

## Supplementary data

**Supplementary Table 1. Baseline demographic characteristics according to prosthesis implanted.**

<b>Characteristic</b>	<b>Evolut R/Pro (n = 750)</b>	<b>Acurate Neo (n = 170)</b>	<b>Portico (n = 172)</b>	<b>Sapien 3 (n = 286)</b>	<b>P value</b>
Age, years	83.0 ± 6.3	83.0 ± 5.8	82.7 ± 5.9	82.5 ± 6.5	0.689
Female	89.1 (668)	90.6 (154)	91.3 (157)	88.8 (254)	0.781
Weight, kg	63.2 ± 14.5	64.5 ± 12.9	66.2 ± 13.8	67.5 ± 16.4	<b>&lt;0.001</b>
Height, cm	157.2 ± 7.8	157.8 ± 7.1	157.7 ± 6.0	159.1 ± 8.5	<b>0.009</b>
Body surface area, m <sup>2</sup>	1.62 ± 0.21	1.66 ± 0.17	1.70 ± 0.19	1.71 ± 0.23	<b>&lt;0.001</b>
Body mass index, kg/m <sup>2</sup>	25.9 ± 5.5	26.1 ± 4.6	26.7 ± 5.2	26.5 ± 5.5	0.204
Hypertension	84.5 (633)	82.3 (140)	86.6 (149)	89.2 (255)	0.157
Diabetes mellitus	25.3 (190)	25.9 (44)	30.8 (53)	26.9 (77)	0.527
Dyslipidemia	53.9 (403)	50.0 (85)	50.3 (86)	48.4 (138)	0.396
COPD	10.3 (77)	14.1 (24)	6.4 (11)	16.1 (46)	<b>0.006</b>
Peripheral artery disease or previous PTA	13.7 (99)	8.2 (14)	10.0 (17)	9.5 (26)	<b>0.090</b>
Cerebrovascular disease	9.3 (70)	5.9 (10)	12.3 (21)	14.7 (42)	<b>0.012</b>
Previous PCI	20.4 (153)	19.4 (33)	27.5 (47)	23.9 (68)	0.149
Previous CABG	5.9 (44)	4.1 (7)	5.8 (10)	7.3 (21)	0.569
Previous MI	8.8 (65)	10.2 (16)	10.5 (18)	10.2 (29)	0.842

Coronary artery disease	37.0 (276)	31.2 (53)	36.3 (62)	46.8 (134)	<b>0.004</b>
PM or ICD	10.3 (77)	11.2 (19)	11.6 (20)	14.3 (41)	0.332
Atrial fibrillation	31.3 (143)	31.2 (39)	32.8 (43)	21.9 (44)	<b>0.066</b>
Angina	19.2 (132)	19.4 (33)	17.2 (20)	27.8 (45)	<b>0.075</b>
NYHA class III or IV	67.5 (506)	57.6 (98)	70.9 (122)	71.0 (203)	<b>0.019</b>
STS-PROM, %	6.0 ± 4.4	5.5 ± 3.8	5.1 ± 2.7	5.7 ± 3.6	<b>0.072</b>

Values are mean ± standard deviation or %(n). The values in **bold** represent differences between groups with p <0.100.

BAV = balloon aortic valvuloplasty; BMI = body mass index; BSA = body surface area; CABG = coronary artery bypass graft; CAD = coronary artery disease; COPD = chronic obstructive pulmonary disease; ICD = implantable cardioverter-defibrillator; MI = myocardial infarction; NT-proBNP = N-terminal pro-brain natriuretic peptide; NYHA = New York Heart Association; PTA = percutaneous transluminal angioplasty; PCI = percutaneous coronary intervention; PM = pacemaker; STS-PROM = Society of Thoracic Surgeons Predicted Risk of Mortality.

P values for Age

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	1.000		
<b>Portico</b>	1.000	1.000	
<b>Sapien 3</b>	1.000	1.000	1.000

P values for Female

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.561		
<b>Portico</b>	0.394	0.824	
<b>Sapien 3</b>	0.906	0.550	0.399

P values for BMI

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	1.000		
<b>Portico</b>	0.489	1.000	
<b>Sapien 3</b>	0.573	1.000	1.000

P values for BSA

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.868		
<b>Portico</b>	<b>0.001</b>	1.000	
<b>Sapien 3</b>	<b>&lt;0.001</b>	0.656	1.000

P values for Weight

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	1.000		
<b>Portico</b>	<b>0.098</b>	1.000	
<b>Sapien 3</b>	<b>&lt;0.001</b>	0.208	1.000

P values for Diabetes Mellitus

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.882		
<b>Portico</b>	0.141	0.312	
<b>Sapien 3</b>	0.601	0.808	0.371

P values for Dyslipidemia

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.360		
<b>Portico</b>	0.397	0.957	
<b>Sapien 3</b>	0.117	0.744	0.699

P values for Hypertension

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.487		
<b>Portico</b>	0.485	0.275	
<b>Sapien 3</b>	<b>0.055</b>	<b>0.039</b>	0.416

P values for COPD

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.149		
<b>Portico</b>	0.123	<b>0.019</b>	
<b>Sapien 3</b>	<b>0.010</b>	0.573	<b>0.003</b>

P values for Peripheral artery disease or previous PTA

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	<b>0.054</b>		
<b>Portico</b>	0.198	0.572	
<b>Sapien 3</b>	<b>0.076</b>	0.645	0.869

P values for Cerebrovascular disease

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.149		
<b>Portico</b>	0.244	<b>0.040</b>	
<b>Sapien 3</b>	<b>0.013</b>	<b>0.004</b>	0.471

P values for Previous PCI

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.760		
<b>Portico</b>	<b>0.044</b>	<b>0.079</b>	
<b>Sapien 3</b>	0.222	0.261	0.400

P values for Previous CABG

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.365		
<b>Portico</b>	0.986	0.463	
<b>Sapien 3</b>	0.387	0.165	0.539

P values for Previous MI

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.590		
<b>Portico</b>	0.489	0.921	
<b>Sapien 3</b>	0.505	0.996	0.905

P values for Coronary artery disease

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.153		
<b>Portico</b>	0.856	0.321	
<b>Sapien 3</b>	<b>0.004</b>	<b>0.001</b>	<b>0.027</b>

P values for PM or ICD

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.726		
<b>Portico</b>	0.600	0.896	
<b>Sapien 3</b>	<b>0.065</b>	0.335	0.409

P values for Atrial fibrillation

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.984		
<b>Portico</b>	0.739	0.781	
<b>Sapien 3</b>	<b>0.014</b>	<b>0.061</b>	<b>0.027</b>

P values for Angina

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.947		
<b>Portico</b>	0.621	0.643	
<b>Sapien 3</b>	<b>0.015</b>	<b>0.072</b>	<b>0.041</b>

P values for NYHA functional class III or IV

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	<b>0.015</b>		
<b>Portico</b>	0.379	0.010	
<b>Sapien 3</b>	0.277	<b>0.004</b>	0.991

P values for STS-PROM

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	1.000		
<b>Portico</b>	<b>0.079</b>	1.000	
<b>Sapien 3</b>	1.000	1.000	0.711

**Supplementary Table 2. Baseline echocardiographic and computed tomography characteristics according to prosthesis implanted.**

<b>Characteristic</b>	<b>Evolut R/Pro (n = 750)</b>	<b>Acurate Neo (n = 170)</b>	<b>Portico (n = 172)</b>	<b>Sapien 3 (n = 286)</b>	<b>P value</b>
<b>Echocardiographic data</b>					
Mean AV gradient, mmHg	48.7 ± 16.0	50.2 ± 16.8	46.8 ± 15.8	44.3 ± 15.3	<b>&lt;0.001</b>
Maximum AV gradient, mmHg	80.0 ± 24.8	79.9 ± 24.7	74.0 ± 23.9	72.3 ± 24.4	<b>&lt;0.001</b>
EOAm, cm <sup>2</sup>	0.63 ± 0.18	0.66 ± 0.20	0.65 ± 0.22	0.67 ± 0.27	<b>0.048</b>
sPAP, mmHg	39.6 ± 13.4	39.6 ± 11.4	42.7 ± 14.8	41.5 ± 15.2	<b>0.077</b>
TAPSE	21.1 ± 3.9	20.8 ± 3.2	20.6 ± 3.0	20.0 ± 2.9	0.181
Bicuspid AV	3.7 (20)	2.5 (4)	3.6 (6)	7.3 (19)	<b>0.055</b>
Moderate or greater AR	7.9 (52)	10.2 (15)	4.3 (7)	3.4 (9)	<b>0.018</b>
Moderate or greater MR	10.2 (71)	11.0 (17)	10.2 (17)	2.6 (7)	<b>0.001</b>
Moderate or greater TR	8.8 (47)	5.0 (7)	6.7 (11)	3.8 (9)	<b>0.060</b>
Ejection fraction	58.5 ± 11.1	56.5 ± 9.6	59.9 ± 9.2	62.2 ± 10.2	<b>&lt;0.001</b>
LVEF <40%	6.0 (45)	6.5 (11)	3.5 (6)	3.1 (9)	0.169
<b>CT data</b>					
Mean annular diameter, mm	21.1 ± 1.4	21.5 ± 1.3	21.2 ± 1.3	21.4 ± 1.0	<b>&lt;0.001</b>
Maximum diameter, mm	23.6 ± 1.9	23.7 ± 1.8	23.9 ± 1.8	24.0 ± 1.4	<b>0.007</b>
Minimum diameter, mm	18.7 ± 1.9	19.3 ± 1.9	18.4 ± 1.6	18.9 ± 1.5	<b>&lt;0.001</b>
Annular eccentricity	1.27 ± 0.17	1.24 ± 0.15	1.30 ± 0.16	1.28 ± 0.18	<b>0.010</b>
Mean aortic annular perimeter, mm	67.3 ± 3.7	67.4 ± 3.3	67.6 ± 3.4	65.0 ± 5.9	<b>&lt;0.001</b>
Mean aortic annular area, mm <sup>2</sup>	345.6 ± 35.3	352.6 ± 36.0	343.8 ± 33.1	362.3 ± 28.7	<b>&lt;0.001</b>
Area-derived diameter, mm	20.9 ± 1.1	21.2 ± 1.1	20.9 ± 1.0	21.5 ± 0.9	<b>&lt;0.001</b>

Perimeter-derived diameter, mm	21.4 ± 1.2	21.5 ± 1.0	21.5 ± 1.2	20.7 ± 1.9	<b>&lt;0.001</b>
Severe leaflets calcification	18.1 (88)	20.6 (19)	8.6 (8)	24.5 (70)	<b>0.005</b>
Severe annular calcification	6.0 (24)	7.5 (5)	3.5 (5)	1.5 (4)	<b>0.015</b>
Severe LVOT calcification	5.8 (30)	5.1 (4)	2.1 (2)	1.4 (4)	<b>0.009</b>
LMCA distance, mm	12.5 ± 2.5	11.7 ± 2.5	12.0 ± 2.8	12.8 ± 2.6	<b>&lt;0.001</b>
RCA distance, mm	14.4 ± 2.9	13.5 ± 3.2	14.5 ± 2.6	14.7 ± 2.5	<b>0.006</b>
Sinotubular junction diameter, mm	25.7 ± 2.7	26.1 ± 3.1	26.3 ± 2.7	25.9 ± 2.4	0.119
Sinus of Valsalva diameter, mm	28.8 ± 2.5	29.1 ± 2.9	29.0 ± 2.4	28.4 ± 2.5	<b>0.053</b>
Ascending aorta diameter, mm	31.5 ± 3.8	32.3 ± 4.1	32.8 ± 4.3	32.0 ± 3.8	<b>0.007</b>
Porcelain aorta	2.7 (17)	2.5 (4)	5.4 (9)	11.9 (31)	<b>&lt;0.001</b>

Values are mean ± standard deviation or %(n). The values in **bold** represent differences between groups with p <0.100.

AV = aortic valve; AR = aortic regurgitation; EOA = effective orifice area; LMCA = left main coronary artery; LVEF = left ventricular ejection fraction; LVEDV = left ventricular end systolic volume; LVESV = left ventricular end systolic volume; LVOT = left ventricular outflow tract; MDCT = multidetector computed tomographic; MR = mitral regurgitation; sPAP = systolic pulmonary artery pressure; RCA = right coronary artery; RV = right ventricular; TR = tricuspid regurgitation; other abbreviations as in **Supplementary Table 1**.

P values for pre-procedural mean aortic valve gradient

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	1.000		
<b>Portico</b>	0.954	0.307	
<b>Sapien 3</b>	<b>0.001</b>	<b>0.001</b>	0.692



P values for pre-procedural maximum aortic valve gradient

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	1.000		
<b>Portico</b>	<b>0.040</b>	0.221	
<b>Sapien 3</b>	<b>&lt;0.001</b>	<b>0.014</b>	1.000

P values for EOAm

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.796		
<b>Portico</b>	1.000	1.000	
<b>Sapien 3</b>	<b>0.061</b>	1.000	1.000

P values for sPAP

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	1.000		
<b>Portico</b>	0.154	0.480	
<b>Sapien 3</b>	0.583	1.000	1.000

P values for TAPSE

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	1.000		
<b>Portico</b>	1.000	1.000	
<b>Sapien 3</b>	0.216	1.000	1.000

P values for Bicuspid aorta

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.481		
<b>Portico</b>	0.943	0.586	
<b>Sapien 3</b>	<b>0.025</b>	<b>0.037</b>	0.106

P values for Moderate or greater AR

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.353		
<b>Portico</b>	0.121	<b>0.046</b>	
<b>Sapien 3</b>	<b>0.015</b>	<b>0.005</b>	0.638

P values for Moderate or greater MR

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.790		
<b>Portico</b>	0.999	0.833	
<b>Sapien 3</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>	<b>0.001</b>

P values for Moderate or greater TR

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.141		
<b>Portico</b>	0.386	0.540	
<b>Sapien 3</b>	<b>0.013</b>	0.572	0.192

P values for Ejection fraction

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.189		
<b>Portico</b>	0.641	<b>0.019</b>	
<b>Sapien 3</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>	0.133

P values for LVEF <40%

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.817		
<b>Portico</b>	0.194	0.205	
<b>Sapien 3</b>	<b>0.065</b>	<b>0.094</b>	0.842

P values for mean aortic annulus diameter

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	<b>0.014</b>		
<b>Portico</b>	1.000	0.123	
<b>Sapien 3</b>	<b>0.006</b>	1.000	0.151

P values for maximum aortic annulus diameter

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	1.000		
<b>Portico</b>	0.287	1.000	
<b>Sapien 3</b>	<b>0.006</b>	0.790	1.000

P values for minimum aortic annulus diameter

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	<b>0.002</b>		
<b>Portico</b>	0.533	<b>&lt;0.001</b>	
<b>Sapien 3</b>	0.725	0.208	<b>0.052</b>

P values for Mean aortic annular area

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.110		
<b>Portico</b>	1.000	0.107	
<b>Sapien 3</b>	<b>&lt;0.001</b>	<b>0.021</b>	<b>&lt;0.001</b>

P values for Mean aortic annular perimeter

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	1.000		
<b>Portico</b>	1.000	1.000	
<b>Sapien 3</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>

P values for LMCA distance

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	<b>0.035</b>		
<b>Portico</b>	0.285	1.000	
<b>Sapien 3</b>	0.541	<b>0.001</b>	<b>0.014</b>

P values for RCA distance

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	<b>0.040</b>		
<b>Portico</b>	1.000	<b>0.081</b>	
<b>Sapien 3</b>	0.980	<b>0.003</b>	1.000

P values for Sinotubular junction diameter

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	1.000		
<b>Portico</b>	0.154	1.000	
<b>Sapien 3</b>	1.000	1.000	0.997

P values for Sinus of Valsalva diameter

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	1.000		
<b>Portico</b>	1.000	1.000	
<b>Sapien 3</b>	0.322	0.205	0.170

P values for Ascending aorta diameter

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.658		
<b>Portico</b>	<b>0.006</b>	1.000	
<b>Sapien 3</b>	0.752	1.000	0.296

P values for Porcelain aorta

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	1.000		
<b>Portico</b>	<b>0.081</b>	0.259	
<b>Sapien 3</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>	<b>0.026</b>

P values for Area-derived diameter

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.117		
<b>Portico</b>	1.000	0.124	
<b>Sapien 3</b>	<b>&lt;0.001</b>	<b>0.020</b>	<b>&lt;0.001</b>

P values for Perimeter-derived diameter

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	1.000		
<b>Portico</b>	1.000	1.000	
<b>Sapien 3</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>

P values for Severe leaflets calcification

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.558		
<b>Portico</b>	<b>0.024</b>	<b>0.020</b>	
<b>Sapien 3</b>	<b>0.033</b>	0.452	<b>0.001</b>

P values for Severe annular calcification

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.587		
<b>Portico</b>	0.384	0.297	
<b>Sapien 3</b>	<b>0.005</b>	<b>0.020</b>	0.288

P values for Severe LVOT calcification

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	1.000		
<b>Portico</b>	0.209	0.410	
<b>Sapien 3</b>	<b>0.003</b>	<b>0.070</b>	0.646

P values for Annular eccentricity

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.196		
<b>Portico</b>	0.211	<b>0.005</b>	
<b>Sapien 3</b>	1.000	0.125	0.874

**Supplementary Table 3. Procedural characteristics according to prosthesis implanted.**

Characteristic	Evolut R/Pro (n = 750)	Acurate Neo (n = 170)	Portico (n = 172)	Sapien 3 (n = 286)	P value
Valve size 25 mm or less	16.1 (121)	95.3 (162)	88.9 (153)	98.9 (283)	<b>&lt;0.001</b>
Oversizing by perimeter	19.2 ± 6.3	9.7 ± 5.8	14.1 ± 5.8	9.5 ± 11.4	<b>&lt;0.001</b>
Oversizing by perimeter ≥15%	75.5 (566)	14.7 (25)	43.6 (75)	27.6 (79)	<b>&lt;0.001</b>
Oversizing by area	50.4 ± 16.0	25.4 ± 12.8	39.4 ± 13.3	11.9 ± 9.4	<b>&lt;0.001</b>
Oversizing by area ≥15%	99.6 (747)	81.8 (139)	98.8 (170)	28.7 (82)	<b>&lt;0.001</b>
Oversizing ≥15%	75.5 (566)	14.7 (25)	43.6 (75)	28.7 (82)	<b>&lt;0.001</b>
Pre-dilation	33.6 (250)	65.7 (111)	70.0 (120)	32.9 (92)	<b>&lt;0.001</b>
Post-dilation	30.8 (230)	36.5 (62)	38.2 (65)	8.2 (23)	<b>&lt;0.001</b>
Annular rupture	0.3 (2)	0	0.6 (1)	0.3 (1)	0.826

Values are mean ± standard deviation or %(n). The values in **bold** represent differences between groups with p <0.100. Oversizing ≥15% refers to oversizing by perimeter ≥15% for self-expandable valves and oversizing by area ≥15% for balloon-expandable valves.

P values for Valve size 25 mm or less

	Evolut R/Pro	Acurate Neo	Portico
<b>Acurate Neo</b>	<b>&lt;0.001</b>		
<b>Portico</b>	<b>&lt;0.001</b>	<b>0.030</b>	
<b>Sapien 3</b>	<b>&lt;0.001</b>	<b>0.023</b>	<b>&lt;0.001</b>

P values for Oversizing by perimeter ≥15%

	Evolut R/Pro	Acurate Neo	Portico
<b>Acurate Neo</b>	<b>&lt;0.001</b>		
<b>Portico</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>	
<b>Sapien 3</b>	<b>&lt;0.001</b>	<b>0.001</b>	<b>&lt;0.001</b>

P values for Oversizing by perimeter

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	<b>&lt;0.001</b>		
<b>Portico</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>	
<b>Sapien 3</b>	<b>&lt;0.001</b>	1.000	<b>&lt;0.001</b>

P values for Oversizing by area  $\geq 15\%$

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	<b>&lt;0.001</b>		
<b>Portico</b>	0.235	<b>&lt;0.001</b>	
<b>Sapien 3</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>

P values for Oversizing by area

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	<b>&lt;0.001</b>		
<b>Portico</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>	
<b>Sapien 3</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>

P values for Oversizing  $\geq 15\%$

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	<b>&lt;0.001</b>		
<b>Portico</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>	
<b>Sapien 3</b>	<b>&lt;0.001</b>	<b>0.001</b>	<b>0.001</b>

P values for Predilation

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	<b>&lt;0.001</b>		
<b>Portico</b>	<b>&lt;0.001</b>	0.420	
<b>Sapien 3</b>	0.832	<b>&lt;0.001</b>	<b>&lt;0.001</b>



P values for Postdilation

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.154		
<b>Portico</b>	<b>0.062</b>	0.737	
<b>Sapien 3</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>

P values for Annular rupture

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	1.000		
<b>Portico</b>	0.481	1.000	
<b>Sapien 3</b>	1.000	1.000	1.000

**Supplementary Table 4. Standardised mean differences (SMDs) of the covariates used for propensity score modelling before and after inverse probability of treatment weight (IPTW) adjustment.**

Covariates	SAV vs. IAV		SEV vs. BEV	
	Before adjustment	After adjustment	Before adjustment	After adjustment
Age	17.0	-0.4	14.8	1.2
BMI	-9.6	0.8	0.2	8.4
Female	8.6	0.9	3.6	1.6
Hypertension	-7.2	-0.3	-5.6	2.4
COPD	-4.3	-0.6	-16.4	1.7
Cerebrovascular disease	-18.8	-0.4	-19.5	1.8
CAD	-13.3	-0.04	-20.1	1.5
Previous PM/ICD	-16.9	-0.4	-19.2	2.3
NYHA Class III/IV	-9.6	-0.5	-2.1	1.9
STS-PROM	3.2	-0.7	-6.3	-2.3
Preprocedural mean AV gradient	15.7	1.2	1.6	4.4
LVEF	-21.2	2.7	-28.2	7.4
AV annular perimeter	36.8	-1.0	61.0	-11.2

Values are in %. Abbreviations as in Supplementary Table 5.

**Supplementary Table 5. Prediction of severe prosthesis-patient mismatch using doubly-robust inverse probability of treatment weight (IPTW)-adjusted logistic regression analysis.**

<b>SAV vs. IAV</b>		
<b>Clinical characteristics</b>	<b>Doubly-robust IPTW-adjusted OR (95% CI)</b>	<b>P value</b>
Atrial fibrillation	0.33 (0.13-0.88)	<b>0.027</b>
Annular perimeter, mm	0.25 (0.10-0.61)	<b>0.003</b>
Bicuspid AV	0.27 (0.11-0.65)	<b>0.004</b>
Moderate/severe AV leaflet calcification	0.28 (0.11-0.72)	<b>0.008</b>
Any AV annular calcification	0.32 (0.12-0.85)	<b>0.022</b>
Any LVOT calcification	0.30 (0.11-0.83)	<b>0.021</b>
<b>SEV vs. BEV</b>		
<b>Clinical characteristics</b>	<b>Doubly-robust IPTW-adjusted OR (95% CI)</b>	<b>P value</b>
Atrial fibrillation	0.44 (0.18-1.08)	<b>0.073</b>
Annular perimeter, mm	0.40 (0.17-0.91)	<b>0.029</b>
Bicuspid AV	0.40 (0.17-0.92)	<b>0.031</b>
Moderate/severe AV leaflet calcification	0.37 (0.15-0.90)	<b>0.029</b>
Any AV annular calcification	0.46 (0.19-1.10)	<b>0.080</b>
Any LVOT calcification	0.42 (0.16-1.07)	<b>0.070</b>

AV = aortic valve; BEV = balloon-expandable valve; CI = confidence interval; IAV = intra-annular valve; IPTW = inverse probability of treatment weighting; LVOT = left ventricular outflow tract; SAV = supra-annular valve; SEV = self-expandable valve.

The values in bold represent differences between groups with  $p < 0.100$ .

**Supplementary Table 6. Post-procedural characteristics and follow-up according to prosthesis implanted.**

<b>Characteristic</b>	<b>Evolut R/Pro (n = 750)</b>	<b>Acurate Neo (n = 170)</b>	<b>Portico (n = 172)</b>	<b>Sapien 3 (n = 286)</b>	<b>P value</b>
<b>Pre-discharge</b>					
Any vascular complication	12.1 (90)	20.2 (34)	17.4 (30)	13.3 (38)	<b>0.025</b>
Major vascular complication	4.0 (30)	5.9 (10)	5.2 (9)	5.6 (16)	0.598
Need for second valve implantation	2.1 (16)	0	3.5 (6)	0.3 (1)	<b>0.009</b>
Mean AV gradient, mmHg	7.5 ± 3.8	8.7 ± 4.4	9.2 ± 4.5	13.6 ± 4.7	<b>&lt;0.001</b>
Maximum AV gradient, mmHg	14.1 ± 6.4	16.3 ± 8.2	17.1 ± 9.0	24.8 ± 7.7	<b>&lt;0.001</b>
EOA, cm <sup>2</sup>	1.71 ± 0.48	1.91 ± 0.58	1.63 ± 0.43	1.41 ± 0.29	<b>&lt;0.001</b>
Indexed EOA, cm <sup>2</sup> /m <sup>2</sup>	1.09 ± 0.30	1.18 ± 0.36	0.97 ± 0.28	0.84 ± 0.19	<b>&lt;0.001</b>
Any PPM (non BMI-adjusted)	17.1 (47)	15.5 (9)	35.9 (28)	58.3 (127)	<b>&lt;0.001</b>
Any PPM	14.4 (36)	13.8 (8)	29.5 (23)	49.5 (108)	<b>&lt;0.001</b>
Moderate PPM (non BMI- adjusted)	13.1 (36)	10.3 (6)	24.4 (19)	44.0 (96)	<b>&lt;0.001</b>
Moderate PPM	9.8 (27)	10.3 (6)	20.5 (16)	40.8 (89)	<b>&lt;0.001</b>
Severe PPM (non BMI- adjusted)	4.0 (11)	5.2 (3)	11.5 (9)	14.2 (31)	<b>&lt;0.001</b>
Severe PPM	3.6 (10)	3.4 (2)	9.0 (7)	8.7 (19)	<b>0.058</b>
More than mild PVL	9.9 (58)	11.2 (15)	19.0 (27)	2.6 (7)	<b>&lt;0.001</b>
More than moderate PVL	0.8 (5)	4.5 (6)	0.7 (1)	0	<b>0.002</b>
PPI	13.9 (103)	10.2 (17)	15.1 (26)	8.1 (23)	<b>0.039</b>

BARC major bleeding	6.9 (52)	4.1 (7)	2.9 (5)	5.9 (17)	0.166
<b>Follow-up</b>					
All-cause mortality	9.8 (65)	7.9 (11)	11.2 (19)	12.3 (34)	0.482
Cardiovascular mortality	2.7 (18)	2.9 (4)	5.4 (9)	4.0 (11)	0.332
Myocardial infarction	1.0 (6)	0.8 (1)	2.7 (3)	0.7 (2)	0.367
TIA/stroke	4.4 (26)	1.5 (2)	1.3 (1)	2.6 (7)	0.254
Acute kidney injury	2.4 (12)	8.1 (7)	4.8 (3)	1.9 (5)	<b>0.020</b>
Hospitalization for HF	6.0 (35)	5.3 (7)	7.8 (6)	6.6 (17)	0.896

Values are mean  $\pm$  standard deviation or %(n). The values in **bold** represent differences between groups with  $p < 0.100$ .

BARC = Bleeding Academic Research Consortium; HF = heart failure; PPM = prosthesis patient mismatch; PPI = permanent pacemaker implantation; PVL = paravalvular leak; TIA = transient ischemic attack; other abbreviations as in **Tables 1 and 2**.

P values for Any vascular complication

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	<b>0.006</b>		
<b>Portico</b>	<b>0.064</b>	0.510	
<b>Sapien 3</b>	0.620	<b>0.050</b>	0.226

P values for Major vascular complication

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.277		
<b>Portico</b>	0.489	0.773	
<b>Sapien 3</b>	0.283	0.874	0.869

P values for Need of second valve implantation

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	<b>0.054</b>		
<b>Portico</b>	0.296	<b>0.030</b>	
<b>Sapien 3</b>	<b>0.053</b>	1.000	<b>0.013</b>

P values for post-procedural mean aortic valve gradient

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	<b>0.020</b>		
<b>Portico</b>	<b>&lt;0.001</b>	1.000	
<b>Sapien 3</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>

P values for post-procedural maximal aortic valve gradient

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	<b>0.007</b>		
<b>Portico</b>	<b>0.003</b>	1.000	
<b>Sapien 3</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>

P values for post-procedural EOA

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	<b>0.006</b>		
<b>Portico</b>	0.860	<b>0.001</b>	
<b>Sapien 3</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>

P values for post-procedural EOAI

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.166		
<b>Portico</b>	<b>0.004</b>	<b>&lt;0.001</b>	
<b>Sapien 3</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>	<b>0.002</b>

P values for any non BMI-adjusted PPM

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.762		
<b>Portico</b>	<b>&lt;0.001</b>	<b>0.008</b>	
<b>Sapien 3</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>	<b>0.001</b>

P values for any PPM

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.953		
<b>Portico</b>	<b>0.001</b>	<b>0.031</b>	
<b>Sapien 3</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>	<b>0.002</b>

P values for moderate non BMI-adjusted PPM

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.561		
<b>Portico</b>	<b>0.016</b>	<b>0.037</b>	
<b>Sapien 3</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>	<b>0.002</b>

P values for moderate PPM

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.910		
<b>Portico</b>	<b>0.011</b>	0.111	
<b>Sapien 3</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>	<b>0.001</b>

P values for severe non BMI-adjusted PPM

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.718		
<b>Portico</b>	<b>0.011</b>	0.235	
<b>Sapien 3</b>	<b>&lt;0.001</b>	<b>0.072</b>	0.700

P values for severe PPM

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	1.000		
<b>Portico</b>	<b>0.053</b>	0.300	
<b>Sapien 3</b>	<b>0.018</b>	0.265	0.945

P values for PPI

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.200		
<b>Portico</b>	0.680	0.172	
<b>Sapien 3</b>	<b>0.011</b>	0.446	<b>0.018</b>

P values for more than moderate PVL

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	<b>0.008</b>		
<b>Portico</b>	1.000	<b>0.060</b>	
<b>Sapien 3</b>	0.332	<b>0.001</b>	0.346

P values for more than mild PVL

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.645		
<b>Portico</b>	<b>0.002</b>	<b>0.071</b>	
<b>Sapien 3</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>

P values for BARC major bleeding

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.176		
<b>Portico</b>	<b>0.053</b>	0.572	
<b>Sapien 3</b>	0.568	0.517	0.178

P values for All-cause mortality

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.478		
<b>Portico</b>	0.575	0.317	
<b>Sapien 3</b>	0.250	0.166	0.734



P values for Cardiovascular mortality

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	1.000		
<b>Portico</b>	<b>0.024</b>	0.141	
<b>Sapien 3</b>	0.317	0.782	0.473

P values for Myocardial infarction

	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	1.000		
<b>Portico</b>	0.160	0.346	
<b>Sapien 3</b>	1.000	1.000	0.143

P values for TIA/stroke

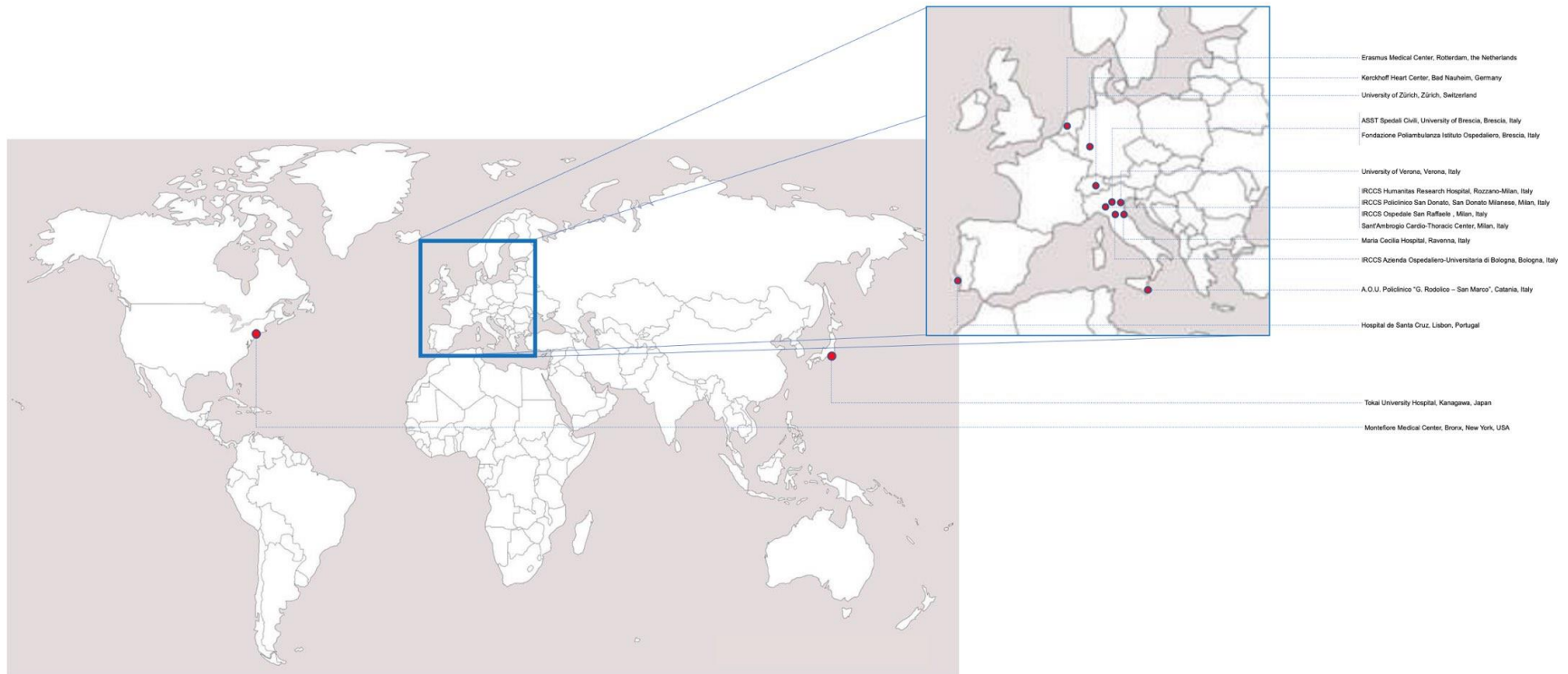
	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.140		
<b>Portico</b>	0.348	1.000	
<b>Sapien 3</b>	0.195	0.724	1.000

P values for Acute kidney injury

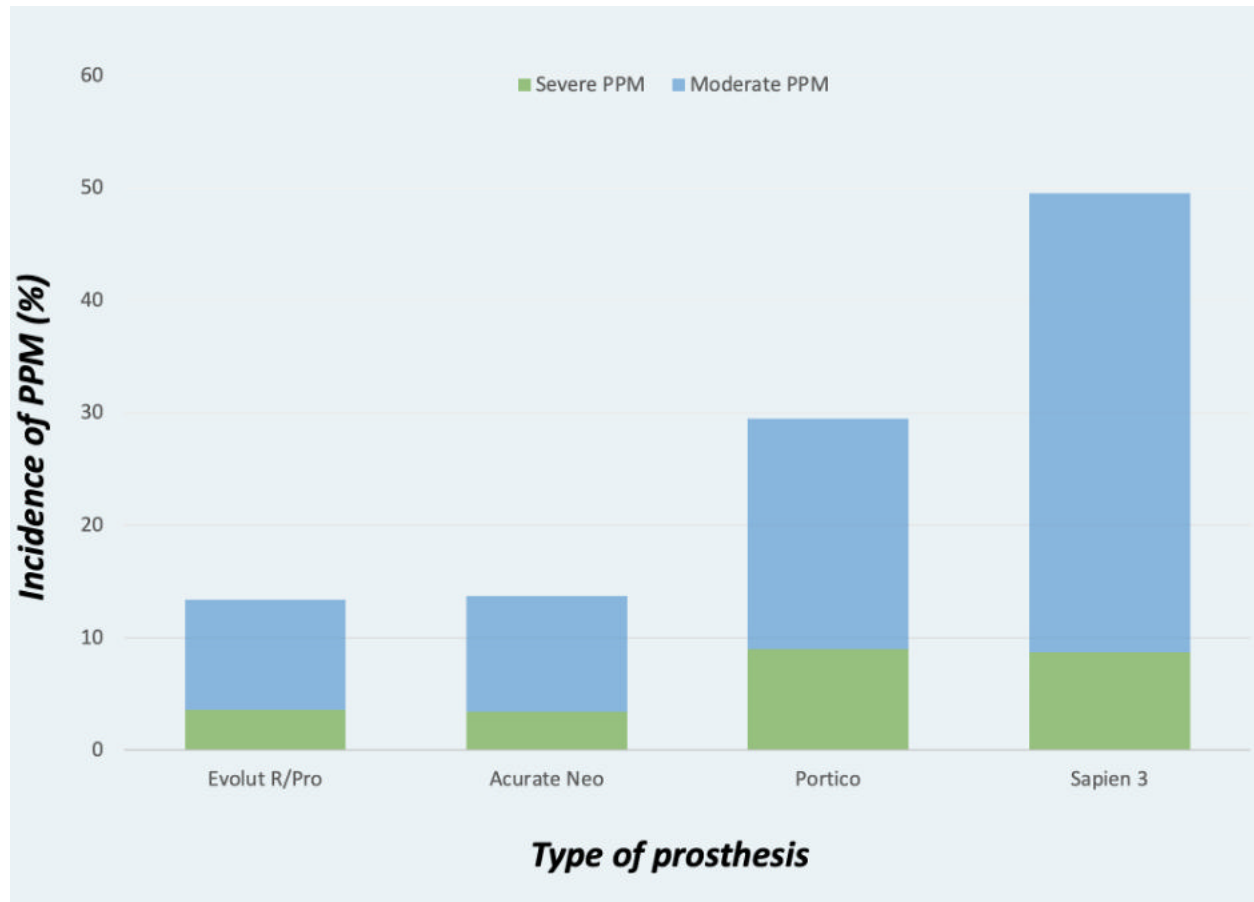
	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	<b>0.005</b>		
<b>Portico</b>	0.220	0.521	
<b>Sapien 3</b>	0.799	<b>0.011</b>	0.176

P values for Hospitalization for HF

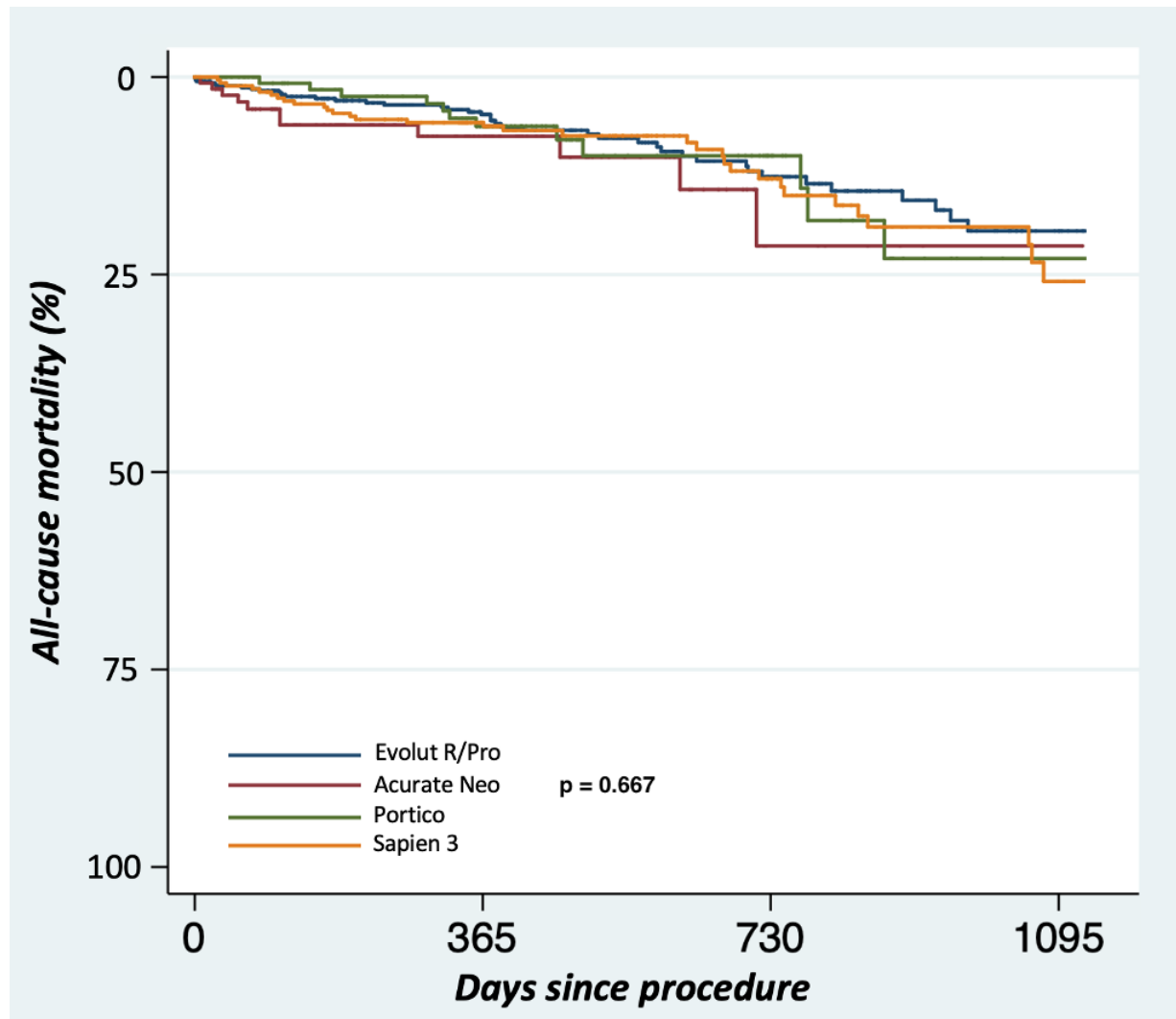
	<b>Evolut R/Pro</b>	<b>Acurate Neo</b>	<b>Portico</b>
<b>Acurate Neo</b>	0.775		
<b>Portico</b>	0.538	0.481	
<b>Sapien 3</b>	0.751	0.636	0.708



**Supplementary Figure 1.** Map of centres involved in the study.



**Supplementary Figure 2.** Incidence of severe and moderate PPM according to prosthesis type.



**Supplementary Figure 3.** Kaplan-Meier analysis assessing all-cause mortality according to prosthesis type.