

# Supplementary Material

## Pan-cancer polygenic risk score associates with cancer susceptibility following kidney transplantation

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[FinnGen ethics statement: permit numbers and access decisions](#)

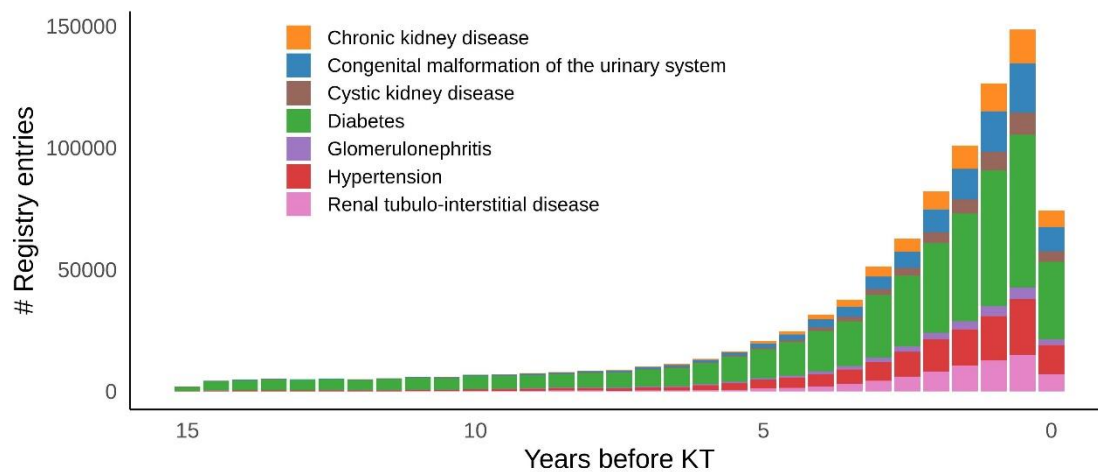
The FinnGen study is approved by Finnish Institute for Health and Welfare (permit numbers:

THL/2031/6.02.00/2017, THL/1101/5.05.00/2017, THL/341/6.02.00/2018, THL/2222/6.02.00/2018, THL/283/6.02.00/2019, THL/1721/5.05.00/2019 and THL/1524/5.05.00/2020), Digital and population data service agency (permit numbers: VRK43431/2017-3, VRK/6909/2018-3, VRK/4415/2019-3), the Social Insurance Institution (permit numbers: KELA 58/522/2017, KELA 131/522/2018, KELA 70/522/2019, KELA 98/522/2019, KELA 134/522/2019, KELA 138/522/2019, KELA 2/522/2020, KELA 16/522/2020), Findata permit numbers THL/2364/14.02/2020, THL/4055/14.06.00/2020, THL/3433/14.06.00/2020, THL/4432/14.06/2020, THL/5189/14.06/2020, THL/5894/14.06.00/2020, THL/6619/14.06.00/2020, THL/209/14.06.00/2021, THL/688/14.06.00/2021, THL/1284/14.06.00/2021, THL/1965/14.06.00/2021, THL/5546/14.02.00/2020, THL/2658/14.06.00/2021, THL/4235/14.06.00/2021, Statistics Finland (permit numbers: TK-53-1041-17 and TK/143/07.03.00/2020 (earlier TK-53-90-20) TK/1735/07.03.00/2021, TK/3112/07.03.00/2021) and Finnish Registry for Kidney Diseases permission/extract from the meeting minutes on 4<sup>th</sup> July 2019.

The Biobank Access Decisions for FinnGen samples and data utilized in FinnGen Data Freeze 11 include: THL Biobank BB2017\_55, BB2017\_111, BB2018\_19, BB\_2018\_34, BB\_2018\_67, BB2018\_71, BB2019\_7, BB2019\_8, BB2019\_26, BB2020\_1, BB2021\_65, Finnish Red Cross Blood Service Biobank 7.12.2017, Helsinki Biobank HUS/359/2017, HUS/248/2020, HUS/430/2021 §28, §29, HUS/150/2022 §12, §13, §14, §15, §16, §17, §18, §23, §58, §59, HUS/128/2023 §18, Auria Biobank AB17-5154 and amendment #1 (August 17 2020) and amendments BB\_2021-0140, BB\_2021-0156 (August 26 2021, Feb 2 2022), BB\_2021-0169, BB\_2021-0179, BB\_2021-0161, AB20-5926 and amendment #1 (April 23 2020) and it's modifications (Sep 22 2021), BB\_2022-0262, BB\_2022-0256, Biobank Borealis of Northern Finland\_2017\_1013, 2021\_5010, 2021\_5010 Amendment, 2021\_5018,

2021\_5018 Amendment, 2021\_5015, 2021\_5015 Amendment, 2021\_5015 Amendment\_2, 2021\_5023, 2021\_5023 Amendment, 2021\_5023 Amendment\_2, 2021\_5017, 2021\_5017 Amendment, 2022\_6001, 2022\_6001 Amendment, 2022\_6006 Amendment, 2022\_6006 Amendment, 2022\_6006 Amendment\_2, BB22-0067, 2022\_0262, 2022\_0262 Amendment, Biobank of Eastern Finland 1186/2018 and amendment 22§/2020, 53§/2021, 13§/2022, 14§/2022, 15§/2022, 27§/2022, 28§/2022, 29§/2022, 33§/2022, 35§/2022, 36§/2022, 37§/2022, 39§/2022, 7§/2023, 32§/2023, 33§/2023, 34§/2023, 35§/2023, 36§/2023, 37§/2023, 38§/2023, 39§/2023, 40§/2023, 41§/2023, Finnish Clinical Biobank Tampere MH0004 and amendments (21.02.2020 & 06.10.2020), BB2021-0140 8§/2021, 9§/2021, §9/2022, §10/2022, §12/2022, 13§/2022, §20/2022, §21/2022, §22/2022, §23/2022, 28§/2022, 29§/2022, 30§/2022, 31§/2022, 32§/2022, 38§/2022, 40§/2022, 42§/2022, 1§/2023, Central Finland Biobank 1-2017, BB\_2021-0161, BB\_2021-0169, BB\_2021-0179, BB\_2021-0170, BB\_2022-0256, BB\_2022-0262, BB22-0067, Decision allowing to continue data processing until 31<sup>st</sup> Aug 2024 for projects: BB\_2021-0179, BB22-0067, BB\_2022-0262, BB\_2021-0170, BB\_2021-0164, BB\_2021-0161, and BB\_2021-0169, and Terveystalo Biobank STB 2018001 and amendment 25<sup>th</sup> Aug 2020, Finnish Hematological Registry and Clinical Biobank decision 18<sup>th</sup> June 2021, Arctic biobank P0844: ARC\_2021\_1001.

## Supplementary Figure 1



**Figure S1.** Primary diagnosis distribution over time prior to KT.

## Supplementary Table 1

**Table S1.** Cancer type-specific numbers of significant SNPs in the source meta-analysis and in FinnGen. Kidney cancer was excluded from PRS calculation due to only one available SNP.

Cancer type	Rashkin <i>et al.</i> 2020	FinnGen
NHL	814	645
bladder	51	51
breast	4816	4681
cervix	1748	1447
colon	145	145
gastrointestinal	13	13
kidney	1	1
leukemia	19	19
lung	46	46
melanoma	1001	963
prostate	1797	1732
rectum	15	15
thyroid	160	160

## Supplementary Table 2

**Table S2.** Primary diagnosis classification.

<b>Class of primary diagnosis</b>	<b>Diagnoses</b>
Chronic tubulo-interstitial nephritis	chronic tubulo-interstitial nephritis
Congenital malformations	congenital obstructive defects of renal pelvis and congenital malformations of ureter, other congenital malformations of the urinary system, obstructive and reflux uropathy, other disorders of kidney and ureter not elsewhere classified, renal agenesis and other reduction defects of kidney, urethral stricture
Polycystic kidney disease	polycystic kidney disease
Glomerular disorders in diabetes mellitus	glomerular diseases classified elsewhere, glomerular disorders in diabetes mellitus
Glomerulonephritis	acute nephritic syndrome, unspecified nephritic syndrome, recurrent and persistent haematuria, isolated proteinuria with specified morphological lesion, rapidly progressing nephritic syndrome, chronic nephritic syndrome, nephrotic syndrome
Other	hypertensive renal disease, acute renal failure, atherosclerosis, hereditary nephropathy not elsewhere classified, hypertensive heart and renal disease, other necrotizing vasculopathies, other renal-tubulointerstitial diseases, calculus of kidney and ureter, congenital malformations in musculo-skeletal system not elsewhere classified, other conditions originating in the perinatal period, other diseases of liver, drug and heavy metal induced tubular and tubulo-interstitial conditions, other diseases of arteries and arterioles, unspecified contracted kidney, unspecified kidney failure,
Unknown	chronic kidney disease, missing data

## Supplementary Table 3

**Table S3.** Cancer diagnosis classification.

<b>Original</b>	<b>classification 1</b>	<b>classification 2</b>
Basal cell carcinoma	Basal cell carcinoma	Skin
Diffuse large B-cell lymphoma	Lymphoma	Hematopoietic
Rare circulating lymphoid malignancy	Lymphoma	Hematopoietic
Non-follicular lymphoma	Lymphoma	Hematopoietic
Malignant neoplasm of urinary organs	Urinary tract cancer	Other
Carcinoma in situ of other and unspecified digestive organs	Gastrointestinal cancer	Other
Secondary uncertain malignant Neoplasm	Malignant neoplasm other	Other
Malignant neoplasm of endocrine gland	Endocrine cancer	Other
Malignant neoplasm of eye, brain and central nervous system	Central nervous system cancer	Other
Malignant neoplasm of kidney, except renal pelvis	Kidney cancer	Other
Malignant neoplasm of mesothelium and soft tissue	Soft tissue cancer	Other
Malignant melanoma	Melanoma	Skin
Carcinoma in situ of penis	Squamous cell carcinoma of skin	Skin
Melanoma in situ	Melanoma	Skin
Carcinoma in situ of colon	Gastrointestinal cancer	Other
Primary lymphoid and hematopoietic malignant neoplasms	Lymphoma	Hematopoietic
Wilm's tumor	Kidney cancer	Other
Clear cell carcinoma of kidney	Kidney cancer	Other
Renal cell carcinoma of kidney	Kidney cancer	Other
Papillary adenocarcinoma of thyroid gland	Thyroid cancer	Other
Marginal zone B-cell lymphoma	Lymphoma	Hematopoietic
Malignant neoplasm, without specification of site	Malignant neoplasm other	Other
Malignant neoplasm of thyroid gland	Thyroid cancer	Other
Malignant neoplasm of brain	Central nervous system cancer	Other
Malignant neoplasm of bladder	Urinary tract cancer	Other
Malignant neoplasm of vulva	Squamous cell carcinoma of lower genital tract	Other
Malignant neoplasm of other connective and soft tissue	Soft tissue cancer	Other
Carcinoma in situ of skin of upper limb, including shoulder	Squamous cell carcinoma of skin	Skin
Melanoma in situ of upper limb including shoulder	Melanoma	Skin
Multiple myeloma and malignant plasma cell neoplasms	Myeloma	Hematopoietic

Carcinoma in situ of oral cavity	Squamous cell carcinoma of head and neck	Other
Carcinoma in situ of oral cavity, oesophagus and stomach	Squamous cell carcinoma of head and neck	Other
Malignant neoplasm of breast, HER positive	Breast cancer	Other
Carcinoma in situ of oral cavity and pharynx	Squamous cell carcinoma of head and neck	Other
Malignant neoplasm of breast, HER negative	Breast cancer	Other
Squamous cell neoplasms and carcinoma in cervix	Squamous cell carcinoma of lower genital tract	Other
Adenocarcinoma and papillary adenocarcinoma of kidney	Kidney cancer	Other
Non-Hodgkin lymphoma, all	Lymphoma	Hematopoietic
Malignant neoplasm of cervix uteri	Cervical cancer	Other
Malignant neoplasm of breast	Breast cancer	Other
Carcinoma in situ of lip, oral cavity and pharynx	Squamous cell carcinoma of head and neck	Other
Mature T/NK-cell lymphomas, hilmo	Lymphoma	Hematopoietic

## Supplementary Table 4

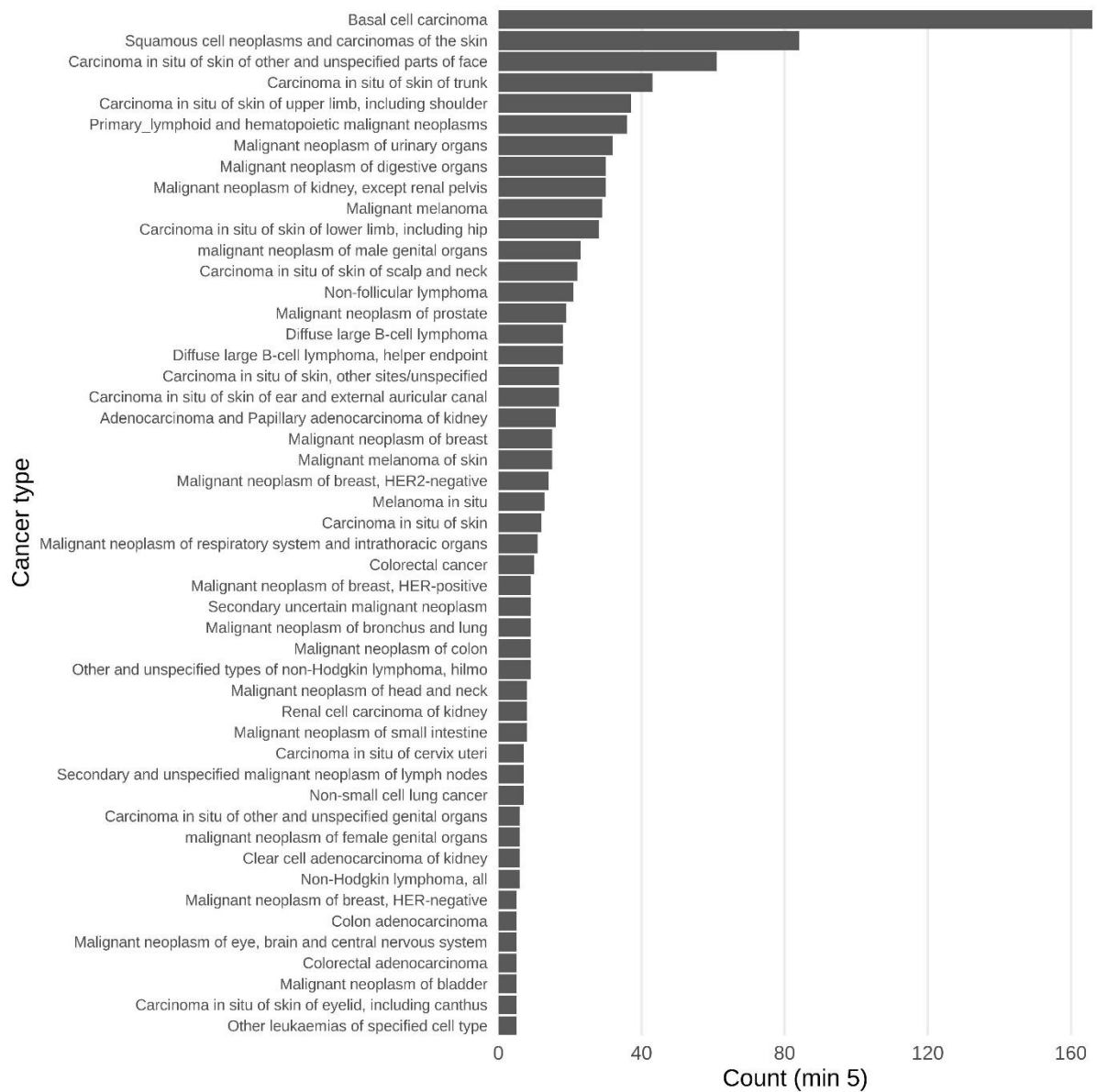
**Table S4.** Demographics of lung and liver transplantation (LLT) patients.

	All patients	Patients with cancer	Patients without cancer	<i>p</i> -value <sup>a</sup>
<b>Lung transplantations</b>	n = 206	n = 35	n = 171	
Male sex, n (%)	120 (58.3)	21 (60.0)	99 (57.9)	0.97
Median age at TX, years (IQR)	57.6 (17.4)	59.5 (15.6)	56.9 (19.2)	0.12 <sup>b</sup>
Median time from TX, years (IQR)	5.46 (7.0)	5.41 (5.35)	5.49 (7.36)	0.33 <sup>b</sup>
Primary diagnosis, n (%),				
COPD	196 (95.2)	35 (100)	161 (94.2)	0.3
ILD	197 (95.6)	35 (100)	162 (94.7)	0.35
Reported co-morbidities before TX, n (%)				
Diabetes	34 (16.5)	6 (17.1)	28 (16.4)	1.0
<b>Liver transplantations</b>	n = 270	n = 64	n = 206	<i>p</i> -value <sup>a</sup>
Male sex, n (%)	128 (47.4)	29 (45.3)	99 (48.1)	0.81
Median age at TX, years (IQR)	50.9 (21.9)	55.2 (15.7)	49.4 (24.4)	0.0018 <sup>b</sup>
Median time from TX, years (IQR)	7.09 (9.8)	7.97 (10.5)	7.0 (10.0)	0.45 <sup>b</sup>
Primary diagnosis, n (%),				
Cirrhosis	154 (57.0)	39 (60.9)	115 (55.8)	0.56
Hepatitis	36 (13.3)	12 (18.8)	24 (11.7)	0.21
Reported co-morbidities before TX, n (%)				
Diabetes	70 (25.9)	16 (25.0)	54 (26.2)	0.98

IQR, interquartile range; TX; transplantation

<sup>a</sup> Patients with vs. without cancer<sup>b</sup> Two-way t-test; otherwise, two-way Z-test of proportions

## Supplementary Figure 2



**Figure S2.** Post-KT cancer diagnosis distribution in KT patients. The shown data lists all available health registry entries; an individual typically has multiple entries of a given diagnosis.

## Supplementary Table 5

**Table S5.** Coxph analysis of the full FinnGen data set including an interaction term for PRS and kidney transplantation (sum:TX).

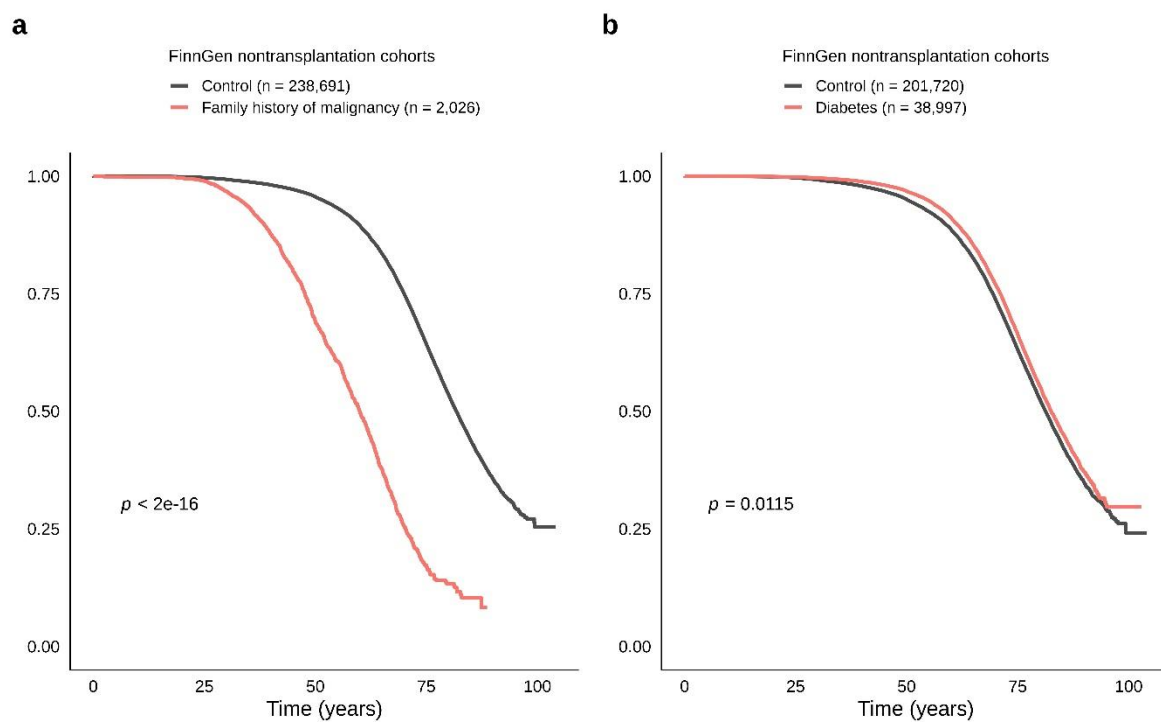
variable	n_obs	n_event	estimate	std.error	statistic	conf.low	conf.high	p.value
BL_AGE	424000	91300	0.962	0.000376	-104	0.961	0.962	0
BL_YEAR	424000	91300	1.04	0.000415	94.4	1.04	1.04	0
sum	424000	91300	1.01	0.000994	13.5	1.01	1.02	1.02E-41
SEXmale	424000	91300	1.02	0.00677	3.02	1.01	1.03	0.00256 9.29E-102
PC1	424000	91300	0.028	0.167	-21.4	0.0202	0.0388	6.25E-75
PC2	424000	91300	241	0.299	18.3	134	433	2.02E-12
PC3	424000	91300	0.0978	0.331	-7.03	0.0512	0.187	0.987
PC4	424000	91300	0.994	0.389	-0.0162	0.463	2.13	0.00097
PC5	424000	91300	0.232	0.443	-3.3	0.0973	0.552	1.75E-10
PC6	424000	91300	0.055	0.454	-6.38	0.0226	0.134	0.242
PC7	424000	91300	0.55	0.511	-1.17	0.202	1.5	0.101
PC8	424000	91300	0.375	0.598	-1.64	0.116	1.21	0.488
PC9	424000	91300	0.686	0.544	-0.693	0.236	1.99	0.34
PC10	424000	91300	0.568	0.594	-0.953	0.177	1.82	1.18E-31
E4_DIABETES	424000	91300	0.909	0.00815	-11.7	0.895	0.924	0.791
TX	424000	91300	0.872	0.517	-0.265	0.317	2.4	0
Z21_FAMILY_HISTORY_ MALIG_NEOPLASM	424000	91300	4.32	0.0206	71.1	4.15	4.5	0.385
sum:TX	424000	91300	1.47	0.447	0.868	0.614	3.54	

## Supplementary Table 6

**Table S6.** Cox proportional hazards model for PRS analysis covariates in KT patients including smoking and BMI as covariates.

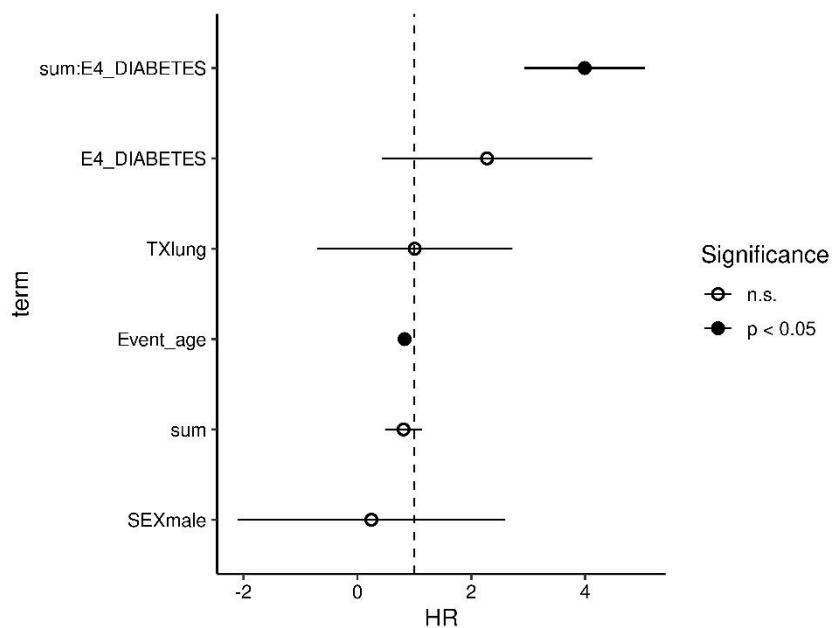
variable	n_obs	n_event	estimate	std.error	statistic	conf.low	conf.high	p.value
BL_AGE	688	173	1	0.0137	0.22	0.976	1.03	0.826
BL_YEAR	688	173	0.979	0.015	-1.38	0.951	1.01	0.167
EVENT_AGE.kidney	688	173	0.906	0.0104	-9.49	0.888	0.925	2.39e-21
PC1	688	173	0.0174	4.16	-0.973	4.95e-06	60.9	0.33
PC2	688	173	225	8	0.677	3.46e-05	1.47e+09	0.499
PC3	688	173	50.2	9.33	0.42	5.78e-07	4.36e+09	0.675
PC4	688	173	4.45e-05	10.9	-0.916	2.2e-14	90200	0.359
PC5	688	173	0.0531	11.9	-0.248	4.32e-12	6.52e+08	0.804
PC6	688	173	2.07e-06	12.1	-1.08	1.1e-16	39000	0.278
PC7	688	173	29.9	13.3	0.256	1.57e-10	5.67e+12	0.798
PC8	688	173	474	15.4	0.4	3.65e-11	6.17e+15	0.689
PC9	688	173	50100	15.5	0.699	3.27e-09	7.68e+17	0.485
PC10	688	173	1.83e-10	15.6	-1.44	9.6e-24	3470	0.151
SEXmale	688	173	0.924	0.159	-0.497	0.677	1.26	0.619
SMOKE2yes	688	173	0.833	0.219	-0.836	0.542	1.28	0.403
BMI	688	173	0.982	0.0189	-0.939	0.947	1.02	0.348
Z21_FAMILY_HISTORY_MALIG_NEOPLASM	688	173	3.03	1.03	1.07	0.402	22.8	0.282
E4_DIABETES	688	173	0.886	0.159	-0.761	0.649	1.21	0.447

## Supplementary Figure 3



**Figure S3.** Kaplan-Maier curves and cox proportional hazard model p-values for the impact of **a)** family history of malignant neoplasm and **b)** diabetes variables on time to first cancer in FinnGen non-transplant data.

## Supplementary Figure 4



**Figure S4.** Coxph association of the PRS in liver and lung transplantations at patient age <40 years at transplantation. the variable sum:S4\_DIABETES is an interaction term between the PRS and diabetes diagnosis. The first ten genetic principal components were included in the model but are not shown in the figure for clarity.

## Supplementary Table 7

**Table S7.** Coxph analysis of the PRS in KT patients in different age groups. The agelim column show the used age limit for filtering the KT population where patients younger than the limit are included in the analysis. The PRS is named “sum”, and other variables are model covariates.

agelim	variable	n_obs	n_event	estimate	std.error	statistic	conf.low	conf.high	p.value
20	BL_AGE	143	15	0.856	0.0695	-2.23	0.747	0.981	0.0255
20	BL_YEAR	143	15	1.1	0.127	0.731	0.856	1.41	0.465
20	EVENT_AGE.kidney	143	15	1.07	0.0723	0.913	0.927	1.23	0.361
20	PC1	143	15	107000	24.3	0.477	2.27E-16	5.06E+25	0.633
20	PC2	143	15	4.38E+50	67.1	1.74	3.16E-07	6.07E+107	0.0824
20	PC3	143	15	7.46E+28	63.2	1.05	1.25E-25	4.46E+82	0.293
20	PC4	143	15	6.66E-08	86.5	-0.191	1.68E-81	2.65E+66	0.848
20	PC5	143	15	2.18E-51	76.3	-1.53	2.69E-116	1.77E+14	0.126
20	PC6	143	15	2.68E-92	98.2	-2.15	6.63E-176	1.08E-08	0.0318
20	PC7	143	15	5.50E+33	84.8	0.916	3.33E-39	9.10E+105	0.36
20	PC8	143	15	3.49E-40	134	-0.68	5.83E-154	2.08E+74	0.497
20	PC9	143	15	3.37E+12	98.6	0.292	3.62E-72	3.14E+96	0.77
20	PC10	143	15	2.85E-83	99.7	-1.91	4.12E-168	197	0.0565
20	SEXmale	143	15	0.319	0.735	-1.55	0.0755	1.35	0.12
20	sum	143	15	1.13	0.104	1.13	0.918	1.38	0.257
20	Z21_FAMILY_HISTOR Y_MALIG_NEOPLASM	143	15	NA	0	NA	NA	NA	NA
20	E4_DIABETES	143	15	2.6	0.903	1.06	0.443	15.3	0.289
30	BL_AGE	243	26	0.95	0.0418	-1.23	0.875	1.03	0.219
30	BL_YEAR	243	26	1.06	0.067	0.809	0.926	1.2	0.419
30	EVENT_AGE.kidney	243	26	0.942	0.0338	-1.75	0.882	1.01	0.0796
30	PC1	243	26	4.18E+08	16.2	1.23	6.95E-06	2.51E+22	0.22
30	PC2	243	26	3.78E+29	37.9	1.8	0.00194	7.37E+61	0.0726
30	PC3	243	26	3.52E+33	46.4	1.67	1.18E-06	1.05E+73	0.0958
30	PC4	243	26	0.034	44.9	-0.0753	1.92E-40	6.01E+36	0.94
30	PC5	243	26	2.84E-17	37.8	-1.01	1.96E-49	4.12E+15	0.313
30	PC6	243	26	1.37E-31	43.3	-1.64	1.94E-68	963000	0.101
30	PC7	243	26	832	55.7	0.121	3.29E-45	2.10E+50	0.904
30	PC8	243	26	1.01E-46	59.9	-1.77	1.10E-97	91700	0.0769
30	PC9	243	26	3.64E+23	64.3	0.843	6.43E-32	2.06E+78	0.399
30	PC10	243	26	9.02E-49	65.3	-1.7	2.51E-104	32400000	0.0901
30	SEXmale	243	26	0.376	0.443	-2.21	0.158	0.897	0.0274
30	sum	243	26	1.13	0.072	1.68	0.98	1.3	0.0927
30	Z21_FAMILY_HISTOR Y_MALIG_NEOPLASM	243	26	13.6	1.17	2.24	1.38	133	0.0252
30	E4_DIABETES	243	26	1.54	0.566	0.762	0.508	4.67	0.446
40	BL_AGE	467	61	0.97	0.0246	-1.25	0.924	1.02	0.211
40	BL_YEAR	467	61	1.05	0.0363	1.34	0.978	1.13	0.179
40	EVENT_AGE.kidney	467	61	0.922	0.023	-3.52	0.882	0.965	0.000437
40	PC1	467	61	243	7.89	0.696	4.65E-05	1.27E+09	0.486
40	PC2	467	61	4.00E+07	16.3	1.07	5.38E-07	2.97E+21	0.283
40	PC3	467	61	1.70E+16	19.5	1.91	0.397	7.28E+32	0.0558
40	PC4	467	61	0.00676	20.7	-0.241	1.65E-20	2.77E+15	0.809

40	PC5	467	61	6.63E-05	20.6	-0.467	1.92E-22	2.29E+13	0.641
40	PC6	467	61	4.15E-13	21.9	-1.3	9.60E-32	1790000	0.193
40	PC7	467	61	0.0313	26.9	-0.129	3.77E-25	2.60E+21	0.898
40	PC8	467	61	1.47E-09	30.1	-0.675	3.27E-35	6.59E+16	0.5
40	PC9	467	61	6.02E-11	29.7	-0.794	3.45E-36	1.05E+15	0.427
40	PC10	467	61	43300	28.5	0.374	2.31E-20	8.13E+28	0.708
40	SEXmale	467	61	0.575	0.271	-2.04	0.338	0.979	0.0415
40	sum	467	61	1.08	0.0381	2.09	1.01	1.17	0.0362
40	Z21_FAMILY_HISTOR Y_MALIG_NEOPLASM	467	61	4.29	0.638	2.28	1.23	15	0.0225
40	E4_DIABETES	467	61	0.661	0.291	-1.42	0.374	1.17	0.154
50	BL_AGE	791	123	1.01	0.0175	0.596	0.976	1.05	0.551
50	BL_YEAR	791	123	0.982	0.0232	-0.764	0.939	1.03	0.445
50	EVENT_AGE.kidney	791	123	0.897	0.0161	-6.71	0.87	0.926	1.92E-11
50	PC1	791	123	0.513	4.98	-0.134	2.95E-05	8930	0.894
50	PC2	791	123	0.000862	9.76	-0.723	4.26E-12	174000	0.47
50	PC3	791	123	5010	10.7	0.794	3.74E-06	6.71E+12	0.427
50	PC4	791	123	37700	12.2	0.865	1.60E-06	8.89E+14	0.387
50	PC5	791	123	510	13.2	0.471	2.74E-09	9.49E+13	0.638
50	PC6	791	123	1.06E-14	14.3	-2.25	6.96E-27	0.0162	0.0246
50	PC7	791	123	1.48E-06	16.6	-0.806	1.01E-20	2.18E+08	0.42
50	PC8	791	123	0.0596	19	-0.148	3.68E-18	9.65E+14	0.882
50	PC9	791	123	0.00104	17.3	-0.398	2.08E-18	5.21E+11	0.691
50	PC10	791	123	0.00118	18.2	-0.371	3.91E-19	3.57E+12	0.711
50	SEXmale	791	123	0.691	0.184	-2.01	0.482	0.992	0.0449
50	sum	791	123	1.03	0.0286	1.12	0.976	1.09	0.261
50	Z21_FAMILY_HISTOR Y_MALIG_NEOPLASM	791	123	3	0.614	1.79	0.902	10	0.0731
50	E4_DIABETES	791	123	0.781	0.19	-1.3	0.538	1.13	0.194
60	BL_AGE	1170	224	1.02	0.0124	1.26	0.991	1.04	0.207
60	BL_YEAR	1170	224	0.974	0.0161	-1.61	0.944	1.01	0.107
60	EVENT_AGE.kidney	1170	224	0.905	0.0111	-8.93	0.886	0.925	4.09E-19
60	PC1	1170	224	0.0414	3.67	-0.868	3.12E-05	55	0.385
60	PC2	1170	224	0.0257	7.12	-0.514	2.22E-08	29800	0.607
60	PC3	1170	224	0.991	7.52	-0.00114	3.93E-07	2500000	0.999
60	PC4	1170	224	0.0591	9.59	-0.295	4.04E-10	8650000	0.768
60	PC5	1170	224	4.72E-06	10.1	-1.22	1.22E-14	1830	0.224
60	PC6	1170	224	3.79E-09	10.9	-1.78	1.99E-18	7.25	0.0754
60	PC7	1170	224	4.83E-06	12.1	-1.01	2.35E-16	99100	0.312
60	PC8	1170	224	11.8	14.8	0.166	2.75E-12	5.06E+13	0.868
60	PC9	1170	224	0.436	12.4	-0.0667	1.15E-11	1.66E+10	0.947
60	PC10	1170	224	8.69E-05	13.1	-0.712	5.72E-16	13200000	0.477
60	SEXmale	1170	224	0.93	0.136	-0.534	0.712	1.21	0.593
60	sum	1170	224	1.02	0.0221	0.735	0.973	1.06	0.462
60	Z21_FAMILY_HISTOR Y_MALIG_NEOPLASM	1170	224	3.16	0.601	1.92	0.973	10.3	0.0555
60	E4_DIABETES	1170	224	0.821	0.14	-1.41	0.624	1.08	0.158
70	BL_AGE	1460	305	1.01	0.0104	1.06	0.991	1.03	0.287
70	BL_YEAR	1460	305	0.974	0.0121	-2.16	0.951	0.998	0.0304

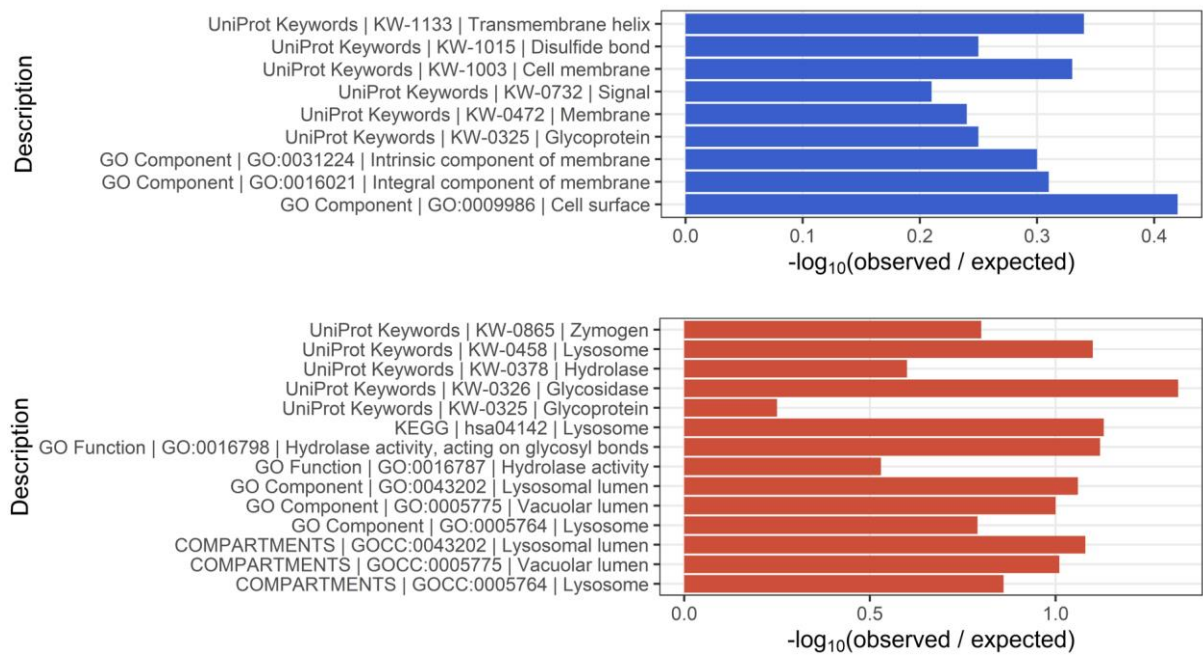
70	EVENT_AGE.kidney	1460	305	0.905	0.00826	-12.1	0.89	0.92	8.07E-34
70	PC1	1460	305	0.0198	3.03	-1.29	5.21E-05	7.52	0.196
70	PC2	1460	305	0.279	6	-0.213	2.18E-06	35800	0.832
70	PC3	1460	305	8.88	6.23	0.351	4.41E-05	1790000	0.726
70	PC4	1460	305	0.104	7.87	-0.287	2.08E-08	520000	0.774
70	PC5	1460	305	8.78E-06	8.5	-1.37	5.14E-13	150	0.171
70	PC6	1460	305	1.80E-07	9.03	-1.72	3.68E-15	8.77	0.0855
70	PC7	1460	305	0.00419	9.78	-0.559	1.97E-11	894000	0.576
70	PC8	1460	305	3960	11.9	0.694	2.72E-07	5.76E+13	0.488
70	PC9	1460	305	1.12	10.5	0.0105	1.38E-09	9.07E+08	0.992
70	PC10	1460	305	0.000141	10.9	-0.813	7.18E-14	275000	0.416
70	SEXmale	1460	305	0.946	0.118	-0.469	0.75	1.19	0.639
70	sum	1460	305	1.02	0.0181	1.26	0.988	1.06	0.206
70	Z21_FAMILY_HISTOR	1460	305	3.2	0.514	2.26	1.17	8.76	0.0237
70	Y_MALIG_NEOPLASM	1460	305	3.2	0.514	2.26	1.17	8.76	0.0237
70	E4_DIABETES	1460	305	0.848	0.12	-1.38	0.671	1.07	0.169
80	BL_AGE	1540	317	1.01	0.0102	1.22	0.993	1.03	0.222
80	BL_YEAR	1540	317	0.971	0.0117	-2.53	0.949	0.993	0.0113
80	EVENT_AGE.kidney	1540	317	0.9	0.00773	-13.6	0.887	0.914	7.59E-42
80	PC1	1540	317	0.00849	2.97	-1.61	2.53E-05	2.85	0.108
80	PC2	1540	317	2.08	5.89	0.125	2.03E-05	213000	0.901
80	PC3	1540	317	65	6.13	0.681	0.000393	10700000	0.496
80	PC4	1540	317	0.0875	7.78	-0.313	2.07E-08	370000	0.754
80	PC5	1540	317	1.35E-05	8.38	-1.34	9.92E-13	185	0.181
80	PC6	1540	317	7.52E-08	8.89	-1.85	2.04E-15	2.78	0.065
80	PC7	1540	317	0.00718	9.54	-0.518	5.49E-11	939000	0.605
80	PC8	1540	317	16700	11.8	0.825	1.55E-06	1.80E+14	0.41
80	PC9	1540	317	4.73	10.4	0.149	6.52E-09	3.43E+09	0.881
80	PC10	1540	317	2.07E-05	10.8	-0.994	1.21E-14	35500	0.32
80	SEXmale	1540	317	0.949	0.116	-0.446	0.756	1.19	0.656
80	sum	1540	317	1.03	0.0175	1.67	0.995	1.07	0.0944
80	Z21_FAMILY_HISTOR	1540	317	3.32	0.513	2.34	1.21	9.09	0.0194
80	Y_MALIG_NEOPLASM	1540	317	3.32	0.513	2.34	1.21	9.09	0.0194
80	E4_DIABETES	1540	317	0.831	0.117	-1.58	0.661	1.05	0.115

## Supplementary Table 8

**Table S8.** Variables and their Coxph p-values included in Benjamini-Yekutieli FDR adjustment.

Variable	p.value	FDR_BY
PRS KT agelimit = 20	0.257	1
Family history of malign neoplasm KT agelimit = 20	NA	NA
PRS KT agelimit = 30	0.0927	0.450887115
Family history of malign neoplasm KT agelimit = 30	0.0252	0.170515572
PRS KT agelimit = 40	0.0362	0.226104898
Family history of malign neoplasm KT agelimit = 40	0.0225	0.170515572
PRS KT agelimit = 50	0.261	1
Family history of malign neoplasm KT agelimit = 50	0.0731	0.395704391
PRS KT agelimit = 60	0.462	1
Family history of malign neoplasm KT agelimit = 60	0.0555	0.321891641
PRS KT agelimit = 70	0.206	0.88462966
Family history of malign neoplasm KT agelimit = 70	0.0237	0.170515572
PRS KT agelimit = 80	0.0944	0.450887115
Family history of malign neoplasm KT agelimit = 80	0.0194	0.170515572
FinnGen non-TX PRS sum	3.75E-25	3.05E-23
FinnGen non-TX PRS pos	1.37E-19	5.57E-18
FinnGen non-TX PRS max	0.000116687	0.001579127
FinnGen non-TX PRS min	4.88E-07	7.93E-06
Agelimit slope in KT	2.66E-18	7.20E-17
SOT non-KT PRSxDiab	0.01	0.101497364
SOT non-KT PRS	0.207	0.88462966
KT vs FinnGen <40y	0.00175	0.020299473
Age at KT	4.40E-07	7.93E-06

## Supplementary Figure 5



**Figure S5.** Functional enrichment of plasma proteins regulated by the PRS in the UK Biobank. Significantly (FDR < 0.05) enriched functional categories in upregulated (top) and downregulated (bottom) plasma proteins. The X-axis shows the ratio of observed vs. expected proteins in each class.