Supplemental Online Content

This supplemental material has been provided by the authors to give readers additional information about their work.

eTable 1: Codes

Variable	Codes	
Study population		
Intact abdominal aortic aneurysm	ICD-10:	I71.4
Open surgical repair	SKS:	KPDG10, KPDG20, KPDG21, KPDG22, KPDG23, KPDG24, KPDG99, KPDN10
Endovascular repair	SKS:	KPDP10, KPDQ10, KPDQ20, KPDQ21
Comorbidities		
Chronic obstructive pulmonary disease (if ICD & ATC coding present)	ICD-10:	I27.8, I27.9, J40 - J47, J60 - J67, J68.4, J70.1, J70.3
	ICD-8:	490, 491, 492
	ATC:	R03
Dialysis	ICD-10:	Z99.2
Diabetes	ICD-10:	E10 - 14
	ICD-8:	250
Atrial fibrillation	ICD-10:	I48
	ICD-8:	42793, 42794
Coronary artery disease	ICD-10:	I25
	ICD-8:	412
Myocardial infarction	ICD-10:	I21, I22
Heart failure	ICD-10:	I42, I50, I11.0, I13.0, I13.2, J81.9
	ICD-8:	425, 428, 4270, 4271
Stroke	ICD-10:	I63, I64
	ICD-8:	430 - 434, 436
Lymphoma	ICD-10:	C81 - C85, C88, C96, C90.0, C90.2
Solid tumor	ICD-10:	C00 - C26, C30 - C34, C37 - C41, C43, C45 - C58, C60 - C76, C97
Tumor metastasis	ICD-10:	C77 - C80
Ruptured abdominal aortic aneurysm	ICD-10:	I71.3

Caption eTable 1:

ICD-10: International classification of diseases, 10th revision.
https://icd.who.int/browse10/2019/en

ICD-8: International classification of diseases, 8th revision.
https://sundhedsdatastyrelsen.dk/-/media/sds/filer/rammer-og-retningslinjer/klassifikationer/sks-download/lukkede-klassifikationer/icd-8-klassifikation.txt?la=da

SKS: Sundhedsvæsenets Klassifikations System - Danish version of the Nordic Classification of Surgical Procedures (NCSP)
https://sundhedsdatastyrelsen.dk/da/rammer-og-retningslinjer/om-klassifikationer/sks-klassifikationer

ATC: Anatomical Therapeutic Chemical Classification
https://www.who.int/tools/atc-ddd-toolkit/atc-classification

eTable 2: Baseline Characteristics of Raw and Weighted Low-Risk Cohort

	Patients, No. (%)			Patients, No. (%)		
	Raw Cohort			**Weighted Cohort**		
	Open Repair	**EVAR**		**Open Repair**	**EVAR**	
Variable	n = 1007	n = 431	**Std. Diff.**	n = 1417	n = 1482	**Std. Diff.**
Age, *years*	66.5 (2.6)[a]	66.8 (2.5)[a]	0.135	66.6 (2.6)[a]	66.4 (2.7)[a]	0.076
Female sex	167 (16.6)	49 (11.4)	0.151	217.7 (15.4)	221.7 (15.0)	0.011
eGFR, *ml/min/1.73m^2*	72.0 (13.7)[a]	72.6 (14.5)[a]	0.046	72.4 (13.7)[a]	72.3 (14.2)[a]	0.009
COPD	63 (6.3)	51 (11.8)	0.195	104.2 (7.3)	135.9 (9.2)	0.066
Atrial fibrillation	59 (5.9)	37 (8.6)	0.105	94.5 (6.7)	103.3 (7.0)	0.012
Coronary artery disease	196 (19.5)	111 (25.8)	0.151	287.6 (20.3)	341.0 (23.0)	0.066
Myocardial infarction	134 (13.3)	72 (16.7)	0.095	207.5 (14.6)	214.9 (14.5)	0.004
Heart failure	40 (4.0)	53 (12.3)	0.308	64.7 (4.6)	144.3 (9.7)	0.202
Diabetes	76 (7.5)	54 (12.5)	0.166	117.6 (8.3)	163.3 (11.0)	0.092
Stroke	119 (11.8)	55 (12.8)	0.029	169.9 (12.0)	177.5 (12.0)	<0.001
Solid Tumor	97 (9.6)	77 (17.9)	0.241	166.2 (11.7)	182.9 (12.3)	0.019
Lymphoma	10 (1.0)	8 (1.9)	0.073	16.9 (1.2)	26.1 (1.8)	0.047
Tumor metastasis	≤5 (≤0.5)	8 (1.9)	0.139	5.7 (0.4)	20.5 (1.4)	0.104
Date of treatment[b]	03/2015 (60)	09/2016 (54)	0.340	10/2015 (59)	06/2015 (56)	0.063
2004 - 2008	131 (13.0)	14 (3.2)		154.3 (10.9)	90.8 (6.1)	
2009 - 2013	252 (25.0)	117 (27.1)		323.9 (22.8)	522.7 (35.3)	
2014 - 2018	366 (36.3)	145 (33.6)		520.9 (36.7)	470.5 (31.7)	
2019 - 2023	258 (25.6)	155 (36.0)		418.4 (29.5)	398.5 (26.9)	

Caption eTable 2:

Data were complete. Std. Diff. = Standardised mean difference between Open Repair and EVAR patients. The weighted cohort represents the adjusted population after inverse probability weighting (=pseudopopulation).

[a] Continuous variables are summarized with mean and standard deviation.

[b] Date of treatment was weighted as a continuous variable and presented with mean date and its standard deviation in brackets.

EVAR = Endovascular aneurysm repair; SMD = standardized mean difference; eGFR = estimated glomerular filtration rate; COPD = Chronic obstructive pulmonary disease.

eTable 3: Baseline Characteristics of Raw and Weighted Low-to-Moderate Risk Cohort

	Patients, No. (%)			Patients, No. (%)		
	Raw Cohort			**Weighted Cohort**		
	Open Repair	**EVAR**		**Open Repair**	**EVAR**	
Variable	n = 1960	n = 1406	**Std. Diff.**	n = 3437	n = 3307	**Std. Diff.**
Age, *years*	74.5 (2.8)[a]	75.0 (2.9)[a]	0.175	74.8 (2.8)[a]	74.7 (2.9)[a]	0.030
Female sex	346 (17.7)	174 (12.4)	0.148	533.4 (15.5)	513.3 (15.5)	<0.001
eGFR, *ml/min/1.73m^2*	72.4 (13.8)[a]	72.9 (13.9)[a]	0.032	72.6 (13.7)[a]	72.6 (14.0)[a]	0.002
COPD	17 (0.9)	15 (1.1)	0.020	28.9 (0.8)	34.2 (1.0)	0.020
Atrial fibrillation	180 (9.2)	188 (13.4)	0.133	363.4 (10.6)	377.4 (11.4)	0.027
Coronary art. disease	376 (19.2)	316 (22.5)	0.081	691.7 (20.1)	682.0 (20.6)	0.012
Myocardial infarction	221 (11.3)	211 (15.0)	0.111	425.3 (12.4)	439.4 (13.3)	0.027
Heart failure	100 (5.1)	105 (7.5)	0.098	225.5 (6.6)	192.2 (5.8)	0.031
Diabetes	161 (8.2)	147 (10.5)	0.077	304.9 (8.9)	294.5 (8.9)	0.001
Stroke	269 (13.7)	225 (16.0)	0.064	483.7 (14.1)	512.4 (15.5)	0.040
Solid Tumor	246 (12.6)	294 (20.9)	0.225	557.1 (16.2)	516.0 (15.6)	0.017
Lymphoma	23 (1.2)	16 (1.1)	0.003	50.9 (1.5)	33.1 (1.0)	0.043
Tumor metastasis	16 (0.8)	19 (1.4)	0.052	32.9 (1.0)	34.0 (1.0)	0.007
Date of treatment[b]	01/2016 (57)	07/2017 (51)	0.340	09/2016 (56)	07/2016 (53)	0.026
2004 - 2008	164 (8.4)	22 (1.6)		220.9 (6.4)	90.8 (2.7)	
2009 - 2013	471 (24.0)	290 (20.6)		705.8 (20.5)	894.6 (27.1)	
2014 - 2018	735 (37.5)	511 (36.3)		1282.9 (37.3)	1230.3 (37.2)	
2019 - 2023	590 (30.1)	583 (41.5)		1227.6 (35.7)	1091.3 (33.0)	

Caption eTable 3:

Data were complete. Std. Diff. = Standardised mean difference between Open Repair and EVAR patients. The weighted cohort represents the adjusted population after inverse probability weighting (=pseudopopulation).

[a] Continuous variables are summarized with mean and standard deviation.

[b] Date of treatment was weighted as a continuous variable and presented with mean date and its standard deviation in brackets.

EVAR = Endovascular aneurysm repair; SMD = standardized mean difference; eGFR = estimated glomerular filtration rate; COPD = Chronic obstructive pulmonary disease.

eTable 4: Baseline Characteristics of Raw and Weighted Moderate-to-High Risk Cohort

	Patients, No. (%)			Patients, No. (%)		
	Raw Cohort			Weighted Cohort		
	Open Repair	EVAR		Open Repair	EVAR	
Variable	n = 581	n = 635	Std. Diff.	n = 1194	n = 1219	Std. Diff.
Age, years	77.9 (5.2)[a]	78.0 (5.0)[a]	0.412	78.8 (5.1)[a]	78.9 (5.7)[a]	0.021
Female sex	140 (24.1)	86 (13.5)	0.272	242.4 (20.3)	213.4 (17.5)	0.072
eGFR, ml/min/1.73m^2	61.0 (20.3)[a]	68.4 (17.5)[a]	0.391	64.3 (18.9)[a]	65.1 (20.4)[a]	0.041
COPD	132 (22.7)	134 (21.1)	0.039	286.3 (24.0)	252.4 (20.7)	0.079
Atrial fibrillation	65 (11.2)	90 (14.2)	0.090	172.6 (14.5)	149.9 (12.3)	0.063
Coronary art. disease	136 (23.4)	145 (22.8)	0.014	302.0 (25.3)	271.4 (22.3)	0.071
Myocardial infarction	73 (12.6)	89 (14.0)	0.043	187.1 (15.7)	157.5 (12.9)	0.079
Heart failure	50 (8.6)	54 (8.5)	0.004	132.8 (11.1)	91.5 (7.5)	0.125
Diabetes	55 (9.5)	76 (12.0)	0.081	133.4 (11.2)	135.8 (11.1)	0.001
Stroke	75 (12.9)	105 (16.5)	0.102	150.0 (12.6)	195.3 (16.0)	0.099
Solid Tumor	66 (11.4)	142 (22.4)	0.297	192.9 (16.2)	217.8 (17.9)	0.046
Lymphoma	≤5 (≤0.9)	16 (2.5)	0.164	15.5 (1.3)	25.1 (2.1)	0.059
Tumor metastasis	≤5 (≤0.9)	10 (1.6)	0.065	7.7 (0.6)	17.9 (1.5)	0.081
Date of treatment[b]	12/2015 (60)	03/2018 (51)	0.481	11/2016 (57)	04/2017 (54)	0.088
2004 - 2008	59 (10.2)	18 (2.8)		84.5 (7.1)	57.5 (4.7)	
2009 - 2013	128 (22.0)	96 (15.1)		210.5 (17.6)	248.4 (20.4)	
2014 - 2018	212 (36.5)	205 (32.3)		439.4 (36.8)	407.2 (33.4)	
2019 - 2023	182 (31.3)	316 (49.8)		459.3 (38.5)	505.7 (41.5)	

Caption eTable 4:

Data were complete. Std. Diff. = Standardised mean difference between Open Repair and EVAR patients. The weighted cohort represents the adjusted population after inverse probability weighting (=pseudopopulation).

[a] Continuous variables are summarized with mean and standard deviation.

[b] Date of treatment was weighted as a continuous variable and presented with mean date and its standard deviation in brackets.

EVAR = Endovascular aneurysm repair; SMD = standardized mean difference; eGFR = estimated glomerular filtration rate; COPD = Chronic obstructive pulmonary disease.

eTable 5: Baseline Characteristics of Raw and Weighted High-Risk Cohort

	Patients, No. (%)			Patients, No. (%)		
	Raw Cohort			**Weighted Cohort**		
	Open Repair	**EVAR**		**Open Repair**	**EVAR**	
Variable	n = 378	n = 493	Std. Diff.	n = 833	n = 901	Std. Diff.
Age, *years*	80.6 (4.6)[a]	81.7 (4.3)[a]	0.249	81.3 (4.6)[a]	81.3 (4.5)[a]	0.001
Female sex	86 (22.8)	96 (19.5)	0.080	152.3 (18.3)	206.8 (23.0)	0.116
eGFR, *ml/min/1.73m²*	43.4 (15.5)[a]	47.8 (14.0)[a]	0.295	44.6 (15.2)[a]	46.3 (14.7)[a]	0.117
COPD	104 (27.5)	152 (30.8)	0.073	246.0 (29.5)	252.4 (28.0)	0.033
Atrial fibrillation	54 (14.3)	88 (17.8)	0.097	131.9 (15.8)	133.5 (14.8)	0.028
Coronary art. disease	92 (24.3)	120 (24.3)	<0.001	224.9 (27.0)	206.7 (22.9)	0.093
Myocardial infarction	54 (14.3)	71 (14.4)	0.003	124.7 (15.0)	119.2 (13.2)	0.050
Heart failure	44 (11.6)	76 (15.4)	0.111	128.5 (15.4)	114.9 (12.8)	0.076
Diabetes	54 (14.3)	61 (12.4)	0.056	134.9 (16.2)	99.0 (11.0)	0.152
Stroke	70 (18.5)	80 (16.2)	0.061	154.2 (18.5)	136.9 (15.2)	0.088
Solid Tumor	52 (13.8)	107 (21.7)	0.209	159.4 (19.1)	156.5 (17.4)	0.046
Lymphoma	<5 (<1.3)	11 (2.2)	0.092	8.3 (1.0)	17.2 (1.9)	0.076
Tumor metastasis	<5 (<1.3)	<5 (<1.0)	0.090	<5 (<0.6)	<5 (<0.6)	0.081
Date of treatment[b]	04/2015 (65)	01/2018 (51)	0.572	08/2016 (62)	05/2017 (54)	0.154
2004 - 2008	55 (14.6)	10 (2.0)		84.6 (10.1)	32.0 (3.5)	
2009 - 2013	97 (25.7)	82 (16.6)		171.4 (20.6)	186.3 (20.7)	
2014 - 2018	109 (28.8)	173 (35.1)		241.3 (28.9)	322.5 (35.8)	
2019 - 2023	117 (31.0)	228 (46.2)		336.2 (40.3)	360.2 (40.0)	

Caption eTable 5:

Data were complete. Std. Diff. = Standardised mean difference between Open Repair and EVAR patients. The weighted cohort represents the adjusted population after inverse probability weighting (=pseudopopulation).

[a] Continuous variables are summarized with mean and standard deviation.

[b] Date of treatment was weighted as a continuous variable and presented with mean date and its standard deviation in brackets.

EVAR = Endovascular aneurysm repair; SMD = standardized mean difference; eGFR = estimated glomerular filtration rate; COPD = Chronic obstructive pulmonary disease.
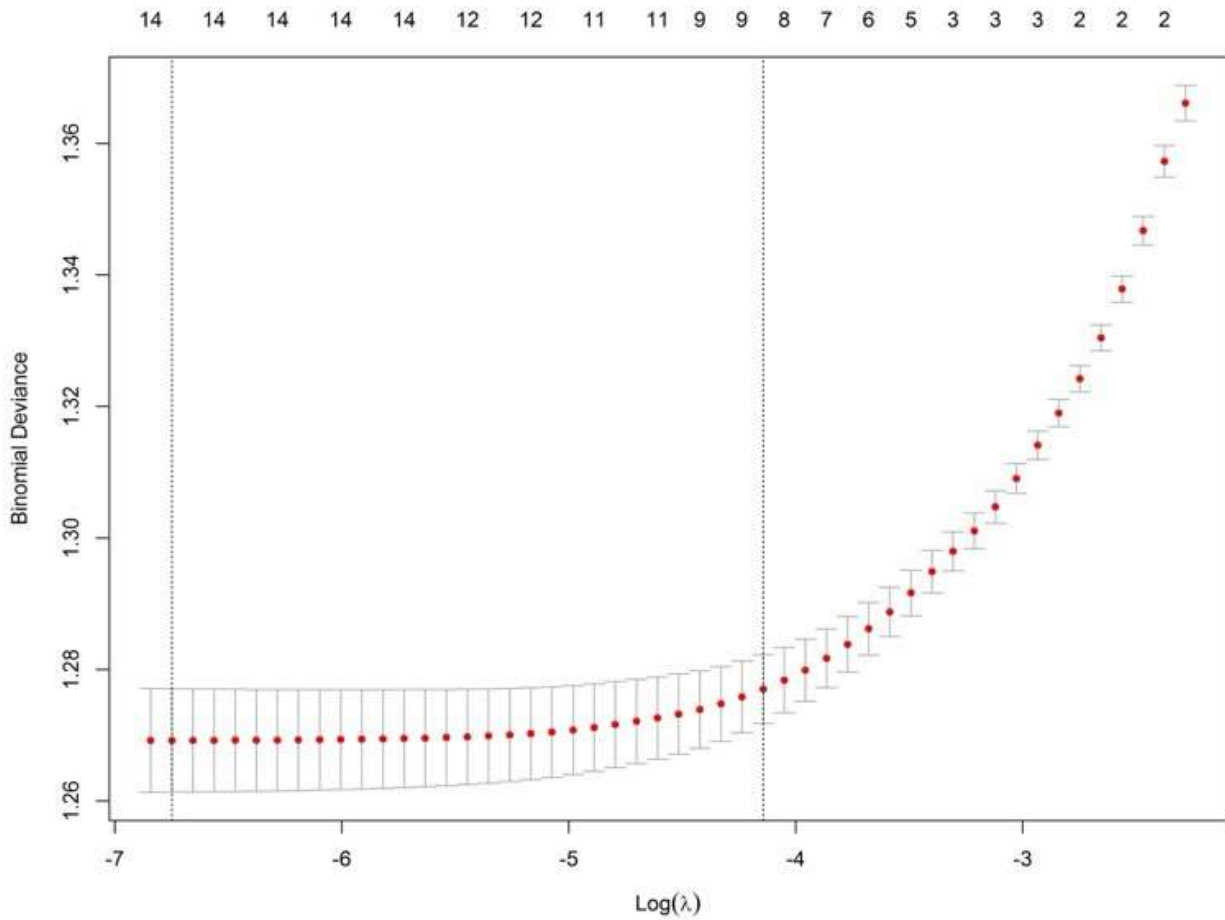
eTable 6: Raw and Weighted Survival Rates at 1, 5, and 10 years after Treatment

Risk Group	No. of Deaths	No. at Risk	Survival Rates at 1 Year (95%-CI)	
			Raw Cohort	Weighted Cohort
Open Repair				
Low	46	918	95.4 (94.1-96.7)	95.6 (94.3-96.8)
Low-to-moderate	182	1679	90.6 (89.3-91.9)	90.3 (88.9-91.7)
Moderate-to-high	92	461	84.0 (81.0-87.0)	83.6 (80.4-86.9)
High	95	269	74.7 (70.5-79.3)	76.7 (72.4-81.3)
Overall	415	3327	89.3 (88.4-90.3)	88.5 (87.4-89.6)
EVAR				
Low	20	384	95.2 (93.2-97.3)	96.1 (94.4-97.9)
Low-to-moderate	57	1226	95.8 (94.8-96.9)	96.0 (95.0-97.1)
Moderate-to-high	45	518	92.6 (90.5-94.7)	92.7 (90.5-95.0)
High	53	393	88.9 (86.1-91.8)	88.4 (85.4-91.5)
Overall	175	2521	93.9 (93.0-94.8)	94.5 (93.7-95.4)

Risk Group	No. of Deaths	No. at Risk	Survival Rates at 5 Years (95%-CI)	
			Raw Cohort	Weighted Cohort
Open Repair				
Low	145	624	83.7 (81.3-86.2)	83.6 (81.1-86.1)
Low-to-moderate	464	994	72.9 (70.8-75.0)	72.2 (70.0-74.5)
Moderate-to-high	212	232	58.5 (54.3-63.1)	56.5 (52.0-61.4)
High	180	113	46.5 (41.3-52.4)	48.4 (42.9-54.6)
Overall	1001	1963	71.1 (69.6-72.7)	69.1 (67.4-70.8)
EVAR				
Low	76	217	78.7 (74.5-83.1)	81.4 (77.4-85.7)
Low-to-moderate	298	599	72.0 (69.3-74.8)	73.4 (70.7-76.2)
Moderate-to-high	157	204	65.9 (61.5-70.6)	66.4 (61.9-71.3)
High	179	141	52.4 (47.3-58.0)	54.5 (49.4-60.3)
Overall	710	1161	68.6 (66.7-70.7)	71.8 (69.9-73.8)

Risk Group	No. of Deaths	No. at Risk	Survival Rates at 10 Years (95%-CI)	
			Raw Cohort	Weighted Cohort
Open Repair				
Low	252	239	65.0 (61.4-68.9)	64.7 (61.0-68.6)
Low-to-moderate	762	251	41.9 (38.9-45.1)	41.1 (38.1-44.4)
Moderate-to-high	308	53	27.6 (23.0-33.1)	26.1 (21.6-31.5)
High	231	24	18.7 (13.8-25.4)	18.8 (13.7-25.7)
Overall	1553	567	44.1 (42.1-68.9)	41.6 (39.6-43.8)
EVAR				
Low	129	75	51.9 (45.5-59.1)	54.9 (48.2-62.6)
Low-to-moderate	493	129	37.5 (33.7-41.8)	39.9 (35.9-44.4)
Moderate-to-high	251	21	19.4 (14.3-26.5)	23.3 (17.2-31.6)
High	260	8	7.8 (4.3-14.2)	8.8 (4.8-16.2)
Overall	1133	233	32.5 (29.9-35.4)	38.0 (35.0-41.2)

Captions eTable 6:
95%-CI = 95% confidence interval of survival rate; EVAR = Endovascular aortic repair.

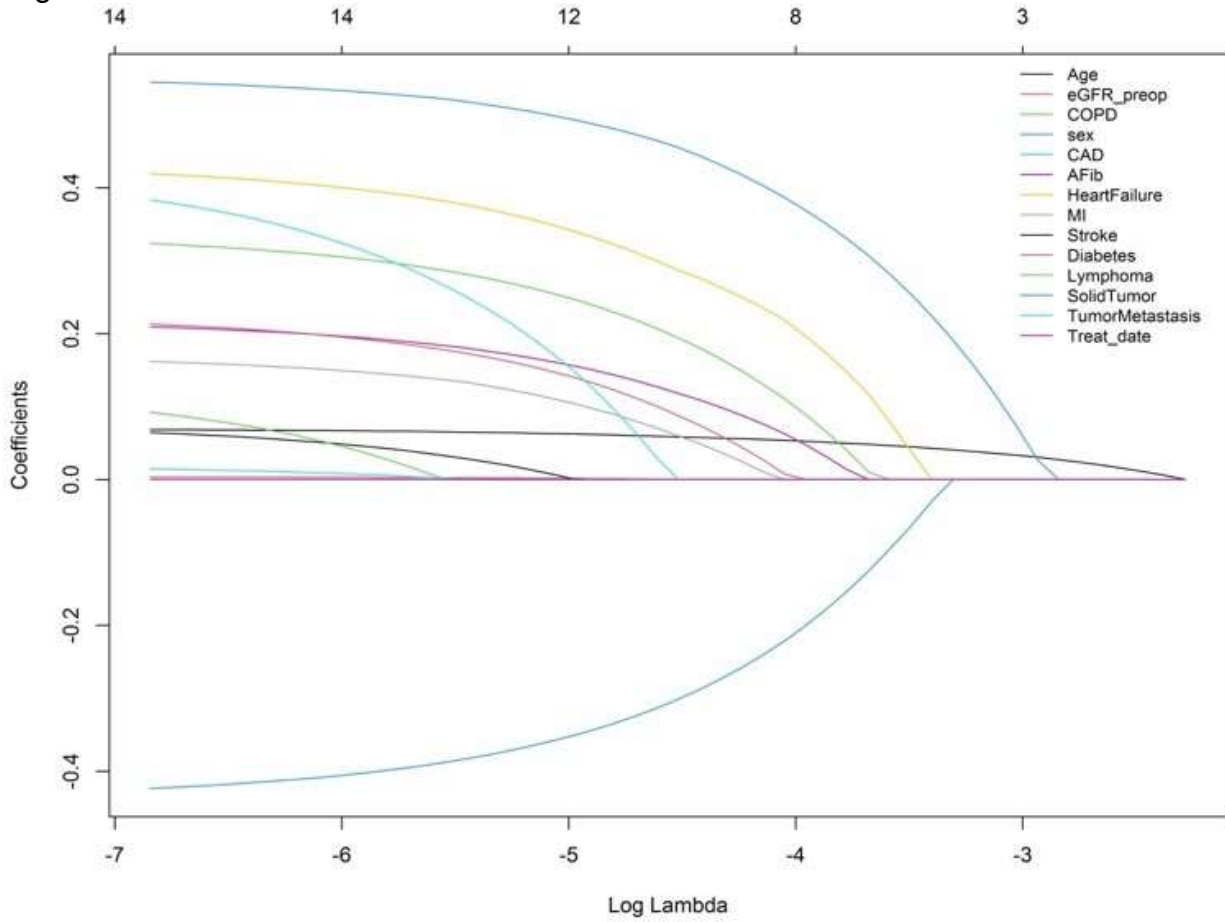eFigure 1: LASSO Variable Selection - Cross Validation

Results of 10-fold cross-validation process with optimal number of variables in the model at λ_{1SE} (lambda) = 1 standard error of minimum λ. At λ_{1SE}, 9 of the 14 variables (numbers across the top) in the model had non-zero coefficients and were selected for the inverse probability weighting. The red dots indicate the estimated variance of the loss metric with 95% confidence intervals. The vertical lines show the locations of λ_{min} and λ_{1SE} of the minimum.

eFigure 2: LASSO Variable Selection - Coefficient Paths

Caption eFigure 2:
Results of the LASSO variable selection process using the glmnet() R-package by Friedman et al., 2010.

Coefficient paths of the included variables against λ in the model during the shrinkage process. The axis above indicates the number of non-zero coefficients at the current log(λ), which is the effective degrees of freedom for the lasso.
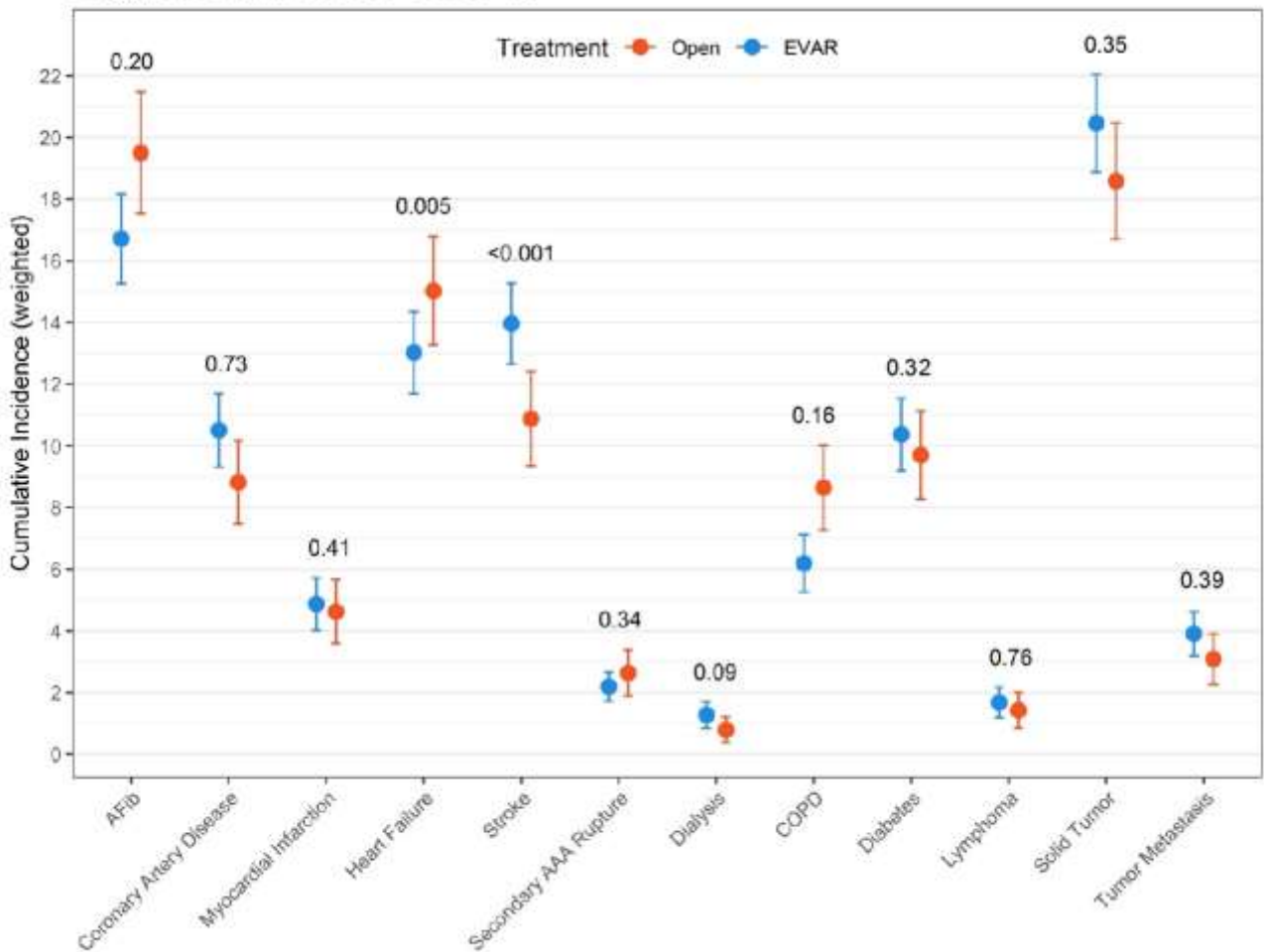
eFigure 3: Inverse Probability Weighting
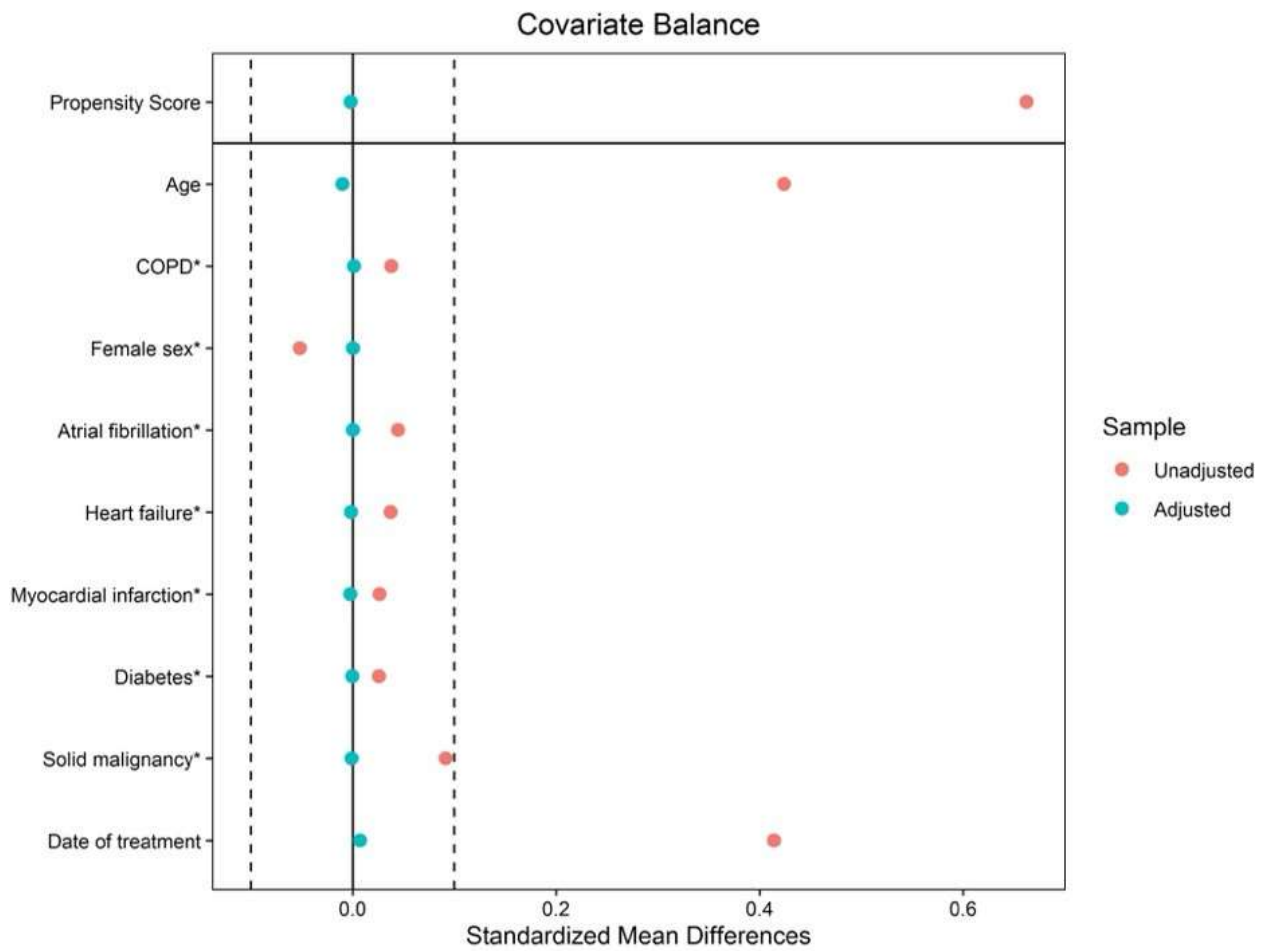
Covariate Balance

Caption eFigure 3:
Results of the IPW process using the cobalt() R-package by Noah Greifer, 2019.
Balance of covariates was assessed using standardized mean differences, with values <0.2 indicating good balance. The dashed lines are set at SME = +/- 0.1.
* Indicating binary variables.

eFigure 4: Cumulative Incidence of Diagnosis at 10 Years

Diagnosis within 10 Year Follow up