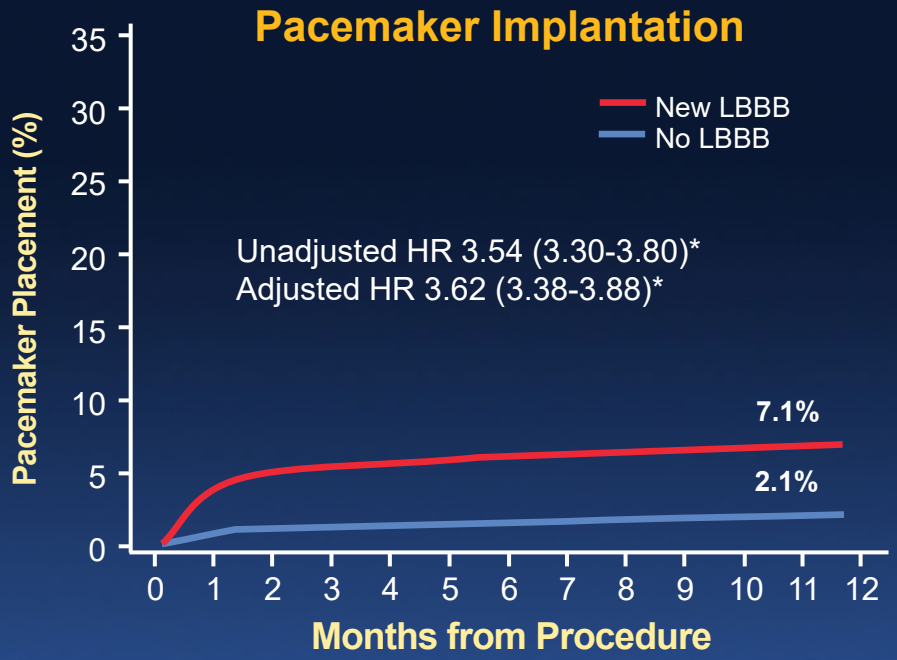

*No. at Risk*

| | | | |
|---|---|---|---|
| No LBBB | 129,856 | 102,621 | 78,274 |
| New LBBB | 26,494 | 20,962 | 15,656 |

CRF TCT

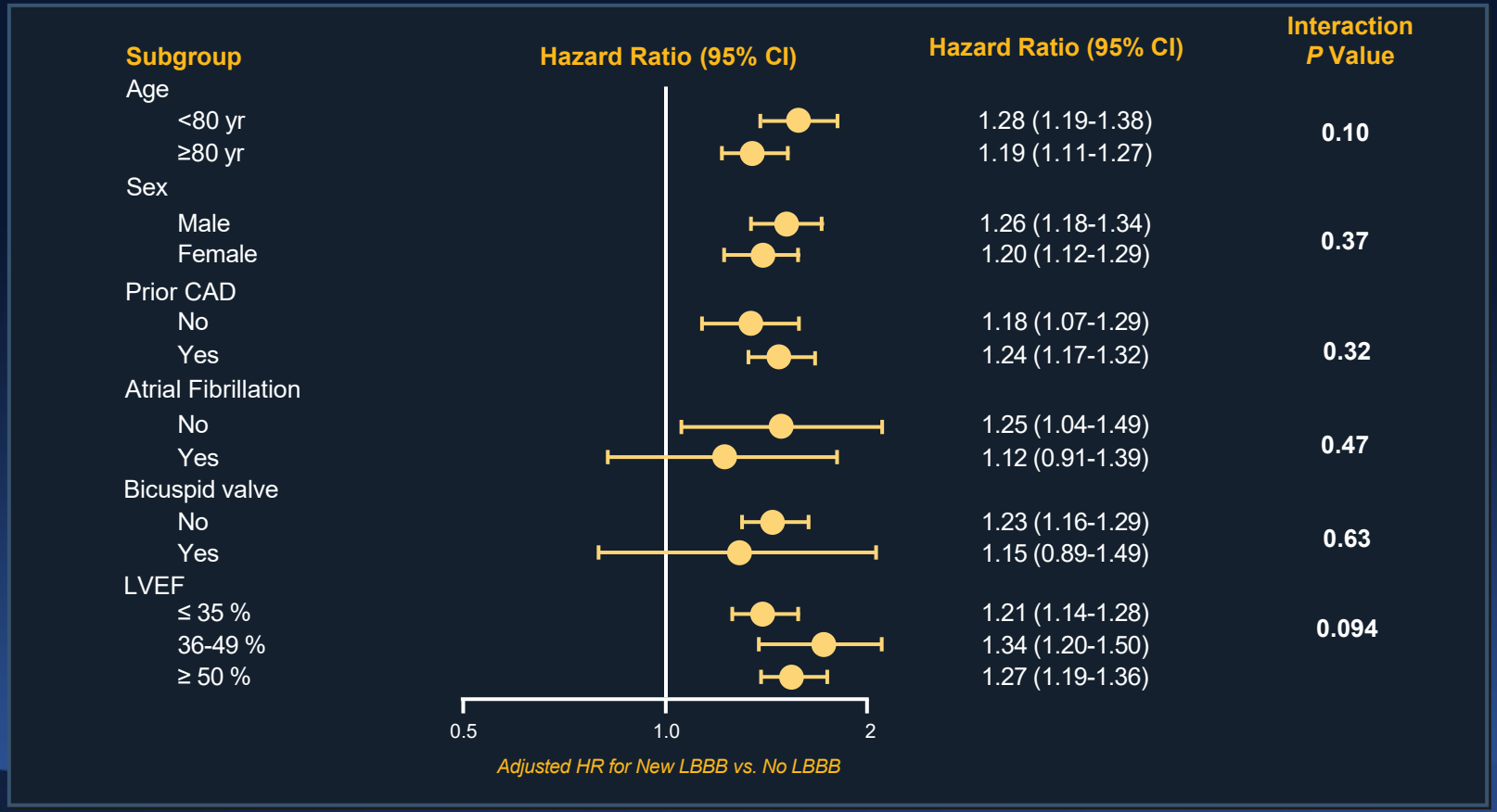
# Results: Key Secondary Outcomes




* P<0.0001 for all hazard ratios

# Results: Subgroup Analyses of Primary Outcome



# Results: Additional Secondary Outcomes

| Outcome | Adj. Coefficient (95% CI) | Adj. *P* Value |
|---|---|---|
| Δ LVEF (%) | -2.8 (-3.4 to -2.3) | < 0.001 |
| Δ KCCQ-12 | -1.8 (-2.2 to -1.3) | < 0.001 |
| Length of hospital stay (days) | +0.41 (0.33 to 0.50) | < 0.001 |

# Limitations

- Missingness of 1-year outcomes: mortality (18.2%), readmission (16.8%), PPM implantation (17.9%), KCCQ-12 (21.6%), and LVEF (14.2%)
  - Addressed using IPW
- Lack of outcomes data beyond 1 year
- Inability to adjust for unmeasured confounding factors, such as frailty

# Summary and Clinical Implications

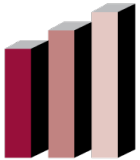
1. The incidence of new LBBB after TAVR has decreased over the past 5 years in the US
2. Development of new LBBB after TAVR is associated with adverse clinical outcomes at 1-year, including more frequent death and re-hospitalization and less improvement in LVEF and quality of life
3. These findings emphasize the importance of procedural strategies to minimize the development of LBBB
4. Future studies should evaluate the role of surveillance and device therapies (e.g, resynchronization/left bundle branch pacing) for patients who develop new LBBB after TAVR

# Acknowledgments and Co-Authors

- **Tamim Nazif**
- **David J Cohen**
- Martin B. Leon
- Ajay J. Kirtane
- Shmuel Chen
- **Miloni A. Shah**
- Amanda Stebbins
- Andrzej S. Kosinski
- Leo Brothers
- **Sreekanth Vemulapalli**


NCDR®

NATIONAL CARDIOVASCULAR DATA REGISTRY



STS National Database™

*Using data to drive quality*

STS/ACC TVT Registry™

The Society of Thoracic Surgeons

AMERICAN COLLEGE *of* CARDIOLOGY