

Table S1. Total follow-up time in person-years during the study period and percentage of data obtained from ESA users, stratified by hemoglobin concentration category with or without cardiovascular comorbidity.

	Dataset for multiple imputation				
	1	2	3	4	5
No cardiovascular comorbidity					
Hemoglobin, g/dl					
<9.0	876 (94%)	878 (94%)	878 (93%)	877 (94%)	877 (93%)
9.0-9.9	1,872 (91%)	1,869 (91%)	1,870 (91%)	1,870 (91%)	1,869 (91%)
10.0-10.9	2,741 (87%)	2,740 (87%)	2,741 (87%)	2,743 (87%)	2,743 (87%)
11.0-11.9	1,675 (80%)	1,677 (80%)	1,676 (79%)	1,674 (79%)	1,675 (79%)
12.0-12.9	511 (62%)	510 (62%)	509 (62%)	511 (61%)	511 (61%)
≥13.0	161 (37%)	161 (37%)	161 (37%)	160 (36%)	160 (38%)
Cardiovascular comorbidity					
Hemoglobin, g/dl					
<9.0	511 (95%)	511 (95%)	512 (95%)	512 (95%)	512 (95%)
9.0-9.9	990 (93%)	991 (93%)	989 (93%)	989 (93%)	989 (93%)
10.0-10.9	1,414 (87%)	1,413 (87%)	1,414 (87%)	1,414 (87%)	1,413 (86%)
11.0-11.9	895 (78%)	895 (79%)	895 (78%)	895 (79%)	896 (78%)
12.0-12.9	303 (65%)	302 (66%)	302 (66%)	302 (66%)	302 (64%)
≥13.0	107 (39%)	107 (40%)	107 (40%)	108 (39%)	108 (40%)

ESA, erythropoietin-stimulating agent

Table S2. Hazard ratios and 95% confidence intervals for all-cause mortality associated with hemoglobin concentration considering cardiovascular comorbidity under a series of models which included different covariates.

	Cardiovascular comorbidity		P-value for interaction
	No	Yes	
Model 1: unadjusted			
Hemoglobin, g/dl			
<9.0	3.47 (2.44-4.94)	7.58 (5.39-10.6)	0.14
9.0-9.9	1.77 (1.24-2.51)	4.02 (2.87-5.65)	0.20
10.0-10.9	1.12 (0.79-1.60)	3.32 (2.39-5.65)	0.88
11.0-11.9	1.00 (Reference)	3.06 (2.14-4.38)	-
12.0-12.9	1.00 (0.56-1.79)	4.48 (2.93-6.85)	0.29
≥13.0	1.53 (0.69-3.39)	3.95 (2.10-7.45)	0.74
Model 2: multivariate-adjusted with all covariates fixed at baseline[†]			
Hemoglobin, g/dl			
<9.0	1.15 (0.82-1.62)	1.80 (1.28-2.53)	0.85
9.0-9.9	1.09 (0.80-1.49)	1.55 (1.14-2.12)	0.53
10.0-10.9	1.13 (0.84-1.53)	1.59 (1.17-2.16)	0.48
11.0-11.9	1.00 (Reference)	1.63 (1.16-2.29)	-
12.0-12.9	1.01 (0.61-1.67)	1.76 (1.11-2.79)	0.84
≥13.0	1.54 (0.66-3.61)	0.90 (0.35-2.27)	0.66
Model 3: time-dependent multivariate-adjusted (this study)[†]			
Hemoglobin, g/dl			
<9.0	2.12 (1.47-3.07)	2.48 (1.72-3.56)	0.03
9.0-9.9	1.51 (1.06-2.15)	1.93 (1.36-2.73)	0.07
10.0-10.9	1.13 (0.79-1.61)	1.96 (1.40-2.74)	0.68
11.0-11.9	1.00 (Reference)	1.92 (1.33-2.76)	-
12.0-12.9	1.03 (0.58-1.85)	2.80 (1.82-4.31)	0.33
≥13.0	1.45 (0.65-3.23)	1.74 (0.90-3.35)	0.37
Model 4: Model 3 minus covariates with substantial missing data at baseline before MI[†]			
Hemoglobin, g/dl			
<9.0	2.20 (1.52-3.17)	2.61 (1.81-3.76)	0.04
9.0-9.9	1.53 (1.07-2.17)	1.96 (1.38-2.79)	0.09
10.0-10.9	1.13 (0.79-1.62)	1.95 (1.39-2.73)	0.66
11.0-11.9	1.00 (Reference)	1.91(1.32-2.75)	-
12.0-12.9	1.04 (0.58-1.86)	2.77 (1.80-4.28)	0.35
≥13.0	1.46 (0.66-3.26)	1.69 (0.88-3.27)	0.33

MI, multiple imputation

[†] Values have been adjusted for possible confounding with Cox regression models.

Table S3. Association between the hemoglobin concentration and all-cause mortality by cardiovascular -comorbid condition under a series of models which included different covariates.

	Unadjusted Model 1	Multivariate-adjusted [†]		
		Model 2	Model 3	Model 4
		all covariates fixed at baseline	time-dependent (this study)	Model 3 minus covariates with large missing data at baseline before MI
No cardiovascular comorbidity (hazard ratio, 95% confidence interval)				
Hemoglobin, g/dl				
<9.0	3.47 (2.44-4.94)	1.1 (0.82-1.62)	2.12 (1.47-3.06)	2.19 (1.52-3.17)
9.0-9.9	1.77 (1.25-2.51)	1.09 (0.80-1.49)	1.51 (1.06-2.15)	1.53 (1.07-2.17)
10.0-10.9	1.12 (0.79-1.60)	1.13 (0.84-1.53)	1.13 (0.79-1.61)	1.13 (0.79-1.62)
11.0-11.9	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
12.0-12.9	1.00 (0.56-1.79)	1.01 (0.61-1.67)	1.03 (0.58-1.85)	1.04 (0.58-1.86)
≥13.0	1.53 (0.69-3.39)	1.54 (0.66-3.61)	1.45 (0.65-3.23)	1.46 (0.66-3.26)
Cardiovascular comorbidity (hazard ratio, 95% confidence interval)				
Hemoglobin, g/dl				
<9.0	2.47 (1.85-3.30)	1.10 (0.79-1.53)	1.29 (0.95-1.76)	1.37 (1.01-1.86)
9.0-9.9	1.31 (0.99-1.75)	0.95 (0.70-1.29)	1.00 (0.75-1.35)	1.03 (0.77-1.38)
10.0-10.9	1.09 (0.82-1.43)	0.97 (0.72-1.31)	1.02 (0.77-1.35)	1.02 (0.77-1.35)
11.0-11.9	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
12.0-12.9	1.46 (0.99-2.15)	1.08 (0.68-1.71)	1.46 (0.99-2.16)	1.45 (0.98-2.15)
≥13.0	1.29 (0.70-2.37)	0.59 (0.22-1.39)	0.91 (0.48-1.70)	0.89 (0.47-1.66)

MI, multiple imputation

[†] Values have been adjusted for possible confounding with Cox regression models.

Table S4. Hazard ratios and 95% confidence intervals for cardiovascular mortality associated with the hemoglobin concentration considering cardiovascular comorbidity under a series of models which included different covariates.

	Cardiovascular comorbidity		P-value for interaction
	No	Yes	
Model 1: unadjusted			
Hemoglobin, g/dl			
<9.0	3.10 (1.64-5.83)	10.6 (5.93-18.8)	0.46
9.0-9.9	1.62 (0.87-3.03)	4.83 (2.69-8.67)	0.28
10.0-10.9	1.23 (0.66-2.28)	4.64 (2.63-8.17)	0.63
11.0-11.9	1.00 (Reference)	4.54 (2.48-8.30)	-
12.0-12.9	1.07 (0.39-2.96)	6.88 (3.47-13.7)	0.56
≥13.0	2.11 (0.61-7.29)	4.38 (1.45-13.2)	0.34
Model 2: multivariate-adjusted with all covariates fixed at baseline[†]			
Hemoglobin, g/dl			
<9.0	1.07 (0.59-1.92)	2.92 (1.73-4.93)	0.10
9.0-9.9	1.04 (0.61-1.76)	1.78 (1.07-2.95)	0.65
10.0-10.9	0.99 (0.60-1.65)	1.82 (1.10-3.00)	0.51
11.0-11.9	1.00 (Reference)	1.45 (0.81-2.58)	-
12.0-12.9	0.96 (0.39-2.36)	2.38 (1.19-4.76)	0.35
≥13.0	0.80 (0.11-5.91)	1.24 (0.29-5.39)	0.9
Model 3: time-dependent multivariate-adjusted (this study)[†]			
Hemoglobin, g/dl			
<9.0	2.23 (1.17-4.26)	4.19 (2.28-7.69)	0.40
9.0-9.9	1.51 (0.80-2.83)	2.41 (1.32-4.39)	0.21
10.0-10.9	1.22 (0.65-2.27)	2.65 (1.48-4.73)	0.63
11.0-11.9	1.00 (Reference)	2.63 (1.41-4.89)	-
12.0-12.9	1.07 (0.39-2.96)	4.09 (2.04-3.23)	0.53
≥13.0	1.97 (0.57-6.90)	1.87 (0.60-5.79)	0.22
Model 4: Model 3 minus covariates with substantial missing data at baseline before MI[†]			
Hemoglobin, g/dl			
<9.0	2.33 (1.22-4.44)	4.40 (2.40-8.06)	0.41
9.0-9.9	1.51 (0.81-2.84)	2.47 (1.36-4.49)	0.23
10.0-10.9	1.21 (0.65-2.25)	2.64 (1.48-4.70)	0.63
11.0-11.9	1.00 (Reference)	2.61 (1.41-4.84)	-
12.0-12.9	1.07 (0.39-2.96)	3.96 (1.98-7.95)	0.56
≥13.0	2.04 (0.58-7.10)	1.83 (0.59-5.67)	0.20

MI, multiple imputation

[†] Values have been adjusted for possible confounding with Cox regression models.

Table S5. Association between the hemoglobin concentration and cardiovascular mortality by cardiovascular-comorbid condition under a series of models which included different covariates.

	Unadjusted Model 1	Multivariate-adjusted [†]		
		Model 2	Model 3	Model 4
		all covariates fixed at baseline	time-dependent (this study)	Model 3 minus covariates with large missing data at baseline before MI
No cardiovascular comorbidity (hazard ratio, 95% confidence interval)				
Hemoglobin, g/dl				
<9.0	3.10 (1.64-5.83)	1.07 (0.59-1.92)	2.23 (1.17-4.26)	2.33 (1.22-4.44)
9.0-9.9	1.62 (0.87-3.03)	1.04 (0.61-1.75)	1.51 (0.80-2.83)	1.51 (0.81-2.83)
10.0-10.9	1.23 (0.66-2.28)	0.99 (0.60-1.65)	1.22 (0.65-2.27)	1.21 (0.65-2.25)
11.0-11.9	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
12.0-12.9	1.07 (0.39-2.96)	0.96 (0.39-2.36)	1.07 (0.39-2.96)	1.07 (0.39-2.96)
≥13.0	2.11 (0.61-7.29)	0.80 (0.11-5.97)	1.97 (0.57-6.90)	2.04 (0.58-7.10)
Cardiovascular comorbidity (hazard ratio, 95% confidence interval)				
Hemoglobin, g/dl				
<9.0	2.33 (1.51-3.57)	2.01 (1.20-3.39)	1.59 (1.01-2.52)	1.68 (1.06-2.66)
9.0-9.9	1.06 (0.68-1.66)	1.23 (0.75-2.02)	0.92 (0.58-1.44)	0.94 (0.60-1.48)
10.0-10.9	1.02 (0.68-1.55)	1.25 (0.77-2.05)	1.01 (0.66-1.53)	1.01 (0.66-1.54)
11.0-11.9	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
12.0-12.9	1.52 (0.86-2.67)	1.65 (0.82-3.29)	1.56 (0.88-2.76)	1.52 (0.85-2.69)
≥13.0	0.96 (0.34-2.71)	0.86 (0.20-3.72)	0.71 (0.24-2.05)	0.70 (0.24-2.02)

MI, multiple imputation

[†] Values have been adjusted for possible confounding with Cox regression models.

Table S6. Hazard ratios and 95% confidence intervals for the incidence of adverse cardiovascular events associated with the hemoglobin concentration considering for cardiovascular comorbidity under a series of models which included different covariates.

	Cardiovascular comorbidity		P-value for interaction
	No	Yes	
Model 1: unadjusted			
Hemoglobin, g/dl			
<9.0	1.69 (1.20-2.40)	5.79 (4.24-7.89)	0.33
9.0-9.9	1.30 (0.95-1.77)	4.62 (3.46-6.12)	0.39
10.0-10.9	1.16 (0.87-1.56)	4.26 (3.22-5.62)	0.44
11.0-11.9	1.00 (Reference)	4.25 (3.14-5.75)	-
12.0-12.9	1.46 (0.95-2.24)	5.23 (3.60-7.57)	0.54
≥13.0	1.86 (1.01-3.44)	3.80 (2.10-6.88)	0.09
Model 2: multivariate-adjusted with all covariates fixed at baseline[†]			
Hemoglobin, g/dl			
<9.0	1.09 (0.77-1.58)	3.47 (2.52-4.79)	0.9
9.0-9.9	1.16 (0.85-1.59)	3.01 (2.24-4.04)	0.41
10.0-10.9	1.37 (1.03-1.84)	2.73 (2.04-3.65)	0.03
11.0-11.9	1.00 (Reference)	3.07 (2.23-4.23)	-
12.0-12.9	1.62 (1.04-2.52)	4.03 (2.75-5.94)	0.48
≥13.0	1.47 (0.63-3.41)	2.98 (1.54-5.76)	0.44
Model 3: time-dependent multivariate-adjusted (this study)[†]			
Hemoglobin, g/dl			
<9.0	1.37 (0.96-1.95)	3.23 (2.32-4.48)	0.42
9.0-9.9	1.18 (0.86-1.61)	2.77 (2.06-3.74)	0.36
10.0-10.9	1.11 (0.82-1.49)	2.71 (2.04-3.61)	0.45
11.0-11.9	1.00 (Reference)	2.83 (2.09-3.86)	-
12.0-12.9	1.44 (0.93-2.21)	3.63 (2.49-5.31)	0.68
≥13.0	1.94 (1.04-3.60)	2.61 (1.42-4.78)	0.08
Model 4: Model 3 minus covariates with substantial missing data at baseline before MI[†]			
Hemoglobin, g/dl			
<9.0	1.39 (0.97-1.97)	3.28 (2.37-4.55)	0.44
9.0-9.9	1.18 (0.86-1.61)	2.79 (2.07-3.75)	0.38
10.0-10.9	1.10 (0.82-1.48)	2.70 (2.03-3.59)	0.46
11.0-11.9	1.00 (Reference)	2.82 (2.07-3.83)	-
12.0-12.9	1.44 (0.93-2.21)	3.61 (2.47-5.26)	0.68
≥13.0	1.94 (1.05-3.61)	2.59 (1.41-4.74)	0.08

MI, multiple imputation

[†] Values have been adjusted for possible confounding with Cox regression models.

Table S7. Association between the hemoglobin concentration and incidence of adverse cardiovascular events by cardiovascular-comorbid condition under a series of models which included different covariates.

	Unadjusted Model 1	Multivariate-adjusted [†]		
		Model 2 all covariates fixed at baseline	Model 3 time-dependent (this study)	Model 4 Model 3 minus covariates with substantial missing data at baseline before MI
No cardiovascular comorbidity (hazard ratio, 95% confidence interval)				
Hemoglobin, g/dl				
<9.0	1.69 (1.20-2.40)	1.10 (0.77-1.58)	1.37 (0.96-1.95)	1.39 (0.97-1.97)
9.0-9.9	1.30 (0.95-1.77)	1.15 (0.85-1.59)	1.18 (0.86-1.61)	1.18 (0.86-1.61)
10.0-10.9	1.16 (0.87-1.56)	1.37 (1.03-1.84)	1.11 (0.82-1.49)	1.10 (0.82-1.48)
11.0-11.9	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
12.0-12.9	1.46 (0.95-2.24)	1.62 (1.04-2.52)	1.44 (0.93-2.21)	1.44 (0.93-2.21)
≥13.0	1.86 (1.01-3.44)	1.47 (0.63-3.41)	1.94 (1.04-3.61)	1.94 (1.05-3.61)
Cardiovascular comorbidity (hazard ratio, 95% confidence interval)				
Hemoglobin, g/dl				
<9.0	1.36 (1.04-1.79)	1.13 (0.85-1.51)	1.14 (0.85-1.52)	1.17 (0.88-1.55)
9.0-9.9	1.09 (0.85-1.39)	0.98 (0.75-1.27)	0.98 (0.76-1.26)	0.99 (0.77-1.27)
10.0-10.9	1.00 (0.79-1.27)	0.89 (0.69-1.15)	0.96 (0.75-1.21)	0.96 (0.76-1.22)
11.0-11.9	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
12.0-12.9	1.23 (0.87-1.73)	1.31 (0.92-1.88)	1.28 (0.91-1.80)	1.28 (0.91-1.80)
≥13.0	0.89 (0.50-1.59)	0.97 (0.51-1.85)	0.92 (0.51-1.66)	0.92 (0.51-1.65)

MI, multiple imputation

[†] Values have been adjusted for possible confounding with Cox regression models.

Table S8. Association between hemoglobin concentration under ESA use and outcomes with interaction test for cardiovascular-comorbid condition

	Cardiovascular comorbidity		P-value for interaction
	No	Yes	
All-cause mortality (hazard ratio, 95% confidence interval)[†]			
Hemoglobin, g/dl			
<9.0	2.35 (1.55-3.57)	3.09 (2.08-4.61)	0.04
9.0-9.9	1.70 (1.14-2.53)	2.16 (1.46-3.20)	0.03
10.0-10.9	1.24 (0.82-1.88)	2.02 (1.37-2.98)	0.22
11.0-11.9	1.00 (Reference)	2.24 (1.47-3.41)	-
12.0-12.9	1.24 (0.61-2.52)	2.91 (1.71-4.93)	0.91
≥13.0	1.14 (0.27-4.75)	2.57 (0.99-6.89)	0.99
Cardiovascular mortality (hazard ratio, 95% confidence interval)[†]			
Hemoglobin, g/dl			
<9.0	1.83 (0.90-3.74)	4.23 (2.23-7.99)	0.99
9.0-9.9	1.49 (0.77-2.89)	2.30 (1.21-4.36)	0.34
10.0-10.9	1.15 (0.60-2.25)	2.18 (1.16-4.09)	0.64
11.0-11.9	1.00 (Reference)	2.30 (1.16-4.57)	-
12.0-12.9	1.00 (0.28-3.53)	4.83 (2.03-9.49)	0.38
≥13.0	1.56 (0.20-12.0)	1.41 (0.18-11.0)	0.53
Adverse cardiovascular events (hazard ratio, 95% confidence interval)[†]			
Hemoglobin, g/dl			
<9.0	1.43 (0.96-2.12)	3.64 (2.56-5.19)	0.53
9.0-9.9	1.29 (0.91-1.83)	2.94 (2.11-4.11)	0.23
10.0-10.9	1.19 (0.86-1.66)	2.88 (2.09-3.98)	0.33
11.0-11.9	1.00 (Reference)	2.98 (2.10-4.22)	-
12.0-12.9	1.57 (0.93-2.65)	3.86 (2.45-6.08)	0.57
≥13.0	2.02 (0.80-5.09)	3.83 (1.71-8.52)	0.46

ESA, erythropoietin-stimulating agent

[†]Values have been adjusted for possible confounding with Cox regression models.

Table S9. Association between the hemoglobin concentration under ESA use and outcomes by cardiovascular-comorbid condition

	All-cause mortality	Cardiovascular mortality	Adverse cardiovascular events
No cardiovascular comorbidity (hazard ratio, 95% confidence interval)			
Hemoglobin, g/dl			
<9.0	2.35 (1.55-3.57)	1.83 (0.90-3.74)	1.43 (0.96-2.12)
9.0-9.9	1.70 (1.14-2.53)	1.49 (0.77-2.89)	1.29 (0.91-1.82)
10.0-10.9	1.24 (0.82-1.87)	1.16 (0.60-2.24)	1.19 (0.85-1.66)
11.0-11.9	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
12.0-12.9	1.24 (0.61-2.52)	1.00 (0.28-3.53)	1.57 (0.93-2.65)
≥13.0	1.14 (0.27-4.75)	1.56 (0.20-12.0)	2.02 (0.80-5.09)
Cardiovascular comorbidity (hazard ratio, 95% confidence interval)			
Hemoglobin, g/dl			
<9.0	1.38 (0.99-1.91)	1.84 (1.11-3.05)	1.22 (0.90-1.67)
9.0-9.9	0.96 (0.70-1.32)	1.00 (0.60-1.66)	0.99 (0.75-1.31)
10.0-10.9	0.90 (0.66-1.23)	0.95 (0.58-1.56)	0.97 (0.74-1.26)
11.0-11.9	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
12.0-12.9	1.30 (0.80-2.09)	1.91 (0.96-3.77)	1.30 (0.74-1.26)
≥13.0	1.14 (0.45-2.89)	0.61 (0.08-4.64)	1.29 (0.59-2.82)

ESA, erythropoietin-stimulating agent

†Values have been adjusted for possible confounding with Cox regression models.

Table 10. Association of the hemoglobin concentration with the outcomes considering the cardiovascular-comorbid condition in patients with a hemodialysis duration exceeding three months at baseline.

	Cardiovascular comorbidity		P-value for interaction
	No	Yes	
All-cause mortality (hazard ratio, 95% confidence interval)[†]			
Hemoglobin, g/dl			
<9.0	1.96 (1.34-2.88)	2.23 (1.53-3.28)	0.04
9.0-9.9	1.44 (1.00-2.06)	1.86 (1.30-2.67)	0.12
10.0-10.9	1.12 (0.78-1.62)	1.89 (1.34-2.67)	0.65
11.0-11.9	1.00 (Reference)	1.88 (1.29-2.74)	-
12.0-12.9	1.10 (0.61-1.97)	2.75 (1.77-4.29)	0.42
≥13.0	1.59 (0.71-3.54)	1.86 (0.96-3.59)	0.36
Cardiovascular mortality (hazard ratio, 95% confidence interval)[†]			
Hemoglobin, g/dl			
<9.0	2.07 (1.07-4.02)	3.50 (1.87-6.54)	0.32
9.0-9.9	1.47 (0.78-2.77)	2.28 (1.24-4.21)	0.22
10.0-10.9	1.23 (0.66-2.30)	2.43 (1.35-4.38)	0.51
11.0-11.9	1.00 (Reference)	2.54 (1.36-4.74)	-
12.0-12.9	1.07 (0.39-2.96)	3.62 (1.77-7.42)	0.64
≥13.0	2.00 (0.57-7.00)	1.82 (0.58-5.67)	0.22
Adverse cardiovascular events (hazard ratio, 95% confidence interval)[†]			
Hemoglobin, g/dl			
<9.0	1.40 (0.97-2.04)	2.91 (2.04-4.14)	0.27
9.0-9.9	1.16 (0.83-1.61)	2.64 (1.92-3.62)	0.42
10.0-10.9	1.13 (0.83-1.54)	2.73 (2.03-3.68)	0.56
11.0-11.9	1.00 (Reference)	2.71 (1.96-3.75)	-
12.0-12.9	1.50 (0.96-2.34)	3.78 (2.55-5.59)	0.81
≥13.0	1.96 (1.03-3.75)	2.62 (1.39-4.92)	0.12

HD, hemodialysis; MI, multiple imputation

[†]Values have been adjusted for possible confounding with Cox regression models.

Table S11. Association between hemoglobin concentration and outcomes by cardiovascular-comorbid condition, in patients with a hemodialysis duration exceeding three months at baseline.

	Hazard ratio and 95% confidence interval for		
	All-cause mortality	Cardiovascular mortality	Adverse cardiovascular event
No cardiovascular comorbidity (hazard ratio, 95% confidence interval)[†]			
Hemoglobin, g/dl			
<9.0	1.96 (1.34-2.88)	2.07 (1.07-4.02)	1.40 (0.97-2.04)
9.0-9.9	1.44 (1.00-2.06)	1.47 (0.78-2.77)	1.16 (0.83-1.61)
10.0-10.9	1.12 (0.78-1.62)	1.23 (0.66-2.30)	1.13 (0.83-1.54)
11.0-11.9	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
12.0-12.9	1.10 (0.61-1.97)	1.07 (0.39-2.96)	1.50 (0.96-2.34)
≥13.0	1.59 (0.72-3.55)	2.00 (0.57-7.00)	1.96 (1.03-3.75)
Cardiovascular comorbidity (hazard ratio, 95% confidence interval)[†]			
Hemoglobin, g/dl			
<9.0	1.19 (0.86-1.66)	1.38 (0.85-2.25)	1.07 (0.78-1.47)
9.0-9.9	0.99 (0.73-1.35)	0.90 (0.57-1.43)	0.97 (0.74-1.28)
10.0-10.9	1.01 (0.75-1.34)	0.96 (0.62-1.47)	1.01 (0.78-1.29)
11.0-11.9	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
12.0-12.9	1.47 (0.98-2.20)	1.43 (0.78-2.60)	1.39 (0.98-1.99)
≥13.0	0.99 (0.53-1.87)	0.72 (0.25-2.08)	0.97 (0.52-1.79)

HD, hemodialysis; MI, multiple imputation

[†]Values have been adjusted for possible confounding with Cox regression models.

Table S12. Association of hemoglobin concentration with outcomes considering cardiovascular-comorbid condition in patients without cancer at baseline.

	Cardiovascular comorbidity		P-value for interaction
	No	Yes	
All-cause mortality (hazard ratio, 95% confidence interval)[†]			
Hemoglobin, g/dl			
<9.0	2.07 (1.41-3.04)	2.41 (1.65-3.54)	0.052
9.0-9.9	1.43 (0.99-2.08)	1.81 (1.25-2.63)	0.11
10.0-10.9	1.06 (0.72-1.54)	1.97 (1.38-2.82)	0.9
11.0-11.9	1.00 (Reference)	1.89 (1.28-2.79)	-
12.0-12.9	0.91 (0.48-1.73)	2.80 (1.78-4.43)	0.21
≥13.0	1.55 (0.69-3.47)	2.04 (1.05-3.97)	0.49
Cardiovascular mortality (hazard ratio, 95% confidence interval)[†]			
Hemoglobin, g/dl			
<9.0	2.06 (1.07-3.99)	3.93 (2.11-7.30)	0.58
9.0-9.9	1.19 (0.62-2.31)	2.10 (1.14-3.87)	0.46
10.0-10.9	1.10 (0.59-2.07)	2.37 (1.32-4.27)	0.79
11.0-11.9	1.00 (Reference)	2.38 (1.27-4.47)	-
12.0-12.9	0.85 (0.28-2.57)	3.64 (1.78-7.47)	0.36
≥13.0	1.91 (0.55-6.70)	1.92 (0.62-5.97)	0.30
Adverse cardiovascular events (hazard ratio, 95% confidence interval)[†]			
Hemoglobin, g/dl			
<9.0	1.34 (0.92-1.95)	3.44 (2.44-4.84)	0.43
9.0-9.9	1.16 (0.83-1.61)	2.62 (1.91-3.60)	0.15
10.0-10.9	1.08 (0.79-1.47)	2.83 (2.10-3.82)	0.44
11.0-11.9	1.00 (Reference)	3.08 (2.23-4.24)	-
12.0-12.9	1.37 (0.86-2.17)	3.69 (2.47-5.51)	0.66
≥13.0	1.97 (1.03-3.77)	2.99 (1.61-5.53)	0.11

MI, multiple imputation

[†]Values have been adjusted for possible confounding with Cox regression models.

Table S13. Association of hemoglobin concentration and outcomes by cardiovascular-comorbid condition among patients without cancer at baseline.

	Hazard ratio and 95% confidence interval for		
	All-cause mortality	Cardiovascular mortality	Adverse cardiovascular event
No cardiovascular comorbidity (hazard ratio, 95% confidence interval)			
Hemoglobin, g/dl			
<9.0	2.07 (1.41-3.04)	2.06 (1.07-3.99)	1.34 (0.92-1.95)
9.0-9.9	1.43 (0.99-2.08)	1.19 (0.62-2.31)	1.16 (0.84-1.01)
10.0-10.9	1.05 (0.72-1.54)	1.10 (0.59-2.07)	1.08 (0.79-1.47)
11.0-11.9	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
12.0-12.9	0.91 (0.48-1.73)	0.85 (0.28-2.57)	1.37 (0.86-2.17)
≥13.0	1.55 (0.69-3.47)	1.91 (0.55-6.70)	1.97 (1.03-3.77)
Cardiovascular comorbidity (hazard ratio, 95% confidence interval)			
Hemoglobin, g/dl			
<9.0	1.28 (0.92-1.78)	1.65 (1.02-2.66)	1.12 (0.83-1.51)
9.0-9.9	0.96 (0.69-1.32)	0.88 (0.54-1.42)	0.85 (0.65-1.12)
10.0-10.9	1.04 (0.78-1.40)	0.99 (0.64-1.54)	0.92 (0.72-1.18)
11.0-11.9	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
12.0-12.9	1.48 (0.98-2.24)	1.53 (0.83-2.80)	1.20 (0.84-1.72)
≥13.0	1.08 (0.57-2.03)	0.81 (0.28-2.34)	0.97 (0.53-1.77)

MI, multiple imputation

†Values have been adjusted for possible confounding with Cox regression models.