SUPPLEMENTAL MATERIAL
## Table S1. Diagnosis and procedure codes used for this analysis.

### OPS codes

| Code       | Description                                           |
|------------|-------------------------------------------------------|
| 5-351.0*   | Surgical aortic valve replacement                     |
| 5-35a.0*   | Transcatheter aortic valve replacement                |
| 5-361.*, 5-362.*, 5-363.* | Coronary artery bypass graft |
| 363.*      |                                                       |
| 5-351.1*, 5-351.2*, 5-353.1, 5-353.2 | Surgical mitral valve replacement/reconstruction |
| 5-354*     | Surgical tricuspid valve replacement                  |
| 5-377.0 et seqq. | Permanent pacemaker implantation                 |

| 8-800.7*   | Transfusion of RBC                                    |
| since 2010:|                                                       |
| 8-800.c*   |                                                       |

### Diagnosis

| Code       | Description                                           |
|------------|-------------------------------------------------------|
| I35.0, I06.0 | Aortic valve stenosis (degenerative/rheumatic)       |
| I35.2, I06.2 | Combined aortic valve diseases (degenerative/rheumatic) |
| I50.1*     | Left ventricular congestive heart failure (according to NYHA classes) |
| I10*       | Arterial Hypertension                                |
| I25.11, I25.12, I25.13 | Coronary artery disease |
| I25.20, I25.21, I25.22 | Previous myocardial infarction (within 4 months/1 year/after 1 year) |
| Z95.1      | Previous coronary artery bypass graft                |
| Z95.1 – Z95.4 | Previous cardiac surgery                  |
| I70.20-I70.25, I70.8, I70.9, I73.9 | Peripheral vascular disease |
| I65.2      | Carotid disease                                      |
| I21*       | Acute myocardial infarction (within the last 28 days) |
| J44*       | Chronic obstructive pulmonary disease                |
| I27*       | Pulmonary hypertension                              |
| N18*       | Renal disease                                        |
| N17*       | Acute kidney injury                                  |
| I48.1*     | Atrial fibrillation                                  |
| E10* - E14* | Diabetes                                           |
| I63*, I64 | Stroke or cerebral infarction incl. occlusion and stenosis of cerebral and precerebral arteries, resulting in cerebral infarction |
Tables S2-S17 Legends (see Excel file):

Table S2. Analysis details, all patients (N=33,789).

**Analysis strategy 1:** Covariate adjustment: Logistic regression models with a random intercept at the center level

**Analysis strategy 2:** Propensity score adjustment: First, a logistic regression model was performed on all patient and procedural characteristics to calculate the propensity score. The propensity score represents the likelihood that the patient was in the TF-TAVR arm. Then, logistic regression models with a random intercept at the center level, the propensity score as continuous covariate and year 2015 as additional confounder were conducted.

SAVR: surgical aortic valve replacement; TF-TAVR: transfemoral transcatheter aortic valve replacement; SD: standard deviation; CAD: coronary artery disease; MI: myocardial infarction; CABG: coronary artery bypass graft; COPD: chronic obstructive pulmonary disease; GFR: glomerular filtration rate.

Table S3. Analysis details, patients <75 years of age (N=11,073).

**Analysis strategy 1:** Covariate adjustment: Logistic regression models with a random intercept at the center level

**Analysis strategy 2:** Propensity score adjustment: First, a logistic regression model was performed on all patient and procedural characteristics to calculate the propensity score. The propensity score represents the likelihood that the patient was in the TF-TAVR arm. Then, logistic regression models with a random intercept at the center level, the propensity score as continuous covariate and year 2015 as additional confounder were conducted.

SAVR: surgical aortic valve replacement; TF-TAVR: transfemoral transcatheter aortic valve replacement; SD: standard deviation; CAD: coronary artery disease; MI: myocardial infarction; CABG: coronary artery bypass graft; COPD: chronic obstructive pulmonary disease; GFR: glomerular filtration rate.

Table S4. Analysis details, patients <80 years of age (N=8,292).

**Analysis strategy 1:** Covariate adjustment: Logistic regression models with a random intercept at the center level

**Analysis strategy 2:** Propensity score adjustment: First, a logistic regression model was performed on all patient and procedural characteristics to calculate the propensity score. The propensity score represents the likelihood that the patient was in the TF-TAVR arm. Then, logistic regression models with a random intercept at the center level, the propensity score as continuous covariate and year 2015 as additional confounder were conducted.

SAVR: surgical aortic valve replacement; TF-TAVR: transfemoral transcatheter aortic valve replacement; SD: standard deviation; CAD: coronary artery disease; MI: myocardial infarction; CABG: coronary artery bypass graft; COPD: chronic obstructive pulmonary disease; GFR: glomerular filtration rate.
Table S5. Analysis details, patients <85 years of age (N=8,283).

Analysis strategy 1: Covariate adjustment: Logistic regression models with a random intercept at the center level

Analysis strategy 2: Propensity score adjustment: First, a logistic regression model was performed on all patient and procedural characteristics to calculate the propensity score. The propensity score represents the likelihood that the patient was in the TF-TAVR arm. Then, logistic regression models with a random intercept at the center level, the propensity score as continuous covariate and year 2015 as additional confounder were conducted.

SAVR: surgical aortic valve replacement; TF-TAVR: transfemoral transcatheter aortic valve replacement; SD: standard deviation; CAD: coronary artery disease; MI: myocardial infarction; CABG: coronary artery bypass graft; COPD: chronic obstructive pulmonary disease; GFR: glomerular filtration rate.

Table S6. Analysis details, patients 85+ years of age (N= 6,141).

Analysis strategy 1: Covariate adjustment: Logistic regression models with a random intercept at the center level

Analysis strategy 2: Propensity score adjustment: First, a logistic regression model was performed on all patient and procedural characteristics to calculate the propensity score. The propensity score represents the likelihood that the patient was in the TF-TAVR arm. Then, logistic regression models with a random intercept at the center level, the propensity score as continuous covariate and year 2015 as additional confounder were conducted.

SAVR: surgical aortic valve replacement; TF-TAVR: transfemoral transcatheter aortic valve replacement; SD: standard deviation; CAD: coronary artery disease; MI: myocardial infarction; CABG: coronary artery bypass graft; COPD: chronic obstructive pulmonary disease; GFR: glomerular filtration rate.

Table S7. Analysis details, female patients (N=16,308).

Analysis strategy 1: Covariate adjustment: Logistic regression models with a random intercept at the center level

Analysis strategy 2: Propensity score adjustment: First, a logistic regression model was performed on all patient and procedural characteristics to calculate the propensity score. The propensity score represents the likelihood that the patient was in the TF-TAVR arm. Then, logistic regression models with a random intercept at the center level, the propensity score as continuous covariate and year 2015 as additional confounder were conducted.

SAVR: surgical aortic valve replacement; TF-TAVR: transfemoral transcatheter aortic valve replacement; SD: standard deviation; CAD: coronary artery disease; MI: myocardial infarction; CABG: coronary artery bypass graft; COPD: chronic obstructive pulmonary disease; GFR: glomerular filtration rate.

Table S8. Analysis details, patients in NYHA class III or IV (N=13,318).
Analysis strategy 1: Covariate adjustment: Logistic regression models with a random intercept at the center level

Analysis strategy 2: Propensity score adjustment: First, a logistic regression model was performed on all patient and procedural characteristics to calculate the propensity score. The propensity score represents the likelihood that the patient was in the TF-TAVR arm. Then, logistic regression models with a random intercept at the center level, the propensity score as continuous covariate and year 2015 as additional confounder were conducted.

SAVR: surgical aortic valve replacement; TF-TAVR: transfemoral transcatheter aortic valve replacement; SD: standard deviation; CAD: coronary artery disease; MI: myocardial infarction; CABG: coronary artery bypass graft; COPD: chronic obstructive pulmonary disease; GFR: glomerular filtration rate.

Table S9. Analysis details, patients with previous CABG (N=2,143).

Analysis strategy 1: Covariate adjustment: Logistic regression models with a random intercept at the center level

Analysis strategy 2: Propensity score adjustment: First, a logistic regression model was performed on all patient and procedural characteristics to calculate the propensity score. The propensity score represents the likelihood that the patient was in the TF-TAVR arm. Then, logistic regression models with a random intercept at the center level, the propensity score as continuous covariate and year 2015 as additional confounder were conducted.

SAVR: surgical aortic valve replacement; TF-TAVR: transfemoral transcatheter aortic valve replacement; SD: standard deviation; CAD: coronary artery disease; MI: myocardial infarction; CABG: coronary artery bypass graft; COPD: chronic obstructive pulmonary disease; GFR: glomerular filtration rate.

Table S10. Analysis details, patients with atherosclerotic disease (N=2,433).

Analysis strategy 1: Covariate adjustment: Logistic regression models with a random intercept at the center level

Analysis strategy 2: Propensity score adjustment: First, a logistic regression model was performed on all patient and procedural characteristics to calculate the propensity score. The propensity score represents the likelihood that the patient was in the TF-TAVR arm. Then, logistic regression models with a random intercept at the center level, the propensity score as continuous covariate and year 2015 as additional confounder were conducted.

SAVR: surgical aortic valve replacement; TF-TAVR: transfemoral transcatheter aortic valve replacement; SD: standard deviation; CAD: coronary artery disease; MI: myocardial infarction; CABG: coronary artery bypass graft; COPD: chronic obstructive pulmonary disease; GFR: glomerular filtration rate.

Table S11. Analysis details, patients with COPD (N=3,900).

Analysis strategy 1: Covariate adjustment: Logistic regression models with a random intercept at the center level
Analysis strategy 2: Propensity score adjustment: First, a logistic regression model was performed on all patient and procedural characteristics to calculate the propensity score. The propensity score represents the likelihood that the patient was in the TF-TAVR arm. Then, logistic regression models with a random intercept at the center level, the propensity score as continuous covariate and year 2015 as additional confounder were conducted.

SAVR: surgical aortic valve replacement; TF-TAVR: transfemoral transcatheter aortic valve replacement; SD: standard deviation; CAD: coronary artery disease; MI: myocardial infarction; CABG: coronary artery bypass graft; COPD: chronic obstructive pulmonary disease; GFR: glomerular filtration rate.

Table S12. Analysis details, patients with pulmonary hypertension (N=5,616).

Analysis strategy 1: Covariate adjustment: Logistic regression models with a random intercept at the center level

Analysis strategy 2: Propensity score adjustment: First, a logistic regression model was performed on all patient and procedural characteristics to calculate the propensity score. The propensity score represents the likelihood that the patient was in the TF-TAVR arm. Then, logistic regression models with a random intercept at the center level, the propensity score as continuous covariate and year 2015 as additional confounder were conducted.

SAVR: surgical aortic valve replacement; TF-TAVR: transfemoral transcatheter aortic valve replacement; SD: standard deviation; CAD: coronary artery disease; MI: myocardial infarction; CABG: coronary artery bypass graft; COPD: chronic obstructive pulmonary disease; GFR: glomerular filtration rate.

Table S13. Analysis details, patients with GFR < 30ml (N=1,647).

Analysis strategy 1: Covariate adjustment: Logistic regression models with a random intercept at the center level

Analysis strategy 2: Propensity score adjustment: First, a logistic regression model was performed on all patient and procedural characteristics to calculate the propensity score. The propensity score represents the likelihood that the patient was in the TF-TAVR arm. Then, logistic regression models with a random intercept at the center level, the propensity score as continuous covariate and year 2015 as additional confounder were conducted.

SAVR: surgical aortic valve replacement; TF-TAVR: transfemoral transcatheter aortic valve replacement; SD: standard deviation; CAD: coronary artery disease; MI: myocardial infarction; CABG: coronary artery bypass graft; COPD: chronic obstructive pulmonary disease; GFR: glomerular filtration rate.

Table S14. Analysis details, patients with diabetes (N=10,046).

Analysis strategy 1: Covariate adjustment: Logistic regression models with a random intercept at the center level

Analysis strategy 2: Propensity score adjustment: First, a logistic regression model was performed on all patient and procedural characteristics to calculate the propensity score. The propensity score
represents the likelihood that the patient was in the TF-TAVR arm. Then, logistic regression models with a random intercept at the center level, the propensity score as continuous covariate and year 2015 as additional confounder were conducted.

SAVR: surgical aortic valve replacement; TF-TAVR: transfemoral transcatheter aortic valve replacement; SD: standard deviation; CAD: coronary artery disease; MI: myocardial infarction; CABG: coronary artery bypass graft; COPD: chronic obstructive pulmonary disease; GFR: glomerular filtration rate.

**Table S15. Analysis details, patients with EuroSCORE < 4 (N=7,053).**

**Analysis strategy 1:** Covariate adjustment: Logistic regression models with a random intercept at the center level

**Analysis strategy 2:** Propensity score adjustment: First, a logistic regression model was performed on all patient and procedural characteristics to calculate the propensity score. The propensity score represents the likelihood that the patient was in the TF-TAVR arm. Then, logistic regression models with a random intercept at the center level, the propensity score as continuous covariate and year 2015 as additional confounder were conducted.

SAVR: surgical aortic valve replacement; TF-TAVR: transfemoral transcatheter aortic valve replacement; SD: standard deviation; CAD: coronary artery disease; MI: myocardial infarction; CABG: coronary artery bypass graft; COPD: chronic obstructive pulmonary disease; GFR: glomerular filtration rate.

**Table S16. Analysis details, patients with EuroSCORE 4-9 (N=12,314).**

**Analysis strategy 1:** Covariate adjustment: Logistic regression models with a random intercept at the center level

**Analysis strategy 2:** Propensity score adjustment: First, a logistic regression model was performed on all patient and procedural characteristics to calculate the propensity score. The propensity score represents the likelihood that the patient was in the TF-TAVR arm. Then, logistic regression models with a random intercept at the center level, the propensity score as continuous covariate and year 2015 as additional confounder were conducted.

SAVR: surgical aortic valve replacement; TF-TAVR: transfemoral transcatheter aortic valve replacement; SD: standard deviation; CAD: coronary artery disease; MI: myocardial infarction; CABG: coronary artery bypass graft; COPD: chronic obstructive pulmonary disease; GFR: glomerular filtration rate.

**Table S17. Analysis details, patients with EuroSCORE >9 (N=14,402).**

**Analysis strategy 1:** Covariate adjustment: Logistic regression models with a random intercept at the center level

**Analysis strategy 2:** Propensity score adjustment: First, a logistic regression model was performed on all patient and procedural characteristics to calculate the propensity score. The propensity score represents the likelihood that the patient was in the TF-TAVR arm. Then, logistic regression models
with a random intercept at the center level, the propensity score as continuous covariate and year 2015 as additional confounder were conducted.

SAVR: surgical aortic valve replacement; TF-TAVR: transfemoral transcatheter aortic valve replacement; SD: standard deviation; CAD: coronary artery disease; MI: myocardial infarction; CABG: coronary artery bypass graft; COPD: chronic obstructive pulmonary disease; GFR: glomerular filtration rate.
Figure S1. Results regarding different subgroups, outcomes and adjustment strategies

All Patients

<75 years

75-79

80-84

>=85

Peripheral vascular disease

All Patients

<75 years

75-79

80-84

>=85

Peripheral vascular disease

TF-TAVR better ↔ SAVR better

mortality

stroke

AKI

bleeding

ventilation

PPI

odds ratios and 95% confidence intervals

Propensity score adjustment

Regression adjustment

mortality

stroke

AKI

bleeding

ventilation

PPI

odds ratios and 95% confidence intervals

Propensity score adjustment

Regression adjustment

mortality

stroke

AKI

bleeding

ventilation

PPI

odds ratios and 95% confidence intervals

Propensity score adjustment

Regression adjustment

mortality

stroke

AKI

bleeding

ventilation

PPI

odds ratios and 95% confidence intervals

Propensity score adjustment

Regression adjustment

mortality

stroke

AKI

bleeding

ventilation

PPI

odds ratios and 95% confidence intervals

Propensity score adjustment

Regression adjustment

mortality

stroke

AKI

bleeding

ventilation

PPI

odds ratios and 95% confidence intervals

Propensity score adjustment

Regression adjustment

mortality

stroke

AKI

bleeding

ventilation

PPI

odds ratios and 95% confidence intervals

Propensity score adjustment

Regression adjustment
EuroSCORE < 4

- TF-AVR better ↔ sAVR better

mortality
stroke
AKI
bleeding
ventilation
PPI

0.15 0.5 1 2 3 4 5 7
odds ratios and 95% confidence intervals

Propensity score adjustment
Regression adjustment

Female sex

- TF-AVR better ↔ sAVR better

mortality
stroke
AKI
bleeding
ventilation
PPI

0.15 0.5 1 2 3 4 5
odds ratios and 95% confidence intervals

Propensity score adjustment
Regression adjustment

EuroSCORE 4-9

- TF-AVR better ↔ sAVR better

mortality
stroke
AKI
bleeding
ventilation
PPI

0.15 0.5 1 2 3 4 5 7
odds ratios and 95% confidence intervals

Propensity score adjustment
Regression adjustment

EuroSCORE > 9

- TF-AVR better ↔ sAVR better

mortality
stroke
AKI
bleeding
ventilation
PPI

0.15 0.5 1 2 3 4 5
odds ratios and 95% confidence intervals

Propensity score adjustment
Regression adjustment
| Subgroup               | SAVR N | TF-TAVR N | Risk-adjusted additional length of stay | days  | 95% CI       | P Value |
|-----------------------|--------|-----------|-----------------------------------------|-------|--------------|---------|
| All patients          | 13,151 | 20,638    |                                         | -1.33 | -1.60 - -1.06| <0.001  |
| Age <75 years         | 8,793  | 2,280     |                                         | -1.35 | -1.85 - -0.85| <0.001  |
| Age 75-79 years       | 3,225  | 5,067     |                                         | -1.27 | -1.74 - -0.80| <0.001  |
| Age 80-84 years       | 980    | 7,303     |                                         | -1.46 | -2.06 - -0.85| <0.001  |
| Age >=85 years        | 153    | 5,936     |                                         | -2.83 | -4.24 - -1.42| <0.001  |
| EuroSCORE <4          | 6,280  | 748       |                                         | -0.85 | -1.41 - -0.28| 0.003   |
| EuroSCORE 4-9         | 5,056  | 7,258     |                                         | -1.31 | -1.68 - -0.94| <0.001  |
| EuroSCORE >9          | 1,770  | 12,632    |                                         | -2.34 | -2.92 - -1.77| <0.001  |
| female                | 5,057  | 11,251    |                                         | -0.88 | -1.29 - -0.48| <0.001  |
| heart failure (NYHA III/IV) | 3,746 | 9,572     |                                         | -0.89 | -1.41 - -0.37| 0.001   |
| previous CABG         | 248    | 1,895     |                                         | -4.28 | -5.79 - -2.76| <0.001  |
| peripheral vascular disease | 598   | 1,835     |                                         | -1.97 | -3.25 - -0.69| 0.002   |
| COPD                  | 1,189  | 2,711     |                                         | -1.63 | -2.62 - -0.63| 0.001   |
| pulmonary hypertension| 1,330  | 4,286     |                                         | -1.88 | -2.76 - -1.00| <0.001  |
| renal failure (GFR <30) | 285   | 1,362     |                                         | -5.40 | -7.51 - -3.30| <0.001  |
| diabetes              | 3,311  | 6,735     |                                         | -1.45 | -2.01 - -0.90| <0.001  |

TF-TAVR better ↔ SAVR better