

Genome-wide association of familial prostate cancer cases identifies evidence for a rare segregating haplotype at 8q24.21

Human Genetics

Authors:

Craig C. Teerlink*,¹ Daniel Leongamornlert,² Tokhir Dadaev,² Alun Thomas,¹ James Farnham,¹ Robert A. Stephenson,^{3,4} Shaun Riska,⁵ Shannon K. McDonnell,⁵ Daniel J. Schaid,⁵ William J. Catalona,⁶ S. Lilly Zheng,⁶ Kathleen A. Cooney,⁷ Anna M. Ray,⁷ Kimberly A. Zuhlke,⁷ Ethan M. Lange,⁸ Graham G. Giles,⁹⁻¹¹ Melissa C. Southey,¹² Liesel M. Fitzgerald,⁹ Antje Rinckleb,¹³ Manuel Luedeke,¹³ Christiane Maier,¹⁴ Janet L. Stanford,¹⁵ Elaine A. Ostrander,¹⁶ Elina Kaikkonen,¹⁷ Csilla Sipeky,¹⁷ Teuvo Tammela,¹⁸ Johanna Schleutker,¹⁹ Kathleen E. Wiley,²⁰ Sarah D. Isaacs,²⁰ Patrick C. Walsh,²⁰ William B. Isaacs,²⁰ Jianfeng Xu,²¹ Geraldine Cancel-Tassin,²² Olivier Cussenot,²² Diptasri Mandal,²³ Cecelia Laurie,²⁴ Cathy Laurie,²⁴

International Consortium for Prostate Cancer Genetics, The PRACTICAL consortium,[‡] Stephen N. Thibodeau,²⁵ Ros Eeles,² Zsafia Kote-Jarai,² Lisa Cannon-Albright^{1,26}

Affiliations:

¹ Department of Internal Medicine, University of Utah School of Medicine, Salt Lake City, UT, 84108, USA

² Division of Genetics and Epidemiology, Institute of Cancer Research, London, SW7 3RP, UK

³ Departments of Urology and Surgery, University of Utah School of Medicine, Salt Lake City, UT, 84132, USA

⁴ Huntsman Cancer Institute, University of Utah, Salt Lake City, UT, 84112, USA

⁵ Department of Health Sciences Research, Mayo Clinic, Rochester, MN, 55905, USA

⁶ Feinberg School of Medicine, Northwestern University, Chicago, IL, 60611, USA

⁷ Departments of Internal Medicine and Urology, Department of Internal Medicine, University of Michigan Medical School, Ann Arbor, MI, 48109, USA

⁸ Departments of Genetics and Biostatistics, University of North Carolina, Chapel Hill, NC, 27599, USA

⁹ Cancer Epidemiology Centre, Cancer Council Victoria, Melbourne, 3004, Australia

¹⁰ Centre for Epidemiology and Biostatistics, Melbourne School of Population and Global Health, University of Melbourne, Victoria, 3010, Australia

¹¹ Department of Epidemiology and Preventive Medicine, Monash University, Melbourne, Victoria, 3004, Australia

¹² Department of Pathology, University of Melbourne, Melbourne, 3010, Australia

¹³ Department of Urology, University Hospital Ulm, Ulm, 53179, Germany

¹⁴ Institute for Human Genetics, University of Ulm, Ulm, 89081, Germany

¹⁵ Fred Hutchinson Cancer Research Center (FHRC), Division of Public Health Sciences, Seattle, WA, 98109, USA

¹⁶ Cancer Genetics Branch, National Human Genome Research Institute (NHGRI), National Institutes of Health (NIH), Bethesda, MD, 20892, USA

¹⁷ Department of Medical Biochemistry and Genetics, University of Turku, Turku, 20520, Finland

¹⁸ Department of Urology, University of Tampere and Tampere University Hospital, Tampere, 33520, Finland

¹⁹ Department of Medical Biochemistry and Genetics, University of Turku, and Tyks, Microbiology and Genetics, Department of Medical Genetics, Turku University Hospital, Turku, 20520, Finland

²⁰ Brady Urological Institute, Johns Hopkins University, Baltimore, MD, 21287, USA

²¹ Program for Personalized Cancer Care, NorthShore University Health System, Evanston, IL, 60201, USA

²² CeRePP, Hopital Tenon, Assistance Publique-Hopitaux de Paris, Paris, 75020, France

²³ Department of Genetics, Louisiana State University Health Sciences Center, New Orleans, LA, 70112, USA

²⁴ Department of Biostatistics, University of Washington, Seattle, WA, 98195, USA

²⁵ Department of Lab Medicine and Pathology, Mayo Clinic, Rochester, MN, 55905, USA

²⁶ George E. Wahlen Department of Veterans Affairs Medical Center, Salt Lake City, UT, 84148, USA

[†] Information of the consortium can be found at <http://practical.ccge.medschl.cam.ac.uk/>.

Members from the Prostate Cancer Association Group to Investigate Cancer Associated Alterations in the Genome (PRACTICAL) consortium are provided in the Supplemental Material.

Correspondence: craig.teerlink@utah.edu

Supplemental Table 3. Most frequent haplotype among carriers of the rare allele at rs138042437.

Chromosome	Marker	Position	Allele_1	Allele_2	Frequency of Allele_1	Presence of allele_2 on the haplotype (1=TRUE, 0=FALSE)
8	rs141692423	128094151	TAGAA	T	0.000376	0
8	rs144374205	128094286	C	T	0.000125	0
8	rs184232975	128094383	A	G	0.000627	0
8	rs6981122	128094460	A	C	0.589348	1
8	kgp5314987	128094483	T	G	0.589599	1
8	kgp28652058	128094577	A	G	0.003258	0
8	rs72725872	128094864	G	A	0.335213	1
8	rs115936719	128094887	A	G	0.000125	0
8	rs112708750	128094913	A	G	0.000627	0
8	rs76639131	128095006	T	C	0.000627	0
8	rs13252298	128095156	A	G	0.277569	0
8	kgp5872800	128095329	G	A	0.013283	0
8	rs142970406	128095343	T	G	0.000125	0
8	rs115773417	128095358	T	G	0.000376	0
8	rs114911018	128095813	A	G	0.000125	0
8	rs73705712	128095977	A	G	0.001128	0
8	rs74421890	128096183	C	T	0.000627	0
8	kgp28569603	128096289	C	T	0.00213	0
8	rs76111959	128096424	C	A	0.000627	0
8	rs77764845	128096442	A	G	0.000125	0
8	kgp6215045	128096477	T	G	0.238972	0
8	rs150645176	128096558	G	A	0.000877	0
8	kgp498405	128096564	A	G	0.006892	0
8	rs78004364	128097025	T	C	0.000376	0
8	rs60091013	128097315	C	T	0.000627	0
8	rs6997559	128097578	C	T	0.541103	1
8	rs111255075	128097619	T	A	0.000376	0

8	rs138178617	128097731	TC	T	0.335088	1
8	rs143007650	128097964	A	C	0.001128	0
8	rs146659909	128098162	C	T	0.000752	0
8	rs145342159	128098538	G	A	0.000125	0
8	rs56311652	128098561	T	A	0.334712	1
8	rs184126408	128098613	C	T	0.003383	0
8	rs139756632	128098662	.CAGCAGCT	A	0.01015	0
8	rs55905282	128098838	G	A	0.336842	1
8	rs138310587	128099139	T	G	0.007519	0
8	kgp1741577	128099166	C	T	0.85614	1
8	rs13257371	128099242	C	A	0.281704	0
8	rs4571699	128099269	A	G	0.866541	1
8	rs61262194	128099457	CGTG	C	0.867168	1
8	rs7837848	128099532	G	T	0.188722	0
8	rs61732842	128099535	G	A	0.000627	0
8	rs59765225	128099765	A	G	0.001378	0
8	rs11993508	128100076	C	T	0.867043	1
8	rs17832021	128100176	A	T	0.337093	1
8	rs28663168	128100409	G	A	0.19198	0
8	rs181632659	128100429	A	G	0.000627	0
8	rs56006726	128100439	G	C	0.000752	0
8	kgp6794704	128100510	G	A	0.002506	0
8	rs3857883	128100606	G	A	0.619048	1
8	rs2392733	128100672	C	T	0.868672	1
8	rs145376908	128100693	TTTTTTTTT	G	0.334586	1
8	rs77618639	128100801	C	T	0.000501	0
8	rs1456316	128100848	A	T	0.619048	1
8	kgp851223	128100925	A	G	0.01015	0
8	rs28735726	128100929	T	C	0.000376	0
8	kgp931577	128100964	A	G	0.336591	1
8	rs9656814	128100977	C	T	0.336591	1
8	rs9656815	128101003	C	T	0.335714	1
8	rs191085113	128101246	C	T	0.001003	0
8	rs74707848	128101277	G	A	0.000125	0
8	rs10505484	128101312	G	A	0.335714	1
8	rs62529913	128101331	A	G	0.619549	1
8	rs11994653	128101343	G	A	0.619048	1
8	kgp6347700	128101352	C	T	0.619048	1
8	rs188002764	128101397	A	T	0.001253	0
8	rs115642184	128101568	A	C	0.000125	0
8	rs75414904	128101646	C	A	0.01015	0
8	rs146678745	128101774	G	A	0.005263	0
8	rs140213611	128101960	G	A	0.000251	0
8	rs71298185	128102021	C	CT	0.784211	1
8	rs79935242	128102029	A	T	0.83208	1
8	rs192806516	128102030	A	T	0.000501	0
8	rs201592624	128102187	GA	G	0.000627	0

8	rs184980226	128102324	C	T	0.000125	0
8	rs6470497	128102330	T	C	0.519674	0
8	rs143783245	128102363	A	G	0.005764	0
8	rs148134608	128102436	G	T	0.000376	0
8	rs7844454	128102501	T	C	0.326316	0
8	rs7826322	128102553	A	G	0.869048	1
8	rs115605497	128102653	T	A	0.000501	0
8	rs116200233	128102879	C	T	0.000501	0
8	rs114778853	128102902	C	T	0.000376	0
8	rs7000321	128103019	A	C	0.326441	0
8	kgp20108723	128103151	A	G	0.0099	0
8	rs117370686	128103217	T	C	0.000125	0
8	rs7000967	128103360	A	G	0.530952	0
8	rs148663063	128103520	C	T	0.000627	0
8	rs72725876	128103635	C	T	0.450752	1
8	rs7001895	128103679	G	C	0.462406	1
8	rs146259474	128103742	A	G	0.000251	0
8	rs181057649	128103880	T	C	0.000376	0
8	exm-rs1456315	128103937	T	C	0.658897	1
8	rs72725879	128103969	C	T	0.209649	0
8	kgp9938326	128103979	T	C	0.197619	0
8	rs185265591	128104043	C	T	0.000501	0
8	kgp774037	128104055	G	T	0.274436	0
8	rs183373024	128104117	A	G	0.016792	1
8	rs78809737	128104218	G	A	0.043609	0
8	rs13254738	128104343	C	A	0.662907	1
8	rs7006390	128104367	C	T	0.009398	0
8	rs118005113	128104745	C	A	0.014286	0
8	rs73342295	128104821	C	T	0.001253	0
8	rs144328514	128104875	GT	G	0.001253	0
8	rs139118942	128104968	G	T	0.003383	0
8	rs143971862	128105011	G	A	0.002256	0
8	kgp20179886	128105031	C	T	0.001253	0
8	rs1073997	128105187	A	C	0.051253	0
8	rs147943597	128105201	T	TA	0.001253	0
8	rs146419022	128105241	A	C	0.000501	0
8	rs73342301	128105259	T	A	0.001253	0
8	rs73344303	128105267	A	C	0.001253	0
8	rs112624731	128105488	G	A	0.001253	0
8	rs115181583	128105562	C	T	0.000125	0
8	rs73344305	128105567	C	A	0.001253	0
8	rs7012407	128105593	G	T	0.000125	0
8	rs199730016	128105666	T	TA	0.021679	0
8	rs57775023	128105672	G	A	0.29599	1
8	rs200995559	128105678	AAAT	A	0.001253	0
8	hr8:128105679:l	128105679	AAT	A	0.001253	0
8	rs7012442	128105731	C	G	0.010401	0

8	rs180746465	128105967	C	T	0.000125	0
8	rs7016828	128106232	A	T	0.051504	0
8	rs7016830	128106235	A	G	0.051504	0
8	rs73344314	128106337	C	T	0.001253	0
8	rs115266272	128106397	G	A	0.000627	0
8	rs186717005	128106495	G	A	0.001128	0
8	kgp3432386	128106784	T	G	0.050251	0
8	rs73705715	128106791	A	G	0.001253	0
8	rs6983561	128106880	A	C	0.052381	0
8	rs139318670	128106991	A	G	0.000251	0
8	kgp1832940	128107018	A	C	0.007769	0
8	rs16901948	128107101	G	A	0.050251	0
8	rs1869931	128107136	A	G	0.265664	0
8	rs16901949	128107153	A	C	0.050251	0
8	rs60681470	128107192	G	A	0.052256	0
8	rs16901950	128107243	G	A	0.050251	0
8	rs16901952	128107270	T	C	0.050251	0
8	rs58717512	128107381	T	A	0.050251	0
8	kgp10140820	128107613	C	T	0.007393	0
8	rs200238550	128107637	AT	A	0.002506	0
8	rs182475946	128107643	T	A	0.000251	0
8	rs200390960	128107643	T	TA	0.00188	0
8	rs7005144	128107644	T	A	0.050251	0
8	rs59786353	128107682	A	C	0.050251	0
8	rs141915450	128107773	C	G	0.000501	0
8	rs62531071	128108056	T	A	0.265664	0
8	rs113924831	128108060	G	C	0.050251	0
8	rs189077593	128108076	T	C	0.000877	0
8	rs16901953	128108229	T	C	0.050376	0
8	rs146278672	128108324	C	T	0.000627	0
8	rs184239744	128108325	G	A	0.000125	0
8	rs200603190	128108415	G	GT	0.000877	0
8	rs180983743	128108486	C	T	0.002632	0
8	rs61622455	128108516	T	C	0.050376	0
8	rs139449092	128108550	C	T	0.000125	0
8	rs57435694	128108593	T	C	0.050376	0
8	rs7010450	128108679	T	G	0.050376	0
8	rs6990420	128108725	C	T	0.050376	0
8	rs35365584	128108726	G	A	0.310652	0
8	kgp28889278	128108774	T	C	0.000376	0
8	rs6994359	128108923	A	G	0.318672	0
8	rs17832285	128108993	A	G	0.172431	0
8	rs7825340	128109129	A	G	0.204887	0
8	rs116718240	128109172	A	G	0.000501	0
8	rs12544977	128109287	A	G	0.685965	1
8	rs73344342	128109356	G	A	0.050376	0
8	rs80103808	128109431	T	C	0.046867	0

8	rs16901959	128109530	A	G	0.050376	0
8	rs7826337	128109574	G	A	0.318421	0
8	rs73348224	128109659	A	G	0.000501	0
8	rs7826388	128109776	C	T	0.049248	0
8	rs148609495	128109805	T	C	0.000376	0
8	rs7830341	128109930	G	A	0.050376	0
8	kgp20188654	128110187	C	T	0.000251	0
8	rs16901966	128110252	A	G	0.050376	0
8	rs16901967	128110277	A	G	0.050376	0
8	kgp9201401	128110402	A	G	0.007393	0
8	rs141885736	128110439	A	G	0.000376	0
8	kgp5611084	128110488	T	C	0.009649	0
8	rs7000910	128110605	A	T	0.318546	0
8	rs7001069	128110646	A	G	0.050376	0
8	rs114099351	128110665	C	G	0.000627	0
8	rs148316641	128110681	T	C	0.000376	0
8	rs142027152	128110721	G	T	0.000125	0
8	rs182829663	128110746	G	A	0.003258	0
8	kgp12026689	128110814	A	G	0.047995	0
8	rs190091637	128110875	A	G	0.004386	0
8	kgp6672517	128110896	A	G	0.019048	0
8	rs145488349	128110941	G	A	0.008772	0
8	rs11774449	128111032	G	T	0.204261	0
8	rs73348231	128111081	C	T	0.001253	0
8	rs138022229	128111133	G	A	0.001128	0
8	rs111728156	128111167	T	C	0.001253	0
8	rs7006076	128111238	G	A	0.050376	0
8	rs7005862	128111342	A	G	0.052506	0
8	rs7006251	128111343	G	A	0.050376	0
8	rs7006409	128111429	G	A	0.685965	1
8	rs6988257	128111456	T	C	0.050376	0
8	kgp870278	128111470	C	T	0.050627	0
8	rs114996033	128111715	A	T	0.000877	0
8	rs57010632	128111717	A	G	0.052381	0
8	rs190838606	128111786	G	A	0.001754	0
8	rs145109128	128111885	T	C	0.000501	0
8	rs202073575	128112009	TG	T	0.000627	0
8	rs192300694	128112024	T	C	0.002757	0
8	rs16901969	128112097	A	C	0.050376	0
8	rs61442569	128112130	C	T	0.001128	0
8	rs73348241	128112179	T	A	0.050376	0
8	rs73348243	128112193	T	A	0.050376	0
8	rs61265543	128112446	C	T	0.052381	0
8	rs73348247	128112580	A	G	0.001253	0
8	rs16901970	128112715	T	G	0.050376	0
8	rs10453084	128112779	G	A	0.050376	0
8	rs6987723	128112859	G	A	0.050376	0

8	kgp20291724	128112904	G	A	0.000501	0
8	kgp4143475	128112976	G	A	0.023935	0
8	rs115347242	128113025	G	A	0.000251	0
8	rs6987640	128113028	A	T	0.050376	0
8	rs151109347	128113200	C	T	0.000125	0
8	rs150202293	128113262	G	A	0.001003	0
8	rs145698299	128113333	G	T	0.000627	0
8	rs56005245	128113426	C	T	0.22782	0
8	rs74305597	128113464	C	T	0.050376	0
8	kgp4380364	128113697	C	A	0.010276	0
8	rs3956788	128113892	A	C	0.006767	0
8	rs78511380	128114146	T	A	0.082707	0
8	rs7824451	128114461	C	G	0.050376	0
8	rs141330790	128114692	G	C	0.000251	0
8	rs7824785	128114710	C	T	0.050627	0
8	rs13268116	128114796	G	A	0.266291	0
8	rs183186659	128115106	C	G	0.001378	0
8	rs147663636	128115162	TACA	T	0.001253	0
8	rs73348257	128115259	G	A	0.050251	0
8	rs75170735	128115378	A	G	0.046867	0
8	rs193019252	128115468	A	T	0.001754	0
8	rs114697590	128115511	G	A	0.000627	0
8	rs6470498	128115720	A	G	0.050251	0
8	rs1011829	128115743	C	A	0.514536	0
8	rs6999725	128115752	C	T	0.048872	0
8	rs116171948	128116390	A	G	0.000501	0
8	rs28686871	128116480	G	T	0.196491	0
8	rs1456306	128116500	G	A	0.26604	0
8	rs114112019	128116617	C	A	0.000125	0
8	rs13260084	128116830	G	A	0.266416	0
8	rs141023590	128116888	T	C	0.000501	0
8	rs115207770	128116947	G	A	0.000627	0
8	rs57905629	128117151	C	G	0.001253	0
8	kgp509399	128117314	C	T	0.000752	0
8	rs137915695	128117339	G	T	0.000501	0
8	rs60591498	128117504	G	A	0.001128	0
8	rs143368544	128117736	C	T	0.014787	0
8	kgp4757615	128117863	C	T	0.052256	0
8	rs7827234	128118106	T	C	0.318672	0
8	kgp20397658	128118637	A	G	0.000125	0
8	rs73705721	128118812	C	T	0.001253	0
8	rs7844219	128118815	A	G	0.052256	0
8	chr8:128118925:	128118925	G	GT	0.001253	0
8	rs6982324	128119056	G	C	0.050877	0
8	rs190565485	128119215	T	C	0.000627	0
8	rs10098867	128119257	A	G	0.20614	0
8	rs141192401	128119347	C	T	0.000877	0

8	rs150679216	128119350	G	A	0.001128	0
8	rs192962350	128119373	C	T	0.000376	0
8	rs189764742	128119543	A	G	0.000125	0
8	rs56974134	128119665	G	C	0.001128	0
8	rs140266678	128119887	A	AAG	0.052256	0
8	rs139875989	128120090	T	G	0.001253	0
8	rs187359375	128120151	C	T	0.050877	0
8	rs192272500	128120185	T	C	0.000125	0
8	rs34425474	128120234	T	C	0.051378	0
8	rs146380714	128120261	G	A	0.001253	0
8	rs183595981	128120494	T	C	0.001253	0
8	rs7837051	128121849	G	C	0.048872	0
8	rs62531076	128121883	A	G	0.011153	0
8	rs78416342	128122364	T	C	0.000627	0
8	kgp5849686	128122422	G	A	0.050376	0
8	rs80105337	128122507	C	T	0.000752	0
8	kgp10302977	128122659	C	T	0.049373	0
8	rs116067414	128122660	G	T	0.000251	0
8	rs13259145	128122780	A	G	0.365789	1
8	rs138379185	128123369	C	CA	0.001253	0
8	rs6470499	128123394	T	C	0.052256	0
8	rs7842760	128123470	G	A	0.052256	0
8	rs71944294	128123830	C	CA	0.052256	0
8	kgp28902652	128123932	A	G	0.00188	0
8	rs114577106	128123941	G	A	0.000251	0
8	rs16901976	128124084	C	G	0.000251	0
8	rs1551512	128124126	T	G	0.052256	0
8	rs147010714	128124480	A	G	0.000125	0
8	rs184242289	128124851	T	G	0.000251	0
8	exm-rs16901979	128124916	C	A	0.052256	0
8	rs188623643	128125047	G	A	0.000251	0
8	rs10505483	128125195	C	T	0.052381	0
8	rs7817677	128125504	A	G	0.050251	0
8	kgp4929521	128125515	C	T	0.012531	0
8	rs144476044	128125657	A	G	0.000501	0
8	rs190559126	128125658	C	G	0.003383	0
8	rs148352370	128125777	G	A	0.007519	0
8	kgp683723	128125849	A	G	0.267669	0
8	rs190098812	128126221	G	C	0.001378	0
8	rs80222523	128126312	C	T	0.000627	0
8	rs115238595	128126452	A	G	0.000627	0
8	rs115890290	128126731	C	T	0.000251	0
8	rs76797182	128126781	C	T	0.000125	0
8	rs73350135	128126782	G	A	0.001253	0
8	rs73350138	128126798	T	G	0.052381	0
8	rs77295707	128126808	G	T	0.000501	0
8	rs74625407	128126908	C	T	0.04198	0

8	kgp20524675	128127091	T	C	0.000627	0
8	rs1456305	128127252	G	A	0.884461	1
8	rs114938413	128127371	A	G	0.000627	0
8	rs57615522	128127493	A	G	0.001128	0
8	rs60081350	128127558	C	A	0.001253	0
8	rs140490841	128127575	GGTTT	G	0.051003	0
8	rs192302396	128127579	T	G	0.000877	0
8	rs58861013	128127804	G	T	0.001128	0
8	rs72154702	128127819	A	AC	0.052381	0
8	rs77080430	128128291	C	G	0.000251	0
8	rs17184796	128128459	G	T	0.36792	1
8	rs73705722	128128475	A	G	0.001128	0
8	rs12678505	128128506	C	T	0.050376	0
8	rs147609435	128128808	C	G	0.000251	0
8	rs189236752	128129021	G	A	0.002882	0
8	rs142719440	128129026	G	GTAA	0.000752	0
8	rs16901983	128129042	G	T	0.019048	0
8	rs73350143	128129250	G	C	0.001253	0
8	rs73350145	128129269	G	A	0.001253	0
8	rs140047721	128129312	C	G	0.009273	0
8	rs73350150	128129345	C	A	0.001253	0
8	kgp7883414	128129372	T	C	0.052381	0
8	kgp498004	128129470	C	T	0.999749	1
8	kgp20478808	128129475	G	T	0.000251	0
8	rs150329920	128129571	G	A	0.000501	0
8	rs78888127	128129587	T	C	0.000251	0
8	rs181692082	128129630	G	A	0.002506	0
8	rs114567577	128129808	C	T	0.000125	0
8	rs149479434	128129826	A	G	0.000752	0
8	rs145825537	128129968	A	G	0.000125	0
8	rs149437660	128129985	G	GAATC	0.052381	0
8	rs190343889	128130064	C	T	0.002632	0
8	rs71520631	128130142	C	T	0.000752	0
8	rs76057855	128130281	C	G	0.000627	0
8	rs143099984	128130351	C	T	0.000376	0
8	rs7013255	128130487	A	G	0.052381	0
8	rs60407771	128130590	A	G	0.000752	0
8	rs150855038	128130647	C	G	0.072055	0
8	rs117690356	128130714	C	T	0.074311	0
8	kgp28574592	128130766	C	T	0.005764	0
8	rs16901984	128130961	T	C	0.050376	0
8	rs191030680	128131262	G	T	0.001003	0
8	rs145446276	128131719	A	G	0.000125	0
8	rs10098156	128131791	C	G	0.885088	1
8	rs116041037	128131809	G	A	0.000627	0
8	rs73350157	128131910	G	T	0.001253	0
8	kgp9983635	128131916	C	T	0.037469	0

8	rs78312458	128132049	A	G	0.000125	0
8	rs140464200	128132116	G	A	0.002757	0
8	rs114159578	128132160	C	T	0.001378	0
8	rs116427573	128132161	A	G	0.003634	0
8	kgp6348096	128132324	A	G	0.267669	0
8	rs79546618	128132447	G	A	0.000125	0
8	rs73350160	128132689	A	C	0.001253	0
8	rs181530208	128132859	G	C	0.000877	0
8	kgp20237972	128132880	A	G	0.003634	0
8	rs114601078	128132904	C	G	0.000251	0
8	rs7000307	128133076	A	G	0.003634	0
8	rs77525956	128133126	G	A	0.001003	0
8	rs144661681	128133247	G	A	0.000627	0
8	rs76589586	128133886	T	C	0.001504	0
8	kgp11632834	128133909	T	G	0.018421	0
8	rs16901985	128133977	T	A	0.022055	0
8	rs73350165	128134049	A	G	0.001378	0
8	rs34720002	128134117	C	T	0.265664	0
8	rs142906123	128134319	A	G	0.000501	0
8	rs185343692	128134360	A	G	0.000125	0
8	rs116075424	128134375	G	A	0.000627	0
8	rs183457026	128134439	A	G	0.000251	0
8	rs79032495	128134570	C	T	0.000125	0
8	kgp8059254	128134683	T	C	0.014912	0
8	rs138925762	128134734	A	G	0.000627	0
8	rs79815134	128135190	C	T	0.000627	0
8	rs7840773	128135334	G	T	0.003634	0
8	rs7824364	128135365	T	C	0.003634	0
8	kgp2127375	128135560	T	C	0.073183	0
8	rs80094171	128135569	T	G	0.003634	0
8	rs79826465	128135593	C	G	0.015915	0
8	rs143919265	128136318	G	C	0.000251	0
8	rs147260239	128136322	T	G	0.000251	0
8	rs58405015	128136566	C	G	0.001378	0
8	rs116638944	128136694	C	G	0.001128	0
8	rs73350173	128136728	C	G	0.003634	0
8	rs79848460	128136746	C	T	0.001504	0
8	rs74376318	128137318	G	C	0.001504	0
8	rs114111380	128137544	C	T	0.000752	0
8	rs114713022	128137585	G	A	0.000125	0
8	rs7816535	128137668	G	A	0.196742	0
8	kgp28669921	128137700	T	C	0.01604	0
8	rs144912976	128138134	G	C	0.000627	0
8	kgp12105139	128138163	A	G	0.011905	0
8	kgp28671076	128138216	T	C	0.011153	0
8	rs77209506	128138257	C	T	0.047494	0
8	rs141357518	128138346	A	G	0.000376	0

8	rs16901988	128138560	T	C	0.001378	0
8	kgp3141672	128138703	G	A	0.040727	0
8	rs7821533	128138757	G	A	0.000125	0
8	rs7821299	128138781	C	T	0.000125	0
8	rs148350314	128139116	T	C	0.000251	0
8	rs114502542	128139855	C	T	0.001754	0
8	rs57877647	128140167	G	T	0.001504	0
8	rs191647937	128140448	G	A	0.003008	0
8	rs75949840	128140484	G	C	0.045614	0
8	rs139179471	128140719	C	A	0.006266	0
8	rs78689287	128140839	A	G	0.000125	0
8	rs142698271	128141645	C	G	0.000125	0
8	rs115342523	128141674	A	C	0.000627	0
8	rs116040182	128142007	A	G	0.000627	0
8	rs73350179	128142041	C	G	0.001504	0
8	rs73350182	128142048	T	A	0.003634	0
8	rs79229630	128142078	G	C	0.000125	0
8	rs150575875	128142339	T	A	0.000125	0
8	rs73350185	128142356	A	G	0.001504	0
8	rs117550530	128142360	T	C	0.000125	0
8	kgp1784502	128142400	C	T	0.040727	0
8	rs59825493	128142502	T	A	0.003509	0
8	rs143128811	128142786	T	G	0.000501	0
8	rs188590633	128143248	C	T	0.000125	0
8	rs146660330	128143759	G	C	0.000752	0
8	rs183745862	128143776	G	T	0.002882	0
8	rs113872918	128143892	G	A	0.003634	0
8	rs189289981	128143917	G	A	0.003008	0
8	rs12335235	128144114	G	T	0.583208	0
8	rs149902757	128144381	A	G	0.000125	0
8	rs145818225	128144418	G	A	0.000125	0
8	rs115149335	128144491	G	C	0.002256	0
8	rs114151985	128144803	T	A	0.000125	0
8	rs2124596	128145170	G	A	0.954762	1
8	rs2124595	128145235	G	T	0.954762	1
8	rs68171617	128145257	T	C	0.370175	1
8	rs116183034	128145316	A	G	0.001128	0
8	rs73352255	128145412	T	C	0.003634	0
8	rs115779814	128145611	G	A	0.001253	0
8	rs10111496	128145817	A	C	0.254637	0
8	rs73352256	128145910	G	A	0.001504	0
8	rs146427333	128146070	T	A	0.000251	0
8	rs141489233	128146198	T	C	0.001003	0
8	rs55768310	128146276	G	GTTA	0.96203	1
8	rs10101884	128146308	T	G	0.584586	0
8	rs58460881	128146352	C	T	0.002757	0
8	rs114471276	128146476	G	A	0.000501	0

8	kgp451283	128146598	G	A	0.961153	1
8	rs191809517	128146855	C	A	0.011529	0
8	rs184690325	128146864	C	G	0.017544	0
8	rs138035342	128146894	G	A	0.026692	0
8	rs149502620	128147022	G	A	0.000627	0
8	rs80317438	128147111	T	C	0.049875	1
8	rs112631776	128147113	G	A	0.001003	0
8	rs139989037	128147221	C	T	0.000251	0
8	rs185837306	128147416	G	A	0.000376	0
8	rs114937331	128147606	T	C	0.000251	0
8	rs181261500	128147853	A	G	0.000125	0
8	rs146195284	128147866	A	G	0.000125	0
8	rs150950358	128148124	C	T	0.000125	0
8	kgp11822588	128148610	C	T	0.050251	1
8	kgp20233035	128148656	A	G	0.001253	0
8	rs76984647	128148659	C	T	0.002005	0
8	rs76588179	128149101	G	T	0.002005	0
8	kgp4818018	128149517	C	T	0.32193	0
8	rs114303996	128149608	C	G	0.000752	0
8	rs143720358	128149827	G	A	0.000125	0
8	rs6987409	128150161	C	T	0.002005	0
8	rs79031580	128150280	C	T	0.002005	0
8	rs144805473	128150513	C	A	0.006516	0
8	rs77711360	128150623	G	A	0.002005	0
8	rs17446747	128150652	T	C	0.378195	1
8	rs76541294	128150812	C	T	0.002005	0
8	rs200825818	128150864	GT	G	0.000627	0
8	rs192542237	128150983	G	T	0.001629	0
8	rs184535719	128150984	G	T	0.001629	0
8	rs141862463	128151027	T	C	0.002005	0
8	rs78267828	128151572	G	A	0.002005	0
8	rs78552069	128151574	T	G	0.002005	0
8	rs114978596	128151611	G	A	0.002005	0
8	rs77262728	128151666	A	G	0.002005	0
8	rs17446776	128151672	C	G	0.025564	0
8	rs186470261	128151739	G	A	0.002005	0
8	rs139051801	128151872	G	T	0.000376	0
8	rs116494274	128152022	T	G	0.002005	0
8	rs149449146	128152046	T	C	0.001003	0
8	rs143866345	128152132	T	C	0.002005	0
8	chr8:128152183:1	128152183	TAA	T	0.002005	0
8	chr8:128152184:	128152184	A	ATATATTT	0.001754	0
8	rs201590551	128152192	T	TTATATA	0.001378	0
8	rs77526477	128152377	G	A	0.002005	0
8	rs75499150	128152482	T	G	0.002005	0
8	rs115726686	128152600	G	C	0.001253	0
8	rs77757034	128152652	C	G	0.002005	0

8	rs76477459	128152717	A	G	0.002005	0
8	kgp20209140	128152869	G	A	0.001253	0
8	rs76710266	128153004	G	A	0.002005	0
8	rs78504346	128153026	C	T	0.002005	0
8	rs116576283	128153090	T	C	0.002005	0
8	rs80095353	128153143	G	A	0.002005	0
8	rs139922671	128153155	A	ACT	0.002005	0
8	rs149063751	128153227	AT	A	0.046867	0
8	rs116481965	128153296	G	C	0.001253	0
8	rs189657310	128153297	G	T	0.001629	0
8	kgp10540377	128153320	T	C	0.050376	1
8	rs77651557	128153358	C	T	0.002005	0
8	rs140877535	128153452	A	C	0.000251	0
8	rs76551862	128153465	C	T	0.001003	0
8	rs76774156	128153533	G	C	0.002005	0
8	rs73705724	128153556	G	A	0.002005	0
8	rs78868267	128153621	C	A	0.002005	0
8	rs80002533	128153662	C	T	0.002005	0
8	rs201965154	128153727	C	CT	0.135714	0
8	kgp11800676	128153805	C	T	0.136717	0
8	rs7017820	128153873	A	G	0.000752	0
8	rs7018238	128153881	G	A	0.002005	0
8	rs7018243	128153891	G	A	0.002005	0
8	rs145873481	128154152	TG	T	0.002005	0
8	rs78974498	128154373	C	T	0.001253	0
8	rs77365928	128154400	G	A	0.000125	0
8	rs75540569	128154490	A	T	0.002005	0
8	rs77043583	128154509	T	C	0.002005	0
8	rs150411791	128154517	T	C	0.000501	0
8	rs78166514	128154535	C	T	0.002005	0
8	rs79848565	128154581	T	C	0.002005	0
8	rs74373229	128154748	C	G	0.002005	0
8	rs76028786	128154943	G	A	0.002005	0
8	rs60560825	128155002	T	C	0.003383	0
8	kgp20608206	128155010	G	A	0.000877	0
8	rs76051982	128155096	A	G	0.002005	0
8	rs74849703	128155104	C	T	0.002005	0
8	rs78304420	128155217	G	A	0.002005	0
8	rs80125247	128155239	C	A	0.002005	0
8	rs192900426	128155258	G	A	0.000376	0
8	rs74772005	128155583	G	T	0.002005	0
8	rs2466040	128155664	T	G	0.231328	0
8	rs148070160	128155694	T	C	0.000752	0
8	rs76610501	128155957	T	C	0.002005	0
8	rs80335924	128156582	C	A	0.000627	0
8	rs7822987	128156663	G	C	0.002005	0
8	rs7822995	128156688	G	A	0.002005	0

8	rs73705729	128156782	G	A	0.002005	0
8	rs115562065	128156799	C	T	0.000501	0
8	rs144777255	128156800	G	A	0.011278	0
8	rs114578686	128156849	C	T	0.000251	0
8	rs76864653	128156885	G	T	0.002005	0
8	rs116163586	128157097	C	T	0.001128	0
8	rs77567702	128157274	C	A	0.002005	0
8	rs56138850	128157375	A	C	0.000125	0
8	rs189827118	128157533	C	T	0.003759	0
8	rs76470748	128158157	G	A	0.002005	0
8	rs73705732	128158160	A	G	0.000125	0
8	rs143788032	128158208	G	GT	0.076942	0
8	kgp20113143	128158252	C	A	0.001253	0
8	rs2516280	128158455	C	A	0.961028	1
8	rs146806683	128158503	A	G	0.000125	0
8	rs115894212	128158511	G	A	0.000627	0
8	rs140601347	128158601	T	C	0.000501	0
8	rs150238719	128158659	CT	C	0.001253	0
8	rs73705733	128158766	A	G	0.000125	0
8	rs76927191	128158835	C	T	0.046867	0
8	rs187018917	128159084	A	T	0.002882	0
8	rs77509923	128159232	A	G	0.000125	0
8	rs73352268	128159326	C	T	0.003383	0
8	rs3100857	128159432	T	C	0.398747	0
8	rs191386901	128159436	T	C	0.002506	0
8	rs182184789	128159440	T	C	0.001629	0
8	rs187907086	128159529	G	A	0.001253	0
8	rs143680494	128159857	CTAT	C	0.000627	0
8	kgp9248011	128160055	G	A	0.192857	0
8	rs55934446	128160174	T	C	0.002005	0
8	rs147382088	128160202	T	A	0.000376	0
8	rs116057702	128160431	A	C	0.000752	0
8	kgp1913700	128160801	C	T	0.018421	0
8	rs150890460	128160808	G	A	0.000125	0
8	rs111754493	128161058	T	C	0.000251	0
8	rs115608784	128161124	A	G	0.001003	0
8	rs116145447	128161152	G	A	0.001003	0
8	rs79721800	128161225	G	A	0.002005	0
8	rs60046410	128161469	G	A	0.001378	0
8	rs189023075	128161509	T	C	0.002005	0
8	rs2392724	128161536	C	T	0.521429	0
8	rs57638440	128161605	G	A	0.001378	0
8	rs36021065	128161611	C	A	0.02995	0
8	rs2392725	128161628	C	T	0.519549	0
8	rs142867847	128161629	G	A	0.007644	0
8	rs2893602	128161653	C	T	0.13609	0
8	rs58642622	128161670	ACT	A	0.433333	1

8	rs199728442	128161673	CTG	C	0.432581	1
8	rs115705407	128161740	G	A	0.000627	0
8	rs2445605	128161944	T	C	0.958897	1
8	rs150171972	128162016	G	T	0.000125	0
8	kgp1944129	128162025	C	T	0.017794	0
8	kgp12452367	128162026	G	A	0.014411	0
8	rs143057604	128162272	T	A	0.000251	0
8	rs76636367	128162547	G	C	0.002005	0
8	kgp20122333	128162574	T	C	0.000752	0
8	kgp10004022	128162720	C	T	0.014912	0
8	rs17446916	128162974	C	T	0.433333	1
8	kgp28942228	128163174	A	G	0.001629	0
8	rs188716223	128163204	T	C	0.003133	0
8	rs116238651	128163526	C	T	0.000251	0
8	kgp20291991	128163570	T	C	0.000501	0
8	rs3037747	128163649	G	GCA	0.957644	1
8	kgp1394077	128163803	G	A	0.016541	0
8	rs79215232	128164243	A	G	0.000125	0
8	rs78329357	128164695	C	T	0.000125	0
8	kgp28781054	128164844	A	G	0.005639	0
8	kgp9285398	128165076	T	C	0.001003	0
8	kgp20413984	128165558	T	C	0.001003	0
8	rs114983938	128165677	C	T	0.001003	0
8	rs181263489	128165729	T	C	0.005639	0
8	rs13275200	128166556	G	A	0.43208	1
8	rs75640309	128166710	C	T	0.001629	0
8	kgp3121234	128167147	A	G	0.046992	0
8	rs142258029	128167343	A	T	0.000501	0
8	rs146380832	128167551	G	A	0.000627	0
8	rs201883080	128167659	GCTAA	G	0.010777	0
8	rs114682375	128167828	A	G	0.000251	0
8	rs149797428	128168596	A	G	0.002882	0
8	rs62531085	128168627	C	T	0.014787	0
8	rs117032061	128168628	G	A	0.000251	0
8	rs147834391	128168980	G	A	0.02807	0
8	rs199883565	128169215	G	GA	0.000125	0
8	rs145298679	128169266	C	G	0.000125	0
8	rs116146766	128169317	C	T	0.045614	0
8	rs115294184	128169322	C	T	0.045614	0
8	rs116719898	128169327	C	T	0.000752	0
8	rs13269873	128169609	G	A	0.000627	0
8	rs181484758	128169623	C	G	0.001128	0
8	rs10111439	128169857	A	G	0.000627	0
8	rs151142881	128170146	G	A	0.000752	0
8	kgp11561458	128170250	C	T	0.052381	0
8	rs75914071	128170350	T	C	0.000125	0
8	rs140239022	128170424	A	G	0.000251	0

8	rs16901996	128170524	T	G	0.001754	0
8	rs73705739	128170559	T	C	0.000125	0
8	rs114296334	128170563	G	T	0.000125	0
8	rs74720733	128170668	G	T	0.000125	0
8	rs113349229	128170815	G	A	0.000376	0
8	rs1378900	128171018	T	C	0.9599	1
8	kgp20362410	128171372	C	T	0.000251	0
8	rs73352276	128171703	C	T	0.000251	0
8	rs7006636	128171790	G	A	0.33183	0
8	rs35636249	128172005	T	G	0.000501	0
8	rs7002343	128172028	T	C	0.345363	0
8	rs73705740	128172072	T	G	0.021679	0
8	rs116952717	128172155	T	A	0.000125	0
8	rs183064432	128172209	G	A	0.000376	0
8	rs76353652	128172372	A	C	0.000376	0
8	rs11994992	128172382	G	A	0.012782	0
8	rs147470989	128172474	A	C	0.002632	0
8	rs114149921	128172526	G	A	0.000125	0
8	rs145263367	128172574	C	G	0.000251	0
8	rs80335375	128172653	C	G	0.002005	0
8	rs2124600	128172686	T	C	0.35614	0
8	kgp6770865	128172764	C	T	0.008647	0
8	rs192288756	128172790	C	T	0.000251	0
8	rs78586469	128173110	G	A	0.000251	0
8	kgp20269534	128173149	A	G	0.001128	0
8	rs60552231	128173201	G	A	0.011529	0
8	rs149743515	128173206	G	A	0.004261	0
8	rs117678645	128173272	A	G	0.007018	0
8	rs115289505	128173716	T	C	0.000627	0
8	rs114037353	128173773	G	T	0.001253	0
8	kgp8843744	128173932	A	G	0.021805	0
8	kgp10204582	128174295	G	T	0.19812	1
8	kgp9380476	128174699	A	C	0.011654	0
8	rs72725897	128174810	G	A	0.318045	0
8	rs55837417	128174939	A	T	0.011654	0
8	rs180830668	128175078	A	G	0.000877	0
8	kgp3161023	128175199	G	T	0.008145	0
8	kgp2573404	128175538	C	T	0.101378	1
8	kgp461730	128175696	G	A	0.662531	0
8	rs16902001	128175867	A	G	0.002882	0
8	rs74931384	128175917	C	A	0.000125	0
8	rs59180736	128176054	G	C	0.011654	0
8	kgp20620307	128176151	C	T	0.000501	0
8	rs138723226	128176393	G	A	0.000125	0
8	rs34392502	128176477	C	T	0.000251	0
8	rs76797740	128176513	C	G	0.000627	0
8	rs114767037	128176597	C	A	0.000125	0

8	rs74927314	128176753	T	A	0.000251	0
8	rs35626935	128176772	C	T	0.000251	0
8	rs35560924	128176793	G	T	0.000251	0
8	rs76784613	128176963	A	G	0.000752	0
8	rs1456311	128177298	G	T	0.663784	0
8	rs28396952	128177392	G	A	0.000501	0
8	rs111650540	128177520	C	G	0.001754	0
8	rs148654310	128177680	C	T	0.001253	0
8	rs113687860	128177717	T	C	0.001128	0
8	rs200763513	128177717	TTC	T	0.280576	0
8	rs199656064	128177730	TCTC	T	0.003133	0
8	rs200609769	128177735	CTTTTTTTT	C	0.012531	0
8	rs142223582	128177771	C	T	0.000376	0
8	rs111282431	128177808	G	C	0.010777	0
8	rs139046764	128177812	G	A	0.016541	0
8	rs186948306	128177867	G	A	0.02782	0
8	rs189821298	128177881	T	C	0.000376	0
8	rs182196803	128177909	C	T	0.001253	0
8	rs66759748	128177923	A	AT	0.400376	0
8	rs1186405	128177933	G	C	0.400627	0
8	rs146415591	128178006	C	T	0.000877	0
8	kgp6027914	128178291	G	A	0.078947	0
8	rs77646139	128178330	T	A	0.000627	0
8	rs139890247	128178411	C	T	0.000627	0
8	rs143258416	128178449	A	C	0.000125	0
8	rs116174955	128178521	C	G	0.000376	0
8	rs2445606	128178647	T	C	0.402005	0
8	rs145357444	128178665	C	T	0.000251	0
8	rs10481166	128178685	G	A	0.399624	0
8	rs149178961	128178711	A	G	0.00589	0
8	rs73335511	128179268	T	C	0.001003	0
8	rs6981995	128179304	A	G	0.001128	0
8	rs181007781	128179383	C	T	0.000125	0
8	rs79181303	128179578	G	C	0.018672	0
8	rs2445607	128179631	G	A	0.401003	0
8	rs2456456	128179876	A	G	0.666792	0
8	rs1605260	128180133	T	C	0.000251	0
8	rs116494606	128180138	C	T	0.000251	0
8	rs138603869	128180178	T	G	0.000251	0
8	rs71520634	128180444	G	A	0.016291	0
8	rs116087835	128180580	T	C	0.000251	0
8	rs36118672	128180872	GC	G	0.396241	0
8	rs2456457	128180908	T	A	0.395363	0
8	rs76982760	128180943	G	C	0.000376	0
8	rs185654871	128181086	C	T	0.000125	0
8	rs35112273	128181139	G	A	0.000251	0
8	rs145951075	128181296	C	A	0.000251	0

8	rs2445608	128181302	G	A	0.394862	0
8	kgp5322993	128181435	A	G	0.255639	0
8	kgp7562221	128181479	T	C	0.396115	0
8	kgp20219251	128181694	T	C	0.01203	0
8	rs13266271	128181807	C	T	0.099749	1
8	kgp11486107	128181903	T	G	0.398747	0
8	rs16902002	128182083	C	G	0.00401	0
8	rs2456461	128182451	A	G	0.398496	0
8	kgp8291078	128182520	G	A	0.020677	0
8	rs13439599	128182763	C	T	0.016667	0
8	rs76865301	128182793	G	A	0.044987	0
8	rs114930320	128182835	T	A	0.000251	0
8	rs117313401	128182885	T	A	0.010025	0
8	rs78067194	128183005	T	C	0.000251	0
8	rs73705744	128183077	G	T	0.001378	0
8	rs111705620	128183112	T	C	0.001754	0
8	rs2466021	128183187	C	G	0.383333	0
8	rs34691155	128183214	A	G	0.000251	0
8	kgp20573775	128183225	C	T	0.000627	0
8	rs192964814	128183583	A	G	0.000877	0
8	rs111365649	128183598	A	G	0.001754	0
8	rs111806098	128183641	G	A	0.016667	0
8	rs2466022	128183646	T	A	0.382206	0
8	rs114981698	128183692	G	A	0.000125	0
8	rs148333139	128183771	G	A	0.005013	0
8	rs187375437	128183778	G	A	0.000251	0
8	rs191785584	128183871	A	G	0.037719	0
8	rs112086682	128183879	G	A	0.001754	0
8	rs2034859	128183918	T	C	0.854511	1
8	rs113183806	128184017	T	C	0.005263	0
8	rs13262596	128184035	C	T	0.000251	0
8	rs139604316	128184079	CAT	C	0.001754	0
8	rs79876094	128184117	G	A	0.001754	0
8	rs74523657	128184139	G	C	0.000376	0
8	rs142671530	128184176	T	C	0.000125	0
8	kgp20614873	128184258	C	T	0.00188	0
8	rs13263238	128184295	C	T	0.003634	0
8	rs116787464	128184364	A	G	0.000251	0
8	rs117962197	128184457	T	C	0.000251	0
8	rs71520635	128184700	A	G	0.000251	0
8	rs114167865	128184817	T	C	0.001754	0
8	rs61056137	128184979	G	A	0.001128	0
8	rs76524631	128185091	C	T	0.001754	0
8	rs1551509	128185142	G	T	0.000125	0
8	rs74447060	128185152	G	C	0.001754	0
8	rs60955457	128185548	G	A	0.000752	0
8	kgp20191311	128185641	T	C	0.000125	0

8	rs79666923	128185734	C	A	0.001754	0
8	rs139280292	128185837	TACAC	T	0.381328	0
8	rs74771179	128185865	G	T	0.001754	0
8	rs78248265	128185886	T	G	0.001754	0
8	rs111521532	128185998	G	T	0.001754	0
8	rs200650202	128186005	AG	A	0.000251	0
8	rs114715051	128186015	G	C	0.001754	0
8	kgp20165970	128186020	T	C	0.00188	0
8	rs76534506	128186357	A	G	0.001754	0
8	kgp20188062	128186421	A	G	0.00188	0
8	kgp11693324	128186437	C	T	0.004261	0
8	rs115705053	128186560	A	G	0.000251	0
8	kgp20143191	128186569	A	G	0.00188	0
8	rs114712190	128186617	A	C	0.001754	0
8	rs76922981	128186838	C	T	0.001754	0
8	rs77462299	128186941	T	C	0.001754	0
8	rs28557055	128187046	G	C	0.001128	0
8	rs74346166	128187051	G	A	0.000251	0
8	rs111599679	128187054	G	GA	0.001754	0
8	rs192319070	128187076	C	T	0.001128	0
8	rs62531100	128187172	T	C	0.016291	0
8	rs113230055	128187218	C	A	0.001754	0
8	rs73705746	128187232	G	C	0.001378	0
8	rs111945483	128187310	C	T	0.001754	0
8	rs115892957	128187434	A	G	0.000125	0
8	rs113300371	128187501	CCA	C	0.001629	0
8	rs71303487	128187579	A	ACACACATA	0.393734	0
8	rs112931223	128187642	C	G	0.001754	0
8	rs80181041	128187662	C	G	0.002005	0
8	rs61622813	128187704	A	T	0.001378	0
8	rs13258906	128187712	A	G	0.000251	0
8	kgp20129366	128187736	G	A	0.00188	0
8	rs10282925	128187993	G	C	0.001128	0
8	rs2466024	128188019	G	A	0.397995	0
8	rs16902003	128188055	T	C	0.001378	0
8	rs73705747	128188096	T	C	0.011905	0
8	rs16902004	128188100	T	A	0.000125	0
8	rs80214879	128188104	C	T	0.001253	0
8	rs2456447	128188198	C	G	0.397995	0
8	rs79841772	128188846	C	T	0.001754	0
8	rs114203625	128188905	G	A	0.001754	0
8	rs140102190	128189145	G	C	0.008897	0
8	rs78260731	128189289	T	A	0.000501	0
8	rs2466025	128189374	C	G	0.382206	0
8	kgp28814597	128189510	T	C	0.016416	0
8	kgp20586929	128189610	T	C	0.000501	0
8	rs79195649	128190255	G	A	0.001504	0

8	rs79659537	128190323	A	T	0.000376	0
8	rs78276389	128190358	G	A	0.044361	0
8	rs113759668	128190493	T	C	0.001504	0
8	rs113936308	128190795	T	G	0.001504	0
8	rs113242945	128191188	T	C	0.001504	0
8	rs76168340	128191237	A	G	0.001378	0
8	kgp5483864	128191320	A	G	0.010401	0
8	rs113795393	128191332	G	A	0.001378	0
8	rs13265475	128191580	T	A	0.000251	0
8	rs183028423	128191648	T	C	0.008897	0
8	rs188140481	128191672	T	A	0.015789	1
8	rs192932167	128191706	T	C	0.000501	0
8	kgp20572603	128191778	C	T	0.000752	0
8	rs2456448	128191795	G	A	0.654887	0
8	rs147310619	128191808	G	A	0.000501	0
8	rs78241450	128191809	T	G	0.000251	0
8	kgp28763301	128192152	A	C	0.009524	0
8	rs146603993	128192331	C	CA	0.001128	0
8	rs72728012	128192647	C	T	0.246742	0
8	rs187959147	128192651	C	T	0.007393	0
8	rs113230300	128192676	G	A	0.000125	0
8	rs112562708	128192717	G	A	0.000376	0
8	rs2466026	128192817	A	G	0.586717	0
8	rs146726331	128192892	G	A	0.000627	0
8	rs140267348	128192905	G	A	0.000877	0
8	exm-rs2456449	128192981	A	G	0.341729	0
8	kgp11814436	128193052	C	G	0.25802	0
8	rs79655367	128193217	A	T	0.046115	0
8	rs115711114	128193263	C	T	0.000501	0
8	rs114081146	128193272	G	A	0.000251	0
8	rs149105384	128193288	G	T	0.000251	0
8	rs897586	128193294	G	A	0.342105	0
8	kgp12177089	128193303	G	A	0.105263	1
8	rs73335523	128193341	G	A	0.011654	0
8	rs1964690	128193606	C	G	0.387845	0
8	kgp6828358	128193658	A	G	0.045363	0
8	rs145819569	128193741	G	A	0.000376	0
8	rs185258295	128193770	A	C	0.001629	0
8	kgp295862	128193841	C	T	0.013158	0
8	rs79970709	128193898	C	G	0.000501	0
8	rs60340240	128194118	T	C	0.001504	0
8	rs35972752	128194169	G	A	0.000251	0
8	rs115316824	128194229	T	G	0.000627	0
8	kgp28576019	128194230	C	A	0.007393	0
8	rs16902006	128194327	G	T	0.000376	0
8	rs34848318	128194456	C	T	0.000251	0
8	rs150873949	128194471	C	T	0.000125	0

8	rs1456304	128194694	A	T	0.046241	0
8	rs139999773	128194699	C	T	0.000251	0
8	rs181467736	128194714	T	C	0.000752	0
8	rs115563653	128194755	T	A	0.000627	0
8	kgp9986309	128195064	A	G	0.048997	0
8	rs2124594	128195259	T	C	0.335464	0
8	rs200390208	128195284	GA	G	0.001378	0
8	rs140099016	128195334	T	C	0.320551	0
8	rs149782417	128195335	G	A	0.320426	0
8	rs2392738	128195337	C	T	0.320426	0
8	rs147772813	128195726	T	G	0.011654	0
8	rs2456450	128196360	A	G	0.355388	0
8	rs143789596	128196473	G	A	0.004135	0
8	rs117388394	128196508	A	G	0.00188	0
8	rs143062437	128196509	C	T	0.001003	0
8	rs112564161	128196595	C	G	0.001128	0
8	rs138821012	128196614	C	T	0.000627	0
8	rs2456451	128196627	G	A	0.339474	0
8	rs187927405	128196645	A	T	0.000125	0
8	rs202048203	128196674	AAAAAT	A	0.046241	0
8	rs116023438	128196976	A	C	0.000627	0
8	rs2456452	128197080	A	G	0.650501	0
8	rs2445610	128197088	A	G	0.354887	0
8	rs16902008	128197295	T	G	0.046366	0
8	rs150818314	128197348	T	C	0.000376	0
8	rs143641428	128197361	AG	A	0.000501	0
8	rs75733747	128197431	C	T	0.003008	0
8	rs150007938	128197537	G	T	0.000125	0
8	rs73350017	128197540	A	G	0.044486	0
8	rs200872649	128197710	C	CAGTG	0.01792	0
8	rs140459423	128197737	A	G	0.000251	0
8	rs2445611	128197819	A	G	0.549499	0
8	rs2445612	128197856	T	C	0.42594	0
8	rs58329648	128198084	C	T	0.000125	0
8	rs116722593	128198147	C	T	0.000627	0
8	rs13279336	128198257	C	G	0.010652	0
8	rs181028990	128198378	G	T	0.000125	0
8	rs150482926	128198502	AAAAG	A	0.010777	0
8	kgp11697583	128198564	C	T	0.07807	0
8	kgp4971184	128198798	G	A	0.054637	0
8	rs57158859	128198832	G	A	0.000251	0
8	kgp11941633	128199026	T	G	0.013283	0
8	rs78484737	128199056	T	A	0.000125	0
8	rs59744910	128199247	CAT	C	0.002256	0
8	kgp28967395	128199285	C	T	0.004762	0
8	rs75761479	128199459	A	G	0.000125	0
8	rs145099654	128199578	T	A	0.000877	0

8	rs146121162	128199753	AG	A	0.096241	0
8	rs1020700	128200052	A	T	0.284085	0
8	rs73350022	128200106	C	T	0.010401	0
8	rs73350024	128200193	T	C	0.010401	0
8	rs73350025	128200518	G	A	0.010401	0
8	rs2466028	128200556	T	C	0.375564	0
8	rs115256765	128200916	A	G	0.000376	0
8	rs150634304	128200948	C	T	0.000251	0
8	kgp8407640	128200955	A	G	0.004637	0
8	rs2466029	128200971	C	G	0.375313	0
8	rs147399323	128201157	G	A	0.000376	0
8	rs71520637	128201190	C	T	0.000752	0
8	rs28555160	128201251	A	G	0.003885	0
8	rs2456453	128201359	C	T	0.361529	0
8	rs149955093	128201388	C	T	0.000376	0
8	rs188681405	128201423	T	A	0.000125	0
8	rs193199840	128201783	A	C	0.002506	0
8	rs34480705	128201953	C	G	0.000752	0
8	rs62531102	128202356	T	G	0.026817	0
8	rs138956333	128202421	T	C	0.000627	0
8	rs74960914	128202473	C	T	0.026817	0
8	rs80240466	128202708	T	C	0.001378	0
8	rs28446612	128202825	G	A	0.004637	0
8	rs143864301	128202986	AAAAAT	A	0.000501	0
8	rs201245619	128203022	C	CTT	0.39411	0
8	rs201871494	128203025	T	TCG	0.39411	0
8	kgp6560645	128203117	C	A	0.036591	0
8	kgp5668462	128203325	G	A	0.003509	0
8	rs143230367	128203389	C	T	0.000501	0
8	rs62531103	128203425	G	A	0.026817	0
8	kgp3535266	128203672	A	G	0.007143	0
8	rs113246033	128203779	A	G	0.000376	0
8	rs143107310	128203856	C	T	0.000501	0
8	rs1021954	128203857	A	G	0.380075	0
8	kgp4312143	128203859	T	A	0.113409	1
8	kgp6786979	128203973	A	G	0.380075	0
8	kgp11102583	128204036	T	C	0.005764	0
8	rs16902019	128204060	T	G	0.072682	0
8	rs1473581	128204216	C	T	0.302005	0
8	kgp10433231	128204230	G	A	0.018045	0
8	rs78886044	128204252	G	A	0.000125	0
8	rs10216368	128204395	C	A	0.001253	0
8	rs185395979	128204460	T	G	0.001504	0
8	rs76862233	128204461	G	T	0.030702	0
8	rs10216379	128204484	G	T	0.023183	0
8	rs182554890	128204604	T	A	0.001003	0
8	rs187640640	128204642	C	A	0.001003	0

8	rs191991270	128204678	T	A	0.010025	0
8	rs139616075	128206325	G	A	0.001253	0
8	rs9720564	128206369	C	G	0.02594	0
8	rs9721234	128206385	T	G	0.02594	0
8	rs192041861	128206415	A	G	0.001253	0
8	rs141798929	128206432	A	T	0.000376	0
8	rs182774308	128206445	T	C	0.001003	0
8	rs2456454	128206623	T	G	0.40401	0
8	rs149673464	128206702	T	G	0.003759	0
8	rs73350039	128206932	A	T	0.030702	0
8	kgp619520	128207099	C	T	0.030702	0
8	rs2466030	128207138	T	C	0.301378	0
8	rs148974531	128207194	A	G	0.000501	0
8	rs116302466	128207306	A	T	0.000125	0
8	rs149178218	128207437	AT	A	0.000125	0
8	kgp20355952	128207466	G	A	0.001378	0
8	kgp20185840	128207650	A	G	0.002381	0
8	rs189565078	128207832	G	A	0.00589	0
8	rs6651241	128207871	C	T	0.002381	0
8	rs71520643	128207977	C	T	0.000251	0
8	rs16902023	128208028	G	A	0.000627	0
8	kgp22803639	128208187	G	A	0.000251	0
8	rs190897987	128208191	T	C	0.009398	0
8	rs147054803	128208209	A	C	0.002882	0
8	rs138042437	128208369	A	G	0.014912	1
8	kgp704630	128208413	C	T	0.030702	0
8	rs12548989	128208453	C	T	0.207268	1
8	kgp3389730	128208454	G	A	0.273935	0
8	rs62531107	128208750	G	T	0.030576	0
8	rs71520644	128208833	A	G	0.000752	0
8	rs144013913	128208931	C	T	0.000251	0
8	rs114053525	128208994	G	A	0.001128	0
8	kgp2767179	128209082	T	C	0.406015	0
8	kgp8921892	128209099	C	T	0.074311	0
8	rs148702520	128209378	A	G	0.002882	0
8	rs11986553	128209438	T	C	0.000251	0
8	kgp11897178	128209439	A	G	0.015915	0
8	kgp20562677	128209505	G	A	0.000877	0
8	rs2466031	128209609	A	G	0.406767	0
8	kgp7940133	128209636	G	A	0.008271	0
8	rs2466032	128209820	T	C	0.300125	0
8	rs192654309	128209964	G	A	0.004261	0
8	rs115209859	128210078	T	C	0.000251	0
8	rs17375869	128210262	G	C	0.026817	0
8	rs11357342	128210342	CA	C	0.318922	0
8	kgp1088870	128210356	A	G	0.029323	0
8	rs192290697	128210374	C	T	0.003383	0

8	rs2466033	128210582	G	T	0.246491	0
8	kgp2054038	128210620	A	G	0.028822	0
8	rs1378902	128210666	T	A	0.321805	0
8	rs115245188	128210683	G	A	0.000376	0
8	rs116091021	128210789	T	G	0.000376	0
8	rs2466035	128211229	T	C	0.32218	0
8	rs75513132	128211389	G	T	0.069424	0
8	rs2466036	128211494	A	G	0.221303	0
8	rs148120863	128211555	T	C	0.000501	0
8	rs150099991	128211677	TAAAC	T	0.003885	0
8	rs116787092	128211817	G	A	0.001128	0
8	kgp2969550	128211972	A	G	0.014536	0
8	rs2466037	128212084	C	A	0.255514	0
8	rs2466038	128212409	G	A	0.22193	0
8	rs141852216	128212483	T	C	0.000501	0
8	rs2445613	128212521	G	C	0.22193	0
8	rs2516295	128212523	G	A	0.255514	0
8	rs2445614	128212594	C	T	0.255514	0
8	kgp8049472	128212633	G	A	0.003509	0
8	rs2466039	128212680	C	A	0.25	0
8	rs13254141	128212937	T	C	0.001504	0
8	rs137893481	128213006	C	T	0.000125	0
8	rs142390041	128213007	G	A	0.002882	0
8	rs13251958	128213015	A	G	0.003008	0
8	rs183127372	128213025	A	T	0.002506	0
8	rs145933573	128213149	A	T	0.000125	0
8	rs9643217	128213233	A	G	0.074436	0
8	rs77610751	128213251	C	T	0.001504	0
8	kgp4096430	128213308	C	T	0.025689	0
8	rs115910016	128213544	A	G	0.000376	0
8	rs35961416	128213561	C	CA	0.419799	0
8	rs189883640	128213580	A	G	0.000125	0
8	rs1378901	128213807	T	C	0.453759	1
8	rs78358967	128213866	C	G	0.000752	0
8	rs116707089	128213900	G	A	0.000501	0
8	rs193065474	128213909	G	A	0.000501	0
8	kgp20277961	128214008	C	T	0.000627	0
8	rs16902026	128214050	T	G	0.000251	0
8	kgp8693611	128214130	C	A	0.071679	0
8	kgp2052645	128214499	A	G	0.053133	0
8	kgp20399083	128214610	C	T	0.000501	0
8	rs55678233	128214618	G	C	0.243734	0
8	rs202220524	128214640	G	GA	0.012406	0
8	rs144940621	128214727	A	G	0.011278	0
8	kgp20395694	128214778	T	C	0.000251	0
8	kgp5797611	128214863	C	T	0.026692	0
8	rs181817763	128215146	C	T	0.004762	0

8	rs182395051	128215636	T	C	0.013409	0
8	rs112581722	128215648	A	G	0.046867	0
8	rs189604686	128215768	G	T	0.004135	0
8	rs200457197	128216015	CAT	C	0.001128	0
8	rs10113744	128216355	A	C	0.305138	0
8	rs117166789	128216394	A	C	0.002005	0
8	rs10113764	128216400	A	C	0.019925	0
8	rs10086030	128216433	C	A	0.004386	0
8	rs148251701	128216472	A	C	0.000125	0
8	rs10086049	128216486	C	T	0.004762	0
8	rs116788384	128216582	C	A	0.000125	0
8	rs138153629	128216716	C	T	0.000125	0
8	rs61462910	128216808	A	G	0.000125	0
8	kgp20600127	128217462	T	G	0.008396	0
8	rs190632839	128217634	G	C	0.000125	0
8	rs7837911	128217812	A	G	0.00802	0
8	kgp20365897	128217961	A	C	0.001504	0
8	rs201553506	128218028	GGGC	G	0.045739	0
8	rs199932803	128218030	GC	G	0.077068	0
8	rs113343238	128218040	G	C	0.075815	0
8	rs35967454	128218318	A	G	0.002506	0

SUPPLEMENTAL TABLES AND FIGURES

Genome-wide association of familial prostate cancer cases identifies evidence for a rare segregating haplotype at 8q24.21

Human Genetics

Craig C. Teerlink*,¹ Daniel Leongamornlert,² Tokhir Dadaev,² Alun Thomas,¹ James Farnham,¹ Robert A. Stephenson,^{3,4} Shaun Riska,⁵ Shannon K. McDonnell,⁵ Daniel J. Schaid,⁵ William J. Catalona,⁶ S. Lilly Zheng,⁶ Kathleen A. Cooney,⁷ Anna M. Ray,⁷ Kimberly A. Zuhlke,⁷ Ethan M. Lange,⁸ Graham G. Giles,⁹⁻¹¹ Melissa C. Southey,¹² Liesel M. Fitzgerald,⁹ Antje Rinckleb,¹³ Manuel Luedeke,¹³ Christiane Maier,¹⁴ Janet L. Stanford,¹⁵ Elaine A. Ostrander,¹⁶ Elina Kaikkonen,¹⁷ Csilla Sipeky,¹⁷ Teuvo Tammela,¹⁸ Johanna Schleutker,¹⁹ Kathleen E. Wiley,²⁰ Sarah D. Isaacs,²⁰ Patrick C. Walsh,²⁰ William B. Isaacs,²⁰ Jianfeng Xu,²¹ Geraldine Cancel-Tassin,²² Olivier Cussenot,²² Diptasri Mandal,²³ Cecelia Laurie,²⁴ Cathy Laurie,²⁴ International Consortium for Prostate Cancer Genetics, The PRACTICAL consortium,[†] Stephen N. Thibodeau,²⁵ Ros Eeles,² Zsofia Kote-Jarai,² Lisa Cannon-Albright^{1,26}

¹ Department of Internal Medicine, University of Utah School of Medicine, Salt Lake City, UT, 84108, USA

² Division of Genetics and Epidemiology, Institute of Cancer Research, London, SW7 3RP, UK

³ Departments of Urology and Surgery, University of Utah School of Medicine, Salt Lake City, UT, 84132, USA

⁴ Huntsman Cancer Institute, University of Utah, Salt Lake City, UT, 84112, USA

⁵ Department of Health Sciences Research, Mayo Clinic, Rochester, MN, 55905, USA

⁶ Feinberg School of Medicine, Northwestern University, Chicago, IL, 60611, USA

⁷ Departments of Internal Medicine and Urology, Department of Internal Medicine, University of Michigan Medical School, Ann Arbor, MI, 48109, USA

⁸ Departments of Genetics and Biostatistics, University of North Carolina, Chapel Hill, NC, 27599, USA

- ⁹ Cancer Epidemiology Centre, Cancer Council Victoria, Melbourne, 3004, Australia
- ¹⁰ Centre for Epidemiology and Biostatistics, Melbourne School of Population and Global Health, University of Melbourne, Victoria, 3010, Australia
- ¹¹ Department of Epidemiology and Preventive Medicine, Monash University, Melbourne, Victoria, 3004, Australia
- ¹² Department of Pathology, University of Melbourne, Melbourne, 3010, Australia
- ¹³ Department of Urology, University Hospital Ulm, Ulm, 53179, Germany
- ¹⁴ Institute for Human Genetics, University of Ulm, Ulm, 89081, Germany
- ¹⁵ Fred Hutchinson Cancer Research Center (FHCRC), Division of Public Health Sciences, Seattle, WA, 98109, USA
- ¹⁶ Cancer Genetics Branch, National Human Genome Research Institute (NHGRI), National Institutes of Health (NIH), Bethesda, MD, 20892, USA
- ¹⁷ Department of Medical Biochemistry and Genetics, University of Turku, Turku, 20520, Finland
- ¹⁸ Department of Urology, University of Tampere and Tampere University Hospital, Tampere, 33520, Finland
- ¹⁹ Department of Medical Biochemistry and Genetics, University of Turku, and Tyks Microbiology and Genetics, Department of Medical Genetics, Turku University Hospital, Turku, 20520, Finland
- ²⁰ Brady Urological Institute, Johns Hopkins University, Baltimore, MD, 21287, USA
- ²¹ Program for Personalized Cancer Care, NorthShore University Health System, Evanston, IL, 60201, USA
- ²² CeRePP, Hopital Tenon, Assistance Publique-Hopitaux de Paris, Paris, 75020, France
- ²³ Department of Genetics, Louisiana State University Health Sciences Center, New Orleans, LA, 70112, USA
- ²⁴ Department of Biostatistics, University of Washington, Seattle, WA, 98195, USA
- ²⁵ Department of Lab Medicine and Pathology, Mayo Clinic, Rochester, MN, 55905, USA

²⁶ George E. Wahlen Department of Veterans Affairs Medical Center, Salt Lake City, UT, 84148, USA

‡Members from the Prostate Cancer Association Group to Investigate Cancer Associated Alterations in the Genome (PRACTICAL) consortium are provided in the Supplemental Material. Information of the consortium can be found at <http://practical.ccge.medschl.cam.ac.uk/>.

Correspondence: craig.teerlink@utah.edu

Supplemental Table 1. The PRACTICAL CONSORTIUM (in addition to those named in the author list)

Information of the consortium can be found at <http://practical.ccge.medschl.cam.ac.uk/>

Additional members from the consortium are:

Study	Name	Affiliation/s
PRACTICAL PI	Doug Easton	Centre for Cancer Genetic Epidemiology, Department of Public Health and Primary Care, University of Cambridge, Strangeways Research Laboratory, Worts Causeway, Cambridge, UK
PRACTICAL PI, UKGPCS	Rosalind Eeles	The Institute of Cancer Research, 15 Cotswold Road, Sutton, Surrey, SM2 5NG, UK Royal Marsden NHS Foundation Trust, Fulham and Sutton, London and Surrey, UK
PRACTICAL co-PI	Zsofia Kote-Jarai	The Institute of Cancer Research, 15 Cotswold Road, Sutton, Surrey, SM2 5NG, UK
PRACTICAL co-ordinator	Sara Benlloch	Centre for Cancer Genetic Epidemiology, Department of Public Health and Primary Care, University of Cambridge, Strangeways Research Laboratory, Worts Causeway, Cambridge, UK
PRACTICAL statistician	Ali Amin Al Olama	Centre for Cancer Genetic Epidemiology, Department of Public Health and Primary Care, University of Cambridge, Strangeways Research Laboratory, Worts Causeway, Cambridge, UK
UKGPCS MCCS	Kenneth Muir Graham G. Giles	University of Warwick, Coventry, UK The Cancer Council Victoria, 615 St Kilda Road, Melbourne, Victoria 3004, Australia
STHM1	Fredrik Wiklund	Centre for Epidemiology and Biostatistics, Melbourne School of Population and Global Health, The University of Melbourne, Victoria 3010, Australia Department of Medical Epidemiology and Biostatistics, Karolinska Institute, Stockholm, Sweden

CAPS	Henrik Gronberg	Department of Medical Epidemiology and Biostatistics, Karolinska Institute, Stockholm, Sweden
MEC	Christopher A. Haiman	Department of Preventive Medicine, Keck School of Medicine, University of Southern California/Norris Comprehensive Cancer Center, Los Angeles, California, USA
TAMPERE	Johanna Schleutker	Department of Medical Biochemistry and Genetics, University of Turku, Turku, Finland
CPCS1, CPCS2	Børge G. Nordestgaard	Institute of Biomedical Technology/BioMediTech, University of Tampere and FimLab Laboratories, Tampere, Finland Department of Clinical Biochemistry, Herlev Hospital, Copenhagen University Hospital, Herlev Ringvej 75, DK-2730 Herlev, Denmark
EPIC	Ruth C. Travis	Cancer Epidemiology Unit, Nuffield Department of Clinical Medicine, University of Oxford, Oxford, UK
ProMPT, ProtecT	David Neal	Surgical Oncology (Uro-Oncology: S4), University of Cambridge, Box 279, Addenbrooke's Hospital, Hills Road, Cambridge, UK and Cancer Research UK Cambridge Research Institute, Li Ka Shing Centre, Cambridge, UK
SEARCH	Nora Pashayan	Centre for Cancer Genetic Epidemiology, Department of Oncology, University of Cambridge, Strangeways Research Laboratory, Worts Causeway, Cambridge, UK University College London, Department of Applied Health Research, 1-19 Torrington Place, London, WC1E 7HB, UK
EPIC-Norfolk	Kay-Tee Khaw	Cambridge Institute of Public Health, University of Cambridge, Forvie Site, Robinson Way, Cambridge CB2 0SR, UK
FHCRC	Janet L. Stanford	Division of Public Health Sciences, Fred Hutchinson Cancer Research Center, Seattle, Washington, USA Department of Epidemiology, School of Public Health, University of Washington, Seattle, Washington, USA
SCCS	William J. Blot	International Epidemiology Institute, 1455 Research Blvd., Suite 550, Rockville, MD 20850, USA
MAYO ULM	Stephen Thibodeau Christiane Maier	Mayo Clinic, Rochester, Minnesota, USA Department of Urology, University Hospital Ulm, Germany Institute of Human Genetics University Hospital Ulm, Germany
WUGS	Adam S. Kibel	Brigham and Women's Hospital/Dana-Farber Cancer Institute, 45 Francis Street- ASB II-3, Boston, MA 02115, USA
Poland	Cezary Cybulski	Washington University, St Louis, Missouri, USA International Hereditary Cancer Center, Department of Genetics and Pathology, Pomeranian Medical University, Szczecin, Poland
UTAH	Lisa Cannon-Albright	Division of Genetic Epidemiology, Department of Medicine, University of Utah School of Medicine, USA
ESTHER	Hermann Brenner	Division of Clinical Epidemiology and Aging Research, German Cancer Research Center (DKFZ), Heidelberg Germany, Division of Preventive Oncology,, German Cancer Research Center (DKFZ), Heidelberg Germany, German Cancer Consortium (DKTK), German Cancer Research Center (DKFZ), Heidelberg Germany,

MOFFITT	Jong Park	Division of Cancer Prevention and Control, H. Lee Moffitt Cancer Center, 12902 Magnolia Dr., Tampa, Florida, USA
PCMUS	Radka Kaneva	Molecular Medicine Center and Department of Medical Chemistry and Biochemistry, Medical University - Sofia, 2 Zdrave St, 1431, Sofia, Bulgaria
QLD	Jyotsna Batra	Australian Prostate Cancer Research Centre-Qld, Institute of Health and Biomedical Innovation and Schools of Life Science and Public Health, Queensland University of Technology, Brisbane, Australia
IPO-Porto	Manuel R. Teixeira	Department of Genetics, Portuguese Oncology Institute, Porto, Portugal and Biomedical Sciences Institute (ICBAS), Porto University, Porto, Portugal
PPF-UNIS	Hardev Pandha	The University of Surrey, Guildford, Surrey, GU2 7XH, UK

Supplemental Table 2. Significant SNPs ($p < 5e^{-8}$) from the genome-wide association of 2,511 familial prostate cancer cases and 1,382 controls using imputed genotypes based on 1000 Genomes.

Chromosome	Marker	Position	Minor allele	Alternative allele	Minor allele frequency	Odds ratio	95% lower CI	95% upper CI	P-value
3	kgp1923988	170,074,517	C	G	0.192	1.41	1.25	1.59	2.17E-08
6	rs7740824	160,808,901	T	G	0.311	1.35	1.21	1.5	3.18E-08
6	rs3105751	160,822,675	G	A	0.306	1.35	1.21	1.5	3.46E-08
6	rs9364554	160,833,664	T	C	0.311	1.35	1.21	1.5	3.37E-08
6	rs12194182	160,834,515	C	T	0.311	1.35	1.21	1.5	3.01E-08
6	rs1112444	160,835,192	A	C	0.311	1.35	1.21	1.5	3.21E-08
6	rs10455782	160,839,350	T	C	0.356	1.37	1.23	1.51	3.30E-09
6	rs3123636	160,842,537	C	T	0.356	1.37	1.23	1.51	2.81E-09
6	rs2661839	160,849,140	T	A	0.357	1.36	1.22	1.5	5.94E-09
8	rs182352457	127,941,793	A	G	0.019	6.91	3.59	13.29	7.27E-09
8	rs28561575	128,014,009	T	C	0.236	1.36	1.22	1.52	3.92E-08
8	rs28556804	128,014,315	G	A	0.236	1.36	1.22	1.52	4.21E-08
8	rs9297750	128,022,973	G	A	0.226	1.37	1.22	1.53	4.85E-08

8	kgp9645322	128,077,146	A	G	0.044	2.39	1.81	3.16	8.22E-10
8	rs1031589	128,092,982	G	A	0.416	1.36	1.23	1.5	1.31E-09
8	rs1031587	128,093,472	G	A	0.415	1.36	1.23	1.5	1.17E-09
8	rs4871008	128,093,541	T	C	0.415	1.36	1.23	1.5	1.17E-09
8	rs6981122	128,094,460	A	C	0.413	1.35	1.22	1.49	3.60E-09
8	kgp5314987	128,094,483	T	G	0.413	1.35	1.22	1.49	2.55E-09
8	kgp9938326	128,103,979	C	T	0.2	1.43	1.27	1.61	4.85E-09
8	rs183373024	128,104,117	G	A	0.017	7.63	3.9	14.93	2.90E-09
8	rs35365584	128,108,726	A	G	0.315	1.34	1.21	1.49	2.98E-08
8	rs56005245	128,113,426	T	C	0.225	1.41	1.25	1.59	1.27E-08
8	rs3100857	128,159,432	C	T	0.369	1.34	1.21	1.49	3.10E-08
8	rs188140481	128,191,672	A	T	0.016	9.38	4.43	19.88	5.15E-09
8	rs138042437	128,208,369	G	A	0.015	13.25	5.37	32.69	2.08E-08
8	rs143229300	128,320,509	T	TTTTTG	0.162	1.47	1.28	1.68	3.71E-08
8	rs74822356	128,320,976	G	C	0.166	1.49	1.3	1.71	7.27E-09
8	rs72728057	128,321,413	C	A	0.168	1.51	1.32	1.72	2.51E-09
8	kgp760058	128,321,483	C	T	0.169	1.5	1.31	1.72	3.18E-09
8	rs72728061	128,321,583	C	T	0.168	1.51	1.32	1.73	2.19E-09
8	rs16902095	128,321,684	T	G	0.164	1.49	1.3	1.71	1.11E-08
8	rs60163266	128,323,157	A	G	0.162	1.49	1.3	1.71	1.00E-08
8	rs56736364	128,323,724	T	C	0.162	1.49	1.3	1.7	1.27E-08
8	rs34585331	128,323,731	G	T	0.16	1.48	1.29	1.69	2.51E-08
8	rs4506170	128,323,891	C	T	0.166	1.51	1.32	1.73	2.18E-09
8	rs151204419	128,323,951	A	AG	0.161	1.49	1.3	1.71	1.10E-08
8	rs139988765	128,324,071	C	T	0.161	1.49	1.3	1.71	1.32E-08

8	rs144898130	128,324,075	T	C	0.161	1.49	1.3	1.71	1.58E-08
8	rs192955651	128,324,718	C	A	0.165	1.51	1.32	1.73	2.22E-09
8	rs151184050	128,326,801	C	A	0.16	1.48	1.29	1.7	2.06E-08
8	rs186307710	128,327,210	G	C	0.159	1.48	1.29	1.7	2.28E-08
8	rs138105578	128,327,419	G	A	0.159	1.48	1.29	1.7	2.05E-08
8	rs140846233	128,327,457	T	C	0.159	1.48	1.29	1.7	2.11E-08
8	rs183738189	128,327,889	A	G	0.155	1.49	1.29	1.71	2.73E-08
8	rs191545467	128,327,920	G	C	0.16	1.48	1.29	1.7	2.04E-08
8	rs117510207	128,330,372	G	A	0.163	1.49	1.3	1.71	9.17E-09
8	rs116881722	128,330,510	G	T	0.163	1.47	1.28	1.69	2.77E-08
8	rs77635060	128,330,555	C	G	0.162	1.49	1.3	1.71	1.18E-08
8	rs146529058	128,331,510	A	G	0.162	1.49	1.3	1.71	9.34E-09
8	rs186935985	128,332,968	A	G	0.162	1.49	1.3	1.71	8.58E-09
8	rs138867633	128,333,103	AT	A	0.162	1.49	1.3	1.71	9.10E-09
8	rs72712308	128,333,220	C	T	0.162	1.49	1.3	1.71	9.02E-09
8	rs72712310	128,333,565	A	G	0.162	1.49	1.3	1.71	9.31E-09
8	rs55717424	128,335,079	G	A	0.162	1.49	1.3	1.71	1.10E-08
8	rs58104177	128,335,536	A	G	0.162	1.49	1.3	1.71	1.16E-08
8	rs72712332	128,336,053	G	C	0.162	1.49	1.3	1.71	1.05E-08
8	kgp7771502	128,336,664	C	A	0.162	1.49	1.3	1.71	8.92E-09
8	rs201361304	128,337,272	TAC	T	0.016	5.93	3.14	11.19	3.89E-08
8	rs72712335	128,338,258	A	G	0.162	1.49	1.3	1.71	8.89E-09
8	rs16902101	128,340,124	G	C	0.162	1.49	1.3	1.71	8.18E-09
8	rs16902102	128,340,221	A	C	0.162	1.49	1.3	1.71	8.09E-09
8	rs16902103	128,340,374	C	A	0.162	1.49	1.3	1.71	7.96E-09

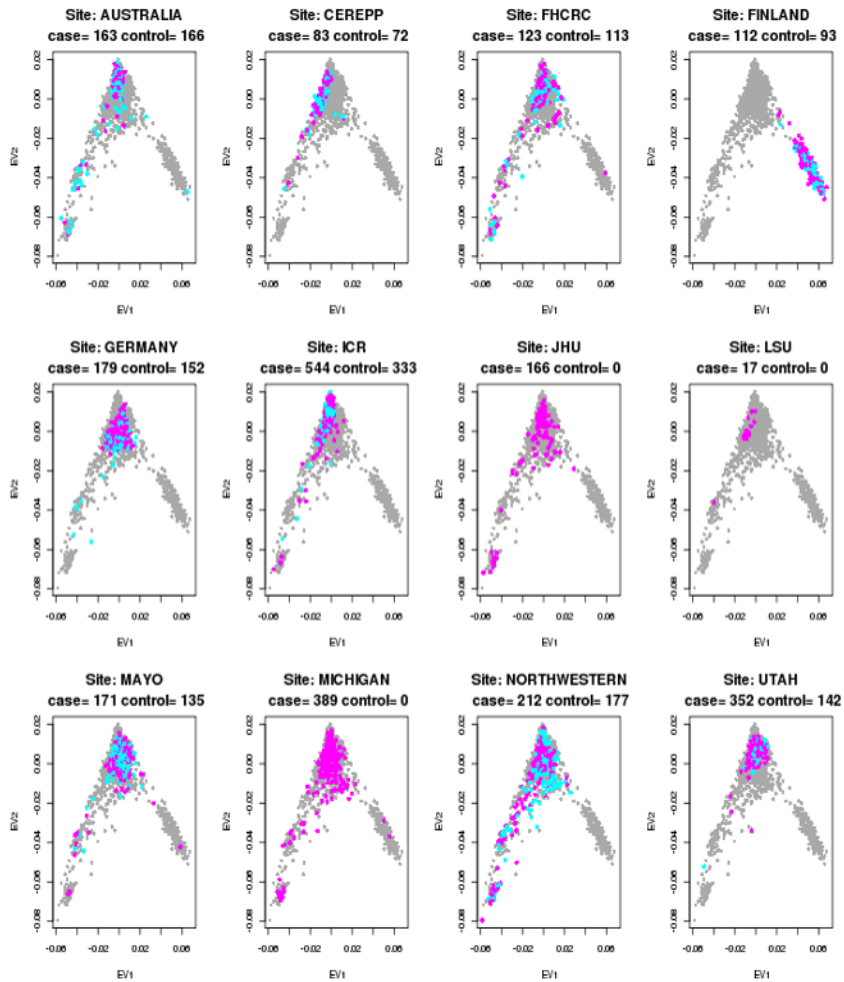
8	rs201134695	128,340,492	AAC	A	0.162	1.5	1.3	1.71	7.87E-09
8	rs72712338	128,340,537	T	A	0.162	1.5	1.3	1.71	7.81E-09
8	rs72712339	128,340,554	T	C	0.162	1.5	1.3	1.71	7.79E-09
8	rs16902104	128,340,908	T	C	0.162	1.5	1.31	1.72	6.41E-09
8	rs60497658	128,341,810	C	T	0.164	1.51	1.32	1.73	3.53E-09
8	rs72712344	128,342,626	T	G	0.168	1.48	1.29	1.7	1.35E-08
10	rs142752112	51,468,284	T	G	0.393	1.38	1.23	1.54	3.55E-08
10	rs2926494	51,517,356	T	C	0.492	1.31	1.19	1.44	3.59E-08
10	rs2611508	51,518,047	T	A	0.492	1.3	1.19	1.43	4.15E-08
10	rs35094615	51,518,083	TA	T	0.493	1.3	1.19	1.43	4.35E-08
10	rs2843547	51,519,358	A	G	0.49	1.31	1.19	1.44	3.31E-08
10	rs3101227	51,520,203	C	A	0.489	1.31	1.19	1.44	3.20E-08
10	kgp10578928	51,521,247	C	A	0.488	1.31	1.19	1.45	2.25E-08
10	rs2843550	51,521,452	C	T	0.488	1.31	1.19	1.44	2.67E-08
10	rs2843551	51,521,945	C	A	0.488	1.31	1.19	1.44	3.02E-08
10	rs7088225	51,522,120	C	T	0.487	1.31	1.19	1.44	3.79E-08
10	rs7077830	51,522,276	G	C	0.487	1.31	1.19	1.44	3.78E-08
10	rs2843554	51,523,861	G	T	0.488	1.31	1.19	1.44	3.17E-08
10	rs2611489	51,524,889	G	A	0.488	1.31	1.19	1.44	2.89E-08
10	rs4935162	51,525,699	G	C	0.488	1.31	1.19	1.44	2.89E-08
10	rs7081532	51,526,093	A	G	0.488	1.31	1.19	1.44	3.12E-08
10	rs7915602	51,528,656	A	G	0.484	1.31	1.19	1.44	3.77E-08
10	rs7896437	51,529,593	A	C	0.484	1.31	1.19	1.44	4.12E-08
10	rs4486572	51,531,805	A	G	0.489	1.31	1.19	1.45	2.40E-08
10	rs4581397	51,532,367	A	G	0.489	1.31	1.19	1.44	2.51E-08

10	rs10763536	51,535,801	G	A	0.49	1.32	1.2	1.45	1.97E-08
10	rs7911198	51,537,475	A	G	-59.49	1.31	1.19	1.44	2.54E-08
10	rs10763567	51,538,169	A	T	0.489	1.31	1.19	1.44	2.99E-08
10	rs11006274	51,540,291	T	C	0.49	1.31	1.19	1.44	2.54E-08
10	rs4512771	51,540,906	C	A	0.49	1.31	1.19	1.45	2.61E-08
10	rs4631830	51,543,344	C	T	0.465	1.31	1.19	1.44	4.88E-08
10	rs7098889	51,544,475	C	T	0.496	1.32	1.19	1.45	2.35E-08
10	rs142854067	51,544,680	CAAA T	C	0.498	1.32	1.2	1.45	2.38E-08
10	rs11006462	51,545,813	G	A	0.495	1.32	1.2	1.45	2.17E-08
11	rs7930375	68,972,657	C	G	0.46	1.39	1.26	1.53	3.93E-11
11	rs7945442	68,972,747	T	C	0.355	1.34	1.22	1.49	7.30E-09
11	rs9783278	68,972,975	A	C	0.355	1.34	1.22	1.49	7.54E-09
11	rs9783279	68,972,992	A	C	0.355	1.34	1.21	1.48	9.43E-09
11	rs9783280	68,973,036	A	G	0.355	1.34	1.22	1.49	7.58E-09
11	rs4255548	68,973,970	A	G	0.351	1.34	1.22	1.49	6.55E-09
11	rs12793009	68,974,355	C	T	0.352	1.35	1.22	1.49	3.49E-09
11	rs7926098	68,975,524	T	C	0.365	1.33	1.2	1.47	2.84E-08
11	rs4495900	68,976,119	T	C	0.35	1.35	1.22	1.49	3.38E-09
11	rs4620729	68,980,335	C	A	0.457	1.38	1.26	1.52	5.74E-11
11	rs4930668	68,980,828	T	G	0.351	1.35	1.22	1.49	4.23E-09
11	rs10896447	68,980,875	C	A	0.351	1.35	1.22	1.49	4.26E-09
11	rs4265599	68,981,066	T	A	0.351	1.35	1.22	1.49	4.42E-09
11	rs12275055	68,981,359	G	A	0.195	1.42	1.25	1.6	4.82E-08
11	rs4451736	68,982,703	A	G	0.45	1.38	1.26	1.53	4.91E-11
11	kgp3232870	68,983,561	A	C	0.45	1.38	1.25	1.52	5.79E-11

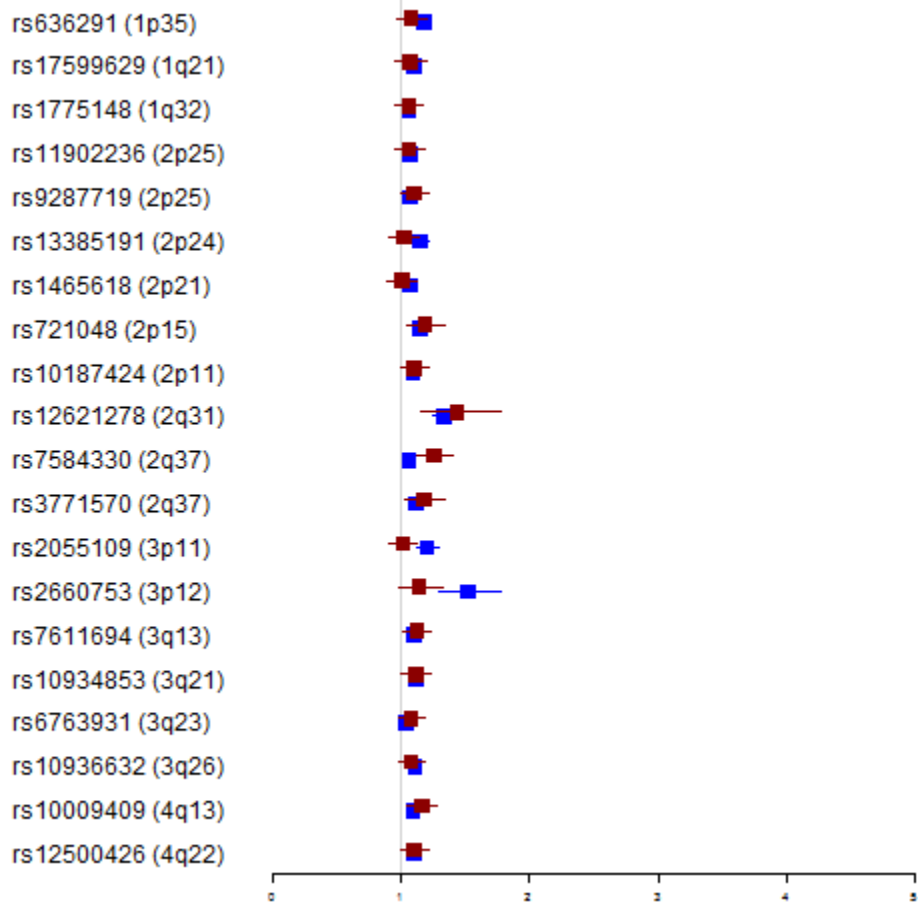
11	rs7939803	68,983,700	T	C	0.45	1.38	1.26	1.52	5.18E-11
11	rs10792032	68,984,602	G	A	0.461	1.38	1.25	1.52	1.34E-10
11	rs11421935	68,984,743	A	AG	0.45	1.38	1.25	1.52	6.57E-11
11	rs11351679	68,985,480	GT	G	0.467	1.37	1.24	1.51	1.88E-10
11	rs7929962	68,985,583	C	T	0.457	1.37	1.24	1.51	1.99E-10
11	rs12790802	68,986,495	A	C	0.451	1.38	1.25	1.52	6.53E-11
11	rs10792033	68,989,198	G	A	0.45	1.38	1.25	1.52	5.87E-11
11	rs7121816	68,990,295	T	G	0.457	1.37	1.24	1.51	1.79E-10
11	rs7109672	68,991,110	A	G	0.449	1.38	1.25	1.52	9.32E-11
11	rs10896448	68,991,749	G	C	0.458	1.38	1.25	1.52	1.08E-10
11	rs12795301	68,992,285	A	C	0.195	1.42	1.25	1.6	4.25E-08
11	rs7122190	68,993,788	C	T	0.451	1.38	1.25	1.52	9.58E-11
11	rs6591374	68,993,832	A	G	0.457	1.37	1.24	1.51	2.33E-10
11	rs7931342	68,994,497	T	G	0.451	1.38	1.25	1.52	1.00E-10
11	rs10896449	68,994,667	A	G	0.457	1.37	1.24	1.51	2.42E-10
11	rs12362678	68,996,170	C	G	0.451	1.38	1.25	1.52	9.96E-11
11	rs9787877	68,996,509	T	C	0.457	1.37	1.24	1.51	2.42E-10
11	rs4644650	68,998,118	T	C	0.449	1.38	1.25	1.52	8.33E-11
11	rs201557676	68,998,187	TA	T	0.457	1.38	1.25	1.52	1.21E-10
11	rs5792472	68,998,188	AG	A	0.457	1.38	1.25	1.52	1.21E-10
11	rs4569015	68,998,405	T	C	0.449	1.38	1.25	1.52	8.33E-11
11	rs7950547	68,998,788	T	C	0.351	1.33	1.21	1.47	1.75E-08
11	rs7925434	69,002,632	T	A	0.35	1.33	1.21	1.47	1.79E-08
11	rs7939250	69,002,950	G	A	0.457	1.38	1.25	1.52	1.15E-10
11	rs12788188	69,003,581	T	A	0.458	1.38	1.25	1.52	1.20E-10

11	rs7106762	69,003,706	T	C	0.456	1.37	1.24	1.51	1.96E-10
11	rs9667638	69,004,339	T	A	0.457	1.38	1.25	1.52	1.15E-10
11	rs7947353	69,004,983	G	A	0.456	1.38	1.25	1.52	1.02E-10
11	rs10896450	69,008,114	A	G	0.456	1.37	1.24	1.51	1.86E-10
11	rs11228583	69,009,114	G	T	0.457	1.38	1.25	1.52	1.09E-10
11	rs12293259	69,010,238	T	G	0.457	1.38	1.25	1.52	9.41E-11
11	kgp3981922	69,010,651	T	G	0.457	1.38	1.25	1.52	8.44E-11
11	chr11:69011692 :l	69,011,692	G	GT	0.454	1.4	1.27	1.54	2.57E-11
11	rs71858850	69,011,693	A	AT	0.454	1.4	1.27	1.54	2.57E-11
11	rs199556390	69,011,694	T	TG	0.456	1.39	1.26	1.54	3.07E-11
11	rs12270641	69,012,244	T	A	0.45	1.4	1.27	1.55	1.42E-11
17	rs2005705	36,096,300	A	G	0.415	1.33	1.21	1.47	1.25E-08
17	rs11263761	36,097,775	G	A	0.441	1.34	1.22	1.48	4.89E-09
17	rs11651755	36,099,840	C	T	0.446	1.34	1.22	1.48	2.95E-09
17	rs10908278	36,099,952	T	A	0.442	1.35	1.22	1.49	1.67E-09
17	kgp203119	36,101,586	A	C	0.434	1.37	1.24	1.51	3.06E-10
17	rs12601991	36,101,633	T	G	0.456	1.32	1.2	1.45	2.28E-08
17	kgp8074160	36,101,926	A	G	0.458	1.32	1.2	1.45	2.32E-08
17	kgp410234	36,102,035	C	G	0.458	1.32	1.2	1.46	1.49E-08
17	rs11651052	36,102,381	A	G	0.435	1.37	1.24	1.51	2.49E-10
17	rs757209	36,102,833	A	G	0.453	1.31	1.19	1.45	4.73E-08
17	rs11263763	36,103,565	G	A	0.437	1.36	1.24	1.5	5.04E-10

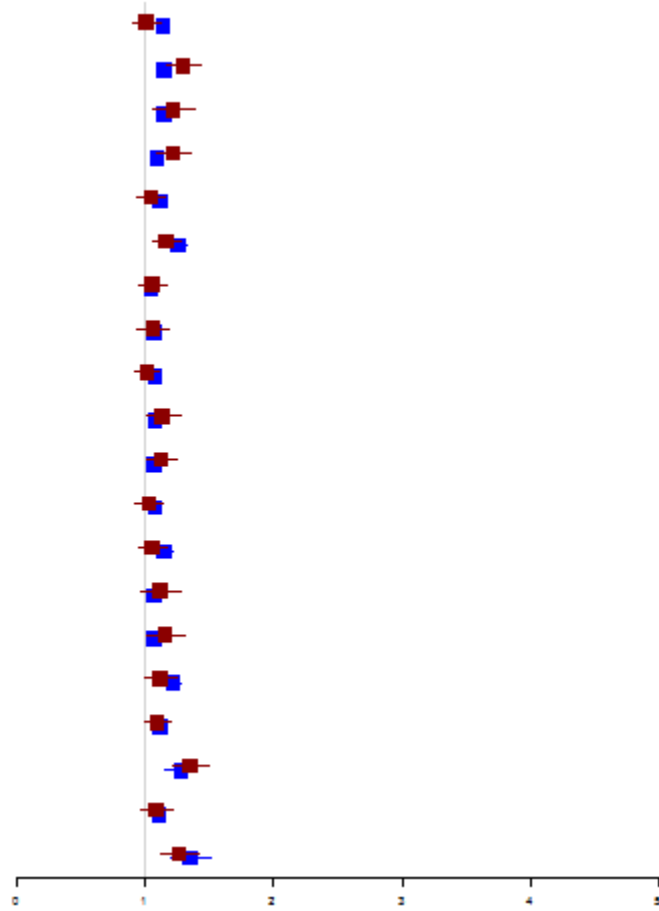
Supplemental Figure 1. The figure depicts the first two eigenvectors (the first eigenvector is labeled EV1 and the second eigenvector is labeled EV2) of a principal components analysis by site for cases and controls. For each site appearing in the plot, cyan dots represent controls, magenta dots represent cases, and gray dots represent subjects from the other sites. Three sites that contributed only cases were merged with other sites with similar genetic background. Specifically, data from Michigan site was merged with FHCRC site, JHU site was merged with Northwestern site, and LSU site was merged with Mayo site.



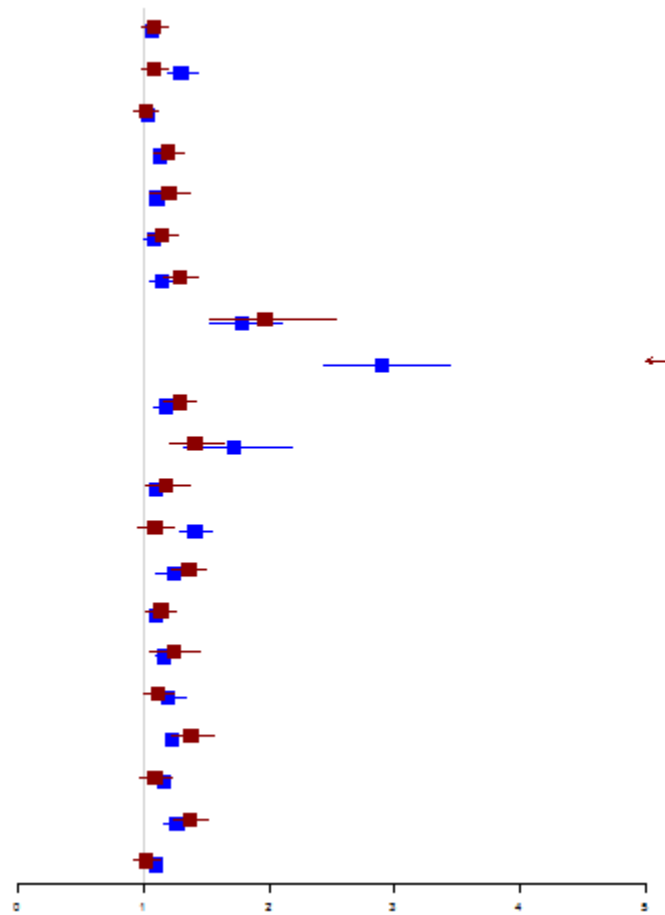
Supplemental Figure 2. Forest plots showing odds ratios (blue boxes) and 95% confidence intervals (blue lines) for SNPs previously associated with prostate cancer, and the estimated odds ratios (red boxes) and 95 percent confidence intervals (red lines) from the set of familial prostate cancer cases. Cytogenetic band designations appear next to SNP names. Previously reported odds ratios are summarized in Al Olama, et al., 2014, except rs138042437 which was reported in Gudmundsson, et al., 2012. In order to improve scale, two SNPs appear with clipped intervals depicted. For SNP rs138213197 (17q21), the upper 95% CI boundary is 8.5. For SNP rs138042437, the estimated odds ratio occurs at 13.3 and the 95% CI is [5.3, 32.7].



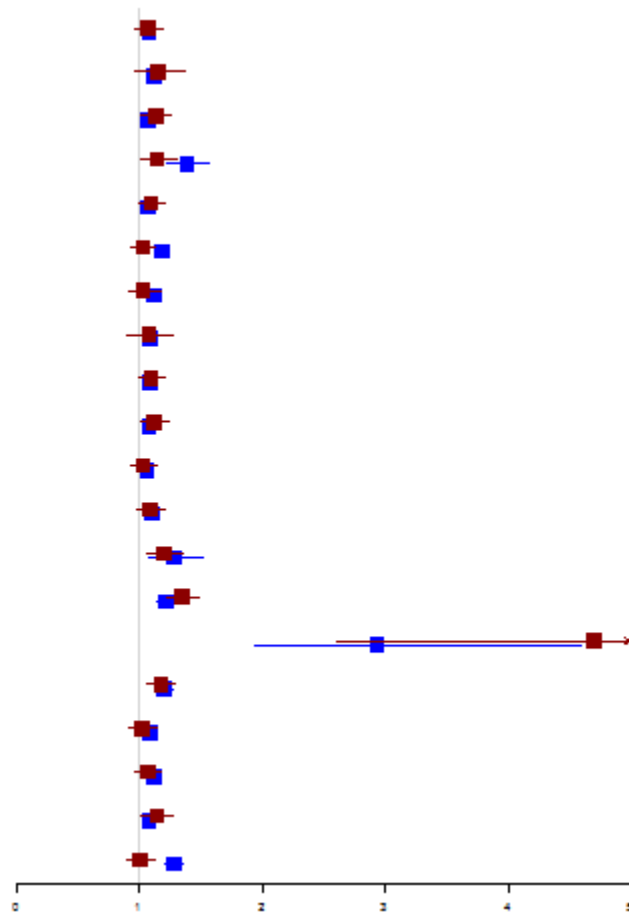
rs17021918 (4q22)
rs7679673 (4q24)
rs2242652 (5p15)
rs2853676 (5p15)
rs2736107 (5p15)
rs12653946 (5p15)
rs2121875 (5p12)
rs6869841 (5q35)
rs4713266 (6p24)
rs7767188 (6p22)
rs3096702 (6p21)
rs3129859 (6p21)
rs1983891 (6p21)
rs9443189 (6q14)
rs2273669 (6q21)
rs339331 (6q22)
rs1933488 (6q25)
rs9364554 (6q25)
rs12155172 (7p15)
rs10486567 (7p15)



rs56232506 (7p12)
rs6465657 (7q21)
rs2928679 (8p21)
rs1512268 (8p21)
rs11135910 (8p21)
rs12543663 (8q24)
rs10086908 (8q24)
rs16901979 (8q24)
rs138042437 (8q24)
rs6983267 (8q24)
rs1447295 (8q24)
rs17694493 (9p21)
rs817826 (9q31)
rs10993994 (10q11)
rs3850699 (10q24)
rs2252004 (10q26)
rs4962416 (10q26)
rs7127900 (11p15)
rs1938781 (11q12)
rs7931342 (11q13)
rs11568818 (11q22)



rs11214775 (11q23)
rs80130819 (12q13)
rs10875943 (12q13)
rs902774 (12q13)
rs1270884 (12q24)
rs9600079 (13q22)
rs8008270 (14q22)
rs7153648 (14q23)
rs7141529 (14q24)
rs8014671 (14q24)
rs12051443 (16q22)
rs684232 (17p13)
rs11649743 (17q12)
rs4430796 (17q12)
rs138213197 (17q21)
rs1859962 (17q24)
rs7241993 (18q23)
rs8102476 (19q13)
rs11672691 (19q13)
rs103294 (19q13)



rs12480328 (20q13)
rs2427345 (20q13)
rs6062509 (20q13)
rs2238776 (22q11)
rs9623117 (22q13)
rs5759167 (22q13)
rs2405942 (Xp22)
rs5945619 (Xp11)
rs2807031 (Xp11)
rs6625711 (Xq13)
rs4844289 (Xq13)

