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Ethics approval

The DOPPS study received Institutional Review Board approval at all participating sites, and patient consent was obtained as required by local medical research ethics committees.

Participant recruitment and data collection

DOPPS was designed to evaluate the association between practice patterns and selected patient outcomes, including mortality, hospitalization and vascular access outcomes.[1] For participation in DOPPS, 20-40 hemodialysis patients aged 18 years or older were randomly selected from 308 dialysis facilities in DOPPS I (1996-2001; n = 17,034 patients from France, Germany, Italy, Japan, Spain, the United Kingdom, and the United States), 322 dialysis facilities in DOPPS II (2002- 2004; n = 12,839 patients from the same countries plus Australia, Belgium, Canada, New Zealand, and Sweden), 300 facilities in DOPPS III (2005-2008; n = 11,361 from the same countries as in DOPPS II) and 300 dialysis facilities in DOPPS IV (2009-2011; n = 15,528 from the same countries as in DOPPS II and III). In DOPPS I, patients who left the study due to death, modality change or transfer to another facility were replaced every 4 months by randomly selected new patients. In DOPPS II replacement was not performed but the cohort was supplemented with up to 15 consecutive patients per facility initiating hemodialysis within 30 days of study entry. In DOPPS III and IV patient replacement occurred on an annual basis, drawing from patients who joined the study unit during the prior year. In DOPPS, data collection occurs at 4-month intervals including events occurred during the previous 4-month intervals, and their dates. In this way, the data collection process informs studies with follow-up of any duration.

Outcome capture in DOPPS

To maximize capture of death data, DOPPS requires information on patient status (dead/alive/unknown) for up to 60 days after departure from a DOPPS facility; all these events were included.[1] However, based on previous analyses showing that most deaths occur within a week of departure from DOPPS, we assumed that follow-up beyond a week of departure was incomplete; we censored observations at 7 days for patients who left the study and had not died during these 60

days. If the patient withdrew from dialysis and no date of death was reported, a date of death was imputed at 8 days (the median reported time to death after dialysis withdrawal).

Mediator

Data collection on access complications included date and type of access-related procedures (new creation, surgical or medical revision, angioplasty, type of surgical or radiological repair, access removal, thrombolysis and mechanical fibrin sheath disruption), primary and secondary diagnoses at discharge from hospital (including clotted access, dysfunctional access, skin infection and sepsis), use of antibiotics, and updated access status (patent but not in use, in use, not used/abandoned, infected or removed). *Non-infectious complications* included access dysfunction or failure events due to any non-infectious-related cause (stenosis or thrombosis of the access, fibrin material within or around a catheter, catheter migration, central vein stenosis or thrombosis) requiring a revision procedure to maintain patency or improve access performance (i.e., surgical or medical revision, angioplasty, type of surgical or radiological repair, access removal, thrombolysis and mechanical fibrin sheath disruption) or requiring creation of a new access because of access removal or abandonment. *Infectious complications* were defined as any infection of the access requiring medical intervention (managed in an outpatient or inpatient setting), or bacteremia or sepsis that were potentially access-related, or bacteremia or sepsis without a documented source for infection as reported in the vascular access history file or hospitalization file.[2]

Statistical analysis details

Descriptive statistics: We used mean (±SD), median (range) or percent and frequency as appropriate.

Multiple imputation: Information on duration of hemodialysis therapy at DOPPS entry and duration of use a temporary catheter before placement of the first permanent access was available in all participants. Because of missing information for the other covariates, we did fully adjusted analyses in two ways: with case-wise deletion for missing values (i.e., complete-case analysis), and using multiple imputation in the full cohort by replacing each missing datum with 20 potential imputed values (obtained using the multiple imputation procedure command 'mi' in STATA). We carried out these analyses 20 times, once with each set of imputed values, and the regression estimates and standard errors were combined in the standard way.[3]

Model building and verification: We used Cox regression and Weibull regression to model time from the date access placement to each access complication (mediator models) and to model time from the date access placement to the date of death (outcome model). We censored observations at the date of switch to peritoneal dialysis or kidney transplant, transfer out of a DOPPS facility, recovery of kidney function, participant withdrawal, study end date (December 31, 2011) or at 180 days from access creation, whichever came first. In mortality models, for participants who received their first permanent access before DOPPS entry, we left truncated their follow-up at the date of enrollment into the DOPPS. All models were adjusted for the variables summarized in Table 1 of the main manuscript. During model building (for both mediator analyses and outcome analyses) we checked that results were consistent across country regions (including formal test for interaction), study time (year 2000 [median] or earlier as compared to after 2000), and minimum follow-up of 14 days. We used graphical and formal tests based on residual analyses to assess the validity of each Cox and Weibull model. We further assessed the assumptions required for Weibull regression by first comparing visually the crude hazard function for weekly time intervals and the overlaid fitted Weibull function without adjustment. We also assessed the fit of one- and two-parameter survival models nested in the three-parameter gamma family, including Weibull, exponential and lognormal. We used likelihood ratio tests to compare nested models, information criteria for non-nested models, and Cox-Snell residuals to graphically assessed their goodness-of-fit. We used STATA (www.stata.com) and R (http://cran.r-project.org/) for all analyses.

Summary of sensitivity analyses: Sensitivity analyses were based on the following considerations:

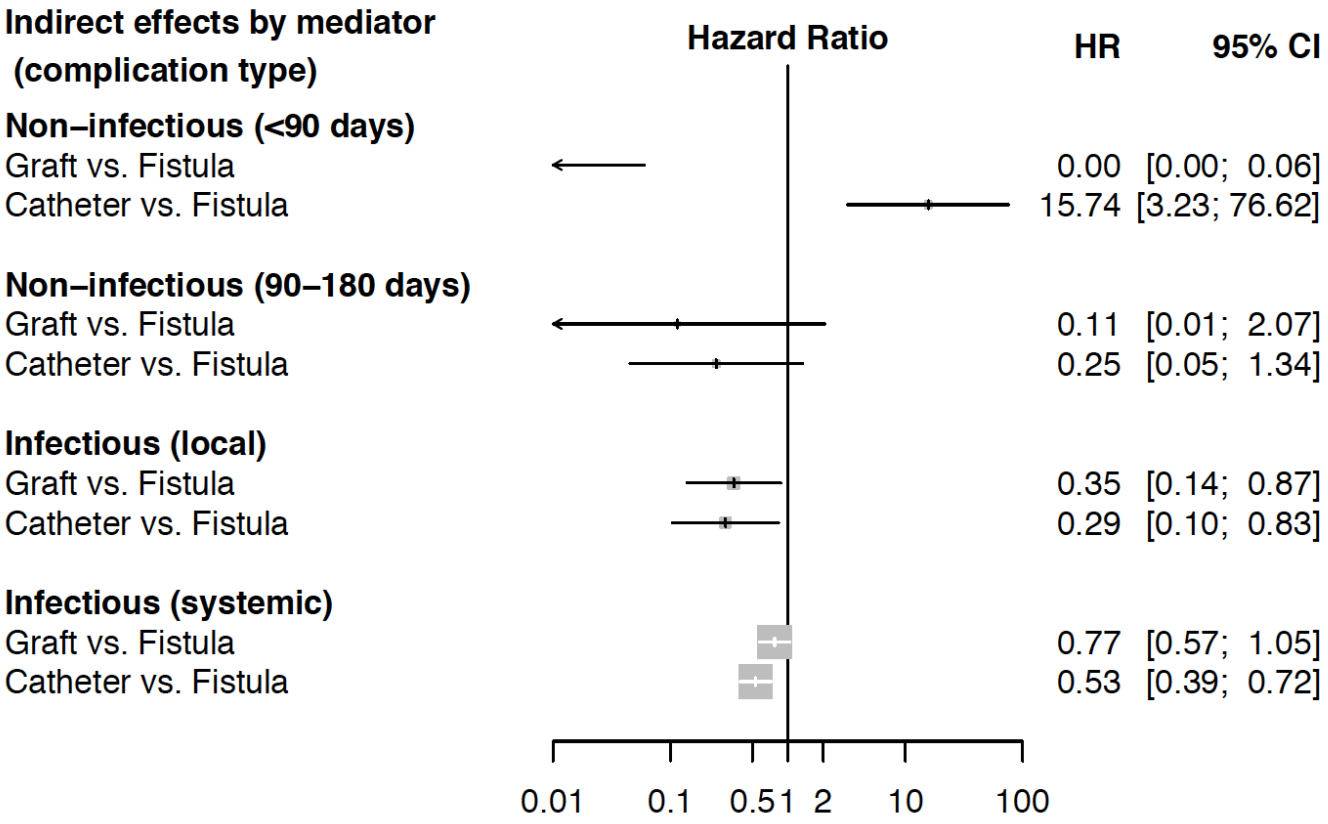
1) Distributional assumptions (Weibull models as opposed to Cox regressions – for all mediator and outcome models);
2) Use of complete cases (as opposed to multiply imputed data – for all mediator and outcome models);
3) Competing risks for death (crude and adjusted) in mediator models and censoring observations with a second access in outcome models;
4) Restricting analyses to 30-day survivors only (outcome models);
5) Censoring observations 30 days following second access placement (outcome models); and

6) Using counts (as opposed to binary variables) to define time-varying complications (outcome models).
7) Mortality model including patients who started hemodialysis within 180 days of DOPPS entry and received their first permanent vascular access from 15 to 180 days prior to DOPPS entry.

These analyses are summarized with figures and legends in this Supplemental Material. To examine the effect of censoring for death in mediator models (point #3) we compared the 1–Kaplan-Meier curve and the cumulative incidence function for each complication type with death as competing event, and checked the consistency of the regression coefficients of these Cox regression and Weibull regression models (in which death was treated as censored) with those from models in which death was treated as a competing event.[4] We defined time-varying non-infectious and infectious complications (point #6) as the time-varying count of each complication type that occurred during the study period (i.e., 0, 1, 2, 3 or greater).

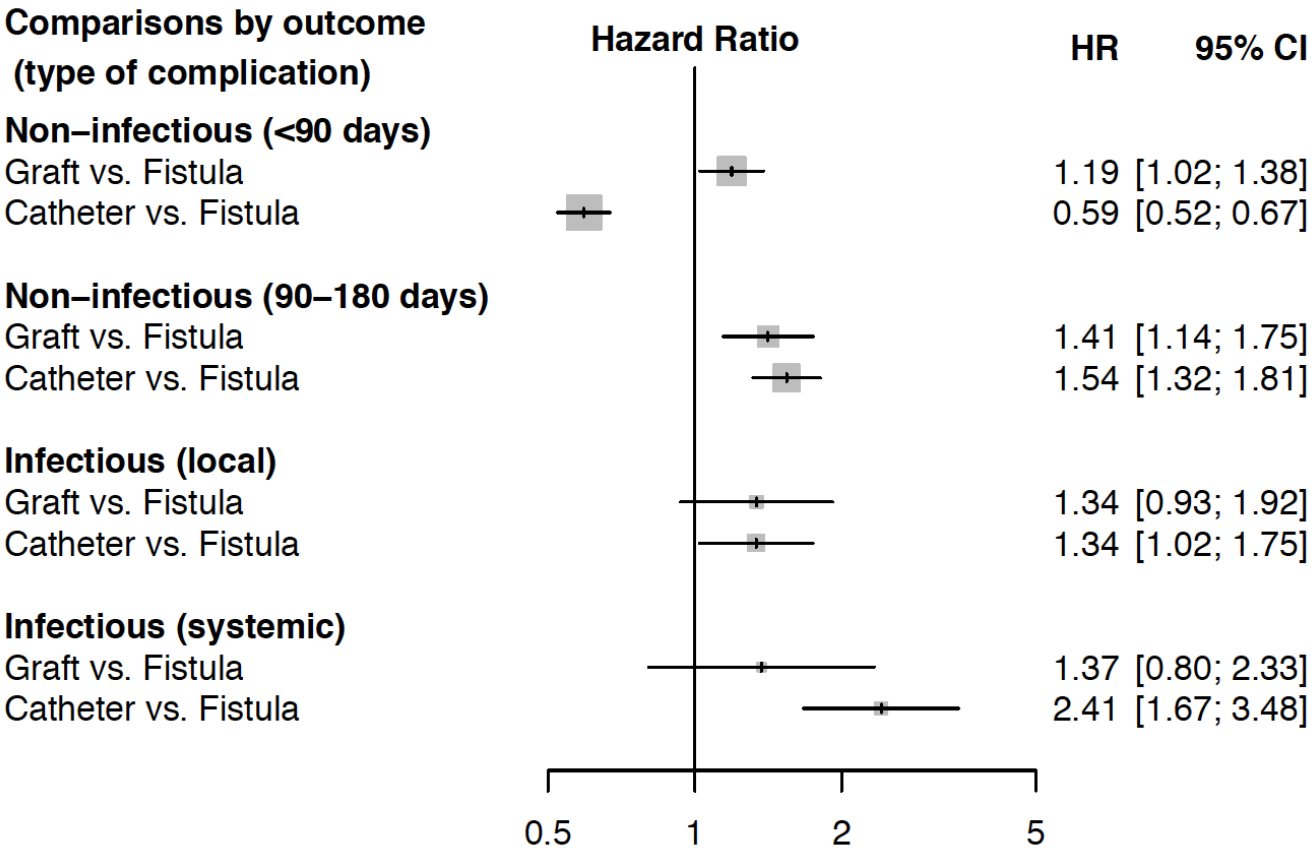
Power considerations: In power analysis, we considered the power of detecting an association between mediator and mortality, and explaining the exposure-outcome relation at least partially (i.e., by 50%). We estimated that a sample of 5,000 participants would have a power of 80% to detect a hazard at least 50% as high in people who experienced either a non-infectious or an infectious complication of the access as it was in people who were complication free.[2, 5] We assumed an average mortality rate of 8% during the six-month follow-up and considered a two-sided P value of 0.05 for statistical significance. Assuming a Weibull distribution of the hazard, the same sample would have a power >90% to detect a hazard ratio as small as 1.2 using a two-sided P value of 0.01 to define significance. Finally, using the package 'powerMediation' in R (https://cran.r-project.org/web/packages/powerMediation/index.html), we estimated that this sample would have a power >80% to detect a change of at least 50% in the largest log-hazard ratio for death associated with access type after accounting for access complications with a two-sided alpha level of 0.05 and assuming a correlation of 10% between exposure (access type) and mediator (infections).[6]

Supplemental Figure 1: Estimates of indirect effects (mediation models)



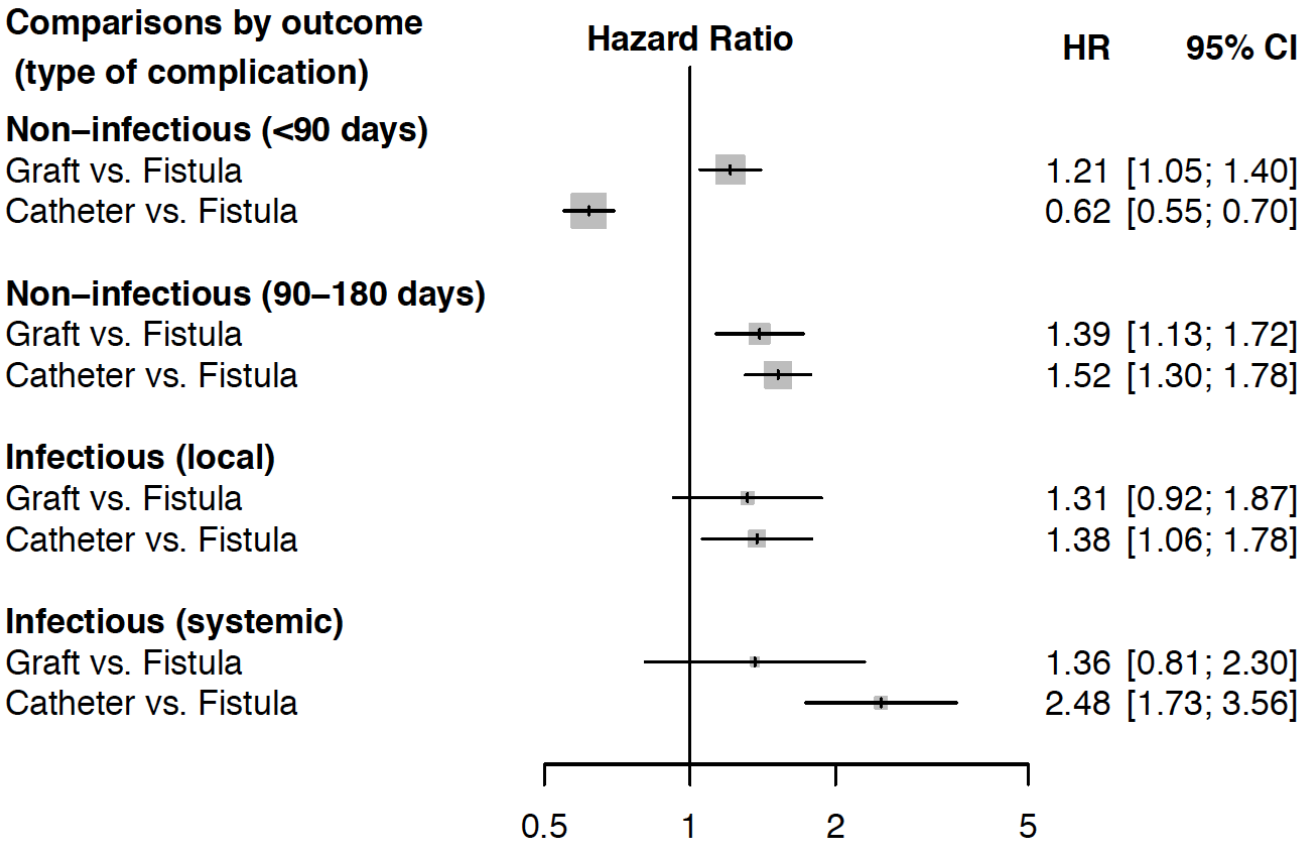
Legend: We planned to use mediation models to formally test the indirect effect of access type mediated through access complications for each combination of access type (graft or catheter vs. fistula) and complication type (early or late non-infectious complication, and local or systemic infection). Input models are summarized in Supplemental Figures 3 and 7. Given the results of Step 3 (Figure 1) showing no mediation effect, Step 4 is unnecessary. In fact, the estimate of the indirect effect of each mediator is either non-significant or artefactually inconsistent with the total effect of the exposure (Supplemental Figure 7 [M1]).

Supplemental Figure 2: Cox regression model of access complications



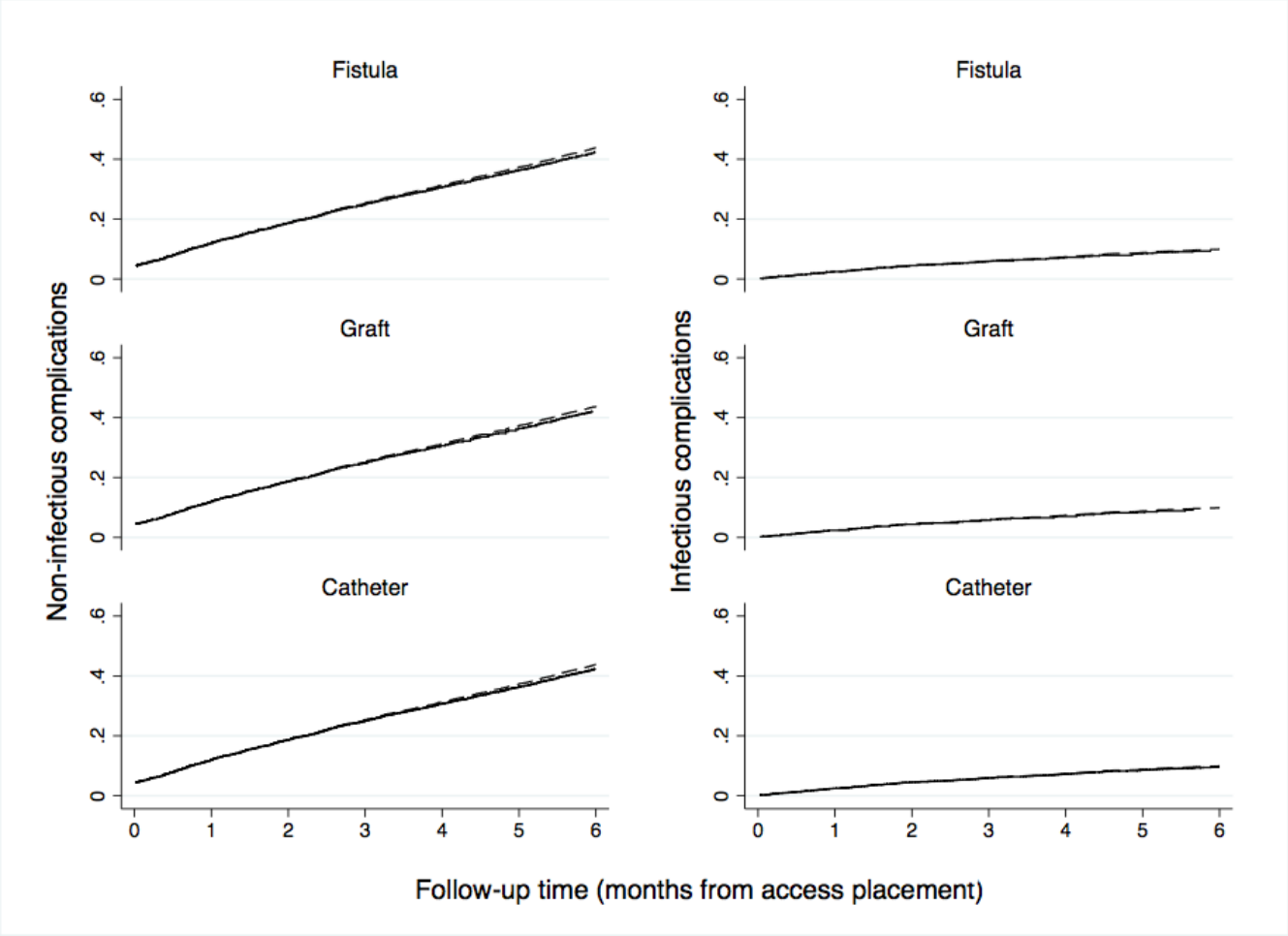
Legend: Fully adjusted model stratified by access complication type (complete case analysis; N=5,722); corresponding model including all participants is summarized in Figure 4.

Supplemental Figure 3: Weibull regression model of access complications

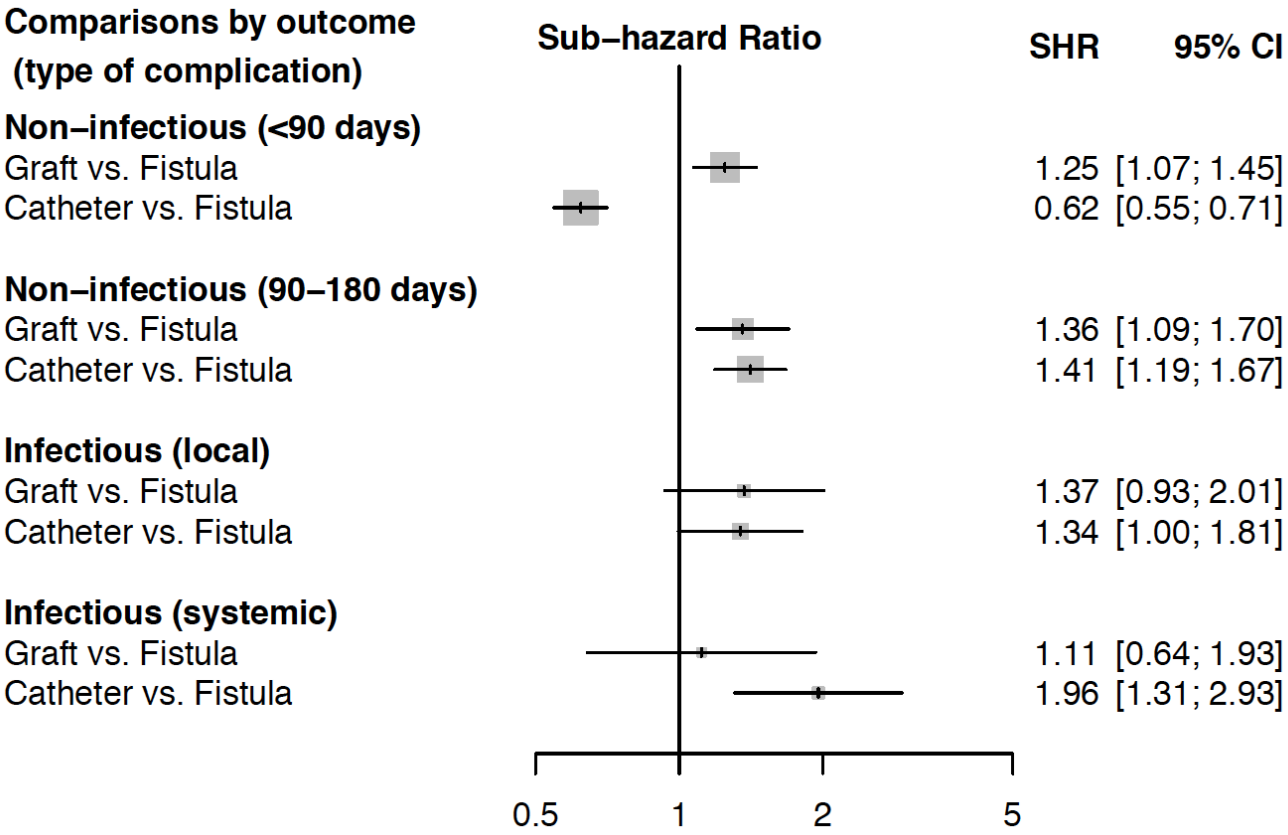


Legend: Fully adjusted model stratified by access complication type (analysis with multiply imputed data; N=6,119). Corresponding Cox regression including the same set of covariates is reported in Figure 4.

Supplemental Figure 4: Cumulative Incidence Functions (solid lines) and 1 – Kaplan Meier Curves (dash lines) by access type and complication type

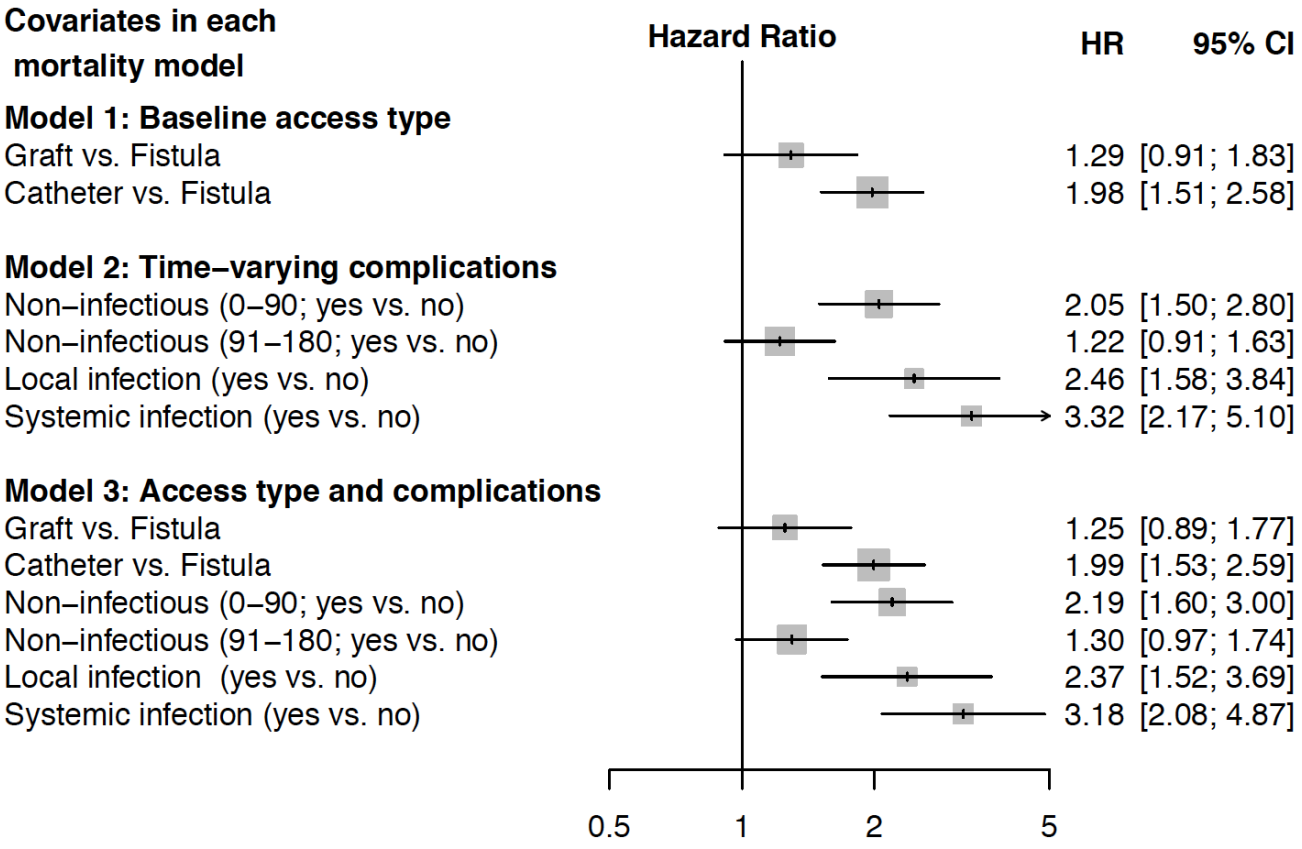


Supplemental Figure 5: Fine and Gray models of access complications



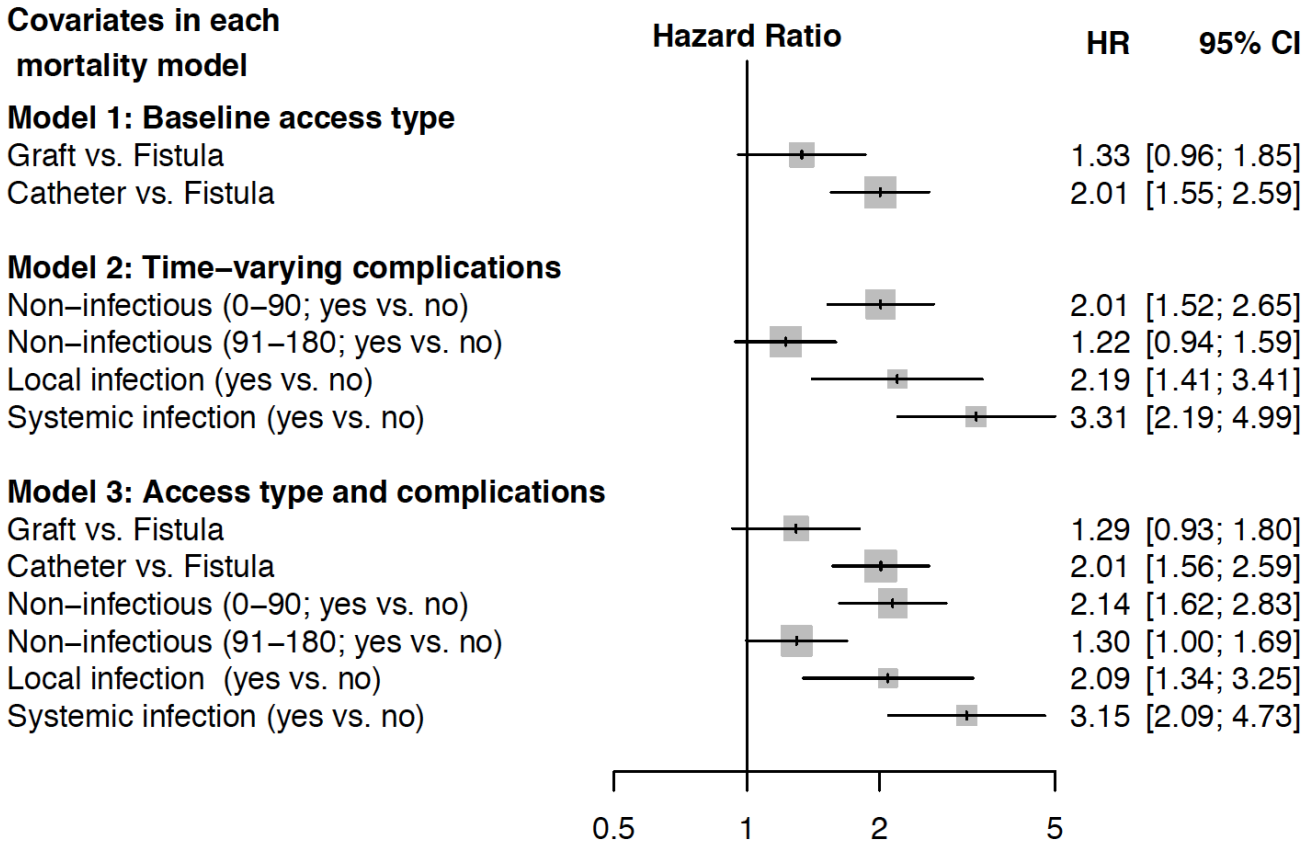
Legend: In each fully adjusted model the complication is treated as event and death as competing event (analysis with multiply imputed data; N=6,119). Corresponding Cox regression including the same set of covariates is reported in Figure 4.

Supplemental Figure 6: Cox regression models of mortality



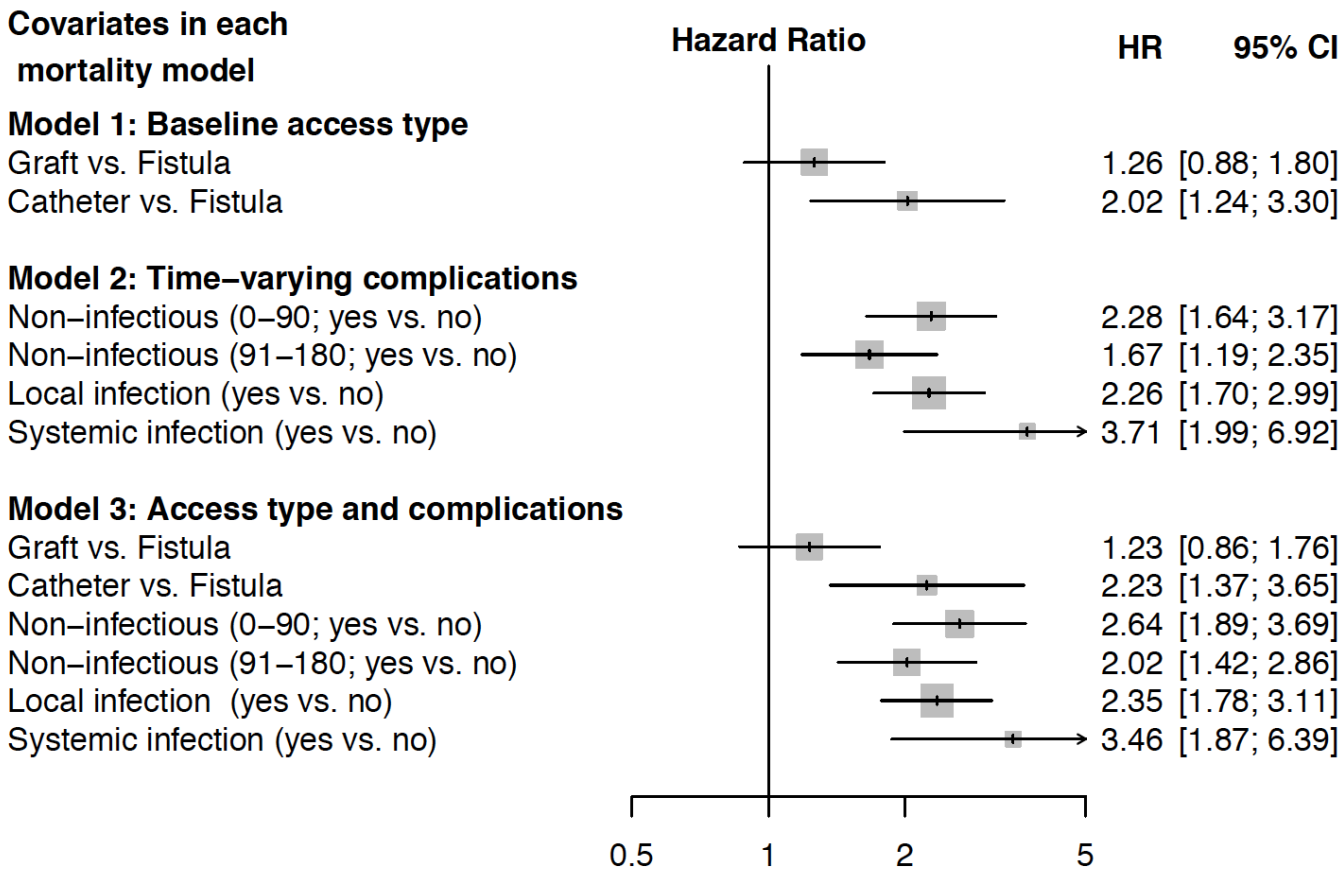
Legend: Fully adjusted models of mortality (complete case analysis; N=5,722); corresponding models including all participants are summarized in Figure 6.

Supplemental Figure 7: Weibull regression models of mortality



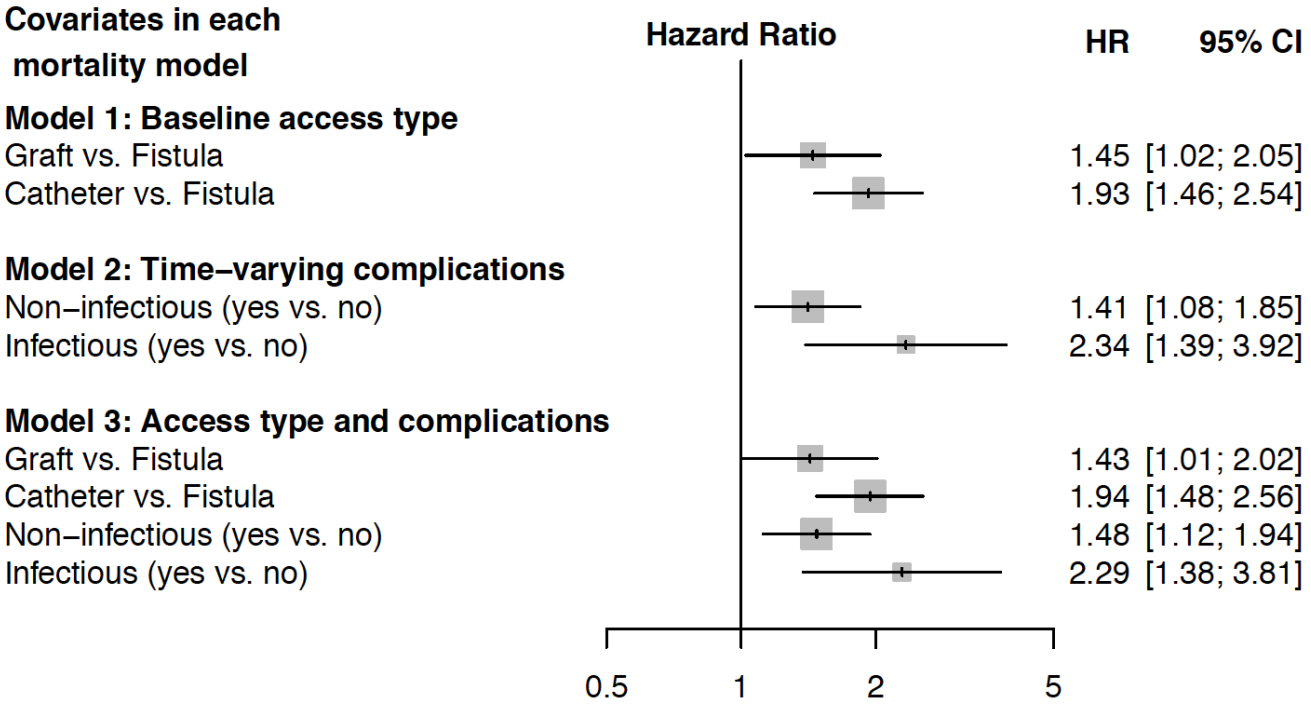
Legend: Fully adjusted models of mortality (analysis with multiply imputed data; N=6,119). Corresponding Cox regression models including the same set of covariates are reported in Figure 6.

Supplemental Figure 8: Cox models with observations censored 30 days following second access placement



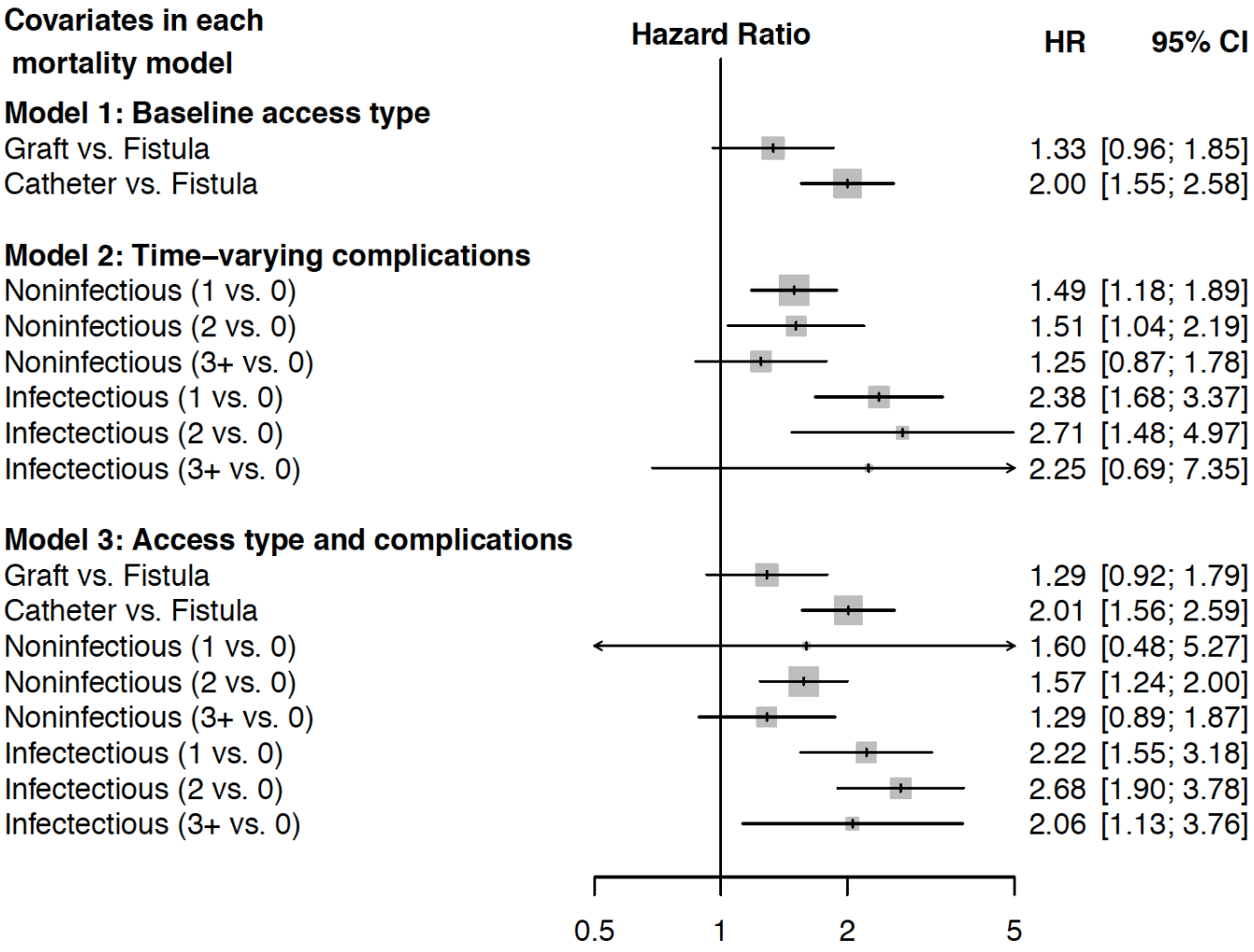
Legend: Fully adjusted models of mortality in which survival times of participants who changed access during the study period were censored at 30 days following the creation of their second permanent access (analysis with multiply imputed data; N=6,119). Corresponding Cox regression models including the same set of covariates are reported in Figure 6.

Supplemental Figure 9: Cox regression models of 30-day survivors



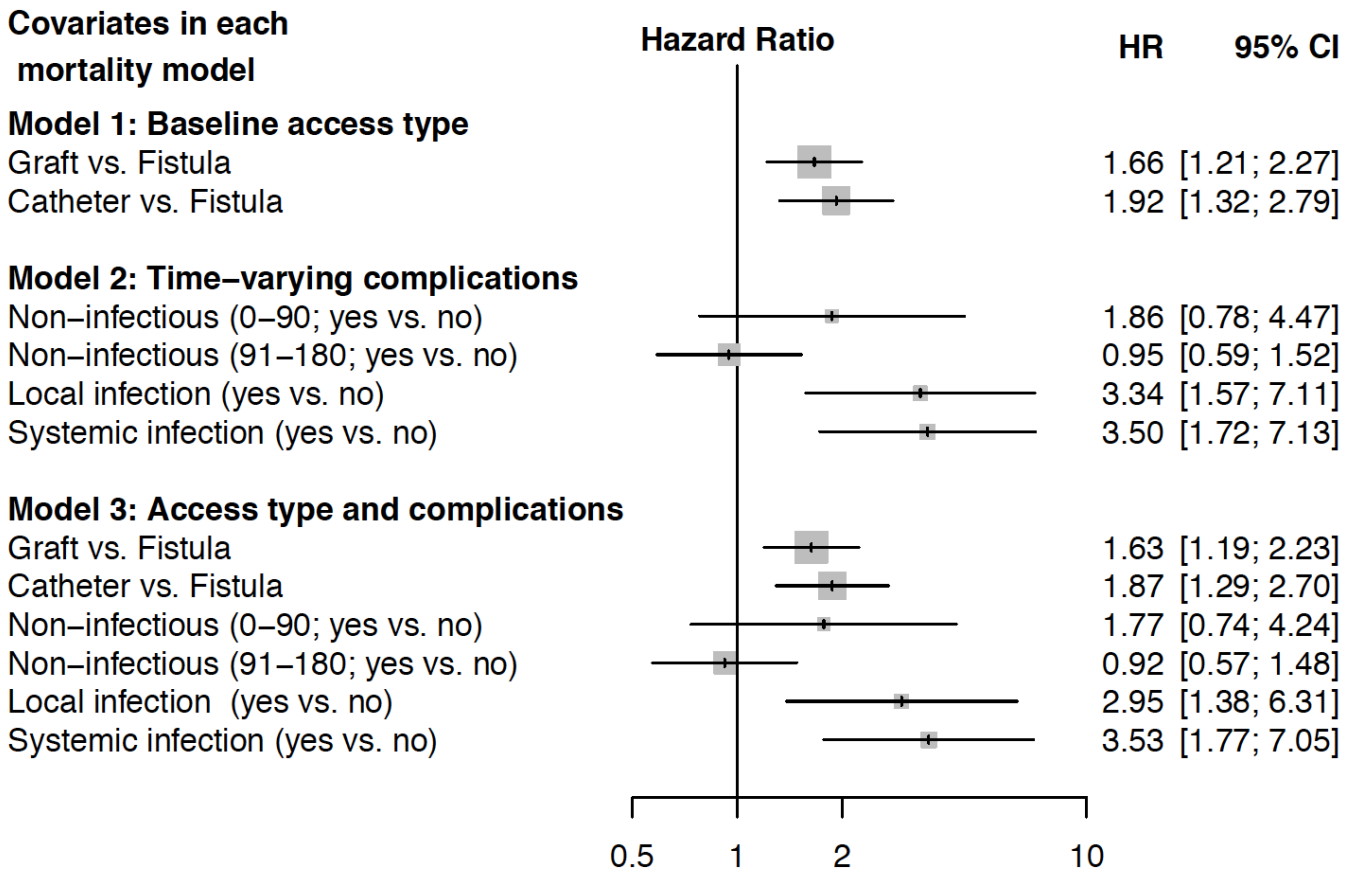
Legend: Fully adjusted models of 30-day survivors from the first permanent access placement (analysis with multiply imputed data; N=5,884); complications that occurred in the first 30 days were used to define the mediator. Corresponding Cox regression models including the same set of covariates are reported in Figure 6.

Supplemental Figure 10: Cox regression models of mortality (count of complications)



Legend: Fully adjusted models of mortality (analysis with multiply imputed data; N=6,119) with complications defined as a time-varying count of complication events (from 0 to 3+). Corresponding Cox regression models including the same set of covariates are reported in Figure 6.

Supplemental Figure 11: Cox regression models of mortality (access placed from 15 to 180 days prior to DOPPS entry)



Legend: Fully adjusted models of mortality including patients who started hemodialysis within 180 days of DOPPS entry and received their first permanent vascular access from 15 to 180 days prior to DOPPS entry (N=7,744); corresponding models including study participants who received their first permanent access within 15 days of DOPPS entry are summarized in Figure 6. Fewer complications were recorded in this cohort (1,184 non-infectious complications and 274 infectious complications), and fewer people died in this cohort (256), as compared to the main study cohort.

Supplemental Table 1: Clinical characteristics of main study participants (after multiple imputation for missing data)

Clinical characteristics	*All (N=6,119)*	*Complications during the first 180 days from the first permanent access placement:*			*P-Value*
		None (N=3,493)	*Non-Infectious Only (N=2,084)*	*Any Infectious (N=542)*	
Age in years	63.7 (14.9)	64.0 (14.9)	63.7 (14.9)	61.9 (14.6)	0.02
Male	3,547 (58.0)	2,042 (58.5)	1,217 (58.4)	293 (54.1)	0.14
Smoking					
Never	2,562 (41.9)	1,458 (41.7)	868 (41.7)	236 (43.5)	0.02
Current	1,157 (18.9)	671 (19.2)	378 (18.1)	108 (19.9)	
Previous	1,211 (19.8)	651 (18.6)	443 (21.3)	117 (21.6)	
Unknown	1,189 (19.4)	713 (20.4)	395 (19.0)	81 (14.9)	
Race					
White	3,951 (64.6)	2,130 (61.0)	1,428 (68.5)	393 (72.5)	<0.001
Black	919 (15.0)	441 (12.6)	382 (18.3)	96 (17.7)	
Asian	1,002 (16.4)	781 (22.4)	200 (9.60)	21 (3.81)	
Other	247 (4.04)	141 (4.04)	74 (3.55)	32 (5.90)	
Access type					
Fistula	2,263 (37.0)	1,419 (40.6)	719 (34.5)	125 (23.1)	< 0.001
Graft	796 (13.0)	333 (9.53)	389 (18.7)	74 (18.7)	
Catheter	3,060 (50.0)	1,741 (49.8)	976 (46.8)	343 (63.3)	
Region†					
North America	3,422 (55.9)	1,753 (50.2)	1,337 (64.2)	332 (61.3)	< 0.001
Europe	1,682 (27.5)	963 (27.6)	545 (26.2)	174 (32.1)	
Australasia	1,015 (16.6)	777 (22.2)	202 (9.7)	36 (6.7)	
Dialysis duration¶	4,809 (78.6)	2,579 (73.8)	1,789 (85.8)	441 (81.4)	<0.001
Timing of access insertion*	4,186 (68.4)	2,301 (65.9)	1,500 (72)	385 (71)	<0.001
Complications within 30 days	1,293 (21.1)	-	1,012 (48.6)	281 (51.9)	< 0.001
Coronary artery disease	2,687 (43.9)	1,453 (41.6)	977 (46.9)	257 (47.4)	< 0.001
Congestive heart failure	2,571 (42.0)	1,394 (39.9)	927 (44.5)	250 (46.1)	< 0.001
Other cardiovascular disease	1,863 (30.5)	991 (28.4)	696 (33.4)	176 (32.5)	< 0.001
Hypertension	5,034 (82.3)	2,493 (80.4)	1,755 (84.2)	470 (86.7)	< 0.001
Cerebrovascular disease	1,032 (16.9)	579 (16.6)	355 (17.0)	98 (18.1)	0.70
Peripheral vascular disease	1,575 (25.7)	852 (24.4)	573 (25.5)	150 (27.7)	0.02
Diabetes	2,919 (47.7)	1,628 (46.6)	992 (47.6)	299 (55.2)	0.01
Cancer	836 (13.7)	453 (13.0)	319 (15.3)	64 (11.8)	0.02

Legend: Mean (standard deviation) is used to summarize age (in years); absolute N and relative (%) frequencies are used for all categorical variables. †Region: North America includes Canada and USA; Europe includes Sweden, Belgium, France, Spain, Germany, Italy and UK; and Australasia includes Japan, Australia and New-Zealand. ¶Dialysis duration ≤30 days vs. 31 to 180 days at the time participants entered the DOPPS. *Permanent access insertion before or within 30 days vs. >30 days of hemodialysis therapy. Clinical characteristics after multiple-imputation for missing data are reported in Table 1.

Supplemental Table 2: Clinical characteristics of main study participants by access type

	All (N=6,119)	*Fistula (N=2,263)*	*Graft (N=796)*	*Catheter (N=3,060)*	*P-Value*
Age in years	63.7 (14.9)	62.7 (14.2)	63.8 (14.3)	64.3 (15.5)	<0.001
Male	3,540 (57.9)	1,489 (65.9)	390 (49.3)	1,661 (54.4)	<0.001
Smoking					
Never	2,475 (40.5)	962 (43.5)	336 (44.3)	1,177 (40)	<0.001
Current	1,122 (18.3)	448 (20.3)	135 (17.8)	539 (18.3)	
Previous	1,172 (19.2)	422 (19.1)	121 (15.9)	629 (21.42)	
Unknown	1,136 (18.6)	378 (17.1)	166 (21.9)	592 (20.1)	
Race					
White	3,951 (64.6)	1,170 (51.7)	443 (55.6)	2,338 (76.4)	<0.001
Black	919 (15.0)	168 (7.4)	252 (31.6)	499 (16.3)	
Asian	1,002 (16.4)	866 (38.3)	67 (8.4)	69 (2.2)	
Other	247 (4.04)	59 (2.6)	34 (4.3)	154 (5)	
Dialysis duration¶	4,809 (78.6)	1,653 (73)	666 (83.7)	2,490 (81.4)	<0.001
Timing of access insertion*	4,186 (68.4)	1,341 (59.3)	503 (63.2)	2,342 (76.6)	<0.001
Coronary artery disease	2,676 (43.7)	708 (31.4)	396 (50.1)	1,572 (51.5)	<0.001
Congestive heart failure	2,537 (41.5)	720 (32)	395 (50.2)	1,422 (47.3)	<0.001
Other cardiovascular disease	1,846 (30.2)	552 (24.4)	254 (31.9)	1,040 (33.9)	<0.001
Hypertension	4,985 (81.5)	1,824 (81.2)	681 (86.4)	2,480 (82)	0.004
Cerebrovascular disease	1,015 (16.6)	320 (14.2)	129 (16.3)	566 (18.8)	<0.001
Peripheral vascular disease	1,554 (25.4)	438 (19.5)	212 (26.8)	904 (29.9)	<0.001
Diabetes	2,880 (47.1)	955 (42.5)	442 (56)	1,483 (49.2)	<0.001
Cancer	827 (13.5)	244 (10.9)	100 (12.7)	483 (16.1)	<0.001

Legend: Mean (standard deviation) is used to summarize age (in years); absolute N and relative (%) frequencies are used for all categorical variables. ¶Dialysis duration ≤30 days vs. 31 to 180 days at the time participants entered the DOPPS. *Permanent access insertion before or within 30 days vs. >30 days of hemodialysis therapy.

Supplemental Table 3: Clinical characteristics of study participants who received the first permanent access 15-180 days before DOPPS entry

Clinical characteristics	*All (N=7,744)*	*Missing data (%)*	*Complications during the first 180 days from the first permanent access placement:*			*P-Value*
			Neither (N=6,286)	*Non-Infectious Only (N=1,184)*	*Any Infectious (N=274)*	
Age in years	63.6 (14.9)	34 (0.44)	63.7 (14.9)	63.3 (14.5)	62.4 (16)	0.32
Male	4,730 (61.1)	13 (0.17)	3,877 (61.7)	691 (58.4)	162 (59.1)	0.18
Smoking						
Never	3,162 (40.8)		2,537 (40.4)	521 (44.0)	104 (37.9)	
Current	1,283 (16.6)	285 (3.7)	1,001 (15.9)	232 (19.6)	50 (18.2)	<0.001
Previous	1,707 (22.1)		1,397 (22.2)	247 (20.9)	63 (22.9)	
Unknown	1,307 (16.9)		1,112 (17.7)	149 (16.8)	46 (16.8)	
Race						
White	5,801 (74.9)		4,807 (76.5)	794 (67.1)	200 (72.9)	
Black	897 (11.6)	0	672 (10.7)	180 (15.2)	45 (16.4)	<0.001
Asian	710 (9.2)		535 (8.5)	172 (14.5)	3 (1.1)	
Other	336 (4.3)		272 (4.3)	38 (3.2)	26 (9.5)	
Access type						
Fistula	4,795 (61.9)		3,990 (63.5)	703 (59.4)	102 (37.2)	
Graft	1,580 (20.4)	0	1,164 (18.5)	332 (28.1)	84 (30.7)	<0.001
Catheter	1,369 (17.7)		1,132 (18.0)	149 (12.6)	88 (32.1)	
Region†						
North America	3,213 (41.5)		2,497 (39.7)	564 (47.6)	152 (55.5)	
Europe	3,687 (47.6)	0	3,137 (49.9)	444 (37.5)	106 (38.7)	<0.001
Australasia	844 (10.9)		652 (10.4)	176 (14.9)	16 (5.8)	
Dialysis duration¶	3,702 (47.8)	0	2,781 (44.2)	783 (66.1)	138 (50.4)	<0.001
Timing of access insertion*	6,490 (83.8)	0	5,230 (83.2)	1,036 (87.5)	224 (81.8)	<0.001
Complications within 30 days	214 (2.8)	0	-	196 (16.6)	18 (6.6)	<0.001
Coronary artery disease	3,406 (43.9)	28 (0.36)	2,745 (43.7)	524 (44.3)	137 (50.0)	0.082
Congestive heart failure	2,532 (32.7)	67 (0.87)	1,977 (31,4)	433 (36.6)	122 (44.5)	<0.001
Other cardiovascular disease	2,205 (28.5)	58 (0.75)	1,773 (28.2)	340 (28.7)	92 (33.6)	0.094
Hypertension	6,554 (84.6)	66 (0.85)	5,311 (84.5)	1,012 (85.5)	231 (84.3)	0.268
Cerebrovascular disease	1,199 (15.5)	88 (1.14)	956 (15.2)	188 (15.6)	55 (20.1)	0.127
Peripheral vascular disease	1,911 (24.7)	86 (1.11)	1,513 (24.1)	309 (26.1)	89 (32.5)	0.015
Diabetes	3,518 (45.4)	84 (1.08)	2,800 (44.5)	572 (48.3)	146 (53.3)	0.009
Cancer	1,031 (13.3)	124 (1.60)	853 (13.6)	147 (12.4)	31 (11.3)	0.50

Legend: Mean (standard deviation) is used to summarize age (in years); absolute N and relative (%) frequencies are used for all categorical variables. †Region: North America includes Canada and USA [37.6%]; Europe includes Sweden, Belgium, France, Spain, Germany, Italy and UK; and Australasia includes Japan, Australia and New-Zealand. ¶Dialysis duration ≤30 days vs. 31 to 180 days at the time participants entered the DOPPS. *Permanent access insertion before or within 30 days vs. >30 days of hemodialysis therapy.

Supplemental Table 4: Distribution of access complications in the main cohort

		Infectious complications		
		No	Yes	*Total*
Non-infectious complications	No	3,493 (57.1)	217 (3.6)	*3,710 (60.6)*
	Yes	2,084 (34.1)	325 (5.3)	*2,409 (39.4)*
	Total	*5,577 (91.1)*	*542 (8.9)*	*6,119 (100.0)*

Legend: 2,409 participants experienced a non-infectious complication; 542 an infectious complication. Of the 325 people who had both during the 180-day study period: 26 had both recorded on the same day; 107 had a non-infectious complication first, followed by an infectious complication in the following 1 to 180 days (median 36 days); and 192 had an infectious complication first, followed by a non-infectious complication in the following 1 to 178 days (median 31 days).

Supplemental Table 5: Type of access placed following the initial permanent access during the study follow-up (main cohort)

	Initial Permanent Access		
Second permanent access	Fistula (N=2,263)	Graft (N=796)	Catheter (N=3,060)
Fistula	283 (12.5)	16 (2)	561 (18.3)
Graft	45 (1.9)	129 (16.2)	337 (11)
Catheter	133 (5.8)	66 (8.3)	491 (16)
None	1,802 (79.6)	585 (73.5)	1,671 (54.6)

Legend: Data are summarized using absolute frequencies (percent within initial permanent access).

Supplemental Table 6: Type of access in place at the time of infection, by initial permanent access (main cohort)

	Initial Permanent Access		
Access in place	Fistula (N=125)	Graft (N=74)	Catheter (N=343)
A new fistula	60 (48)	5 (6.8)	51 (14.9)
A new graft	7 (5.6)	41 (55.4)	25 (7.3)
A new catheter	54 (43.2)	28 (37.8)	257 (74.9)
Same initial access	4 (3.2)	0 (0)	10 (2.9)

Legend: There were 542 infectious complications in the cohort of 6,119 people; data are summarized using absolute frequencies (percent within initial permanent access). Infections were more likely in people who had a catheter for initial access (343 out of 3,060). Of these, 15% had a fistula in place at the time of infection diagnosis. Of those who had a fistula for initial permanent access and had an infection (N=125), 51% had a fistula in place when the diagnosis of infection was made (either a new fistula or the same initial fistula). Of note most participants (528 out of 542; 97.4%) had received another access when they experienced an infection.

References (Supporting Information)

1. Robinson BM, Zhang J, Morgenstern H, Bradbury BD, Ng LJ, McCullough KP, Gillespie BW, Hakim R, Rayner H, Fort J, Akizawa T, Tentori F, Pisoni RL: Worldwide, mortality risk is high soon after initiation of hemodialysis. *Kidney international,* 85**:** 158-165, 2014
2. Ravani P, Gillespie BW, Quinn RR, MacRae J, Manns B, Mendelssohn D, Tonelli M, Hemmelgarn B, James M, Pannu N, Robinson BM, Zhang X, Pisoni R: Temporal risk profile for infectious and noninfectious complications of hemodialysis access. *Journal of the American Society of Nephrology : JASN,* 24**:** 1668-1677, 2013
3. Rubin DB, Schenker N: Multiple imputation in health-care databases: an overview and some applications. *Stat Med,* 10**:** 585-598, 1991
4. Fine JPG, R.J.: A Proportional Hazards Model for the Subdistribution of a Competing Risk. *J Am Stat Assoc,* 94**:** 496-509, 1999
5. Ravani P, Palmer SC, Oliver MJ, Quinn RR, MacRae JM, Tai DJ, Pannu NI, Thomas C, Hemmelgarn BR, Craig JC, Manns B, Tonelli M, Strippoli GF, James MT: Associations between hemodialysis access type and clinical outcomes: a systematic review. *Journal of the American Society of Nephrology : JASN,* 24**:** 465-473, 2013
6. VanderWeele TJ: Causal mediation analysis with survival data. *Epidemiology,* 22**:** 582-585, 2011

STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation	Page
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1-2
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	3
Objectives	3	State specific objectives, including any pre-specified hypotheses	3-4
Methods			(Suppl.)
Study design	4	Present key elements of study design early in the paper	4
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	4
Participants	6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants	4
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case	4
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	4-5
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	4-6
Bias	9	Describe any efforts to address potential sources of bias	4-6
Study size	10	Explain how the study size was arrived at	(Suppl.)
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	6
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	6-7
		(*b*) Describe any methods used to examine subgroups and interactions	6-7
		(*c*) Explain how missing data were addressed	(Suppl.)
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases and controls was addressed *Cross-sectional study*—If applicable, describe analytical methods taking account of sampling strategy	6-7
		(*e*) Describe any sensitivity analyses	(Suppl.)

Results			**Page**
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analyzed	6-7
		(b) Give reasons for non-participation at each stage	6-7

		(c) Consider use of a flow diagram	(S)
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	T. 1
		(b) Indicate number of participants with missing data for each variable of interest	T. 1
		(c) *Cohort study*—Summarize follow-up time (eg, average and total amount)	6-7
Outcome data	15*	*Cohort study*—Report numbers of outcome events or summary measures over time	7-8
		Case-control study—Report numbers in each exposure category, or summary measures of exposure	*NA*
		Cross-sectional study—Report numbers of outcome events or summary measures	*NA*
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	7-8
		(*b*) Report category boundaries when continuous variables were categorized	NA
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	NA
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	(Suppl.)
Discussion			
Key results	18	Summarize key results with reference to study objectives	8
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	9
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	8-9
Generalizability	21	Discuss the generalizability (external validity) of the study results	10-11
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	12

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.