

Table S3. Incidence rates of AF across glycemic stages and proteinuria levels using competing risk models.

Groups	N	Event	Deaths	Duration*	AF IR*	Sub-distribution Hazard Ratio (95% CI)					
						Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Glycemic Stages						W					
Normal	2,783,623	68,388	124,852	33394.4	2.05	1 (ref.)	1 (ref.)	1 (ref.)	1 (ref.)	1 (ref.)	1 (ref.)
Prediabetes	915,914	32,892	61,585	10818.8	3.04	1.47 (1.45, 1.49)	1.09 (1.08, 1.11)	1.01 (0.99, 1.02)	1.01 (1.00, 1.02)	1.01 (0.99, 1.02)	1.01 (1.00, 1.02)
New-onset DM	120,758	5,423	13,219	1387.3	3.91	1.85 (1.80, 1.91)	1.19 (1.16, 1.22)	1.04 (1.01, 1.07)	1.04 (1.02, 1.08)	1.04 (1.01, 1.07)	1.04 (1.01, 1.07)
Early DM	119,710	7,417	19,107	1342.0	5.53	2.56 (2.50, 2.62)	1.21 (1.18, 1.24)	1.01 (0.98, 1.03)	1.00 (0.97, 1.02)	0.98 (0.96, 1.01)	0.98 (0.95, 1.00)
Late DM	104519	8104	24175	1121.8	7.22	3.24 (3.17, 3.32)	1.27 (1.25, 1.30)	1.08 (1.06, 1.11)	1.07 (1.04, 1.09)	1.03 (1.00, 1.06)	1.02 (0.99, 1.05)
p-value						<.0001	<.0001	<.0001	0.0031	<.0001	0.0023
Proteinuria Levels											
Negative	3,852,974	112,808	222,537	45863.5	2.46	1 (Ref.)	1 (Ref.)	1 (Ref.)	1 (Ref.)		
Trace	91,593	3,421	7,277	1074.1	3.18	1.28 (1.24, 1.33)	1.12 (1.08, 1.16)	1.07 (1.03, 1.10)	1.06 (1.03, 1.10)		
1	67,532	3,618	7,552	772.4	4.68	1.86 (1.80, 1.92)	1.41 (1.36, 1.46)	1.28 (1.24, 1.33)	1.28 (1.24, 1.32)		
2	24,877	1,726	3,938	274.6	6.29	2.43 (2.31, 2.55)	1.67 (1.59, 1.75)	1.46 (1.40, 1.54)	1.45 (1.38, 1.52)		
+3,4	7,548	651	1,634	79.6	8.18	3.06 (2.83, 3.30)	1.91 (1.76, 2.07)	1.64 (1.51, 1.77)	1.62 (1.49, 1.75)		
p-value						<.0001	<.0001	<.0001	<.0001		

Model 1: non-adjusted; Model 2: age, sex; Model 3: age, sex, income quartile, body-mass index (BMI), smoking status, drinking habit, physical activity, hypertension, dyslipidemia, and chronic kidney disease; Model 4: age, sex, income quartile, BMI, smoking status, drinking habit, physical activity, hypertension, dyslipidemia, chronic kidney disease, heart failure, history of myocardial infarction, and history of ischemic stroke; Model 5: Model 3 + diabetic retinopathy and diabetic neuropathy; Model 6: Model 4 + diabetic retinopathy and diabetic neuropathy.

AF: atrial fibrillation; IR: incidence rate; 95% CI: 95% confidence interval; ref.: reference value of sub-distribution hazard ratio; DM: diabetes mellitus; Neg: negative urine dipstick test.

* Per 1000 person-years

Table S4. Hazard ratios of AF incidence rate by proteinuria level within each glycemic stage using competing risk models.

Glycemic stages	Protein uria	N	Events	Deaths	Duration*	AF IR*	Sub-Distribution Hazard Ratio (95% CI)					
							Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Normal	Neg	2,674,628	64,623	117,732	32,107.6	2.01	1 (ref.)	1 (ref.)	1 (ref.)	1 (ref.)	1 (ref.)	1 (ref.)
	Trace	56,703	1,573	2,998	676.0	2.33	1.15 (1.09, 1.21)	1.08 (1.03, 1.14)	1.04 (0.99, 1.10)	1.04 (0.99, 1.10)	1.04 (0.99, 1.10)	1.04 (0.99, 1.10)
	+1	37,062	1,449	2,627	435.3	3.33	1.63 (1.55, 1.72)	1.35 (1.28, 1.42)	1.25 (1.19, 1.32)	1.25 (1.19, 1.32)	1.25 (1.19, 1.32)	1.25 (1.19, 1.32)
	+2	12,089	568	1,117	139.9	4.06	1.97 (1.81, 2.14)	1.52 (1.40, 1.66)	1.36 (1.25, 1.48)	1.35 (1.24, 1.47)	1.36 (1.25, 1.48)	1.35 (1.24, 1.47)
	+3,4	3,141	175	378	35.6	4.91	2.35 (2.03, 2.73)	1.65 (1.42, 1.92)	1.46 (1.25, 1.69)	1.45 (1.24, 1.68)	1.45 (1.25, 1.69)	1.44 (1.24, 1.68)
Prediabetes	Neg	870,724	30,492	57,016	10,298.7	2.96	1.46 (1.44, 1.48)	1.09 (1.07, 1.10)	1.01 (0.99, 1.02)	1.01 (0.99, 1.02)	1.01 (0.99, 1.02)	1.01 (0.99, 1.02)
	Trace	22,000	980	1,897	256.4	3.82	1.87 (1.75, 1.99)	1.22 (1.15, 1.30)	1.08 (1.02, 1.15)	1.08 (1.01, 1.15)	1.08 (1.02, 1.15)	1.08 (1.01, 1.15)
	+1	16,138	914	1,690	185.0	4.94	2.39 (2.24, 2.55)	1.45 (1.35, 1.55)	1.24 (1.16, 1.32)	1.24 (1.16, 1.33)	1.24 (1.16, 1.32)	1.24 (1.16, 1.33)
	+2	5,483	379	741	61.4	6.17	2.93 (2.65, 3.24)	1.63 (1.47, 1.81)	1.36 (1.23, 1.51)	1.36 (1.23, 1.50)	1.36 (1.23, 1.51)	1.36 (1.22, 1.50)
	+3,4	1,569	127	241	17.2	7.38	3.48 (2.92, 4.14)	1.79 (1.49, 2.14)	1.47 (1.23, 1.76)	1.46 (1.22, 1.76)	1.46 (1.22, 1.76)	1.46 (1.22, 1.75)
New-onset DM	Neg	110,163	4,708	11,630	1,269.9	3.71	1.79 (1.74, 1.85)	1.15 (1.12, 1.19)	1.02 (0.99, 1.05)	1.02 (0.99, 1.05)	1.01 (0.98, 1.04)	1.02 (0.99, 1.05)
	Trace	4,156	233	537	47.0	4.95	2.37 (2.08, 2.70)	1.43 (1.25, 1.63)	1.22 (1.07, 1.39)	1.22 (1.07, 1.39)	1.21 (1.06, 1.38)	1.22 (1.07, 1.39)
	+1	4,159	282	609	46.2	6.11	2.89 (2.57, 3.25)	1.70 (1.51, 1.92)	1.41 (1.26, 1.59)	1.41 (1.25, 1.59)	1.41 (1.25, 1.58)	1.41 (1.25, 1.58)
	+2	1,765	147	324	18.8	7.80	3.59 (3.05, 4.23)	2.04 (1.72, 2.41)	1.67 (1.41, 1.98)	1.67 (1.42, 1.98)	1.66 (1.40, 1.96)	1.66 (1.41, 1.97)
	+3,4	515	53	119	5.3	9.93	4.50 (3.43, 5.90)	2.49 (1.88, 3.29)	2.01 (1.52, 2.65)	2.00 (1.51, 2.64)	1.98 (1.50, 2.62)	1.98 (1.50, 2.61)
Early DM	Neg	107,415	6,479	16,607	1,209.1	5.36	2.53 (2.47, 2.60)	1.19 (1.16, 1.22)	1.00 (0.97, 1.02)	0.99 (0.96, 1.01)	0.98 (0.95, 1.00)	0.97 (0.94, 1.00)
	Trace	4,540	285	793	50.5	5.65	2.64 (2.35, 2.97)	1.24 (1.10, 1.40)	1.00 (0.89, 1.13)	1.00 (0.88, 1.12)	0.98 (0.87, 1.11)	0.98 (0.87, 1.10)
	+1	4,746	371	954	51.4	7.22	3.32 (3.00, 3.68)	1.55 (1.40, 1.72)	1.23 (1.10, 1.36)	1.22 (1.10, 1.35)	1.20 (1.08, 1.33)	1.19 (1.08, 1.32)
	+2	2,198	191	519	22.9	8.32	3.73 (3.24, 4.30)	1.80 (1.56, 2.09)	1.39 (1.20, 1.61)	1.38 (1.19, 1.59)	1.35 (1.17, 1.56)	1.34 (1.16, 1.55)
	+3,4	811	91	234	8.1	11.27	4.88 (3.97, 6.00)	2.33 (1.88, 2.88)	1.77 (1.43, 2.19)	1.75 (1.41, 2.16)	1.72 (1.39, 2.12)	1.70 (1.38, 2.10)
Late DM	Neg	90,044	6,506	19,552	978.2	6.65	3.06 (2.98, 3.14)	1.20 (1.17, 1.24)	1.03 (1.01, 1.06)	1.02 (0.99, 1.04)	0.99 (0.96, 1.02)	0.98 (0.95, 1.01)
	Trace	4,194	350	1,052	44.2	7.93	3.58 (3.22, 3.97)	1.37 (1.23, 1.52)	1.14 (1.02, 1.26)	1.11 (1.00, 1.24)	1.08 (0.97, 1.20)	1.07 (0.96, 1.19)
	+1	5,427	602	1,672	54.6	11.03	4.81 (4.44, 5.22)	1.81 (1.67, 1.97)	1.48 (1.36, 1.60)	1.45 (1.33, 1.57)	1.40 (1.29, 1.52)	1.39 (1.28, 1.51)
	+2	3,342	441	1,237	31.5	14.00	5.85 (5.32, 6.42)	2.19 (1.99, 2.42)	1.76 (1.60, 1.94)	1.70 (1.54, 1.87)	1.66 (1.51, 1.83)	1.62 (1.46, 1.79)
	+3,4	1,512	205	662	13.4	15.33	6.06 (5.28, 6.96)	2.37 (2.06, 2.73)	1.86 (1.61, 2.14)	1.79 (1.55, 2.06)	1.74 (1.50, 2.00)	1.69 (1.46, 1.95)
p-value							<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
Glycemic stages	Protein uria	N	Events	Deaths	Duration*	AF IR*	Sub-Distribution Hazard ratio (95% CI)					
							Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Normal	Neg	2,674,628	64,623	117,732	32,107.6	2.01	1 (ref.)	1 (ref.)	1 (ref.)	1 (ref.)	1 (ref.)	1 (ref.)
	Trace	56,703	1,573	2,998	676.0	2.33	1.15 (1.09, 1.21)	1.08 (1.03, 1.14)	1.04 (0.99, 1.10)	1.04 (0.99, 1.10)	1.04 (0.99, 1.10)	1.04 (0.99, 1.10)
	+1	37,062	1,449	2,627	435.3	3.33	1.63 (1.55, 1.72)	1.35 (1.28, 1.42)	1.25 (1.19, 1.32)	1.25 (1.19, 1.32)	1.25 (1.19, 1.32)	1.25 (1.19, 1.32)
	+2	12,089	568	1,117	139.9	4.06	1.97 (1.81, 2.14)	1.52 (1.40, 1.66)	1.36 (1.25, 1.48)	1.35 (1.24, 1.47)	1.36 (1.25, 1.48)	1.35 (1.24, 1.47)
	+3,4	3,141	175	378	35.6	4.91	2.35 (2.03, 2.73)	1.65 (1.42, 1.92)	1.46 (1.25, 1.69)	1.45 (1.24, 1.68)	1.45 (1.25, 1.69)	1.44 (1.24, 1.68)
Prediabetes	Neg	870,724	30,492	57,016	10,298.7	2.96	1 (ref.)	1 (ref.)	1 (ref.)	1 (ref.)	1 (ref.)	1 (ref.)
	Trace	22,000	980	1,897	256.4	3.82	1.28 (1.20, 1.36)	1.12 (1.05, 1.20)	1.08 (1.01, 1.15)	1.07 (1.01, 1.14)	1.08 (1.01, 1.15)	1.07 (1.01, 1.14)
	+1	16,138	914	1,690	185.0	4.94	1.64 (1.53, 1.75)	1.33 (1.24, 1.42)	1.23 (1.15, 1.32)	1.23 (1.15, 1.32)	1.23 (1.15, 1.32)	1.23 (1.15, 1.32)
	+2	5,483	379	741	61.4	6.17	2.01 (1.82, 2.22)	1.50 (1.35, 1.66)	1.36 (1.22, 1.50)	1.35 (1.22, 1.49)	1.35 (1.22, 1.50)	1.35 (1.21, 1.49)

	+3,4	1,569	127	241	17.2	7.38	2.38 (2.00, 2.84)	1.64 (1.37, 1.97)	1.46 (1.22, 1.75)	1.45 (1.21, 1.74)	1.46 (1.22, 1.74)	1.45 (1.21, 1.74)
New-onset DM	Neg	110,163	4,708	11,630	1,269.9	3.71	1 (ref.)	1 (ref.)	1 (ref.)	1 (ref.)	1 (ref.)	1 (ref.)
	Trace	4,156	233	537	47.0	4.95	1.32 (1.16, 1.51)	1.24 (1.09, 1.42)	1.20 (1.05, 1.37)	1.20 (1.05, 1.37)	1.20 (1.05, 1.37)	1.20 (1.05, 1.37)
	+1	4,159	282	609	46.2	6.11	1.61 (1.43, 1.82)	1.48 (1.31, 1.67)	1.39 (1.23, 1.57)	1.39 (1.23, 1.57)	1.39 (1.23, 1.57)	1.38 (1.23, 1.56)
	+2	1,765	147	324	18.8	7.80	2.00 (1.70, 2.37)	1.77 (1.49, 2.10)	1.64 (1.39, 1.95)	1.64 (1.39, 1.95)	1.64 (1.38, 1.94)	1.64 (1.38, 1.94)
	+3,4	515	53	119	5.3	9.93	2.51 (1.91, 3.30)	2.16 (1.63, 2.86)	1.98 (1.50, 2.61)	1.96 (1.48, 2.59)	1.96 (1.48, 2.58)	1.95 (1.47, 2.57)
Early DM	Neg	107,415	6,479	16,607	1,209.1	5.36	1 (ref.)	1 (ref.)	1 (ref.)	1 (ref.)	1 (ref.)	1 (ref.)
	Trace	4,540	285	793	50.5	5.65	1.04 (0.93, 1.17)	1.04 (0.92, 1.18)	1.01 (0.89, 1.14)	1.01 (0.89, 1.14)	1.01 (0.89, 1.14)	1.01 (0.89, 1.14)
	+1	4,746	371	954	51.4	7.22	1.31 (1.18, 1.46)	1.30 (1.17, 1.44)	1.23 (1.11, 1.37)	1.23 (1.11, 1.37)	1.23 (1.10, 1.36)	1.23 (1.11, 1.37)
	+2	2,198	191	519	22.9	8.32	1.47 (1.27, 1.70)	1.52 (1.31, 1.76)	1.40 (1.20, 1.62)	1.39 (1.20, 1.62)	1.38 (1.20, 1.60)	1.38 (1.19, 1.60)
	+3,4	811	91	234	8.1	11.27	1.93 (1.56, 2.37)	1.96 (1.58, 2.42)	1.78 (1.44, 2.20)	1.77 (1.43, 2.19)	1.76 (1.42, 2.18)	1.75 (1.42, 2.17)
Late DM	Neg	90,044	6,506	19,552	978.2	6.65	1 (ref.)	1 (ref.)	1 (ref.)	1 (ref.)	1 (ref.)	1 (ref.)
	Trace	4,194	350	1,052	44.2	7.93	1.17 (1.05, 1.30)	1.14 (1.02, 1.27)	1.10 (0.98, 1.23)	1.09 (0.98, 1.22)	1.09 (0.98, 1.22)	1.09 (0.98, 1.22)
	+1	5,427	602	1,672	54.6	11.03	1.57 (1.45, 1.71)	1.51 (1.38, 1.64)	1.43 (1.31, 1.56)	1.42 (1.30, 1.55)	1.42 (1.30, 1.54)	1.41 (1.30, 1.54)
	+2	3,342	441	1,237	31.5	14.00	1.91 (1.73, 2.10)	1.82 (1.65, 2.01)	1.70 (1.54, 1.88)	1.66 (1.51, 1.84)	1.68 (1.52, 1.86)	1.65 (1.49, 1.82)
	+3,4	1,512	205	662	13.4	15.33	1.98 (1.72, 2.28)	1.97 (1.70, 2.27)	1.80 (1.56, 2.07)	1.76 (1.52, 2.03)	1.76 (1.52, 2.03)	1.72 (1.49, 1.99)
p-value							<.0001	0.0304	0.0027	0.0061	0.0065	0.0123

Model 1: non-adjusted; Model 2: age, sex; Model 3: age, sex, income quartile, body-mass index (BMI), smoking status, drinking habit, physical activity, hypertension, dyslipidemia, and chronic kidney disease; Model 4: age, sex, income quartile, BMI, smoking status, drinking habit, physical activity, hypertension, dyslipidemia, chronic kidney disease, heart failure, history of myocardial infarction, and history of ischemic stroke; Model 5: Model 3 + diabetic retinopathy and diabetic neuropathy; Model 6: Model 4 + diabetic retinopathy and diabetic neuropathy.

AF: atrial fibrillation; IR: incidence rate; 95% CI: 95% confidence interval; ref.: reference value of sub-distribution hazard ratio; DM: diabetes mellitus; Neg: negative urine dipstick test.

* Per 1000 person-years

Fig S2. Cumulative incidence curves for AF incidence corresponding to glycemic stages and proteinuria level using competing risk models.

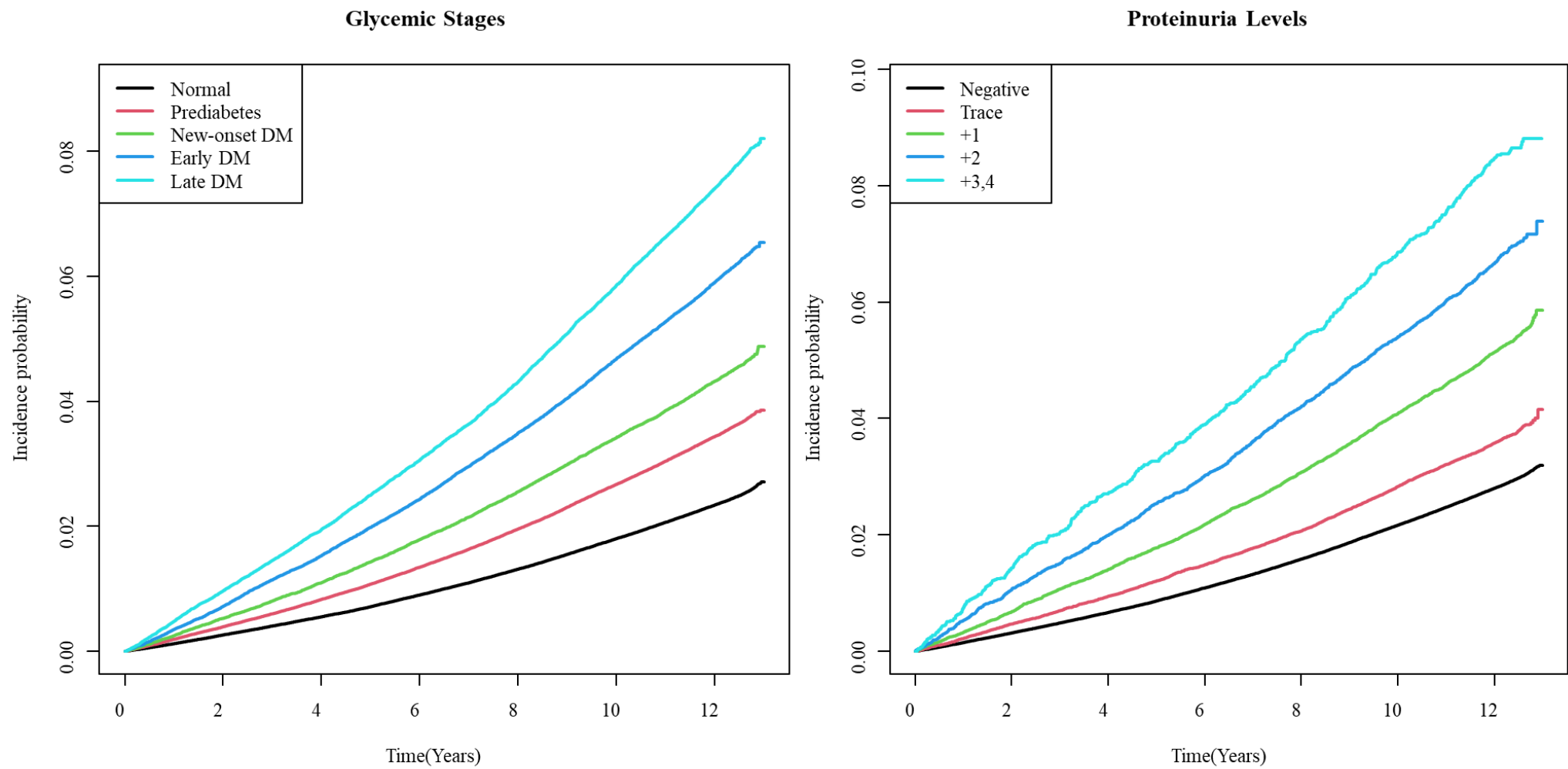


Fig S3. Cumulative incidence curves for AF incidence corresponding proteinuria level for each glycemic stage using competing risk models.

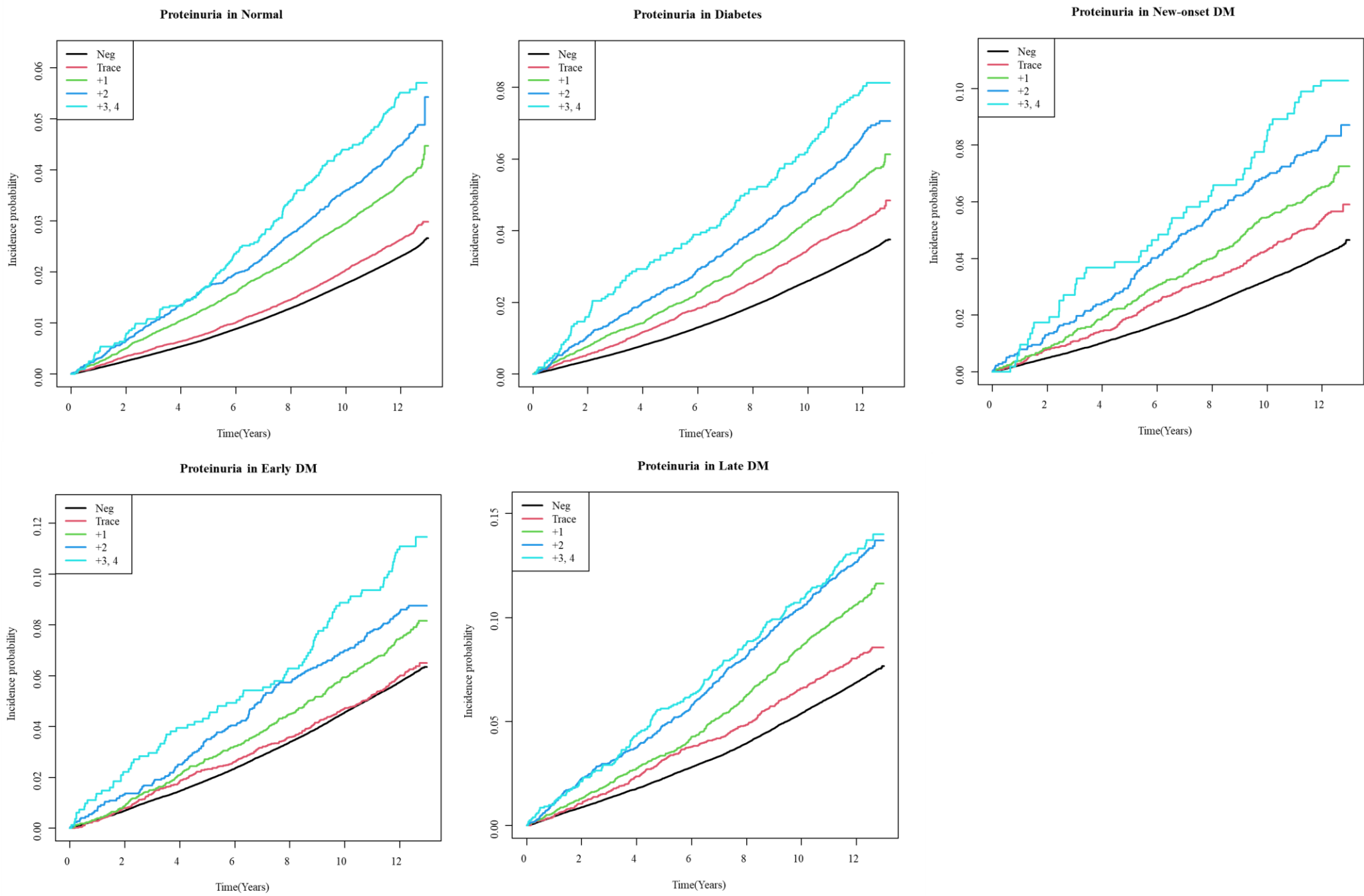


Fig S4. AF incidence rates and hazard ratios in Cox Proportional-Hazards Regression Model 4 with competing risks.

