Supplementary Online Material

Supplemental Table 1. ICD-9 Codes for Exclusion Criteria

Supplemental Table 2. ICD-9 Codes for Comorbidities

Supplemental Table 3. Baseline Characteristics of Patients before Propensity Score Matching

Supplemental Figure 1. Survival Estimate of Patients with Aortic Valve Replacement, Stratified by the Type of Surgery, before Propensity Score Matching

Supplemental Figure 2. Cumulative Incidence of Stroke in Patients who Underwent Aortic Valve Replacement, Stratified by the Type of Surgery, before Propensity Score Matching

Supplemental Figure 3. Cumulative Incidence of Major bleeding in Patients who Underwent Aortic Valve Replacement, Stratified by the Type of Surgery, before Propensity Score Matching

Supplemental Figure 4. Cumulative Incidence of Reoperation in Aortic and/or Pulmonary Valves in Patients who Underwent Aortic Valve Replacement, Stratified by the Type of Surgery, before Propensity Score Matching

Supplemental Figure 5. Cumulative Incidence of Endocarditis in Patients who Underwent Aortic Valve Replacement, Stratified by the Type of Surgery, before Propensity Score Matching

Supplemental Figure 6. Patient Selection Flow Diagram

Supplemental Figure 7. Cumulative Incidence of Reoperation for Pulmonary Homografts in Patients who Underwent the Ross Procedure

Supplemental Methods. Generalized Propensity Score Analysis for Three or More Treatment Groups

Supplemental References.

Supplemental Table 1. ICD-9 Codes for Exclusion Criteria

Exclusion Criterion	International Classification of Disease, 9th Edition, Clinical Modification Codes
Carcinoid Disease	Diagnosis Codes (from Index and Prior Admissions) 2592, 20900, 20901, 20902, 20903, 20910, 20911, 20912, 20913, 20914, 20915, 20916, 20917, 20920, 20921, 20922, 20923, 20924, 20925, 20926, 20927, 20929, 20930, 20940, 20941, 20942, 20943, 20950, 20951, 20952, 20953, 20954, 20955, 20956, 20957, 20960, 20961, 20962, 20963, 20964, 20965, 20966, 20967, and 20969
Marfan Syndrome	Diagnosis Codes (from Index and Prior Admissions) 75982
Drug Abusers	Diagnosis Codes (from Index and Prior Admissions) 304, 3040, 3041, 3042, 3043, 3044, 3045, 3046, 3047, 3048, 3049, 30400, 30401, 30402, 30403, 30410, 30411, 30412, 30413, 30420, 30421, 30422, 30423, 30430, 30431, 30432, 30433, 30440, 30441, 30442, 30443, 30450, 30451, 30452, 30453, 30460, 30461, 30462, 30463, 30470, 30471, 30472, 30473, 30480, 30481, 30482, 30483, 30490, 30491, 30492, 30493, 305, 3052, 3053, 3054, 3055, 3056, 3057, 3058, 3059, 30520, 30521, 30522, 30523, 30530, 30531, 30532, 30533, 30540, 30541, 30542, 30543, 30550, 30551, 30552, 30553, 30560, 30561, 30562, 30563, 30570, 30571, 30572, 30573, 30580, 30581, 30582, 30583, 30590, 30591, 30592, 30593, 9650, 96500, 96501, 96502 and 96509
Aortic Dissection	Diagnosis Codes (from Index Admission) 44101, 44103, and 44100
Endocarditis	Diagnosis Codes (from Index Admissions) 4210, 4211, 4219. 03642, 09884, 11281, 11504, 11514, and 11594
Concomitant CABG	Procedure Codes (from Index Admissions) 3610, 3611, 3612, 3613, 3614, 3615, 3616, 3617 and 3619
Concomitant Mitral Valve Surgery	Procedure Codes (from Index Admission) 3523, 3524, 3512, and 3533
Concomitant Tricuspid Valve Surgery	Procedure Codes (from Index Admission) 3527, 3528, and 3514
Dialysis dependency	Diagnosis codes (index or prior admissions) 40301, 40311, 40391, 40402, 40403, 40412, 40413, 40492, 40493, 5856, V451, V4511, V4512, V560, V561 and V5631

Supplemental Table 2. ICD-9 Codes for Comorbidities

Baseline Comorbidities	International Classification of Disease, 9th Edition, Clinical Modification Codes
Hypertension	Diagnosis Codes (from Index and Prior Admissions) 401, 4010, 4011, 4019, 402, 40200, 40201, 4021, 40210, 40211, 4029, 40290, 40291, 403, 4030, 40300, 40301, 4031, 40310, 40311, 4039, 40390, 40391, 404, 4040, 40400, 40401, 40402, 40403, 4041, 40410, 40411, 40412, 40413, 4049, 40490, 40491, 40492, 40493, 405, 4050, 40501, 40509, 4051, 40511, 40519, 4059, 40591, 40599 and 4372
Complicated Diabetes	Diagnosis Codes (from Index and Prior Admissions) 2504, 25040, 25041, 25042, 25043, 2505, 25050, 25051, 25052, 25053, 2506, 25060, 25061, 25062, 25063, 2507, 25070, 25071, 25072, 25073, 2509, 25090, 25091, 25092 and 25093
Peripheral Vascular Disease	Diagnosis Codes (from Index and Prior Admissions) 4400, 4401, 4402, 44020, 44021, 44022, 44023, 44024, 44029, 4403, 44030, 44031, 44032, 4404, 4408, 4409, 4471, 9961, 99662, 99674 and V434
Cerebrovascular Disease	Diagnosis Codes (from Index and Prior Admissions) 3623, 36230, 36231, 36232, 36233, 36234, 36235, 36236, 36237, 3466, 34660, 34661, 34662, 34663, 430, 431, 432, 4320, 4321, 4329, 433, 4330, 43300, 43301, 4331, 43310, 43311, 4332, 43320, 43321, 4333, 43330, 43331, 4338, 43380, 43381, 4339, 43390, 43391, 434, 4340, 43400, 43401, 4341, 43410, 43411, 4349, 43490, 43491, 435, 4350, 4351, 4352, 4353, 4358, 4359, 436, 437, 4370, 4371, 4372, 4373, 4374, 4375, 4376, 4377, 4378, 4379, 438, 4380, 4381, 43810, 43811, 43812, 43813, 43814, 43819, 4382, 43820, 43821, 43822, 4383, 43830, 43831, 43832, 4384, 43840, 43841, 43842, 4385, 43850, 43851, 43852, 4386, 4387, 4388, 43881, 43882, 43883, 43884, 43885, 43889 and 4389
Congestive Heart Failure	Diagnosis Codes (from Index and Prior Admissions) 39891, 428, 4280, 4281, 4282, 42820, 42821, 42822, 42823, 4283, 42830, 42831, 42832, 42833, 4284, 42840, 42841, 42842, 42843, 4289, 429, 4290, 4291, 4292, 4293, 4294, 4295, 4296, 4297, 42971, 42979, 4298, 42981, 42982, 42983, 42989 and 4299
Atrial Fibrillation	Diagnosis Codes (from Index and Prior Admissions) 4273, 42731 and 42732
Chronic Obstructive Pulmonary Disease	Diagnosis Codes (from Index and Prior Admissions) 491, 4910, 4911, 4912, 49120, 49121, 49122, 4918, 4919, 492, 4920, 4928, 493, 4930, 49300, 49301, 49302, 4931, 49310, 49311, 49312, 4932, 49320, 49321, 49322, 4938, 49380, 49381, 49382, 4939, 49390, 49391, 49392, 494, 4940, 4941 and 496
Chronic Kidney Disease	Diagnosis Codes (from Index and Prior Admissions) 403, 4030, 40300, 40301, 4031, 40310, 40311, 4039, 40390, 40391, 404, 4040, 40400, 40401, 40402, 40403, 4041, 40410, 40411, 40412, 40413, 4049, 40490, 40491, 40492, 40493, 582, 5820, 5821, 5822, 5824, 5828, 58281, 58289, 5829, 583, 5830, 5831, 5832, 5834, 5836, 5837, 5838, 58381, 58389, 5839, 585, 5851, 5852, 5853, 5854, 5855, 5859, 586, 587, 588, 5880, 5881, 5888, 58881, 58888, 5889, V420, V56, V560, V561, V562, V563, V5631, V5632, V568, 5856, V451, V4511 and V4512
Liver Disease	Diagnosis Codes (from Index and Prior Admissions) 070, 0700, 0701, 0702, 07020, 07021, 07022, 07023, 0703, 07030, 07031, 07032, 07033, 0704, 07041, 07042, 07043, 07044, 07049, 0705, 07051, 07052,

	07053, 07054, 07059, 0706, 0707, 07070, 07071, 0709, 456, 4560, 4561, 4562, 45620, 45621, 4563, 4564, 4565, 4566, 4568, 570, 571, 5710, 5711, 5712, 5713, 5714, 57140, 57141, 57142, 57149, 5715, 5716, 5718, 5719, 572, 5720, 5721, 5722, 5723, 5724, 5728, 573, 5730, 5731, 5732, 5733, 5734, 5735, 5738, 5738, 7824, 7891, 7895, 78951, 78959, 7904, 7905, 7948 and V427
Cancer	*Oropharyngeal Cancers* Diagnosis Codes (from Index and Prior Admissions) 140, 1400, 1401, 1403, 1404, 1405, 1406, 1408, 1409, 141, 1410, 1411, 1412, 1413, 1414, 1415, 1416, 1418, 1419, 142, 1420, 1421, 1422, 1428, 1429, 143, 1430, 1431, 1438, 1439, 144, 1440, 1441, 1448, 1449, 145, 1450, 1451, 1452, 1453, 1454, 1455, 1456, 1458, 1459, 146, 1460, 1461, 1462, 1463, 1464, 1465, 1466, 1467, 1468, 1469, 147, 1470, 1471, 1472, 1473, 1478, 1479, 148, 1480, 1481, 1482, 1483, 1488, 1489, 149, 1490, 1491, 1498 and 1499 *Gastrointestinal Cancers* Diagnosis Codes (from Index and Prior Admissions) 150, 1500, 1501, 1502, 1503, 1504, 1505, 1506, 1508, 1509, 1510, 151, 1511, 15012, 1513, 1514, 1515, 1516, 1518, 1519, 152, 1520, 1521, 1522, 1523, 1528, 1529, 153, 1530, 1531, 1532, 1533, 1534, 1535, 1536, 1537, 1538, 1539, 154, 1540, 1541, 1542, 1543, 1548, 155, 1550, 1551, 1552, 156, 1560, 1561, 1562, 1568, 1569, 157, 1570, 1571, 1572, 1573, 1574, 1578, 1579, 158, 1580, 1588, 1589, 159, 1590, 1591, 1598 and 1599 *Respiratory Tract Cancers* Diagnosis Codes (from Index and Prior Admissions) 160, 1600, 1601, 1602, 1603, 1604, 1605, 1608, 1609, 161, 1610, 1611, 1612, 1613, 1618, 1619, 162, 1620, 1622, 1623, 1624, 1625, 1628, 1629, 163, 1630, 1631, 1638, 1639, 164, 1640, 1461, 1462, 1463, 1468, 1649, 165, 1650, 1658 and 1659 *Bone and Connective Tissue Cancer* Diagnosis Codes (from Index and Prior Admissions) 170, 1700, 1701, 1702, 1703, 1704, 1705, 1706, 1707, 1708, 1709, 171, 1710, 1712, 1713, 1714, 1715, 1716, 1717, 1718, 1719, 172, 1720, 1721, 1722, 1723, 1724, 1725, 1726, 1727, 1728, 1729, 173, 1730, 17300, 17301, 17302, 17309, 1731, 17310, 17311, 17312, 17319, 1732, 17320, 17321, 17322, 17329, 1733, 17330, 17331, 17332, 17339, 1734, 17340, 17341, 17342, 17349, 1735, 17350, 17351, 17352, 17359, 1736, 17360, 17361, 17362, 17369, 1737, 17370, 17371, 17372, 17379, 1738, 17380, 17381, 17382, 17389, 1739, 17390, 17391, 17392, 17399, 174, 1740, 1741, 1742, 1743, 1744, 1745, 1746, 1748, 1749, 175, 1750, 1759, 176, 1760, 1761, 1762, 1763, 1764, 1765, 1768 and 1769 *Genitourinary Cancers* Diagnosis Codes (from Index and Prior Admissions) 179, 180, 1800, 1801, 1808, 1809, 181, 182, 1820, 1821, 1828, 183, 1830, 1832, 1833, 1834, 1835, 1838, 1839, 184, 1840, 1841, 1842, 1843, 1844, 1848, 1849, 185, 186, 1860, 1869, 187, 1871, 1872, 1873, 1874, 1875, 1876, 1877, 1878, 1879, 188, 1880, 1881, 1882, 1883, 1884, 1885, 1886, 1887, 1888, 1889, 189, 1890, 1891, 1892, 1893, 1894, 1898 and 1899 *Lymphoid Cancers*

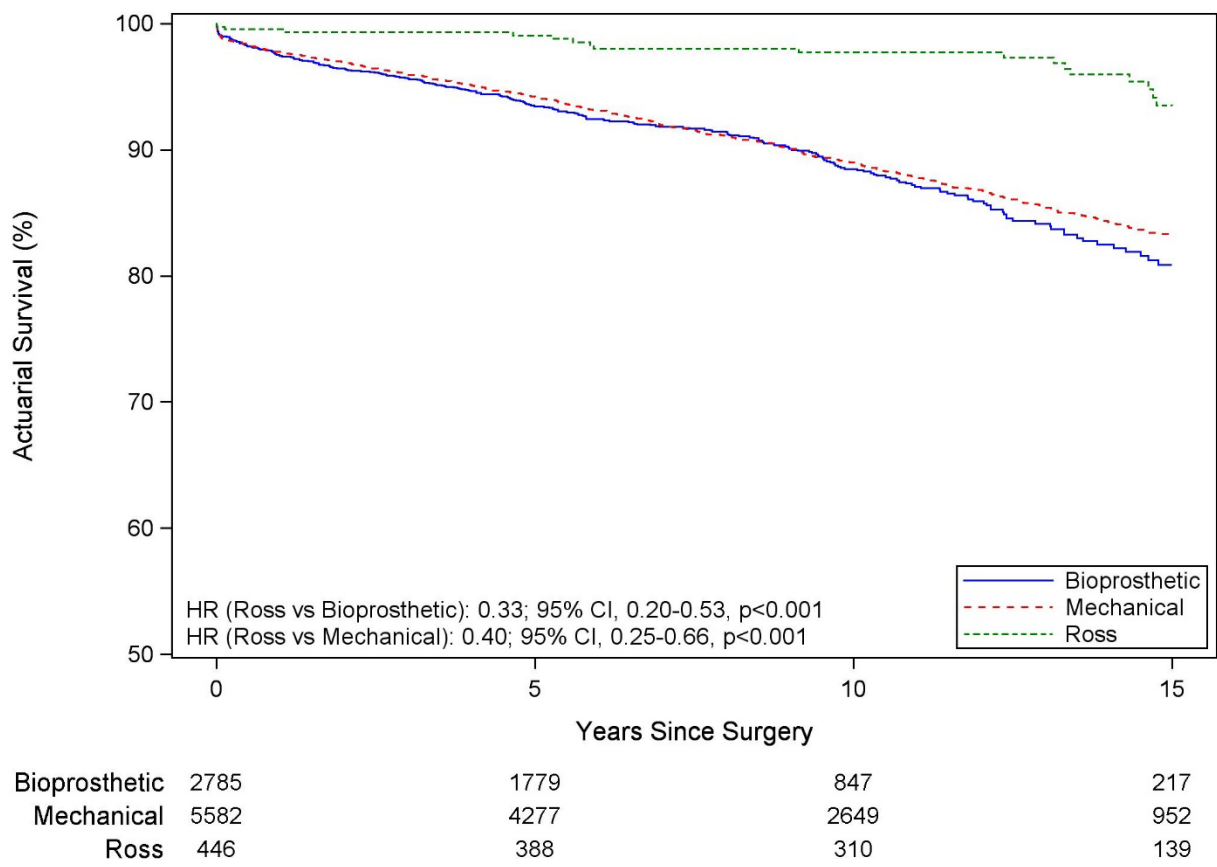| | Diagnosis Codes (from Index and Prior Admissions)
200, 2000, 20000, 20001, 20002, 20003, 20004, 20005, 20006, 20007, 20008, 2001, 20010, 20011, 20012, 20013, 20014, 20015, 20016, 20017, 20018, 2002, 20020, 20021, 20022, 20023, 20024, 20025, 20026, 20027, 20028, 2003, 20030, 20031, 20032, 20033, 20034, 20035, 20036, 20037, 20038, 2004, 20040, 20041, 20042, 20043, 20044, 20045, 20046, 20047, 20048, 2005, 20050, 20051, 20052, 20053, 20054, 20055, 20056, 20057, 20058, 2006, 20060, 20061, 20062, 20063, 20064, 20065, 20066, 20067, 20068, 2007, 20070, 20071, 20072, 20073, 20074, 20075, 20076, 20076, 20077, 20078, 2008, 20080, 20081, 20082, 20083, 20084, 20085, 20086, 20087, 20088, 201, 2010, 20100, 20101, 20102, 20103, 20104, 20105, 20106, 20107, 20108, 2011, 20110, 20111, 20112, 20113, 20114, 20115, 20116, 20117, 20118, 2012, 20120, 20121, 20122, 20123, 20124, 20125, 20126, 20127, 20128, 2014, 20140, 20141, 20142, 20143, 20144, 20145, 20146, 20147, 20148, 2015, 20150, 20151, 20152, 20153, 20154, 20155, 20156, 20157, 20158, 2016, 20160, 20161, 20162, 20163, 20164, 20165, 20166, 20167, 20168, 2017, 20170, 20171, 20172, 20173, 20174, 20175, 20176, 20177, 20178, 2019, 20190, 20191, 20192, 20193, 20194, 20195, 20196, 20197, 20198, 202, 2020, 20200, 20201, 20202, 20203, 20204, 20205, 20206, 20207, 20208, 2021, 20210, 20211, 20212, 20213, 20214, 20215, 20216, 20217, 20218, 2022, 20220, 20221, 20222, 20223, 20224, 20225, 20226, 20227, 20228, 2023, 20230, 20231, 20232, 20233, 20234, 20235, 20236, 20237, 20238, 2024, 20240, 20241, 20242, 20243, 20244, 20245, 20246, 20247, 20248, 2025, 20250, 20251, 20252, 20253, 20254, 20255, 20256, 20257, 20258, 2026, 20260, 20261, 20262, 20263, 20264, 20265, 20266, 20267, 20268, 2027, 20270, 20271, 20272, 20273, 20274, 20275, 20276, 20277, 20278, 2028, 20280, 20281, 20282, 20283, 20284, 20285, 20286, 20287, 20288, 2029, 20290, 20291, 20292, 20293, 20294, 20295, 20296, 20297, 20298, 203, 2030, 20300, 20301, 20302, 2031, 20310, 20311, 20312, 2038, 20380, 20381 and 20382

Hematologic Cancers
Diagnosis Codes (from Index and Prior Admissions)
204, 2040, 20400, 20401, 20402, 2041, 20410, 20411, 20412, 2042, 20420, 20421, 20422, 2048, 20480, 20481, 20482, 2049, 20490, 20491, 20492, 205, 2050, 20500, 20501, 20502, 2051, 20510, 20511, 20512, 2052, 20520, 20521, 20522, 2053, 20530, 20531, 20532, 2058, 20580, 20581, 20582, 2059, 20590, 20591, 20592, 206, 2060, 20600, 20601, 20602, 2061, 20610, 20611, 20612, 2062, 20620, 20621, 20622, 2068, 20680, 20681, 20682, 2069, 20690, 20691, 20692, 207, 2070, 20700, 20701, 20702, 2071, 20710, 20711, 20712, 2072, 20720, 20721, 20722, 2078, 20780, 20781, 20782, 208, 2080, 20800, 20801, 20802, 2081, 20810, 20811, 20812, 2082, 20820, 20821, 20822, 2088, 20880, 20881, 20882, 2089, 20890, 20891, 20892, 209, 2090, 20900, 20901, 20902, 20903, 2091, 20910, 20911, 20912, 20913, 20914, 20915, 20916, 20917, 2092, 20920, 20921, 20922, 20923, 20924, 20925, 20926, 20927, 20929, 2093, 20930, 20931, 20932, 20933, 20934, 20935, 20936, 2094, 20940, 20941, 20942, 20943, 2095, 20950, 20951, 20952, 20953, 20954, 20955, 20956, 20957, 2096, 20960, 20961, 20962, 20963, 20964, 20965, 20966, 20967, 20969, 2097, 20970, 20971, 20972, 20973, 20974, 20975 and 20979

Other Cancers |

	Diagnosis Codes (from Index and Prior Admissions)
	190, 1900, 1901, 1902, 1903, 1904, 1905, 1906, 1907, 1908, 1909, 191, 1910, 1911, 1912, 1913, 1914, 1915, 1916, 1917, 1918, 1919, 192, 1920, 1921, 1922, 1923, 1928, 1929, 193, 194, 1940, 1941, 1943, 1944, 1945, 1946, 1948, 195, 1950, 1951, 1952, 1953, 1954, 1955, 1958, 196, 1960, 1961, 1962, 1963, 1965, 1966, 1968, 1969, 197, 1970, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 198, 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 19881, 19882, 19889, 199, 1990, 1991 and 1992 V1001, V1002, V1021, V1003, V1004, V1005, V1006, V1007, V1000, V1009, V1011, V1012, V1020, V1022, V1082, V1083, V103, V1042, V1043, V1040, V1044, V1046, V1047, V1045, V1048, V1049, V1051, V1052, V1053, V1050, V1059, V1085, V1086, V1087, V1072, V1071, V1079, V1060, V1061, V1062, V1063, V1069, V1029, V1081, V1084, V1088, V1089, V109, V1090, V1091 and V711
Coagulation/Platelets Disorders	Diagnosis Codes (from Index and Prior Admissions) 286, 2860, 2861, 2862, 2863, 2864, 2865, 28652, 28653, 28659, 2866, 2867, 2869, 287, 2870, 2871, 2872, 2873, 28730, 28731, 28732, 28733, 28739, 2874, 2875, 2878 and 2879

Supplemental Table 3. Baseline Characteristics of Patients before Propensity Score Matching
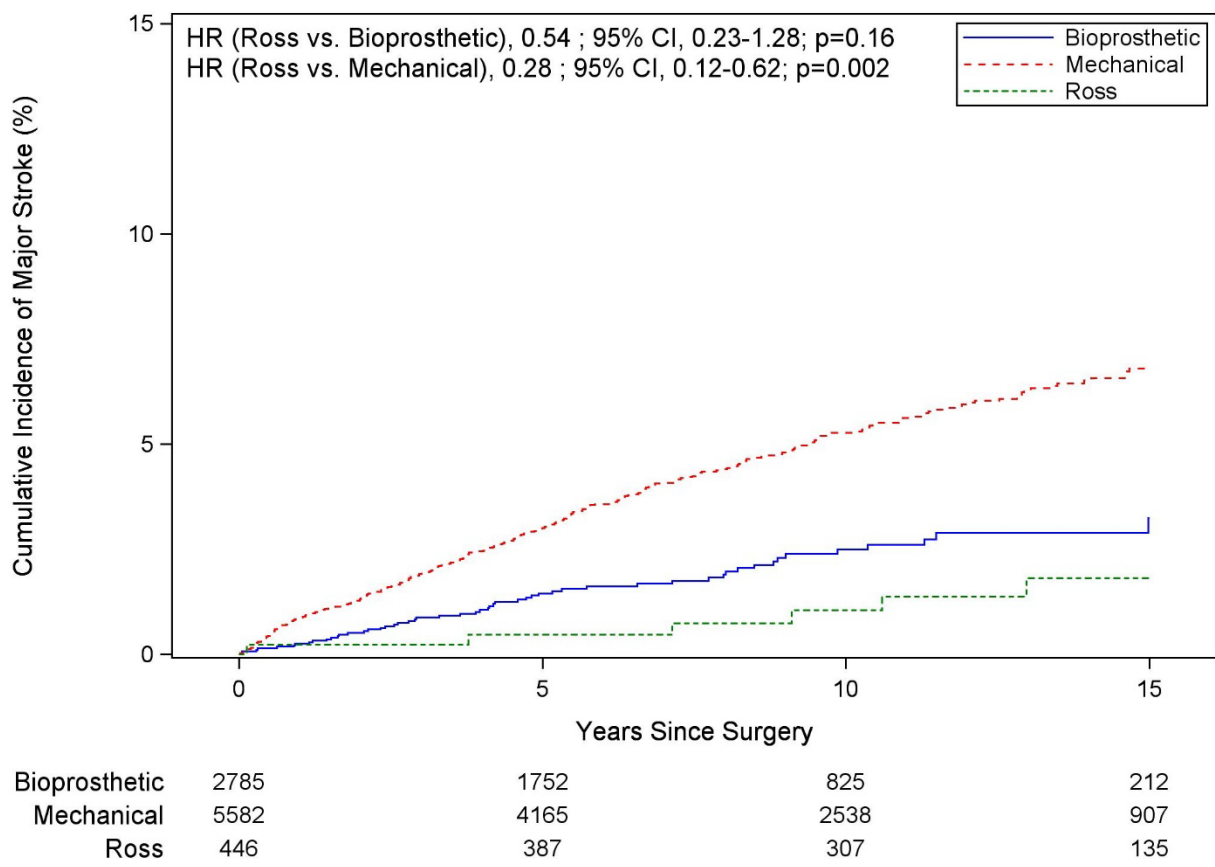
	No. (%)			
	Ross Procedure (n=446)	Biological AVR (n=2,785)	Mechanical AVR (n=5,582)	*P* Value
Demographics				
Age, mean (SD), years	35.5 (9.4)	41.4 (7.9)	41.1 (7.8)	<0.001
Male	332 (74.4)	4174 (74.8)	2095 (75.2)	0.88
Race				
White	333 (74.7)	4005 (71.7)	2054 (73.8)	0.09
Black	21 (4.7)	344 (6.2)	176 (6.3)	0.42
Others	92 (20.6)	1233 (22.1)	555 (19.9)	0.07
Comorbidities				
Hypertension	80 (17.9)	2136 (38.3)	1085 (39.0)	<0.001
Diabetes	1 (0.2)	61 (1.1)	18 (0.6)	0.04
Chronic renal disease, no dialysis	2 (0.4)	123 (2.2)	77 (2.8)	0.008
Coronary artery disease	25 (5.6)	767 (13.7)	339 (12.2)	<0.001
Atrial fibrillation	16 (3.6)	409 (7.3)	191 (6.9)	0.01
Peripheral vascular disease	6 (1.3)	117 (2.1)	45 (1.6)	0.21
Congestive heart failure	65 (14.6)	1671 (29.9)	686 (24.6)	<0.001
Obstructive lung disease	21 (4.7)	599 (10.7)	283 (10.2)	0.0003
Liver disease	4 (0.9)	225 (4.0)	124 (4.5)	0.002
History of cancer	4 (0.9)	147 (2.6)	135 (4.8)	<0.001
Cerebrovascular disease	5 (1.1)	168 (3.0)	65 (2.3)	0.02
Coagulation disorders	11 (2.5)	211 (3.8)	125 (4.5)	0.08
AVR center annual volume (SD)	159 (96)	180 (121)	141 (110)	<0.001

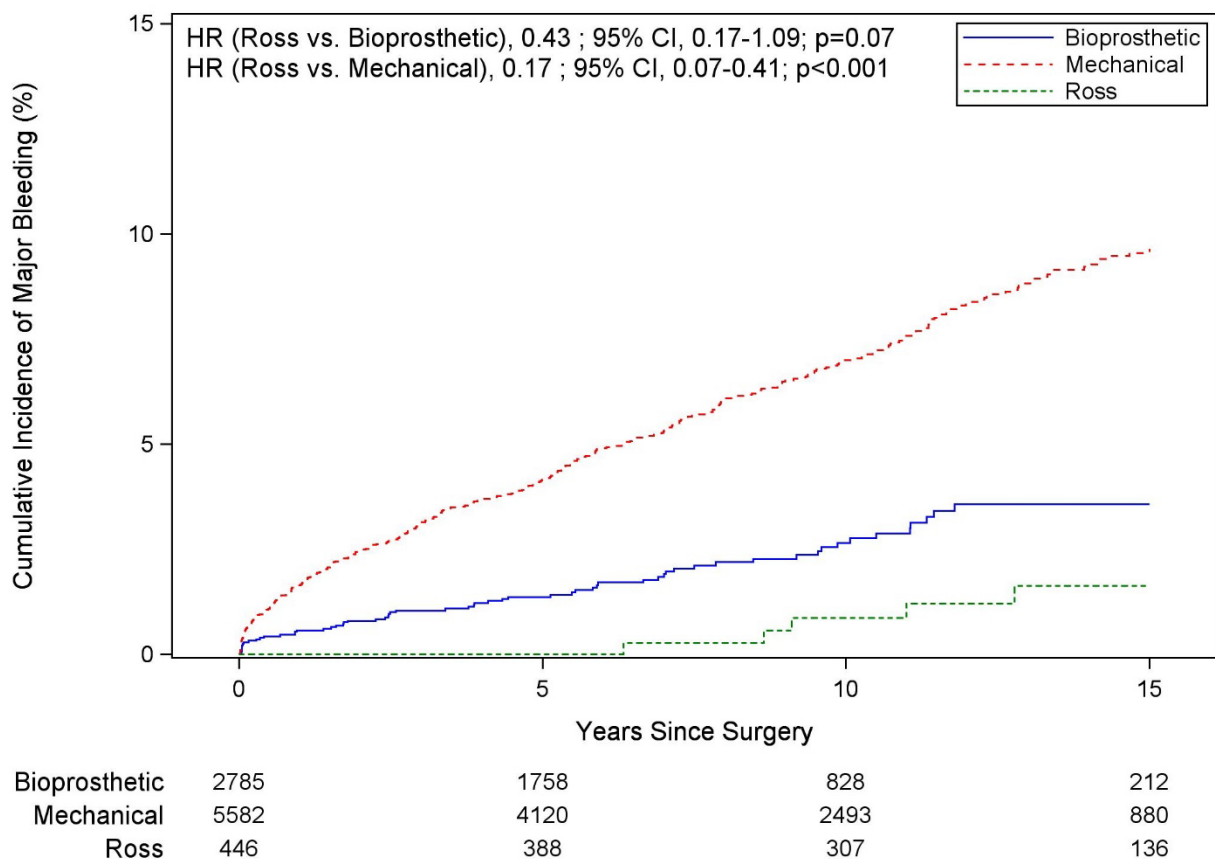AVR: Aortic valve replacement, SD: Standard deviation

Supplemental Figure 1. Survival Estimate of Patients with Aortic Valve Replacement, Stratified by the Type of Surgery, before Propensity Score Matching

Bioprosthetic	2785	1779	847	217
Mechanical	5582	4277	2649	952
Ross	446	388	310	139

Supplemental Figure 2. Cumulative Incidence of Stroke in Patients who Underwent Aortic Valve Replacement, Stratified by the Type of Surgery, before Propensity Score Matching

HR (Ross vs. Bioprosthetic), 0.54 ; 95% CI, 0.23-1.28; p=0.16
HR (Ross vs. Mechanical), 0.28 ; 95% CI, 0.12-0.62; p=0.002

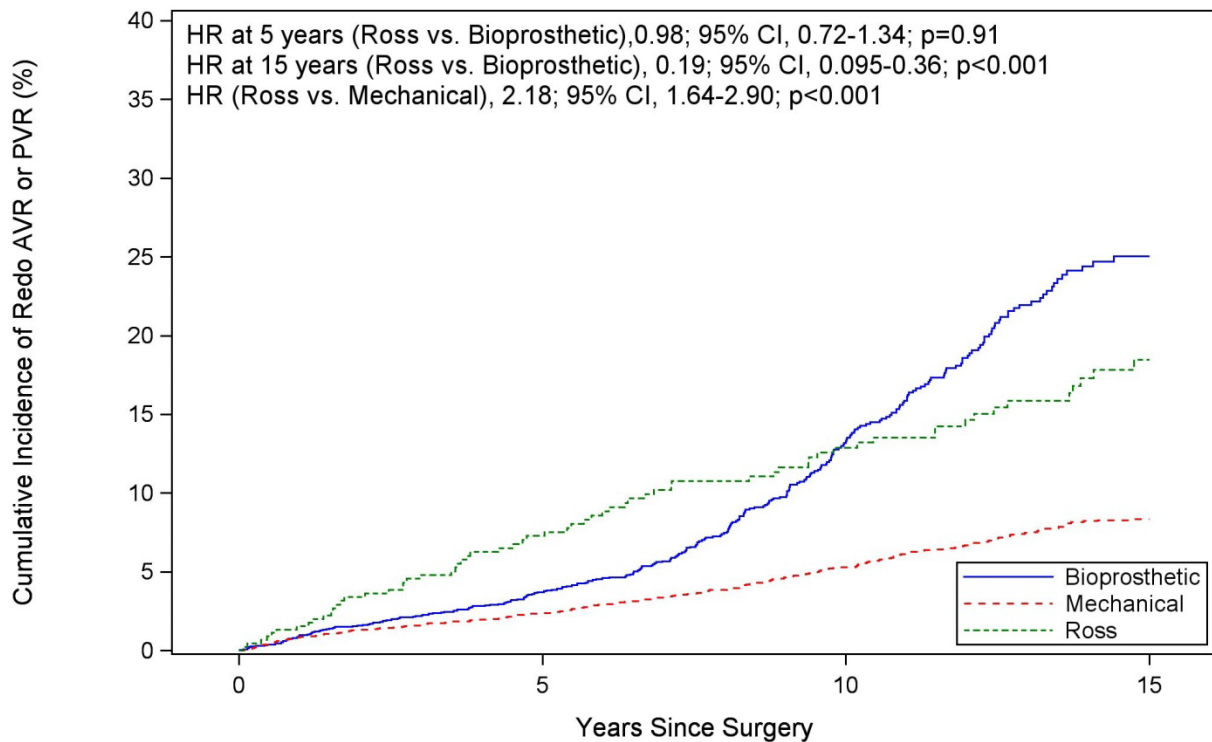|				
Bioprosthetic	2785	1752	825	212
Mechanical	5582	4165	2538	907
Ross	446	387	307	135

Supplemental Figure 3. Cumulative Incidence of Major bleeding in Patients who Underwent Aortic Valve Replacement, Stratified by the Type of Surgery, before Propensity Score Matching

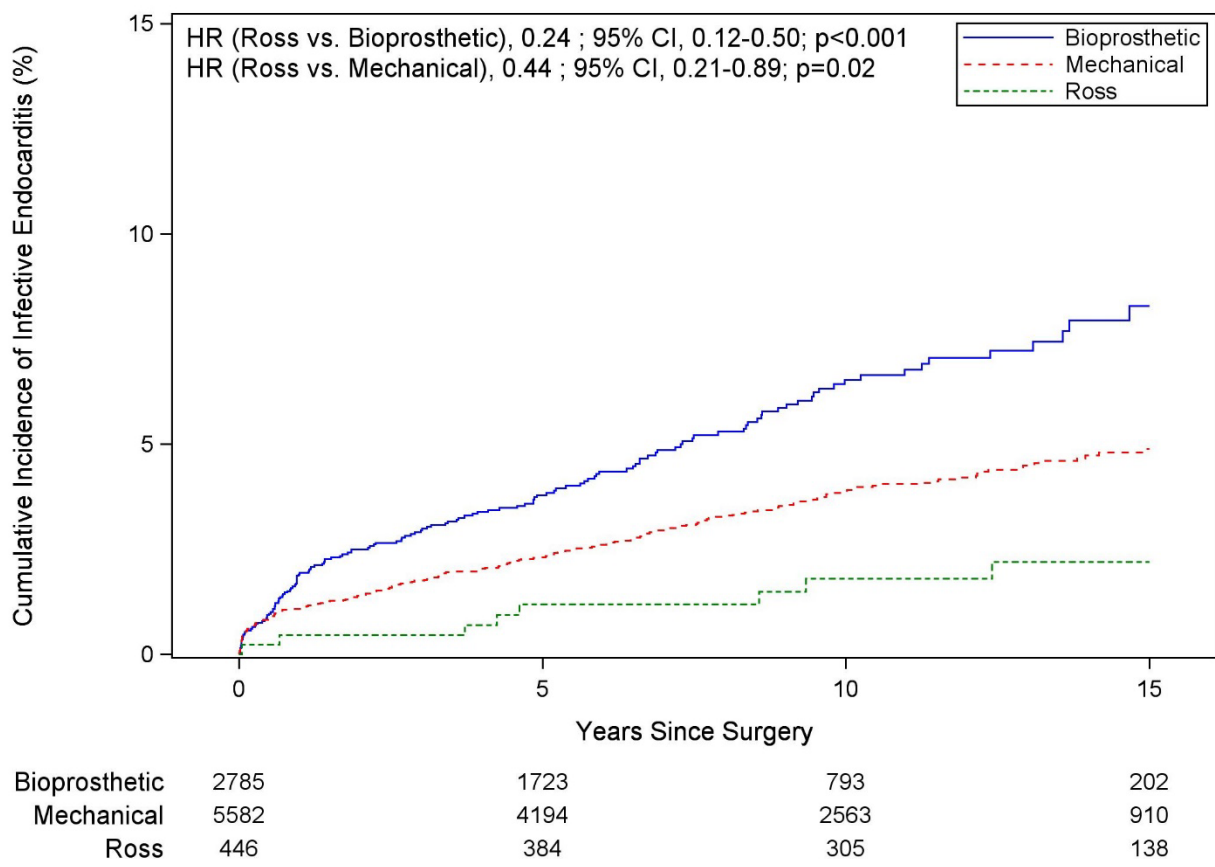|				
Bioprosthetic	2785	1758	828	212
Mechanical	5582	4120	2493	880
Ross	446	388	307	136

Supplemental Figure 4. Cumulative Incidence of Reoperation in Aortic and/or Pulmonary Valves in Patients who Underwent Aortic Valve Replacement, Stratified by the Type of Surgery, before Propensity Score Matching

Bioprosthetic	2785	1731	729	156
Mechanical	5582	4184	2518	880
Ross	446	360	267	115

The proportional hazards assumption was violated and the hazard ratios were reported at different follow-up times at 5 years and 15 years for the Ross operation and the Bioprosthetic valve comparison.

Supplemental Figure 5. Cumulative Incidence of Endocarditis in Patients who Underwent Aortic Valve Replacement, Stratified by the Type of Surgery, before Propensity Score Matching

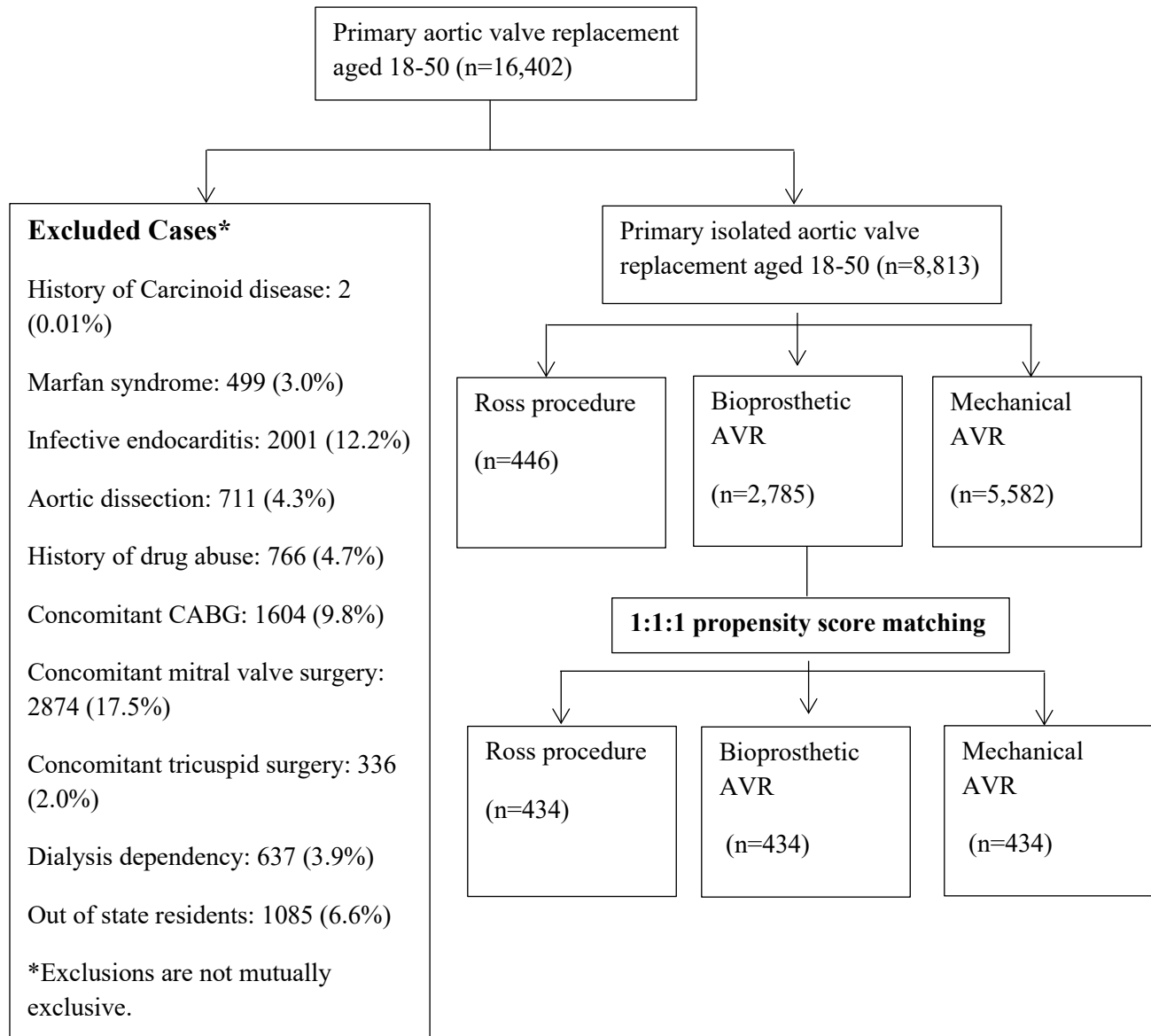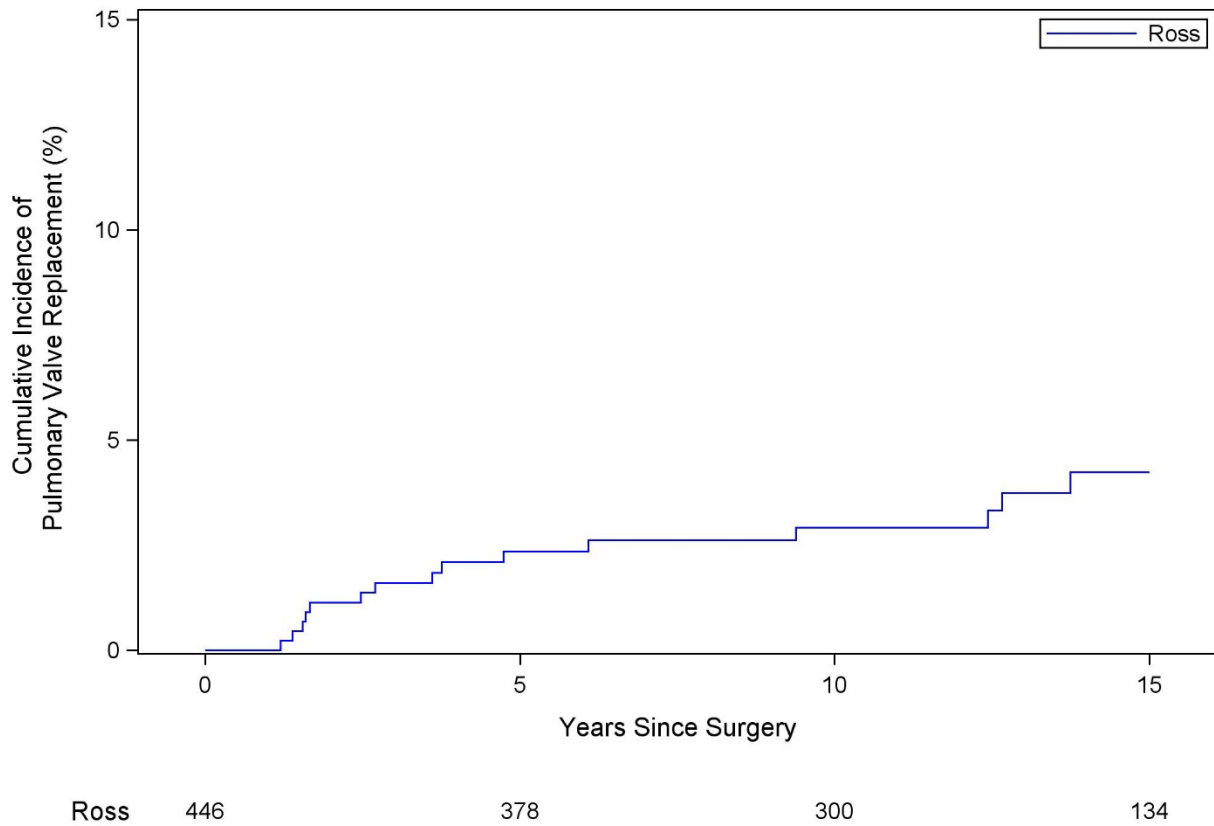|			
Bioprosthetic	2785	1723	793	202
Mechanical	5582	4194	2563	910
Ross	446	384	305	138

Supplemental Figure 6. Patient Selection Flow Diagram

Primary aortic valve replacement aged 18-50 (n=16,402)

Excluded Cases*

History of Carcinoid disease: 2 (0.01%)

Marfan syndrome: 499 (3.0%)

Infective endocarditis: 2001 (12.2%)

Aortic dissection: 711 (4.3%)

History of drug abuse: 766 (4.7%)

Concomitant CABG: 1604 (9.8%)

Concomitant mitral valve surgery: 2874 (17.5%)

Concomitant tricuspid surgery: 336 (2.0%)

Dialysis dependency: 637 (3.9%)

Out of state residents: 1085 (6.6%)

*Exclusions are not mutually exclusive.

Primary isolated aortic valve replacement aged 18-50 (n=8,813)

Ross procedure (n=446)

Bioprosthetic AVR (n=2,785)

Mechanical AVR (n=5,582)

1:1:1 propensity score matching

Ross procedure (n=434)

Bioprosthetic AVR (n=434)

Mechanical AVR (n=434)

Supplemental Figure 7. Cumulative Incidence of Reoperative surgical replacement for the Pulmonary Homograft in Patients who Underwent the Ross Procedure

Supplemental Methods. Generalized Propensity Score Analysis for Three or More Treatment Groups

The propensity score has been used to adjust for confounders through matching, stratification, and inverse weighting. While it has been extensively used in comparing two treatment groups, recently application of the propensity score to multi-treatment groups has been introduced, using the generalized propensity score (1). The generalized propensity score is an application of the binary treatment case to the setting of three or more treatment groups. Estimation of the generalized propensity score is done using multinominal logistic regression. The generalized propensity score (in three treatment groups) for each patient is a three dimensional vector of scores representing the probability of being assigned to each treatment, with the sum of the vector component adding to one. There are several generalized matching methods and we adopted the one which was introduced by Rassen et al. (2). The algorithm performs within-trio optimized matching without replacement to find the trios of patients with the smallest within-trio distance. The success of the generalized propensity score is assessed by the balance in covariates achieved. As in the binary treatment groups, the standardized mean difference is used in the multi-treatment groups.

Supplemental References

1. Imbens G. The role of the propensity score in estimating dose-response functions. Biometrika. 2000;87:706–710

2. Rassen JA. Matching by Propensity Score in Cohort Studies with Three Treatment Groups. Epidemiology; 2013; 24: 401-409