

Prediction of breast and prostate cancer risks in male BRCA1 and BRCA2 mutation carriers using Polygenic Risk Scores

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SUPPLEMENTARY METHODS

The Illumina OncoArray

A full description of the array has been described elsewhere.¹ The design of the custom Illumina OncoArray was made possible through a large scale collaboration comprising investigators from the Genetic Associations and Mechanisms of Oncology (GAME-ON), Personalised Risk Stratification for Prevention and Early Detection of Breast Cancer (PERSPECTIVE), the Prostate Cancer Association Group to Investigate Cancer Associated Alterations in the Genome (PRACTICAL), the Breast Cancer Association Consortium (BCAC), Ovarian Cancer Association Consortium (OCAC), CIMBA, ATHENA Breast Health Network and the NIEHS Sisters. The array incorporates fine-scale mapping of more than 150 known cancer susceptibility regions, variants showing evidence for association from previous GWAS, putative risk variants identified through exome or whole genome sequencing, and other functional candidate variants potentially associated with disease risk. The array includes a backbone of 260,000 markers selected for high genome-wide coverage of common variants based on the 1000 Genomes Project (GP), providing the basis for discovery of new associations for any cancer or associated trait. Additionally, markers associated with pharmacological outcomes, gene expression in multiple tissues, and traits (e.g. smoking behavior, menarche, body mass index) that are associated with cancer risk have been selected.

Genotyping the OncoArray allows for the replication of findings from the iCOGS array²⁻⁴ or previous GWAS, the identification of variants associated with cancer risk (including disease subtypes and SNPs potentially associated with disease outcome), it facilitates fine-mapping of regions of interest, genotyping of “candidate” SNPs of interest within the consortia, including rarer variants, but also allows for large-scale GWAS to be performed in

previously understudied diseases (e.g. male breast and prostate cancer in *BRCA1* and *BRCA2* mutation carriers).

OncoArray genotyping

Genotyping was performed at four genotyping centres: University of Cambridge, the Center for Inherited Disease Research (CIDR), Genome Quebec and Mayo Clinic.

We excluded samples with genotyping call rates <95%, if they were genotypically female, had ambiguous gender, or if they had low or high autosomal-chromosome heterozygosity.

Duplicated samples and relatives were identified using the IBS function of the GenABEL library (<http://www.genabel.org/>). Cryptic duplicates that could not be resolved with the

study investigators were removed. For confirmed duplicates, the sample with the higher

call rate was retained. We excluded samples of non-European ancestry using multi-

dimensional scaling analysis. For this purpose we selected 30,733 weakly correlated

autosomal SNPs (pair-wise $r^2 < 0.10$) to compute the genomic kinship between all pairs of *BRCA1* and *BRCA2* carriers along with 267 HapMap samples (CHB, JPT, YRI and CEU).

These were converted into distances and subjected to multidimensional scaling. Using the first two components, we calculated the proportion of European ancestry for each

individual and excluded samples with >27% non-European ancestry (Supplementary Table

1). A total of 1,802 samples remained in the analysis (484 with a *BRCA1* mutation, 1,318

with a *BRCA2* mutation). The eligible samples came from 39 study-groups in 19 countries

(Supplementary Table 2).

The SNP quality control was carried out on the basis of the OncoArray QC guidelines.¹

Only SNPs that passed QC for all the OncoArray consortia were used for imputation.

SNPs with a MAF > 0.01 and a call rates < 95% or with a MAF < 0.01 and a call rate < 98% in

Europeans or that failed the genotyping cluster plot checks in any consortium were

excluded. Any markers showing deviation from Hardy-Weinberg equilibrium ($p < 10^{-7}$ in

controls, or $p < 10^{-12}$ in cases) in unrelated samples from all CIMBA samples genotyped (males and females) were excluded. Of the 570,000 SNPs selected for the OncoArray, 533,631 were successfully manufactured, and 469,364 were used in the imputation.

Imputation using data from the 1000 Genomes Project

We imputed genotypes using the 1000 GP Phase 3 (Haplotype release date October 2014) as reference panel. We used a two-stage procedure which involved using SHAPEIT (shapeit.v2.r790.Ubuntu_12.04.4.static) to derive phased genotypes, and IMPUTEv2 (impute_v2.3.2_x86_64_static) to perform imputation of the phased data.

Definition of cases and controls for the logistic regression analyses

The primary analysis involved analyzing the associations with breast and prostate cancer simultaneously using multinomial regression analysis. To investigate whether our results are sensitive to the analytical framework, we also analysed the associations with breast and prostate cancer separately using logistic regression. We used two approaches for each disease which varied in terms of the definition of the control group: (1) For the breast cancer association analyses, the control group was defined as the set of samples without a breast cancer diagnosis, including the men diagnosed with prostate cancer only (1,514 controls) and the case group was defined as the set of samples with a breast cancer diagnosis irrespective of a prostate cancer diagnosis (288 breast cancer cases). For the prostate cancer association analyses, the control group was defined as the set of samples without a prostate cancer diagnosis, including those who were diagnosed with breast cancer only (1,559 controls) and the case group was defined as the set of samples who had been diagnosed with prostate cancer irrespective of a breast cancer diagnosis (243 prostate cancer cases). (2) In both the breast cancer and prostate cancer association analyses, we considered as controls, the samples with neither a prostate nor a breast

cancer diagnosis (total control sample size: 1,313). The definition of cases remained the same as in (1).

Definition of cases and controls for the multinomial logistic regression sensitivity analyses

In the main analyses, patients who developed both breast and prostate cancer (38 samples) were considered as breast (27 samples) or prostate (11 samples) cancer cases based on the first occurring cancer, and the 4 patients who were diagnosed with a breast and a prostate cancer at the same age were considered as breast cancer cases. To investigate whether our results are sensitive to these assumptions, we also analysed the associations with breast and prostate cancer by considering these 42 samples as a fourth group in the multinomial logistic regression model. Thus, of the 1,802 samples, 246 were defined as breast cancer cases, 201 as prostate cancer cases, 42 as cases with both diseases and 1,313 as controls.

Polygenic Risk Scores (PRS)

Assuming a log-additive model for the joint effects of the SNPs, we constructed PRS by summing the number of alleles across the SNPs weighted by their estimated per-allele log-odds ratios (ORs) in published studies.³⁻¹³ For each individual i :

$$PRS_i = \sum_{j=1}^N \beta_j g_{ij}$$

Where

N: Number of SNPs in the PRS

g_{ij} : number of effect alleles at SNP j for individual i . For SNPs not on the OncoArray and for samples with missing genotypes, the missing genotype was replaced by the dosage derived through imputation

β_j : Per-allele log-OR of SNP j

For independent SNPs, the log-OR estimates from the published marginal logistic regression analyses were used. When two or more correlated SNPs were included (e.g., conditionally independent signals), we used log-OR estimates from the multiple logistic regression analyses in the BCAC and PRACTICAL data that included all correlated variants at a particular locus.

The log-additive assumption was tested by assessing the evidence for pairwise interactions between the SNPs. We assessed the evidence of interaction between the PRSs and age by introducing an age×PRS interaction term in the multinomial model. To provide more easily interpretable and comparable estimates of the associations, the PRSs were standardised to have mean 0 and variance 1 (Supplementary Table 3). Thus, the OR estimates represent the increase in cancer risk per standard deviation (SD) increase in the PRS. We also evaluated the associations with quartiles of the PRS on the basis of the PRS distribution in controls.

To evaluate the ability of the PRS to discriminate between male carriers with breast or prostate cancer and unaffected men, we computed the area under the receiver operating characteristic curve (AUC).

Polygenic Risk Scores (PRS) and cancer severity

To investigate whether the PRS is associated with disease severity, we assessed the association between the breast cancer PRSs and the breast cancer grade by using a multinomial model with five possible outcomes: neither breast nor prostate cancer; prostate cancer; breast cancer grade 1; breast cancer grade 2; breast cancer grade 3. A case-only analysis using a logistic regression was also performed to investigate differences in the associations between breast cancer grade 1 and 2 vs grade 3. For

prostate cancer, we used the reported Gleason score as a marker of disease aggressiveness. We used a multinomial model with four possible outcomes: neither breast nor prostate cancer; breast cancer; prostate cancer with a Gleason score <7; and prostate cancer with a Gleason score ≥ 7 .

Grade was available for 203 of the 288 men who were diagnosed with breast cancer; of these, 12 (6%) were of grade 1, 78 (38%) were grade 2 tumours, and 113 (56%) were grade 3 tumours. For the multinomial regression analysis, breast cases who had a prior prostate cancer diagnosis were considered as prostate cancer cases, reducing the number of grade 2 breast cancers to 74 and the number of grade 3 tumours to 110.

Gleason score was available for 172 of the 243 men who had been diagnosed with prostate cancer; of these, 113 (66%) tumours had a score of ≥ 7 and 59 (34%) had a score less than 7. For the multinomial regression analysis, some prostate cancer cases who had a prior breast cancer diagnosis, were considered as breast cancer cases, reducing the number of prostate cases with a Gleason score of ≥ 7 to 102 samples and the number of a Gleason score <7 to 53.

Breast cancer PRS developed using data from female *BRCA1* and *BRCA2* mutation carriers

In addition to the three main breast cancer PRSs, we also investigated PRS constructed on the basis of associations with breast cancer risk for female *BRCA1* and *BRCA2* mutation carriers: ^{2,7,8,14-16}

- (a) *CIMBA BRCA1 PRS*: This included SNPs that showed evidence of association with female breast cancer in *BRCA1* mutation carriers. This PRS included 24 SNPs (22 genotyped, two imputed) using as weights the log hazard ratio (HR) estimates

obtained through CIMBA studies (Supplementary Table 4).^{2,7,8,14-16} Twenty SNPs included in this PRS were a subset of the SNPs included in the ER-negative PRS.

(b) *CIMBA BRCA2 PRS*: This included SNPs that showed evidence of association with breast cancer risk in female *BRCA2* mutation carriers. This PRS included 20 SNPs (14 genotyped, six imputed) using the log-HRs estimates for *BRCA2* mutation carriers from CIMBA studies (Supplementary Table 4).^{2,7,8,14-16} Eighteen SNPs included in this PRS were a subset of the SNPs included in the overall or ER-positive PRS.

Predicted risks of male breast and prostate cancer by PRS percentiles

Absolute age-specific cumulative risks of developing breast or prostate cancer at different percentiles of the standardised PRS were calculated using the approach described in Antoniou *et al.*¹⁷ The age-specific incidences over the distribution of the PRS were constrained to agree with the average incidence of male breast and prostate cancers in *BRCA1* and *BRCA2* mutation carriers. The average incidences of male breast and prostate cancer for *BRCA1* and *BRCA2* mutation carriers were obtained from published data. For this purpose we used (i) estimates of the male breast cancer relative risk for *BRCA1* mutation carriers from the Breast Cancer Linkage Consortium (D. Easton, personal communication, September 2015), (ii) published estimates of the prostate cancer relative risk for *BRCA1* mutation carriers,¹⁸ (iii) published estimates of the male breast cancer relative risk for *BRCA2* mutation carriers,¹⁹ (iv) and a meta-analysis of the relative risk estimates from 3 studies²⁰⁻²² for prostate cancer in *BRCA2* mutation carriers. To derive the age specific incidences (and hence average cumulative risks) the relative risk estimates from these external studies were applied to the UK calendar-period and age-specific incidences of prostate and male breast cancers assuming a man born in 1985.²³

This approach yields average cumulative risks for male breast cancer by age 80 of 0.9% for *BRCA1* and 8.7% for *BRCA2* mutation carriers. The corresponding average risks of prostate cancer are 13.2% for *BRCA1* mutation carriers and 35.6% for *BRCA2* mutation carriers.

SUPPLEMENTARY RESULTS

Single SNP associations from GWAS analysis

Analyses were restricted to genotyped SNPs, accurately imputed SNPs (imputation accuracy >30%) and common SNPs (SNPs for which at least five carriers of the minor allele among breast and prostate cancer cases are expected). Due to the small number of *BRCA1* mutation carriers, results are presented only for all samples (*BRCA1* and *BRCA2* mutation carriers combined) and for *BRCA2* mutation carriers separately. A total of 9,530,887 SNPs were used in the combined analysis of all samples and 8,900,634 SNPs in the *BRCA2* analyses.

There was no evidence of inflation in the test statistic for association on the basis of all SNPs in the combined analysis of *BRCA1* and *BRCA2* samples ($\lambda=0.994$ for breast cancer, and $\lambda=1.016$ for prostate cancer, Supplementary Table 6, Supplementary figures 1 to 4).

In the combined *BRCA1* and *BRCA2* analysis, 168 SNPs from 32 different regions were associated with the breast cancer with $p<10^{-5}$ (Supplementary Table 7, Supplementary figure 5). Eighty-seven SNPs were located in the 1q44 region. The lowest p-value within this region was reported for SNP rs76216839, located in the intronic region of the *SMYD3* gene ($p = 2.95 \times 10^{-7}$).

SMYD3 is overexpressed in several human cancers including breast cancer, and a polymorphism of variable number of tandem repeats in the promoter of *SMYD3* had been previously suggested as a breast cancer susceptibility factor.²⁴

A total of 113 SNPs from 39 regions were associated with the prostate cancer risk with $p<10^{-5}$. Forty-four of these SNPs were located at 4q22 (Supplementary Table 8, Supplementary figure 6). SNP rs13147804 had the lowest p-value at this region and located in the intronic region of the *CCSER1* gene ($p = 2.32 \times 10^{-6}$). This gene, also known

as *FAM190A*, lies at a consensus site of genomic deletions in human cancers, thus suggesting a role as a tumor-suppressor gene.^{25,26}

Similarly, no associations at genome-wide level were observed in the analyses restricted to the *BRCA2* only samples.

Among *BRCA2* mutation carriers, 160 SNPs from 31 regions showed associations with breast cancer risk at $p < 10^{-5}$. Sixty-two of these SNPs were located at 1q44 confirming the association found in the combined *BRCA1/2* analysis (Supplementary Table 9, Supplementary figure 7). 223 SNPs from 35 regions showed associations with the prostate cancer risk at $p < 10^{-5}$. Forty-seven of these SNPs were located at 3p24.5 and 50 SNPs at 4q32 (Supplementary Table 10, Supplementary figure 8). One SNP (rs11332659:166777503:TA:TAA) at 4q32 near the gene *TLL1*, displayed an association with the prostate cancer risk with a p-value of 1.1×10^{-8} . However, this association was weaker ($p = 2.3 \times 10^{-6}$) when analysis was performed using logistic regression as sensitivity analyses and was also weaker ($p = 5.2 \times 10^{-7}$) on the combined *BRCA1/2* analysis. Twelve SNPs were located at the 4q22 region confirming the association found in the combined *BRCA1/2* analysis.

We did not find significant associations between the risk of breast cancer for *BRCA1* and *BRCA2* mutation carriers and the two SNPs that had been reported to be associated with male breast cancer in the general population (rs1314913 and rs3803662).²⁷ Nevertheless, the OR estimates were in the same direction as those reported by Orr *et al.*²⁷ for both SNPs (rs1314913: OR=1.20, 95%CI: 0.95-1.53, $p=0.12$ and rs3803662: OR=1.12, 95%CI: 0.90-1.39, $p=0.32$).

Breast cancer PRSs: Single SNP associations

Supplementary Table 11 shows the associations between each SNP included in the breast cancer PRSs and male breast cancer risk for *BRCA1* and *BRCA2* mutation carriers (p-values: 0.006-0.99). Eleven SNPs out of 102 were associated with breast cancer risk at $p < 0.05$. These included SNPs at 1q21.1 (rs12405132), 2q35 (rs16857609 and rs4442975), 3p26.1 (rs6762644), 4q34.1 (rs6828523), 6q25.1 (rs2747652 and rs9397437), 8p11.23 (rs13365225), 9q31.2 (rs10759243), 11q13.3 (rs75915166), and 14q24.1 (rs999737).

Prostate cancer PRS: Single SNP associations

As shown in the Supplementary Table 15, eight SNPs out of 103 were associated with prostate cancer risk at $p < 0.05$. These included SNPs at 3p11.2 (rs114278123), 6q21 (rs12209480), 8q24.21 (rs16901979, rs1447295), 11q13.3 (rs36225067), 12q24.21 (rs61933115), 16q22.2 (rs12051443), and 17q24.3 (rs8072735).

PRS and male breast cancer severity

There was a suggestion that the associations of the Overall PRS are stronger for grade 2 and grade 3 breast cancers in male *BRCA1/2* carriers, but the differences were not statistically significant (Supplementary Table 17).

Breast cancer associations with the CIMBA *BRCA1* and CIMBA *BRCA2* PRS

The PRS constructed on the basis of SNPs associated with breast cancer risk in female *BRCA1* mutation carriers (CIMBA *BRCA1* PRS) did not show any evidence of association with breast cancer risk among male *BRCA1* mutation carriers (OR=1.10, 95%CI: 0.74-1.64, $p=0.62$) or male *BRCA2* mutation carriers (OR=1.13, 95%CI: 0.97-1.31, $p=0.12$). However, there was association between the CIMBA *BRCA2* PRS and the male breast cancer risk among all the samples (OR=1.16, 95%CI: 1.02-1.33, $p=0.029$) (Supplementary

Table 18). These results are in line with the main findings where the associations were stronger with the overall and ER-positive PRS. The weaker associations with the CIMBA-based PRS are most likely due to the fact that the set of SNPs in the CIMBA-based PRS were subsets of the SNPs included in the PRS derived on the basis of results from population-based studies.

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Supplementary Table 1: Summary of the number of samples excluded during the quality control process

Reason for exclusion	Number of samples excluded
Call Rate<95%	52
Genotypically females	8
XXY	1
Non-European samples	89
Extreme heterozygosity	8
Cryptic duplicates	2
Duplicates	25
Technical failure	2
Total number of exclusions	187

Supplementary Table 2: Description of the samples included in the analyses by study and country

Study name	Country	<i>BRCA1</i> mutation carriers				<i>BRCA2</i> mutation carriers			
		Neither breast cancer nor prostate cancer	Breast cancer only	Prostate cancer only	Breast and prostate cancer	Neither breast cancer nor prostate cancer	Breast cancer only	Prostate cancer only	Breast and prostate cancer
BCFR-AU	Australia	0	0	0	0	0	0	1	0
KCONFAB	Australia	39	5	10	0	128	21	27	4
VFCTG	Australia	11	1	1	0	15	1	2	1
MUV	Austria	3	0	1	0	10	4	1	3
G-FaST	Belgium	0	0	0	0	24	6	0	0
BCFR-ON	Canada	5	1	1	0	6	3	2	0
OCGN	Canada	4	0	2	0	9	3	0	0
CBCS	Denmark	1	0	0	0	0	0	0	0
OUH	Denmark	19	2	5	0	60	10	8	0
HEBCS	Finland	5	0	1	0	20	0	5	0
GEMO	France	7	0	3	0	43	9	5	1
DKFZ	Germany	5	0	0	0	1	0	0	0
GC-HBOC	Germany	28	9	4	0	74	28	4	3
DEMOKRITOS	Greece	1	0	1	0	0	1	0	0
HUNBOCS	Hungary	6	2	0	0	4	13	1	0
ILUH	Iceland	0	0	0	0	26	7	7	2
CONSIT TEAM	Italy	77	2	0	0	64	24	1	5
IOVHBOCS	Italy	0	0	1	0	14	4	1	1
PBCS	Italy	0	0	0	0	1	3	0	0
BFBOCC	Lithuania	3	0	1	0	0	0	0	0
HEBON	Netherlands	6	0	2	0	7	0	0	0
IPOBCS	Portugal	0	0	0	0	9	1	1	1
CNIO	Spain	1	0	0	0	3	0	0	0
HCSC	Spain	0	0	0	0	28	6	3	0
HVH	Spain	1	0	1	0	10	7	1	0
ICO	Spain	7	0	0	0	52	7	4	1
SWE-BRCA	Sweden	6	0	2	0	2	0	1	0
EMBRACE	UK	58	4	15	0	162	19	32	8
BCFR-NC	USA	2	0	0	0	5	0	0	0
BCFR-UT	USA	11	1	2	0	24	1	2	1
BRICOH	USA	12	1	6	0	36	14	8	2
FCCC	USA	1	0	1	0	11	2	2	0
MAYO	USA	2	0	0	0	1	1	0	0
MSKCC	USA	11	1	2	0	27	3	5	2
NCI	USA	5	0	1	1	7	1	0	0
OSU CCG	USA	3	0	1	0	7	2	0	0
UCHICAGO	USA	4	0	3	0	9	2	2	0
UPENN	USA	36	2	3	1	31	6	3	4
UPITT	USA	0	0	1	0	3	6	1	1
Total		380	31	71	2	933	215	130	40

Supplementary Table 3: Mean and standard deviation of the distribution before standardisation of the Overall PRS, ER-negative PRS, ER-positive PRS and Prostate Cancer PRS for *BRCA1* and *BRCA2* mutation carriers

	Mean	Standard Deviation
Overall PRS		
All	0.46	0.51
Controls	0.44	0.51
Breast cancer cases	0.60	0.51
ER-negative PRS		
All	0.26	0.43
Controls	0.26	0.43
Breast cancer cases	0.33	0.41
ER-positive PRS		
All	0.47	0.58
Controls	0.45	0.58
Breast cancer cases	0.63	0.57
Prostate Cancer PRS		
All	1.88	0.75
Controls	1.87	0.74
Prostate cancer cases	2.19	0.71

Supplementary Table 4: SNPs included in the construction of the Overall PRS, ER-negative PRS, ER-positive PRS, CIMBA *BRCA1* or CIMBA *BRCA2* PRS with assumed Odds Ratios or Hazard Ratios for each copy of the effect allele

SNP name	Position ^a	Locus	Effect allele	OR ^b for the Overall PRS	OR ^b for the ER-negative PRS	OR ^b for the ER-positive PRS	HR ^c for the CIMBA <i>BRCA1</i> PRS	HR ^c for the CIMBA <i>BRCA2</i> PRS
rs616488	10566215	1p36.22	G	0.94	0.90	0.96	-	-
rs11552449	114448389	1p13.2	A	1.07	-	1.08	-	-
rs11249433	121280613	1p11.2	G	1.09	-	1.12	-	-
rs12405132	145644984	1q21.1	T	0.95	-	0.93	-	-
rs12048493	149927034	1q21.2	C	1.07	-	1.09	1.06	-
rs6678914	202187176	1q32.1	A	-	0.92	-	-	-
rs4245739	204518842	1q32.1	C	-	1.16	-	1.10	-
rs72755295	242034263	1q43	G	1.15	1.21	1.16	-	1.21
rs12710696	19320803	2p24.1	A	-	1.10	-	-	-
rs4577244	29120733	2p23.2	A	-	0.91	-	0.91	-
rs4849887	121245122	2q14.2	A	0.91	0.91	0.91	-	-
rs2016394	172972971	2q31.1	A	0.95	-	0.94	-	-
rs1550623	174212894	2q31.1	G	0.94	0.95	0.95	-	-
rs1830298	202181247	2q33	C	1.06	1.06	1.05	1.08	-
rs4442975	217920769	2q35	T	0.87	-	0.85	-	-
rs16857609	218296508	2q35	A	1.08	1.08	1.08	-	-
rs6762644	4742276	3p26.1	G	1.07	-	1.07	-	-
rs4973768	27416013	3p24.1	A	1.10	-	1.11	-	1.09
rs12493607	30682939	3p24.1	G	1.06	-	1.07	-	-
rs6796502	46866866	3p21.3	A	0.92	-	0.90	-	-
rs9790517	106084778	4q24	A	1.05	-	1.06	-	-
rs6828523	175846426	4q34.1	A	0.89	-	0.87	-	-
rs56963355	1251503	5p15.33	T	0.90	-	-	-	-
rs10069690	1279790	5p15.33	A	-	-	-	1.21	-
rs2242652	1280028	5p15.33	A	-	1.23	-	-	1.12
rs7734992	1280128	5p15.33	C	1.05	-	-	-	-
rs3215401	1296255	5p15.33	AG	0.94	0.88	-	-	-
rs2736108	1297488	5p15.33	A	-	-	-	0.89	-
rs2736107	1297854	5p15.33	T	-	-	0.95	-	0.92
rs13162653	16187528	5p15.1	T	0.95	-	0.94	-	-
rs2012709	32567732	5p13.3	T	1.05	-	1.05	-	-
rs10941679	44706498	5p12	G	1.13	-	1.16	-	1.08
rs889312	56031884	5q11.2	C	1.12	-	1.15	-	-
rs10472076	58184061	5q11.3	G	1.05	1.05	1.04	-	-
rs1353747	58337481	5q11.3	C	0.92	0.91	0.93	-	-
rs7707921	81538046	5q14	T	0.93	-	0.92	-	-
rs1432679	158244083	5q33.3	G	1.07	1.08	1.07	1.05	-
rs11242675	1318878	6p25.3	G	0.95	0.94	0.95	-	-
rs9348512	10456706	6p24.3	A	-	-	-	-	0.85

SNP name	Position ^a	Locus	Effect allele	OR ^b for the Overall PRS	OR ^b for the ER-negative PRS	OR ^b for the ER-positive PRS	HR ^c for the CIMBA BRCA1 PRS	HR ^c for the CIMBA BRCA2 PRS
rs204247	13722523	6p23	G	1.05	-	1.06	-	1.09
rs9257408	28926220	6p22.1	C	1.05	1.05	1.05	-	-
rs17530068	82193109	6q14	G	1.06	1.05	1.05	-	1.10
rs3757322	151942194	6q25.1	C	1.08	1.14	1.06	1.13	-
rs9397437	151952332	6q25.1	A	1.16	1.18	1.12	1.15	1.09
rs851984	152023191	6q25.1	A	1.07	1.04	1.07	1.04	-
rs9918437	152072718	6q25.1	A	-	1.13	-	1.15	-
rs2747652	152437016	6q25.1	A	0.93	0.89	0.95	-	-
rs4593472	130667121	7q32.3	T	0.95	-	0.94	-	-
rs720475	144074929	7q35	A	0.94	-	0.93	-	-
rs9693444	29509616	8p12	A	1.07	1.09	1.07	-	-
rs13365225	36858483	8p11.23	G	0.95	0.93	0.95	-	-
rs6472903	76230301	8q21.11	C	0.91	0.93	0.91	-	-
rs2943559	76417937	8q21.11	G	1.13	1.08	1.14	-	-
rs13267382	117209548	8q23.3	A	1.05	1.06	1.05	-	-
rs13281615	128355618	8q24.21	G	1.10	-	1.11	-	-
rs11780156	129194641	8q24.21	A	1.07	1.06	1.08	-	-
rs1011970	22062134	9p21.3	A	1.05	1.12	1.04	-	-
rs10759243	110306115	9q31.2	A	1.05	-	1.08	-	-
rs865686	110888478	9q31.2	C	0.90	-	0.87	-	-
rs7072776	22032942	10p12.31	A	1.07	-	1.09	-	-
rs11814448	22315843	10p12.31	C	1.26	1.18	1.25	-	-
rs10995190	64278682	10q21.2	A	0.86	0.87	0.86	-	-
rs704010	80841148	10q22.3	A	1.08	-	1.10	-	-
rs7904519	114773927	10q25.2	G	1.06	1.06	1.05	1.09	-
rs11199914	123093901	10q26.12	A	0.95	-	0.94	-	-
rs35054928	123340431	10q26.12	C	1.27	-	1.33	-	1.27
rs45631563	123349324	10q26.12	A	0.80	-	0.74	-	0.90
rs3817198	1909006	11p15.5	G	1.07	1.06	1.08	1.08	1.11
rs3903072	65583066	11q13.1	A	0.94	0.97	0.94	-	-
rs554219	69331642	11q13.3	G	1.27	-	1.28	-	1.08
rs494406	69344241	11q13.3	A	1.07	-	1.07	-	-
rs75915166	69379161	11q13.3	A	-	-	1.18	-	-
rs11820646	129461171	11q24.3	A	0.95	0.96	0.95	0.93	0.92
rs12422552	14413931	12p13.1	C	1.05	-	1.04	-	-
rs805510	28139846	12p11.22	T	0.93	0.90	0.93	0.89	-
rs7297051	28174817	12p11.22	T	0.92	0.91	0.93	0.91	0.94
rs17356907	96027759	12q22	G	0.91	0.94	0.90	0.95	-
rs4767280	115363953	12q24.22	T	0.96	0.94	0.96	-	0.93
rs1391721	115836132	12q24.21	C	0.92	-	0.91	-	0.91
rs11571833	32972626	13q13.1	A	1.26	1.44	1.25	-	-
rs8002929	73964519	13q22	A	-	0.94	-	0.89	-
rs2236007	37132769	14q13.3	A	0.93	-	0.91	-	-

SNP name	Position ^a	Locus	Effect allele	OR ^b for the Overall PRS	OR ^b for the ER-negative PRS	OR ^b for the ER-positive PRS	HR ^c for the CIMBA BRCA1 PRS	HR ^c for the CIMBA BRCA2 PRS
rs2588809	68660428	14q24.1	A	1.08	-	1.10	-	-
rs999737	69034682	14q24.1	A	0.92	0.95	0.91	-	-
rs941764	91841069	14q32.11	G	1.06	-	1.07	-	-
rs11627032	93104072	14q32.12	C	0.94	0.92	0.95	-	-
rs4784227	52599188	16q12.1_1	T	1.26	1.17	1.27	1.07	1.24
rs17817449	53813367	16q12.1_2	C	0.93	0.91	0.93	0.94	0.94
rs11075995	53855291	16q12.1_2	T	-	1.11	-	-	-
rs13329835	80650805	16q23.2	G	1.08	-	1.09	-	-
chr17:29230520:D	29230520	17q11.2	G	0.93	0.93	0.92	-	0.90
rs6504950	53056471	17q22	A	0.94	-	0.93	-	-
rs745570	77781725	17q25.3	G	0.95	0.95	0.94	0.96	-
rs527616	24337424	18q11.2	G	0.95	-	0.95	-	-
rs1436904	24570667	18q11.2	C	0.95	-	0.94	-	-
rs6507583	42399590	18q12.3	G	0.91	-	0.90	-	-
c19_pos17262859	17401859	19p13.11	A	-	1.16	-	1.21	-
rs4808801	18571141	19p13.11	G	0.93	0.92	0.93	-	-
rs3760982	44286513	19q13.31	A	1.06	1.04	1.06	-	-
rs2823093	16520832	21q21.1	A	0.92	-	0.91	0.95	-
rs132390	29621477	22q12.2	G	1.12	-	1.13	-	-
rs6001930	40876234	22q13.1	G	1.12	1.11	1.12	1.07	-
No. of SNPS for PRS construction				88	53	87	24	20

^aPosition: Built 37 position

^bOR: per allele odds ratio (for the effect allele) used to weight each SNPs

^cHR: per allele hazard ratio (for the effect allele) used to weight each SNPs

Supplementary Table 5: SNPs included in the Prostate cancer PRS with assumed Odds Ratios for each copy of the effect allele

SNP name	Position ^a	Locus	Effect allele	OR ^b for the prostate PRS
rs636291	10556097	1p36.22	A	1.05
rs17599629	150658287	1q21.3	G	1.10
rs4845695	154911798	1q21.3	A	0.93
rs4245739	204518842	1q32.1	A	1.09
rs1775148	205757824	1q32.1	C	1.06
rs11902236	10117868	2p25.1	T	1.07
rs9287719	10710730	2p25.1	C	1.07
rs9306895	20878153	2p24.1	T	0.92
rs7591218	43637998	2p21	A	1.09
rs901532	62763347	2p15	T	1.10
rs58235267	63277843	2p15	C	0.88
rs2028900	85767735	2p11.2	T	0.90
rs13410475	173309618	2q31.1	A	0.78
rs12151618	173415560	2q31.1	T	0.92
rs11891348	238440449	2q37.3	T	0.92
rs111770284	242157087	2q37.3	T	1.13
rs183997311	242420971	2q37.3	A	0.67
rs143351723	87142064	3p12.1	C	0.85
rs2088396	87192778	3p12.1	C	0.90
rs114278123	87372756	3p11.2	A	0.86
rs6769767	113282326	3q13.2	A	0.90
rs10934853	128038373	3q21.3	A	1.12
rs6763931	141102833	3q23	A	1.06
rs78416326	170074517	3q26.2	C	0.83
rs11288195	170092053	3q26.2	A	1.12
rs1894292	74349158	4q13.3	A	0.92
rs7682375	95505592	4q22.3	A	1.09
rs6853490	95544718	4q22.3	A	0.93
rs7679673	106061534	4q24	C	1.15
rs2242652	1280028	5p15.33	G	1.18
rs10866527	1891800	5p15.33	T	1.08
rs1482679	44385415	5p12	A	0.92
rs6869841	172939426	5q35.2	T	1.07
rs4713266	11219030	6p24.2	C	1.07
rs115457135	30073776	6p22.1	A	1.08
rs2596546	31329386	6p21.33	A	1.09
rs115306967	32400939	6p21.32	C	0.93
rs6458228	41543793	6p21.1	A	1.08
rs9443189	76495882	6q14.1	A	1.07
rs12209480	109279211	6q21	A	1.12
rs339331	117210052	6q22.1	T	1.10
rs3968480b	153432566	6q25.2	A	0.90
rs4646284	160581543	6q25.3	T	0.81
rs2063347	160882029	6q25.3	A	1.07
rs10713532	20996952	7p15.3	T	0.89
rs200362064	27591214	7p15.2	T	0.94
rs10486567	27976563	7p15.2	A	0.88
rs56232506	47437244	7p12.3	A	1.07
rs6965016	97807882	7q21.3	A	0.89
rs2928679	23438975	8p21.2	A	1.06
rs1512268	23526463	8p21.2	T	1.14
rs6984769	25910156	8p21.2	T	1.10
rs16901979	128124916	8q24.21	A	1.65

SNP name	Position ^a	Locus	Effect allele	OR ^b for the prostate PRS
rs6983267	128413305	8q24.21	G	1.25
rs1447295	128485038	8q24.21	A	1.43
rs17694493	22041998	9p21.3	G	1.10
rs1771718	110151379	9q31.2	T	0.92
rs76934034	46082985	10q11.21	T	1.14
rs10993994	51549496	10q11.23	T	1.26
rs34032774	104415093	10q24.32	CT	1.09
rs67609008	126640936	10q26.13	T	0.94
rs11043143	2234093	11p15.5	T	1.24
rs12275055	68981359	11q13.3	A	0.83
rs10792032	68984602	11q13.3	A	1.13
rs36225067	69453985	11q13.3	A	0.80
rs11568818	102401661	11q22.2	T	1.09
rs11214775	113807181	11q23.2	G	1.08
rs80130819	48419618	12q13.11	A	1.13
rs10875943	49676010	12q13.12	T	0.91
rs73110471	53316821	12q13.13	A	1.18
rs1270884	114685571	12q24.21	A	1.08
rs61933115	115084059	12q24.21	A	1.09
rs62003539	53389699	14q22.1	T	1.15
rs7153648	61122526	14q23.1	C	1.09
rs2189517	69002988	14q24.1	A	1.06
rs17105852	69030652	14q24.1	A	0.86
rs7141529	69126744	14q24.1	T	0.92
rs8014671	71092256	14q24.2	G	1.07
rs12051443	71691329	16q22.2	A	1.06
rs461251	619162	17p13.3	A	0.90
rs2229295	36047276	17q12	T	1.10
rs718961	36077099	17q12	A	0.90
rs11263763	36103565	17q12	A	1.25
rs138263737	46915735	17q21.32	T	1.93
rs11655191	47452263	17q21.33	T	1.13
rs8072735	69117214	17q24.3	T	1.21
rs9959454	76770820	18q23	A	1.09
rs12610267	38744733	19q13.2	A	1.10
rs74738513	41985931	19q13.2	A	0.90
rs2735839	51364623	19q13.33	G	1.20
rs12480328	49527922	20q13.13	T	1.13
rs2427345	61015611	20q13.33	C	1.07
rs1058319	62374389	20q13.33	T	0.84
rs1041449	42901421	21q22.3	G	1.06
rs2238776	19757892	22q11.21	G	1.09
rs11704314	40797933	22q13.1	A	0.92
rs5759167	43500212	22q13.2	T	0.87
rs5751435	43513156	22q13.2	T	0.88
rs2405943	9814284	23p22.2	T	0.93
rs1541241	51287789	23p11.22	T	1.12
rs2807031	52896949	23p11.22	C	1.07
rs4446868	66881583	23q12	T	0.93
rs4844289	70407983	23q13.1	G	1.05

^aPosition: Built 37 position

^bOR: per allele odds ratio used to weight each SNP

Supplementary Table 6: Inflation factor in the test statistic for association with disease risk on the basis of all imputed and genotyped SNPs selected for the analyses (N=9,530,887) and on the basis of the GWAS-backbone SNPs (N=233,244)

	Breast cancer associations		Prostate cancer associations	
	λ for all SNP	λ for backbone SNPs	λ for all SNP	λ for backbone SNPs
ALL Samples	0.994	1.008	1.016	1.028
<i>BRCA1</i> Samples	1.008	0.991	1.010	1.014
<i>BRCA2</i> Samples	1.015	1.019	1.022	1.030

Supplementary Table 7: Results from the single SNP analysis. A total of 168 SNPs associated with male breast cancer risk with $p < 10^{-5}$ in all samples (*BRCA1* and *BRCA2* combined)

SNP name	Chr ^a	Position ^b	r ^{2c}	Baseline allele	Effect allele	EAF ^d in controls	EAF ^d in breast cancer cases	EAF ^d in prostate cancer cases	Association with breast cancer			Association with prostate cancer		
									Beta ^e	s.e. ^f	p-value	Beta ^e	s.e. ^f	p-value
rs76216839:246395109:C:CA	1	246395109	0.985	C	CA	0.026	0.072	0.036	1.13	0.22	2.95×10 ⁻⁷	0.34	0.29	0.25
chrX_69314251_C_T	23	69314251	1.000	C	T	0.028	0.097	0.028	0.70	0.14	3.21×10 ⁻⁷	0.05	0.23	0.83
rs147425910:69313771:A:G	23	69313771	0.997	A	G	0.028	0.097	0.028	0.70	0.14	3.38×10 ⁻⁷	0.05	0.23	0.83
rs2730338:16179863:C:T	3	16179863	0.957	C	T	0.772	0.681	0.762	-0.56	0.11	4.3×10 ⁻⁷	-0.04	0.13	0.74
rs111471013:87486588:ATGTGTG:A	6	87486588	0.875	ATGTGTG	A	0.712	0.605	0.745	-0.55	0.11	4.44×10 ⁻⁷	0.21	0.13	0.10
rs11340525:50196940:GT:G	14	50196940	0.688	GT	G	0.867	0.801	0.878	-0.74	0.15	5.44×10 ⁻⁷	0.14	0.19	0.45
rs200776800:167137613:GAGA:G	1	167137613	0.753	GAGA	G	0.015	0.043	0.015	1.62	0.32	5.48×10 ⁻⁷	-0.13	0.52	0.80
rs143550752:69318207:A:C	23	69318207	0.985	A	C	0.029	0.096	0.028	0.69	0.14	5.58×10 ⁻⁷	0.04	0.23	0.86
rs145409277:69329329:G:A	23	69329329	0.975	G	A	0.029	0.096	0.028	0.69	0.14	5.59×10 ⁻⁷	0.04	0.23	0.86
rs185829107:69333894:G:A	23	69333894	0.963	G	A	0.029	0.095	0.028	0.70	0.14	5.79×10 ⁻⁷	0.04	0.23	0.85
rs145516212:69334186:C:T	23	69334186	0.962	C	T	0.029	0.095	0.028	0.70	0.14	5.84×10 ⁻⁷	0.05	0.23	0.84
rs11719989:192438197:G:T	3	192438197	0.635	G	T	0.016	0.044	0.020	1.67	0.34	6.81×10 ⁻⁷	0.33	0.48	0.49
rs61748781:167097070:G:A	1	167097070	0.765	G	A	0.019	0.047	0.015	1.46	0.30	7.77×10 ⁻⁷	-0.34	0.50	0.50
rs79085164:246393004:G:A	1	246393004	0.983	G	A	0.024	0.067	0.035	1.12	0.23	8.7×10 ⁻⁷	0.37	0.30	0.20
rs140053665:246391358:G:A	1	246391358	0.982	G	A	0.024	0.067	0.035	1.12	0.23	8.7×10 ⁻⁷	0.37	0.30	0.20
rs79570895:246422807:C:T	1	246422807	0.984	C	T	0.024	0.067	0.035	1.12	0.23	8.85×10 ⁻⁷	0.37	0.30	0.21
rs112806420:246486213:A:G	1	246486213	0.991	A	G	0.026	0.069	0.040	1.08	0.22	8.95×10 ⁻⁷	0.44	0.28	0.11
rs113692318:246491508:C:CA	1	246491508	0.990	C	CA	0.026	0.069	0.040	1.08	0.22	9.06×10 ⁻⁷	0.44	0.28	0.11
rs116146431:246379001:G:C	1	246379001	0.980	G	C	0.024	0.067	0.035	1.12	0.23	9.27×10 ⁻⁷	0.38	0.30	0.20
rs114966206:246417709:G:C	1	246417709	0.979	G	C	0.024	0.067	0.035	1.11	0.23	9.56×10 ⁻⁷	0.37	0.30	0.22
rs186332467:246412634:G:A	1	246412634	0.979	G	A	0.024	0.067	0.035	1.11	0.23	9.57×10 ⁻⁷	0.37	0.30	0.22
rs77274418:246484176:G:A	1	246484176	0.957	G	A	0.027	0.071	0.042	1.08	0.22	1.03×10 ⁻⁶	0.44	0.28	0.11
rs11600894:120478676:C:T	11	120478676	0.970	C	T	0.396	0.292	0.360	-0.53	0.11	1.03×10 ⁻⁶	-0.13	0.11	0.24
rs114127577:49903813:G:A	5	49903813	0.681	G	A	0.086	0.144	0.086	0.87	0.18	1.14×10 ⁻⁶	0.09	0.23	0.69
rs11600354:120477883:G:A	11	120477883	0.966	G	A	0.393	0.290	0.355	-0.52	0.11	1.24×10 ⁻⁶	-0.14	0.11	0.21
rs10274344:90838106:C:G	7	90838106	0.945	C	G	0.045	0.092	0.058	0.92	0.19	1.25×10 ⁻⁶	0.30	0.24	0.21
rs76078502:246463395:C:T	1	246463395	0.987	C	T	0.025	0.068	0.040	1.07	0.22	1.3×10 ⁻⁶	0.45	0.28	0.10
rs144103868:246474090:G:A	1	246474090	0.993	G	A	0.025	0.068	0.040	1.07	0.22	1.31×10 ⁻⁶	0.44	0.28	0.11
rs185087143:246479872:G:A	1	246479872	0.993	G	A	0.025	0.068	0.040	1.07	0.22	1.33×10 ⁻⁶	0.44	0.28	0.11
rs13282617:90029977:C:G	8	90029977	0.967	C	G	0.054	0.106	0.052	0.84	0.17	1.33×10 ⁻⁶	-0.11	0.25	0.65
rs77339204:246481183:T:C	1	246481183	0.993	T	C	0.025	0.068	0.040	1.07	0.22	1.34×10 ⁻⁶	0.44	0.28	0.11
rs1538692:246460806:C:T	1	246460806	0.989	C	T	0.025	0.068	0.041	1.08	0.22	1.39×10 ⁻⁶	0.47	0.28	0.09
rs76562663:246484960:G:C	1	246484960	0.993	G	C	0.026	0.068	0.040	1.07	0.22	1.39×10 ⁻⁶	0.44	0.28	0.11

SNP name	Chr ^a	Position ^b	r ² ^c	Baseline allele	Effect allele	EAF ^d in controls	EAF ^d in breast cancer cases	EAF ^d in prostate cancer cases	Association with breast cancer			Association with prostate cancer		
									Beta ^e	s.e. ^f	p-value	Beta ^e	s.e. ^f	p-value
rs139780901:246489842:G:A	1	246489842	0.992	G	A	0.026	0.068	0.040	1.07	0.22	1.40×10 ⁻⁶	0.44	0.28	0.12
rs79589520:246491119:A:C	1	246491119	0.992	A	C	0.026	0.068	0.040	1.07	0.22	1.41×10 ⁻⁶	0.44	0.28	0.12
rs75066090:246493558:G:C	1	246493558	0.991	G	C	0.026	0.068	0.040	1.07	0.22	1.42×10 ⁻⁶	0.44	0.28	0.12
rs77432753:246494658:T:A	1	246494658	0.991	T	A	0.026	0.068	0.040	1.07	0.22	1.42×10 ⁻⁶	0.44	0.28	0.12
rs116629135:246495417:T:G	1	246495417	0.991	T	G	0.026	0.068	0.040	1.07	0.22	1.43×10 ⁻⁶	0.44	0.28	0.12
rs77375743:246495506:A:C	1	246495506	0.991	A	C	0.026	0.068	0.040	1.07	0.22	1.43×10 ⁻⁶	0.44	0.28	0.12
rs114570650:246370843:T:C	1	246370843	0.978	T	C	0.024	0.065	0.036	1.11	0.23	1.48×10 ⁻⁶	0.39	0.30	0.19
rs244725:176536402:T:C	5	176536402	0.967	T	C	0.382	0.496	0.378	0.47	0.10	1.51×10 ⁻⁶	-0.03	0.11	0.78
rs9726870:246418633:T:A	1	246418633	0.954	T	A	0.028	0.073	0.037	1.05	0.22	1.51×10 ⁻⁶	0.27	0.29	0.35
rs148033290:246450201:T:C	1	246450201	0.988	T	C	0.025	0.068	0.041	1.08	0.22	1.51×10 ⁻⁶	0.49	0.28	0.08
rs201246492:246450181:T:TG	1	246450181	0.988	T	TG	0.025	0.068	0.041	1.08	0.22	1.51×10 ⁻⁶	0.49	0.28	0.08
rs75552700:246368479:C:T	1	246368479	0.979	C	T	0.024	0.065	0.036	1.10	0.23	1.54×10 ⁻⁶	0.39	0.30	0.19
rs13255290:90005576:T:C	8	90005576	0.969	T	C	0.057	0.109	0.053	0.83	0.17	1.56×10 ⁻⁶	-0.15	0.24	0.55
rs75066702:246501822:T:C	1	246501822	0.988	T	C	0.026	0.068	0.040	1.06	0.22	1.58×10 ⁻⁶	0.43	0.28	0.12
rs75975916:246359097:T:C	1	246359097	0.968	T	C	0.024	0.065	0.035	1.11	0.23	1.60×10 ⁻⁶	0.40	0.30	0.18
1:246502815:A:ATCCAAGTATCAGATCAAAG	1	246502815	0.988	A	ATCCAAGTATCAGATCAAAG	0.026	0.068	0.040	1.06	0.22	1.61×10 ⁻⁶	0.43	0.28	0.12
1:246502816:A:AT	1	246502816	0.988	A	AT	0.026	0.068	0.040	1.06	0.22	1.61×10 ⁻⁶	0.43	0.28	0.12
1:246502816:A:T	1	246502816	0.988	A	T	0.026	0.068	0.040	1.06	0.22	1.61×10 ⁻⁶	0.43	0.28	0.12
rs115049480:246503116:G:A	1	246503116	0.988	G	A	0.026	0.068	0.040	1.06	0.22	1.61×10 ⁻⁶	0.43	0.28	0.12
rs116213659:246503082:A:G	1	246503082	0.988	A	G	0.026	0.068	0.040	1.06	0.22	1.61×10 ⁻⁶	0.43	0.28	0.12
rs115636931:246503068:G:A	1	246503068	0.988	G	A	0.026	0.068	0.040	1.06	0.22	1.61×10 ⁻⁶	0.43	0.28	0.12
rs201357693:246447753:CTT:C	1	246447753	0.988	CTT	C	0.025	0.067	0.042	1.08	0.22	1.65×10 ⁻⁶	0.50	0.28	0.07
rs76598257:246508712:G:C	1	246508712	0.973	G	C	0.026	0.067	0.039	1.08	0.22	1.66×10 ⁻⁶	0.42	0.28	0.14
rs17677760:90020671:T:G	8	90020671	0.973	T	G	0.054	0.105	0.047	0.84	0.18	1.77×10 ⁻⁶	-0.23	0.26	0.37
rs9854389:25945806:G:A	3	25945806	0.832	G	A	0.020	0.058	0.021	1.27	0.27	1.81×10 ⁻⁶	0.11	0.41	0.78
rs78750949:246513266:A:G	1	246513266	0.972	A	G	0.026	0.067	0.039	1.07	0.22	1.86×10 ⁻⁶	0.42	0.28	0.14
rs77651504:246559703:G:A	1	246559703	0.946	G	A	0.032	0.075	0.033	1.01	0.21	1.96×10 ⁻⁶	0.03	0.30	0.93
rs74329440:246429256:A:G	1	246429256	0.988	A	G	0.025	0.067	0.043	1.07	0.23	1.96×10 ⁻⁶	0.53	0.27	0.05
rs2657603:16180240:G:A	3	16180240	0.952	G	A	0.773	0.688	0.760	-0.53	0.11	1.97×10 ⁻⁶	-0.05	0.13	0.70
rs13073422:16180235:G:A	3	16180235	0.952	G	A	0.773	0.688	0.760	-0.53	0.11	1.97×10 ⁻⁶	-0.05	0.13	0.70
rs35181812:120497465:C:T	11	120497465	0.891	C	T	0.323	0.230	0.292	-0.58	0.12	1.98×10 ⁻⁶	-0.13	0.12	0.28
rs11575741:115333651:C:T	10	115333651	0.924	C	T	0.007	0.032	0.021	1.75	0.37	1.98×10 ⁻⁶	1.22	0.44	4.99×10 ⁻³
rs115594689:246560484:C:A	1	246560484	0.945	C	A	0.032	0.075	0.033	1.01	0.21	2.00×10 ⁻⁶	0.02	0.30	0.94
rs78088532:246506672:T:C	1	246506672	0.984	T	C	0.026	0.068	0.040	1.06	0.22	2.00×10 ⁻⁶	0.43	0.28	0.13
rs114812938:246441028:T:C	1	246441028	0.991	T	C	0.025	0.067	0.043	1.07	0.23	2.03×10 ⁻⁶	0.53	0.27	0.05

SNP name	Chr ^a	Position ^b	r ² ^c	Baseline allele	Effect allele	EAF ^d in controls	EAF ^d in breast cancer cases	EAF ^d in prostate cancer cases	Association with breast cancer			Association with prostate cancer		
									Beta ^e	s.e. ^f	p-value	Beta ^e	s.e. ^f	p-value
rs150561703:246590829:A:T	1	246590829	0.948	A	T	0.031	0.075	0.030	1.01	0.21	2.04×10 ⁻⁶	-0.04	0.31	0.89
rs78714516:33499672:A:T	13	33499672	0.811	A	T	0.034	0.072	0.049	1.11	0.23	2.06×10 ⁻⁶	0.39	0.29	0.19
rs11575745:115334304:C:CT	10	115334304	0.927	C	CT	0.007	0.032	0.021	1.75	0.37	2.09×10 ⁻⁶	1.21	0.44	0.01
rs116744657:246582158:C:T	1	246582158	0.952	C	T	0.032	0.075	0.033	1.01	0.21	2.14×10 ⁻⁶	0.02	0.30	0.95
rs75932170:246511101:A:G	1	246511101	0.982	A	G	0.026	0.067	0.040	1.05	0.22	2.25×10 ⁻⁶	0.42	0.28	0.13
rs74367074:246563301:A:G	1	246563301	0.946	A	G	0.032	0.075	0.033	1.00	0.21	2.27×10 ⁻⁶	0.02	0.30	0.95
rs139914907:167146103:G:A	1	167146103	0.699	G	A	0.014	0.039	0.014	1.62	0.34	2.41×10 ⁻⁶	-0.07	0.55	0.90
rs79362349:246565632:A:G	1	246565632	0.948	A	G	0.032	0.075	0.033	1.00	0.21	2.44×10 ⁻⁶	0.02	0.30	0.96
rs77714032:25949839:C:A	3	25949839	0.889	C	A	0.049	0.099	0.047	0.88	0.19	2.45×10 ⁻⁶	-0.02	0.26	0.93
rs140472458:25953060:G:T	3	25953060	0.835	G	T	0.020	0.056	0.021	1.27	0.27	2.49×10 ⁻⁶	0.12	0.41	0.78
rs76622204:246570721:C:T	1	246570721	0.950	C	T	0.032	0.075	0.033	1.00	0.21	2.55×10 ⁻⁶	0.01	0.30	0.97
rs79781602:246567949:G:A	1	246567949	0.949	G	A	0.032	0.075	0.033	1.00	0.21	2.57×10 ⁻⁶	0.01	0.30	0.96
rs79671408:246568827:G:A	1	246568827	0.950	G	A	0.032	0.075	0.033	1.00	0.21	2.61×10 ⁻⁶	0.01	0.30	0.97
rs143546145:246569291:C:T	1	246569291	0.950	C	T	0.032	0.075	0.033	1.00	0.21	2.62×10 ⁻⁶	0.01	0.30	0.97
1:246573684:T:G	1	246573684	0.946	T	G	0.032	0.076	0.033	0.99	0.21	2.68×10 ⁻⁶	0.01	0.30	0.98
rs115382377:246572021:G:C	1	246572021	0.952	G	C	0.032	0.075	0.033	0.99	0.21	2.73×10 ⁻⁶	0.01	0.30	0.97
1:246572810:G:A	1	246572810	0.952	G	A	0.032	0.075	0.033	0.99	0.21	2.77×10 ⁻⁶	0.01	0.30	0.97
3:26468824:GTA:G	3	26468824	0.768	GTA	G	0.284	0.378	0.312	0.54	0.12	2.81×10 ⁻⁶	0.19	0.13	0.14
rs2152087:246503544:C:A	1	246503544	0.981	C	A	0.969	0.926	0.953	-0.98	0.21	2.84×10 ⁻⁶	-0.44	0.26	0.09
rs147154179:246576030:G:A	1	246576030	0.954	G	A	0.032	0.075	0.033	0.99	0.21	2.92×10 ⁻⁶	0.01	0.30	0.97
rs34884722:120479125:A:G	11	120479125	0.972	A	G	0.405	0.305	0.366	-0.50	0.11	2.94×10 ⁻⁶	-0.14	0.11	0.21
17:29222409:G:GTTTTTTTT	17	29222409	0.986	G	GTTTTTTTT	0.244	0.333	0.249	0.51	0.11	2.99×10 ⁻⁶	0.04	0.13	0.73
rs115220580:246503083:T:C	1	246503083	0.986	T	C	0.027	0.068	0.042	1.03	0.22	3.11×10 ⁻⁶	0.44	0.27	0.10
rs199684281:246580045:T:TA	1	246580045	0.956	T	TA	0.032	0.075	0.033	0.98	0.21	3.13×10 ⁻⁶	0.01	0.30	0.98
rs146730883:246585880:C:T	1	246585880	0.956	C	T	0.032	0.075	0.033	0.98	0.21	3.14×10 ⁻⁶	0.01	0.30	0.98
rs77749019:246580735:G:C	1	246580735	0.957	G	C	0.032	0.075	0.033	0.98	0.21	3.16×10 ⁻⁶	0.01	0.30	0.98
rs80021183:246583000:T:C	1	246583000	0.956	T	C	0.032	0.075	0.033	0.98	0.21	3.17×10 ⁻⁶	0.01	0.30	0.98
rs77422326:246587363:C:A	1	246587363	0.956	C	A	0.032	0.075	0.033	0.98	0.21	3.19×10 ⁻⁶	0.01	0.30	0.99
rs78059362:246588042:G:A	1	246588042	0.956	G	A	0.032	0.075	0.033	0.98	0.21	3.20×10 ⁻⁶	0.01	0.30	0.99
rs78486697:246589818:G:A	1	246589818	0.956	G	A	0.032	0.075	0.032	0.98	0.21	3.20×10 ⁻⁶	0.00	0.30	0.99
rs368506379:246601365:T:C	1	246601365	0.951	T	C	0.032	0.075	0.032	0.98	0.21	3.33×10 ⁻⁶	0.00	0.31	0.99
rs74839228:246601663:T:C	1	246601663	0.951	T	C	0.032	0.075	0.032	0.98	0.21	3.33×10 ⁻⁶	0.00	0.31	0.99
rs376421245:246602073:GATCATCCA:G	1	246602073	0.951	GATCATCC A	G	0.032	0.075	0.032	0.98	0.21	3.34×10 ⁻⁶	0.00	0.31	0.99
rs149644518:246542149:A:ATATATT	1	246542149	0.948	A	ATATATT	0.036	0.081	0.049	0.95	0.20	3.47×10 ⁻⁶	0.30	0.26	0.24
rs200115205:29953690:G:GT	14	29953690	0.768	G	GT	0.810	0.730	0.771	-0.58	0.13	3.73×10 ⁻⁶	-0.28	0.14	0.05
rs2153379:246508196:A:G	1	246508196	0.975	A	G	0.968	0.926	0.953	-0.97	0.21	3.77×10 ⁻⁶	-0.42	0.26	0.10

SNP name	Chr ^a	Position ^b	r ^{2c}	Baseline allele	Effect allele	EAF ^d in controls	EAF ^d in breast cancer cases	EAF ^d in prostate cancer cases	Association with breast cancer			Association with prostate cancer		
									Beta ^e	s.e. ^f	p-value	Beta ^e	s.e. ^f	p-value
rs4654241:246515468:T:G	1	246515468	0.969	T	G	0.968	0.925	0.953	-0.97	0.21	3.93×10 ⁻⁶	-0.43	0.26	0.10
rs75237045:25953216:G:C	3	25953216	0.889	G	C	0.049	0.099	0.047	0.86	0.19	3.99×10 ⁻⁶	-0.04	0.26	0.87
rs12286173:120486195:C:T	11	120486195	0.990	C	T	0.409	0.310	0.373	-0.48	0.10	4.09×10 ⁻⁶	-0.13	0.11	0.24
rs12278678:120481866:G:A	11	120481866	0.976	G	A	0.392	0.294	0.352	-0.49	0.11	4.10×10 ⁻⁶	-0.15	0.11	0.19
rs2153381:246507983:T:A	1	246507983	0.975	T	A	0.969	0.927	0.953	-0.97	0.21	4.13×10 ⁻⁶	-0.43	0.26	0.09
rs78877512:246531610:A:T	1	246531610	0.894	A	T	0.042	0.088	0.057	0.92	0.20	4.15×10 ⁻⁶	0.33	0.25	0.19
rs11600274:120477398:G:A	11	120477398	0.965	G	A	0.395	0.298	0.355	-0.49	0.11	4.31×10 ⁻⁶	-0.15	0.11	0.20
rs11602011:120480258:C:G	11	120480258	0.976	C	G	0.405	0.306	0.369	-0.49	0.11	4.32×10 ⁻⁶	-0.13	0.11	0.24
rs34759019:120479913:C:A	11	120479913	0.978	C	A	0.403	0.305	0.366	-0.48	0.11	4.65×10 ⁻⁶	-0.13	0.11	0.23
rs78795342:246550057:G:A	1	246550057	0.943	G	A	0.058	0.110	0.069	0.77	0.17	4.75×10 ⁻⁶	0.16	0.21	0.46
rs11605735:120480136:A:T	11	120480136	0.979	A	T	0.403	0.305	0.366	-0.48	0.11	4.89×10 ⁻⁶	-0.13	0.11	0.24
rs11601552:120480191:C:A	11	120480191	0.979	C	A	0.403	0.305	0.366	-0.48	0.11	4.91×10 ⁻⁶	-0.13	0.11	0.24
rs4656364:162278855:T:C	1	162278855	0.981	T	C	0.085	0.154	0.103	0.65	0.14	4.94×10 ⁻⁶	0.21	0.18	0.24
rs11604139:120480291:T:A	11	120480291	0.980	T	A	0.403	0.305	0.366	-0.48	0.11	4.96×10 ⁻⁶	-0.13	0.11	0.24
rs199730253:55407179:G:A	8	55407179	0.721	G	A	0.347	0.261	0.327	-0.60	0.13	5.04×10 ⁻⁶	-0.16	0.14	0.24
rs12541487:89997734:C:A	8	89997734	0.973	C	A	0.084	0.140	0.105	0.70	0.15	5.10×10 ⁻⁶	0.23	0.18	0.20
rs7532839:162276716:G:A	1	162276716	0.982	G	A	0.085	0.154	0.102	0.65	0.14	5.12×10 ⁻⁶	0.20	0.18	0.27
rs10800444:162282513:C:T	1	162282513	0.981	C	T	0.085	0.153	0.103	0.65	0.14	5.28×10 ⁻⁶	0.20	0.18	0.26
rs4654242:246515522:T:C	1	246515522	0.975	T	C	0.969	0.927	0.953	-0.96	0.21	5.29×10 ⁻⁶	-0.43	0.26	0.09
rs6692293:246516011:T:G	1	246516011	0.975	T	G	0.969	0.927	0.953	-0.96	0.21	5.36×10 ⁻⁶	-0.43	0.26	0.09
rs10093601:102003950:G:A	8	102003950	0.676	G	A	0.148	0.091	0.127	-0.95	0.21	5.43×10 ⁻⁶	-0.21	0.20	0.28
rs182465698:69305558:G:A	23	69305558	0.974	G	A	0.040	0.104	0.028	0.59	0.13	5.47×10 ⁻⁶	-0.14	0.23	0.53
rs28830515:25961302:A:G	3	25961302	0.843	A	G	0.020	0.055	0.021	1.22	0.27	5.67×10 ⁻⁶	0.15	0.40	0.72
rs202010370:99684457:T:C	9	99684457	0.822	T	C	0.034	0.073	0.033	1.05	0.23	5.77×10 ⁻⁶	-0.07	0.35	0.83
2:69365227:G:GA	2	69365227	0.524	G	GA	0.007	0.025	0.018	2.47	0.55	5.91×10 ⁻⁶	1.99	0.62	1.33×10 ⁻³
1:246548618:G:A	1	246548618	0.949	G	A	0.033	0.076	0.049	0.95	0.21	6.04×10 ⁻⁶	0.39	0.26	0.13
12:3289484:C:T	12	3289484	0.910	C	T	0.011	0.035	0.012	1.51	0.33	6.14×10 ⁻⁶	0.04	0.52	0.94
rs11575732:115331810:T:G	10	115331810	0.888	T	G	0.009	0.034	0.021	1.58	0.35	6.30×10 ⁻⁶	0.99	0.43	0.02
rs80224782:246518838:G:A	1	246518838	0.901	G	A	0.043	0.091	0.057	0.88	0.20	6.44×10 ⁻⁶	0.28	0.25	0.26
rs74862271:246519393:G:A	1	246519393	0.901	G	A	0.043	0.091	0.057	0.88	0.20	6.49×10 ⁻⁶	0.28	0.25	0.26
rs12057315:246599820:A:T	1	246599820	0.952	A	T	0.033	0.075	0.032	0.95	0.21	6.53×10 ⁻⁶	-0.04	0.30	0.89
rs12088390:246599821:G:T	1	246599821	0.952	G	T	0.033	0.075	0.032	0.95	0.21	6.53×10 ⁻⁶	-0.04	0.30	0.89
rs76171463:192456000:C:T	3	192456000	0.707	C	T	0.010	0.033	0.015	1.74	0.39	6.59×10 ⁻⁶	0.51	0.52	0.33
rs149391667:128531338:A:T	6	128531338	0.663	A	T	0.010	0.032	0.029	1.79	0.40	6.59×10 ⁻⁶	1.59	0.43	2.32×10 ⁻⁴
rs141479235:246521490:TA:T	1	246521490	0.901	TA	T	0.043	0.090	0.057	0.88	0.20	6.73×10 ⁻⁶	0.28	0.25	0.26
rs78962656:246556196:C:T	1	246556196	0.961	C	T	0.036	0.079	0.049	0.92	0.20	6.94×10 ⁻⁶	0.31	0.26	0.23

SNP name	Chr ^a	Position ^b	r2 ^c	Baseline allele	Effect allele	EAF ^d in controls	EAF ^d in breast cancer cases	EAF ^d in prostate cancer cases	Association with breast cancer			Association with prostate cancer		
									Beta ^e	s.e. ^f	p-value	Beta ^e	s.e. ^f	p-value
10:130739755:C:G	10	130739755	0.676	C	G	0.029	0.060	0.042	1.22	0.27	7.03×10 ⁻⁶	0.51	0.33	0.13
rs4588769:152288187:T:C	7	152288187	0.916	T	C	0.065	0.118	0.097	0.75	0.17	7.26×10 ⁻⁶	0.44	0.19	0.02
rs79936639:152287759:G:A	7	152287759	0.915	G	A	0.065	0.118	0.097	0.75	0.17	7.33×10 ⁻⁶	0.44	0.19	0.02
rs4383897:152288321:G:T	7	152288321	0.916	G	T	0.066	0.118	0.097	0.75	0.17	7.36×10 ⁻⁶	0.44	0.19	0.02
rs4409325:152288396:C:T	7	152288396	0.916	C	T	0.066	0.118	0.097	0.75	0.17	7.36×10 ⁻⁶	0.44	0.19	0.02
rs148534219:152287190:T:C	7	152287190	0.915	T	C	0.065	0.117	0.096	0.75	0.17	7.38×10 ⁻⁶	0.44	0.20	0.03
rs6967685:152287128:G:A	7	152287128	0.915	G	A	0.065	0.117	0.096	0.75	0.17	7.41×10 ⁻⁶	0.43	0.20	0.03
rs115117321:152286443:C:T	7	152286443	0.915	C	T	0.065	0.117	0.096	0.75	0.17	7.47×10 ⁻⁶	0.43	0.20	0.03
rs12278532:120481773:C:T	11	120481773	0.979	C	T	0.397	0.300	0.359	-0.47	0.11	7.61×10 ⁻⁶	-0.13	0.11	0.23
rs7044440:99678687:A:G	9	99678687	0.662	A	G	0.081	0.127	0.075	0.84	0.19	7.62×10 ⁻⁶	-0.13	0.26	0.61
rs76844062:246529176:G:A	1	246529176	0.901	G	A	0.044	0.090	0.057	0.87	0.20	7.74×10 ⁻⁶	0.27	0.25	0.27
rs115935802:246558014:C:A	1	246558014	0.958	C	A	0.036	0.079	0.049	0.91	0.20	7.75×10 ⁻⁶	0.31	0.26	0.23
rs143306341:246558024:CT:C	1	246558024	0.957	CT	C	0.036	0.079	0.049	0.91	0.20	7.76×10 ⁻⁶	0.31	0.26	0.23
rs150864953:19560976:CAA:C	6	19560976	0.505	CAA	C	0.583	0.514	0.525	-0.61	0.14	7.92×10 ⁻⁶	-0.50	0.15	9.19×10 ⁻⁴
rs142025070:128600842:A:C	6	128600842	0.731	A	C	0.012	0.036	0.032	1.60	0.36	7.94×10 ⁻⁶	1.45	0.39	2.11×10 ⁻⁴
rs11971964:152289676:G:T	7	152289676	0.915	G	T	0.067	0.118	0.098	0.74	0.17	8.01×10 ⁻⁶	0.43	0.19	0.03
rs17343897:123460687:T:C	8	123460687	0.978	T	C	0.119	0.192	0.140	0.58	0.13	8.23×10 ⁻⁶	0.21	0.15	0.18
rs17343869:123460576:G:A	8	123460576	0.979	G	A	0.119	0.192	0.140	0.58	0.13	8.30×10 ⁻⁶	0.21	0.15	0.18
rs2621322	6	32788712	1.000	T	G	0.156	0.242	0.184	0.53	0.12	8.32×10 ⁻⁶	0.20	0.14	0.15
chr7_90833383_C_T	7	90833383	1.000	T	C	0.049	0.094	0.054	0.80	0.18	8.36×10 ⁻⁶	0.13	0.23	0.57
rs9608003:43502927:C:T	22	43502927	0.944	C	T	0.051	0.102	0.044	0.81	0.18	8.41×10 ⁻⁶	-0.17	0.26	0.53
rs4631889:120494034:G:A	11	120494034	0.967	G	A	0.402	0.306	0.365	-0.47	0.11	8.48×10 ⁻⁶	-0.13	0.11	0.26
rs72753741:49930871:C:T	5	49930871	0.713	C	T	0.102	0.157	0.100	0.73	0.17	8.95×10 ⁻⁶	0.05	0.21	0.81
rs145851615:128494500:A:G	6	128494500	0.651	A	G	0.011	0.033	0.029	1.74	0.39	8.97×10 ⁻⁶	1.48	0.43	6.01×10 ⁻⁴
rs146956491:128485056:A:C	6	128485056	0.650	A	C	0.011	0.033	0.029	1.75	0.39	9.03×10 ⁻⁶	1.48	0.43	5.99×10 ⁻⁴
rs1429877:209483239:A:G	2	209483239	0.880	A	G	0.687	0.780	0.724	0.54	0.12	9.32×10 ⁻⁶	0.19	0.13	0.14
rs11338402:246517952:CT:C	1	246517952	0.904	CT	C	0.951	0.904	0.936	-0.83	0.19	9.45×10 ⁻⁶	-0.30	0.23	0.19
rs10892588	11	120488347	1.000	G	A	0.413	0.316	0.377	-0.45	0.10	9.87×10 ⁻⁶	-0.13	0.11	0.25

^aChr: chromosome

^bPosition: Built 37 position

^cr2: imputation r2 in the samples (obtained from the info score from IMPUTEv2)

^dEAF: Effect Allele Frequency

^ebeta: per allele coefficient of association

^fs.e.: standard error

Supplementary Table 8: Results from the single SNP analysis. A total of 113 SNPs associated with prostate cancer risk with $p < 10^{-5}$ in all samples (*BRCA1* and *BRCA2* combined)

SNP name	Chr ^a	Position ^b	r ² ^c	Baseline allele	Effect allele	EAF ^d in controls	EAF ^d in breast cancer cases	EAF ^d in prostate cancer cases	Association with breast cancer			Association with prostate cancer		
									Beta ^e	s.e. ^f	p-value	Beta ^e	s.e. ^f	p-value
rs11332659:166777503:TA:TAA	4	166777503	0.908	TA	TAA	0.031	0.038	0.075	0.16	0.27	0.57	1.19	0.24	5.15×10 ⁻⁷
rs13021400	2	125312883	1.000	A	G	0.223	0.213	0.340	-0.03	0.11	0.78	0.56	0.11	6.45×10 ⁻⁷
rs115628923:86215125:C:T	2	86215125	0.951	C	T	0.016	0.026	0.056	0.60	0.33	0.07	1.39	0.28	7.59×10 ⁻⁷
rs149157041:32055503:C:A	8	32055503	0.990	C	A	0.011	0.016	0.045	0.47	0.40	0.24	1.55	0.32	8.91×10 ⁻⁷
rs12995531:125311206:A:G	2	125311206	0.998	A	G	0.223	0.213	0.338	-0.03	0.11	0.78	0.55	0.11	9.38×10 ⁻⁷
rs1504012:125309425:G:A	2	125309425	0.996	G	A	0.223	0.213	0.338	-0.03	0.11	0.78	0.55	0.11	9.48×10 ⁻⁷
4:121415645:A:G	4	121415645	0.938	A	G	0.008	0.010	0.033	0.13	0.52	0.81	1.86	0.38	1.01×10 ⁻⁶
rs28583208:43278915:G:T	13	43278915	0.847	G	T	0.029	0.036	0.070	0.32	0.29	0.28	1.25	0.26	1.10×10 ⁻⁶
rs12993508:125310284:A:T	2	125310284	0.992	A	T	0.225	0.214	0.338	-0.04	0.11	0.73	0.55	0.11	1.16×10 ⁻⁶
2:9323716:A:G	2	9323716	0.551	A	G	0.079	0.091	0.131	0.22	0.23	0.32	1.03	0.21	1.36×10 ⁻⁶
rs141104154:32057037:C:G	8	32057037	0.990	C	G	0.011	0.016	0.045	0.43	0.40	0.29	1.51	0.31	1.42×10 ⁻⁶
rs75966139:32040866:C:T	8	32040866	0.992	C	T	0.011	0.016	0.045	0.43	0.40	0.29	1.51	0.31	1.43×10 ⁻⁶
chr2_86176045_G_T	2	86176045	1.000	T	G	0.017	0.025	0.057	0.44	0.32	0.17	1.29	0.27	2.07×10 ⁻⁶
rs13147804	4	91210048	1.000	C	T	0.376	0.359	0.493	-0.06	0.10	0.54	0.51	0.11	2.32×10 ⁻⁶
rs76531849:14697014:T:C	6	14697014	0.575	T	C	0.052	0.053	0.095	0.21	0.29	0.47	1.15	0.24	2.38×10 ⁻⁶
rs841567:43468739:C:T	1	43468739	0.937	C	T	0.980	0.977	0.941	-0.10	0.34	0.76	-1.24	0.27	3.12×10 ⁻⁶
chr8_32024297_C_T	8	32024297	1.000	C	T	0.011	0.016	0.045	0.37	0.40	0.36	1.44	0.31	3.21×10 ⁻⁶
rs140659441:90670297:C:T	8	90670297	0.642	C	T	0.008	0.009	0.028	0.53	0.65	0.42	2.18	0.47	3.36×10 ⁻⁶
rs78483286:86185947:C:T	2	86185947	0.859	C	T	0.010	0.013	0.040	0.38	0.46	0.42	1.62	0.35	3.65×10 ⁻⁶
rs4857958:20583264:C:T	3	20583264	0.972	C	T	0.258	0.297	0.362	0.18	0.11	0.10	0.55	0.12	3.84×10 ⁻⁶
rs62312868:91220507:A:T	4	91220507	0.988	A	T	0.402	0.387	0.517	-0.06	0.10	0.53	0.50	0.11	3.84×10 ⁻⁶
rs1037926:91227681:C:T	4	91227681	0.986	C	T	0.402	0.387	0.517	-0.06	0.10	0.53	0.50	0.11	3.91×10 ⁻⁶
rs2870246:91234498:C:A	4	91234498	0.982	C	A	0.516	0.534	0.637	0.08	0.10	0.38	0.51	0.11	3.93×10 ⁻⁶
rs142726194:142859429:C:T	8	142859429	0.475	C	T	0.008	0.014	0.027	1.42	0.65	0.03	2.57	0.56	4.15×10 ⁻⁶
rs2036602:20605021:G:A	3	20605021	0.982	G	A	0.256	0.297	0.361	0.19	0.11	0.08	0.54	0.12	4.17×10 ⁻⁶
rs62313910:91144549:T:C	4	91144549	0.993	T	C	0.378	0.355	0.491	-0.09	0.10	0.37	0.50	0.11	4.35×10 ⁻⁶
rs62313911:91144557:A:T	4	91144557	0.993	A	T	0.378	0.355	0.491	-0.09	0.10	0.37	0.50	0.11	4.35×10 ⁻⁶
rs9759809:91225024:A:C	4	91225024	0.938	A	C	0.373	0.355	0.482	-0.07	0.10	0.50	0.51	0.11	4.55×10 ⁻⁶
rs6546060:25513316:C:T	2	25513316	0.959	C	T	0.826	0.824	0.737	-0.01	0.13	0.97	-0.59	0.13	4.62×10 ⁻⁶
12:131855050:T:G	12	131855050	0.787	T	G	0.971	0.958	0.929	-0.38	0.29	0.19	-1.18	0.26	4.84×10 ⁻⁶
rs11963635:118254891:T:C	6	118254891	0.891	T	C	0.004	0.011	0.023	1.01	0.58	0.08	2.28	0.50	4.93×10 ⁻⁶
rs140739026:85057809:T:C	10	85057809	0.867	T	C	0.009	0.016	0.039	0.79	0.44	0.07	1.64	0.36	5.03×10 ⁻⁶
rs3070027:91120747:C:CTCTCT	4	91120747	0.998	C	CTCTCT	0.481	0.482	0.604	0.02	0.09	0.79	0.49	0.11	5.05×10 ⁻⁶

SNP name	Chr ^a	Position ^b	r ^{2c}	Baseline allele	Effect allele	EAF ^d in controls	EAF ^d in breast cancer cases	EAF ^d in prostate cancer cases	Association with breast cancer			Association with prostate cancer		
									Beta ^e	s.e. ^f	p-value	Beta ^e	s.e. ^f	p-value
rs142275184:1275874:G:A	8	1275874	0.815	G	A	0.006	0.012	0.028	0.82	0.54	0.13	2.04	0.45	5.09×10 ⁻⁶
rs16881847:53215330:G:T	5	53215330	0.869	G	T	0.175	0.218	0.265	0.34	0.13	0.01	0.60	0.13	5.47×10 ⁻⁶
rs117502812:92305321:C:A	10	92305321	0.874	C	A	0.006	0.018	0.030	1.06	0.46	0.02	1.90	0.42	5.48×10 ⁻⁶
rs12645744:91122378:G:A	4	91122378	0.999	G	A	0.482	0.482	0.604	0.02	0.09	0.82	0.49	0.11	5.71×10 ⁻⁶
rs7681376:91122398:A:G	4	91122398	0.999	A	G	0.482	0.482	0.604	0.02	0.09	0.82	0.49	0.11	5.71×10 ⁻⁶
rs13146102:91121536:A:T	4	91121536	0.999	A	T	0.482	0.482	0.604	0.02	0.09	0.82	0.49	0.11	5.71×10 ⁻⁶
rs10461168	4	91123665	1.000	G	T	0.482	0.482	0.604	0.02	0.09	0.83	0.49	0.11	5.81×10 ⁻⁶
rs78117962:130933852:A:C	5	130933852	0.628	A	C	0.019	0.019	0.048	-0.10	0.44	0.82	1.53	0.34	5.83×10 ⁻⁶
rs1429966:40389842:T:C	8	40389842	0.831	T	C	0.763	0.741	0.673	-0.08	0.12	0.50	-0.58	0.13	5.87×10 ⁻⁶
rs80183817:91128139:C:T	4	91128139	0.997	C	T	0.377	0.353	0.488	-0.09	0.10	0.37	0.49	0.11	5.91×10 ⁻⁶
6:32446227:A:G	6	32446227	0.941	A	G	0.289	0.232	0.187	-0.30	0.12	0.01	-0.62	0.14	5.92×10 ⁻⁶
rs1461738:91228639:C:T	4	91228639	0.980	C	T	0.406	0.390	0.517	-0.07	0.10	0.47	0.49	0.11	6.05×10 ⁻⁶
rs1342729:117784812:C:T	1	117784812	0.966	C	T	0.014	0.013	0.047	0.01	0.43	0.98	1.35	0.30	6.50×10 ⁻⁶
rs72667403:40647619:A:G	14	40647619	0.843	A	G	0.058	0.048	0.118	-0.28	0.24	0.24	0.84	0.19	6.56×10 ⁻⁶
rs13006887:7822077:G:A	2	7822077	0.781	G	A	0.115	0.150	0.184	0.38	0.15	0.01	0.71	0.16	6.56×10 ⁻⁶
rs10494199:117791156:A:T	1	117791156	0.962	A	T	0.015	0.012	0.047	-0.15	0.44	0.74	1.32	0.29	6.64×10 ⁻⁶
rs1350855:91194806:G:A	4	91194806	0.994	G	A	0.378	0.357	0.489	-0.08	0.10	0.43	0.49	0.11	6.65×10 ⁻⁶
6:32446228:G:A	6	32446228	0.947	G	A	0.284	0.229	0.184	-0.29	0.12	0.01	-0.62	0.14	6.65×10 ⁻⁶
rs841566:43469994:T:C	1	43469994	0.939	T	C	0.980	0.977	0.943	-0.12	0.34	0.72	-1.21	0.27	6.71×10 ⁻⁶
rs76306120:117789974:T:G	1	117789974	0.969	T	G	0.015	0.012	0.047	-0.11	0.44	0.79	1.32	0.29	6.88×10 ⁻⁶
rs74537183:117790039:A:T	1	117790039	0.967	A	T	0.015	0.012	0.047	-0.12	0.44	0.79	1.32	0.29	6.91×10 ⁻⁶
rs75200045:117789836:C:T	1	117789836	0.969	C	T	0.015	0.012	0.047	-0.11	0.44	0.80	1.32	0.29	6.93×10 ⁻⁶
rs72752080:62617327:G:A	15	62617327	0.831	G	A	0.011	0.016	0.037	0.47	0.43	0.28	1.61	0.36	6.99×10 ⁻⁶
rs55983260:20617726:T:C	3	20617726	0.975	T	C	0.257	0.297	0.359	0.19	0.11	0.09	0.53	0.12	7.02×10 ⁻⁶
rs1461743:91224164:G:A	4	91224164	0.987	G	A	0.499	0.508	0.613	0.06	0.10	0.55	0.49	0.11	7.06×10 ⁻⁶
rs6684488:117793106:C:G	1	117793106	0.949	C	G	0.015	0.012	0.048	-0.23	0.45	0.62	1.32	0.29	7.06×10 ⁻⁶
rs9684316:91225993:C:T	4	91225993	0.987	C	T	0.499	0.508	0.613	0.06	0.10	0.56	0.49	0.11	7.07×10 ⁻⁶
rs1913107:117792798:C:A	1	117792798	0.950	C	A	0.015	0.012	0.048	-0.22	0.45	0.63	1.32	0.29	7.14×10 ⁻⁶
rs5878353:94917193:C:CTA	6	94917193	0.883	C	CTA	0.282	0.264	0.194	-0.14	0.12	0.23	-0.65	0.14	7.16×10 ⁻⁶
rs1466391:91234250:A:G	4	91234250	0.983	A	G	0.523	0.538	0.639	0.07	0.10	0.48	0.49	0.11	7.19×10 ⁻⁶
rs2669048:117795008:G:A	1	117795008	0.899	G	A	0.984	0.988	0.952	0.21	0.46	0.65	-1.33	0.30	7.32×10 ⁻⁶
rs6853354:91168401:T:G	4	91168401	0.993	T	G	0.379	0.358	0.489	-0.08	0.10	0.44	0.49	0.11	7.34×10 ⁻⁶
rs10188071:125315057:C:A	2	125315057	0.973	C	A	0.232	0.218	0.336	-0.06	0.11	0.61	0.51	0.11	7.40×10 ⁻⁶
rs114286036:210805896:A:G	1	210805896	0.725	A	G	0.025	0.025	0.060	0.08	0.37	0.84	1.30	0.29	7.47×10 ⁻⁶
rs5829967:25515242:CA:C	2	25515242	0.960	CA	C	0.828	0.824	0.741	-0.02	0.13	0.85	-0.58	0.13	7.54×10 ⁻⁶
rs7794252:4379761:T:G	7	4379761	0.846	T	G	0.266	0.273	0.362	0.05	0.12	0.65	0.54	0.12	7.58×10 ⁻⁶

SNP name	Chr ^a	Position ^b	r ^{2c}	Baseline allele	Effect allele	EAF ^d in controls	EAF ^d in breast cancer cases	EAF ^d in prostate cancer cases	Association with breast cancer			Association with prostate cancer		
									Beta ^e	s.e. ^f	p-value	Beta ^e	s.e. ^f	p-value
rs76945681:91217924:C:T	4	91217924	0.989	C	T	0.409	0.391	0.519	-0.08	0.10	0.42	0.48	0.11	7.67×10 ⁻⁶
rs149933885:32931416:C:A	4	32931416	0.869	C	A	0.013	0.023	0.042	0.76	0.37	0.04	1.47	0.33	7.69×10 ⁻⁶
rs7669038:91238762:A:G	4	91238762	0.991	A	G	0.546	0.534	0.658	-0.04	0.10	0.69	0.50	0.11	7.70×10 ⁻⁶
rs4353865:91239210:A:C	4	91239210	0.992	A	C	0.546	0.534	0.658	-0.04	0.10	0.69	0.50	0.11	7.74×10 ⁻⁶
rs1811543:91240604:T:C	4	91240604	0.993	T	C	0.546	0.534	0.658	-0.04	0.10	0.69	0.50	0.11	7.84×10 ⁻⁶
rs9684318:91225876:G:C	4	91225876	0.987	G	C	0.409	0.391	0.519	-0.08	0.10	0.42	0.48	0.11	7.87×10 ⁻⁶
rs112215682:117791659:CGA:C	1	117791659	0.953	CGA	C	0.015	0.012	0.047	-0.16	0.44	0.71	1.31	0.29	7.89×10 ⁻⁶
rs3042052:91240796:C:CTG	4	91240796	0.991	C	CTG	0.546	0.533	0.658	-0.04	0.10	0.69	0.50	0.11	7.92×10 ⁻⁶
rs7658082:91245506:T:C	4	91245506	0.994	T	C	0.546	0.534	0.658	-0.04	0.10	0.69	0.50	0.11	7.97×10 ⁻⁶
rs111228106:117790239:G:C	1	117790239	0.966	G	C	0.015	0.014	0.047	0.03	0.41	0.95	1.31	0.29	7.98×10 ⁻⁶
rs1078765:91251649:A:G	4	91251649	0.996	A	G	0.546	0.534	0.659	-0.04	0.10	0.69	0.50	0.11	7.98×10 ⁻⁶
rs2735970:2021815:T:C	11	2021815	0.998	T	C	0.293	0.329	0.392	0.17	0.11	0.11	0.50	0.11	7.99×10 ⁻⁶
rs10461167:91123414:T:C	4	91123414	0.996	T	C	0.486	0.483	0.605	0.01	0.09	0.90	0.48	0.11	8.01×10 ⁻⁶
rs7676382:91121900:G:A	4	91121900	0.996	G	A	0.486	0.483	0.605	0.01	0.09	0.90	0.48	0.11	8.01×10 ⁻⁶
rs2169399:91244218:T:C	4	91244218	0.995	T	C	0.546	0.534	0.658	-0.04	0.10	0.69	0.50	0.11	8.03×10 ⁻⁶
rs7656001:91243865:G:A	4	91243865	0.994	G	A	0.546	0.534	0.658	-0.04	0.10	0.69	0.50	0.11	8.04×10 ⁻⁶
rs2126282:91244648:T:C	4	91244648	0.995	T	C	0.546	0.534	0.658	-0.04	0.10	0.69	0.50	0.11	8.05×10 ⁻⁶
rs7693226:91247472:G:A	4	91247472	0.995	G	A	0.546	0.534	0.658	-0.04	0.10	0.69	0.50	0.11	8.10×10 ⁻⁶
rs77299096:117786362:G:A	1	117786362	0.975	G	A	0.014	0.013	0.047	-0.06	0.43	0.89	1.31	0.29	8.38×10 ⁻⁶
rs10494198:117786992:G:A	1	117786992	0.977	G	A	0.014	0.013	0.047	-0.06	0.43	0.89	1.31	0.29	8.38×10 ⁻⁶
rs78897237:117786438:C:G	1	117786438	0.975	C	G	0.014	0.013	0.047	-0.06	0.43	0.89	1.31	0.29	8.39×10 ⁻⁶
rs2246211:200145506:G:A	1	200145506	0.859	G	A	0.114	0.127	0.181	0.22	0.16	0.16	0.69	0.15	8.43×10 ⁻⁶
rs146077016:20621759:T:TA	3	20621759	0.972	T	TA	0.258	0.297	0.358	0.19	0.11	0.09	0.53	0.12	8.56×10 ⁻⁶
rs62054567:90062009:G:C	16	90062009	0.984	G	C	0.837	0.814	0.747	-0.17	0.13	0.18	-0.57	0.13	8.59×10 ⁻⁶
rs13130000:91210536:T:A	4	91210536	0.994	T	A	0.501	0.511	0.616	0.06	0.10	0.56	0.48	0.11	8.67×10 ⁻⁶
rs841834:43460400:C:T	1	43460400	0.910	C	T	0.969	0.972	0.929	0.10	0.31	0.74	-1.07	0.24	8.72×10 ⁻⁶
rs9991550:91211087:G:A	4	91211087	0.993	G	A	0.501	0.511	0.616	0.06	0.10	0.56	0.48	0.11	8.81×10 ⁻⁶
rs4694022:91241948:T:C	4	91241948	0.995	T	C	0.522	0.504	0.632	-0.05	0.10	0.57	0.49	0.11	8.88×10 ⁻⁶
rs7680268:91245507:G:A	4	91245507	0.995	G	A	0.522	0.504	0.632	-0.05	0.10	0.57	0.49	0.11	8.97×10 ⁻⁶
rs57304193:117802272:T:C	1	117802272	0.883	T	C	0.020	0.014	0.056	-0.36	0.43	0.40	1.20	0.27	8.99×10 ⁻⁶
rs2169400:91260973:C:A	4	91260973	1.000	C	A	0.517	0.502	0.627	-0.04	0.10	0.66	0.49	0.11	9.01×10 ⁻⁶
rs7670926:91247358:T:C	4	91247358	0.996	T	C	0.522	0.504	0.632	-0.05	0.10	0.56	0.49	0.11	9.14×10 ⁻⁶
rs6069501:54542005:G:A	20	54542005	0.824	G	A	0.828	0.804	0.752	-0.21	0.13	0.12	-0.62	0.14	9.17×10 ⁻⁶
rs75254175:114942106:G:C	7	114942106	0.702	G	C	0.033	0.033	0.075	-0.07	0.33	0.84	1.12	0.25	9.19×10 ⁻⁶
rs10025552:91250106:A:T	4	91250106	0.997	A	T	0.522	0.504	0.632	-0.06	0.10	0.56	0.49	0.11	9.20×10 ⁻⁶
rs17227818:91249878:T:C	4	91249878	0.997	T	C	0.522	0.504	0.632	-0.06	0.10	0.56	0.49	0.11	9.21×10 ⁻⁶

SNP name	Chr ^a	Position ^b	r ² ^c	Baseline allele	Effect allele	EAF ^d in controls	EAF ^d in breast cancer cases	EAF ^d in prostate cancer cases	Association with breast cancer			Association with prostate cancer		
									Beta ^e	s.e. ^f	p-value	Beta ^e	s.e. ^f	p-value
rs13002703:7821831:C:T	2	7821831	0.783	C	T	0.112	0.145	0.178	0.37	0.16	0.02	0.71	0.16	9.48×10 ⁻⁶
rs11840229:107903611:T:A	13	107903611	0.873	T	A	0.014	0.021	0.040	0.34	0.38	0.37	1.48	0.33	9.76×10 ⁻⁶
4:91279422:T:TAAAAA	4	91279422	0.997	T	TAAAAA	0.549	0.537	0.660	-0.04	0.10	0.71	0.49	0.11	9.78×10 ⁻⁶
rs7698908:91310029:T:C	4	91310029	0.885	T	C	0.338	0.299	0.438	-0.18	0.11	0.09	0.51	0.11	9.79×10 ⁻⁶
rs10573763:91262827:CCTGA:C	4	91262827	0.999	CCTGA	C	0.519	0.504	0.630	-0.04	0.10	0.64	0.48	0.11	9.81×10 ⁻⁶
rs76404232:117786057:G:T	1	117786057	0.973	G	T	0.014	0.015	0.047	0.08	0.40	0.83	1.30	0.29	9.89×10 ⁻⁶
rs73212545:7461661:G:A	4	7461661	0.836	G	A	0.132	0.142	0.212	0.12	0.15	0.43	0.67	0.15	9.92×10 ⁻⁶
rs371990135:35176005:G:A	22	35176005	0.942	G	A	0.017	0.031	0.054	0.49	0.30	0.11	1.21	0.27	9.95×10 ⁻⁶

^aChr: chromosome

^bPosition: Built 37 position

^cr²: imputation r² in the samples (obtained from the info score from IMPUTEv2)

^dEAF: Effect Allele Frequency

^ebeta: per allele coefficient of association

^fs.e.: standard error

Supplementary Table 9: Results from the single SNP analysis. A total of 160 SNPs associated with male breast cancer risk with $p < 10^{-5}$ in *BRCA2* samples

SNP name	Chr ^a	Position ^b	r ² ^c	Baseline allele	Effect allele	EAF ^d in controls	EAF ^d in breast cancer cases	EAF ^d in prostate cancer cases	Association with breast cancer			Association with prostate cancer		
									Beta ^e	s.e. ^f	p-value	Beta ^e	s.e. ^f	p-value
rs111471013:87486588:ATGTGTG:A	6	87486588	0.875	ATGTGTG	A	0.723	0.596	0.732	-0.63	0.12	1.17×10 ⁻⁷	0.08	0.16	0.60
rs11719989:192438197:G:T	3	192438197	0.635	G	T	0.013	0.046	0.022	2.14	0.40	1.18×10 ⁻⁷	0.84	0.59	0.15
rs13255290:90005576:T:C	8	90005576	0.969	T	C	0.051	0.114	0.044	0.96	0.19	3.15×10 ⁻⁷	-0.14	0.31	0.65
rs114127577:49903813:G:A	5	49903813	0.681	G	A	0.082	0.150	0.086	0.98	0.19	3.34×10 ⁻⁷	0.14	0.28	0.62
rs72582199:29583031:GCCA:G	3	29583031	0.959	GCCA	G	0.097	0.188	0.072	0.72	0.14	4.20×10 ⁻⁷	-0.28	0.25	0.26
rs13282617:90029977:C:G	8	90029977	0.967	C	G	0.049	0.110	0.041	0.96	0.19	4.76×10 ⁻⁷	-0.18	0.33	0.58
rs17677760:90020671:T:G	8	90020671	0.973	T	G	0.048	0.109	0.036	0.95	0.19	6.39×10 ⁻⁷	-0.33	0.35	0.34
rs72753741:49930871:C:T	5	49930871	0.713	C	T	0.095	0.165	0.099	0.89	0.18	8.93×10 ⁻⁷	0.16	0.26	0.54
rs76216839:246395109:C:CA	1	246395109	0.985	C	CA	0.025	0.074	0.047	1.20	0.24	8.99×10 ⁻⁷	0.65	0.33	0.05
rs113692318:246491508:C:CA	1	246491508	0.99	C	CA	0.025	0.073	0.050	1.18	0.24	1.09×10 ⁻⁶	0.70	0.32	0.03
rs140053665:246391358:G:A	1	246391358	0.982	G	A	0.024	0.070	0.046	1.22	0.25	1.10×10 ⁻⁶	0.68	0.33	0.04
rs79085164:246393004:G:A	1	246393004	0.983	G	A	0.024	0.070	0.046	1.22	0.25	1.10×10 ⁻⁶	0.68	0.33	0.04
rs112806420:246486213:A:G	1	246486213	0.991	A	G	0.025	0.073	0.050	1.18	0.24	1.10×10 ⁻⁶	0.70	0.32	0.03
rs79570895:246422807:C:T	1	246422807	0.984	C	T	0.024	0.070	0.046	1.22	0.25	1.12×10 ⁻⁶	0.67	0.33	0.04
rs116146431:246379001:G:C	1	246379001	0.98	G	C	0.024	0.069	0.046	1.22	0.25	1.17×10 ⁻⁶	0.68	0.33	0.04
rs114966206:246417709:G:C	1	246417709	0.979	G	C	0.024	0.070	0.046	1.22	0.25	1.21×10 ⁻⁶	0.67	0.33	0.04
rs186332467:246412634:G:A	1	246412634	0.979	G	A	0.024	0.070	0.046	1.22	0.25	1.21×10 ⁻⁶	0.67	0.33	0.04
rs77274418:246484176:G:A	1	246484176	0.957	G	A	0.027	0.074	0.052	1.17	0.24	1.32×10 ⁻⁶	0.69	0.31	0.03
rs17271441:172623045:C:T	4	172623045	0.806	C	T	0.012	0.042	0.032	1.78	0.37	1.39×10 ⁻⁶	1.33	0.46	3.80×10 ⁻³
rs144103868:246474090:G:A	1	246474090	0.993	G	A	0.025	0.071	0.050	1.17	0.24	1.63×10 ⁻⁶	0.70	0.32	0.03
rs76078502:246463395:C:T	1	246463395	0.987	C	T	0.025	0.071	0.050	1.17	0.24	1.64×10 ⁻⁶	0.71	0.32	0.03
rs6608456:171133107:C:T	1	171133107	0.997	C	T	0.244	0.340	0.234	0.55	0.12	1.65×10 ⁻⁶	-0.05	0.15	0.73
rs2421707:171133251:A:G	1	171133251	0.997	A	G	0.244	0.340	0.234	0.55	0.12	1.66×10 ⁻⁶	-0.05	0.15	0.73
rs185087143:246479872:G:A	1	246479872	0.993	G	A	0.025	0.071	0.050	1.17	0.24	1.66×10 ⁻⁶	0.70	0.32	0.03
rs77339204:246481183:T:C	1	246481183	0.993	T	C	0.025	0.071	0.050	1.17	0.24	1.67×10 ⁻⁶	0.70	0.32	0.03
rs75066090:246493558:G:C	1	246493558	0.991	G	C	0.025	0.071	0.050	1.16	0.24	1.71×10 ⁻⁶	0.69	0.32	0.03
rs116629135:246495417:T:G	1	246495417	0.991	T	G	0.025	0.071	0.050	1.16	0.24	1.72×10 ⁻⁶	0.69	0.32	0.03
rs77375743:246495506:A:C	1	246495506	0.991	A	C	0.025	0.071	0.050	1.16	0.24	1.72×10 ⁻⁶	0.69	0.32	0.03
rs77432753:246494658:T:A	1	246494658	0.991	T	A	0.025	0.071	0.050	1.16	0.24	1.72×10 ⁻⁶	0.69	0.32	0.03
rs139780901:246489842:G:A	1	246489842	0.992	G	A	0.025	0.071	0.050	1.16	0.24	1.72×10 ⁻⁶	0.69	0.32	0.03
rs79589520:246491119:A:C	1	246491119	0.992	A	C	0.025	0.071	0.050	1.16	0.24	1.72×10 ⁻⁶	0.69	0.32	0.03
rs76562663:246484960:G:C	1	246484960	0.993	G	C	0.025	0.071	0.050	1.16	0.24	1.73×10 ⁻⁶	0.69	0.32	0.03

SNP name	Chr ^a	Position ^b	r ² ^c	Baseline allele	Effect allele	EAF ^d in controls	EAF ^d in breast cancer cases	EAF ^d in prostate cancer cases	Association with breast cancer			Association with prostate cancer		
									Beta ^e	s.e. ^f	p-value	Beta ^e	s.e. ^f	p-value
rs12729618:171134783:G:A	1	171134783	0.999	G	A	0.244	0.339	0.234	0.55	0.12	1.76×10 ⁻⁶	-0.05	0.15	0.72
rs12129672:171139246:G:A	1	171139246	0.999	G	A	0.244	0.339	0.234	0.55	0.12	1.76×10 ⁻⁶	-0.05	0.15	0.72
rs1538692:246460806:C:T	1	246460806	0.989	C	T	0.025	0.071	0.051	1.17	0.25	1.78×10 ⁻⁶	0.73	0.32	0.02
rs6580417:145773210:A:G	5	145773210	0.993	A	G	0.790	0.889	0.848	0.75	0.16	1.80×10 ⁻⁶	0.41	0.17	0.02
rs75066702:246501822:T:C	1	246501822	0.988	T	C	0.025	0.071	0.049	1.16	0.24	1.85×10 ⁻⁶	0.69	0.32	0.03
rs115049480:246503116:G:A	1	246503116	0.988	G	A	0.025	0.071	0.049	1.16	0.24	1.88×10 ⁻⁶	0.69	0.32	0.03
rs116213659:246503082:A:G	1	246503082	0.988	A	G	0.025	0.071	0.049	1.16	0.24	1.88×10 ⁻⁶	0.69	0.32	0.03
1:246502815:A:ATCCAAGTATCAGATCAAAG	1	246502815	0.988	A	ATCCAAGTATCAGATCAAAG	0.025	0.071	0.049	1.16	0.24	1.88×10 ⁻⁶	0.69	0.32	0.03
1:246502816:A:AT	1	246502816	0.988	A	AT	0.025	0.071	0.049	1.16	0.24	1.88×10 ⁻⁶	0.69	0.32	0.03
1:246502816:A:T	1	246502816	0.988	A	T	0.025	0.071	0.049	1.16	0.24	1.88×10 ⁻⁶	0.69	0.32	0.03
rs115636931:246503068:G:A	1	246503068	0.988	G	A	0.025	0.071	0.049	1.16	0.24	1.88×10 ⁻⁶	0.69	0.32	0.03
rs10912478	1	171136125	1.000	A	G	0.244	0.338	0.234	0.55	0.12	1.90×10 ⁻⁶	-0.05	0.15	0.72
rs61814303:171138223:T:A	1	171138223	1.000	T	A	0.244	0.338	0.234	0.55	0.12	1.90×10 ⁻⁶	-0.05	0.15	0.72
rs114570650:246370843:T:C	1	246370843	0.978	T	C	0.024	0.068	0.046	1.21	0.25	1.91×10 ⁻⁶	0.68	0.33	0.04
rs5871966:145773539:CAA:C	5	145773539	0.994	CAA	C	0.790	0.889	0.848	0.75	0.16	1.92×10 ⁻⁶	0.41	0.18	0.02
rs7731096:145776798:A:C	5	145776798	0.999	A	C	0.790	0.889	0.851	0.75	0.16	1.97×10 ⁻⁶	0.43	0.18	0.01
rs6580418	5	145776488	1.000	T	C	0.790	0.889	0.851	0.75	0.16	1.97×10 ⁻⁶	0.43	0.18	0.01
rs148033290:246450201:T:C	1	246450201	0.988	T	C	0.025	0.071	0.051	1.17	0.25	1.97×10 ⁻⁶	0.74	0.32	0.02
rs201246492:246450181:T:TG	1	246450181	0.988	T	TG	0.025	0.071	0.051	1.17	0.25	1.97×10 ⁻⁶	0.74	0.32	0.02
rs75552700:246368479:C:T	1	246368479	0.979	C	T	0.024	0.068	0.046	1.20	0.25	1.99×10 ⁻⁶	0.68	0.33	0.04
rs75975916:246359097:T:C	1	246359097	0.968	T	C	0.024	0.067	0.046	1.21	0.26	1.99×10 ⁻⁶	0.69	0.33	0.04
rs76598257:246508712:G:C	1	246508712	0.973	G	C	0.025	0.070	0.048	1.17	0.25	2.01×10 ⁻⁶	0.69	0.32	0.03
rs12136568:171146605:A:C	1	171146605	0.999	A	C	0.244	0.338	0.234	0.55	0.12	2.01×10 ⁻⁶	-0.05	0.15	0.72
rs7349818:145779021:C:G	5	145779021	0.995	C	G	0.791	0.889	0.850	0.75	0.16	2.05×10 ⁻⁶	0.42	0.18	0.02
rs6868971:145776261:G:A	5	145776261	0.998	G	A	0.790	0.889	0.851	0.75	0.16	2.05×10 ⁻⁶	0.43	0.18	0.01
rs2152087:246503544:C:A	1	246503544	0.981	C	A	0.970	0.922	0.943	-1.09	0.23	2.09×10 ⁻⁶	-0.66	0.30	0.02
rs147736765:49897700:G:A	5	49897700	0.701	G	A	0.100	0.169	0.100	0.85	0.18	2.10×10 ⁻⁶	0.07	0.26	0.78
rs4705061:145777708:A:G	5	145777708	0.997	A	G	0.791	0.889	0.851	0.75	0.16	2.10×10 ⁻⁶	0.43	0.18	0.01
rs2901513:171135394:A:G	1	171135394	0.995	A	G	0.245	0.339	0.234	0.55	0.12	2.12×10 ⁻⁶	-0.06	0.15	0.69
rs201357693:246447753:CTT:C	1	246447753	0.988	CTT	C	0.025	0.070	0.052	1.17	0.25	2.19×10 ⁻⁶	0.76	0.31	0.02
rs78750949:246513266:A:G	1	246513266	0.972	A	G	0.025	0.070	0.048	1.17	0.25	2.19×10 ⁻⁶	0.68	0.32	0.03
rs78088532:246506672:T:C	1	246506672	0.984	T	C	0.025	0.071	0.049	1.16	0.24	2.23×10 ⁻⁶	0.69	0.32	0.03
rs2153379:246508196:A:G	1	246508196	0.975	A	G	0.970	0.922	0.943	-1.09	0.23	2.35×10 ⁻⁶	-0.67	0.30	0.02
rs200115205:29953690:G:GT	14	29953690	0.768	G	GT	0.811	0.725	0.750	-0.65	0.14	2.36×10 ⁻⁶	-0.44	0.17	0.01
rs75932170:246511101:A:G	1	246511101	0.982	A	G	0.025	0.070	0.049	1.15	0.24	2.44×10 ⁻⁶	0.69	0.32	0.03

SNP name	Chr ^a	Position ^b	r ^{2c}	Baseline allele	Effect allele	EAF ^d in controls	EAF ^d in breast cancer cases	EAF ^d in prostate cancer cases	Association with breast cancer			Association with prostate cancer		
									Beta ^e	s.e. ^f	p-value	Beta ^e	s.e. ^f	p-value
rs74329440:246429256:A:G	1	246429256	0.988	A	G	0.025	0.070	0.053	1.16	0.25	2.65×10 ⁻⁶	0.78	0.31	0.01
rs6889415:145781355:A:G	5	145781355	0.985	A	G	0.792	0.888	0.846	0.74	0.16	2.70×10 ⁻⁶	0.38	0.17	0.03
rs4588769:152288187:T:C	7	152288187	0.916	T	C	0.069	0.123	0.093	0.84	0.18	2.72×10 ⁻⁶	0.29	0.24	0.23
rs4409325:152288396:C:T	7	152288396	0.916	C	T	0.069	0.123	0.093	0.84	0.18	2.73×10 ⁻⁶	0.29	0.24	0.22
rs4383897:152288321:G:T	7	152288321	0.916	G	T	0.069	0.123	0.093	0.84	0.18	2.74×10 ⁻⁶	0.29	0.24	0.23
rs12541487:89997734:C:A	8	89997734	0.973	C	A	0.077	0.140	0.102	0.80	0.17	2.75×10 ⁻⁶	0.33	0.22	0.15
rs79936639:152287759:G:A	7	152287759	0.915	G	A	0.069	0.123	0.093	0.84	0.18	2.75×10 ⁻⁶	0.28	0.24	0.23
rs114812938:246441028:T:C	1	246441028	0.991	T	C	0.025	0.070	0.053	1.16	0.25	2.75×10 ⁻⁶	0.78	0.31	0.01
rs148534219:152287190:T:C	7	152287190	0.915	T	C	0.069	0.123	0.092	0.84	0.18	2.77×10 ⁻⁶	0.28	0.24	0.24
rs6967685:152287128:G:A	7	152287128	0.915	G	A	0.069	0.123	0.092	0.84	0.18	2.78×10 ⁻⁶	0.28	0.24	0.24
rs11971964:152289676:G:T	7	152289676	0.915	G	T	0.069	0.124	0.094	0.84	0.18	2.79×10 ⁻⁶	0.29	0.24	0.22
rs115117321:152286443:C:T	7	152286443	0.915	C	T	0.069	0.123	0.092	0.84	0.18	2.82×10 ⁻⁶	0.27	0.24	0.25
rs2153381:246507983:T:A	1	246507983	0.975	T	A	0.970	0.923	0.943	-1.08	0.23	2.92×10 ⁻⁶	-0.66	0.30	0.02
rs4654241:246515468:T:G	1	246515468	0.969	T	G	0.970	0.921	0.943	-1.08	0.23	2.94×10 ⁻⁶	-0.66	0.30	0.03
2:69365227:G:GA	2	69365227	0.524	G	GA	0.006	0.028	0.019	3.01	0.65	3.30×10 ⁻⁶	2.47	0.77	1.36×10 ⁻³
rs9726870:246418633:T:A	1	246418633	0.954	T	A	0.027	0.074	0.048	1.12	0.24	3.38×10 ⁻⁶	0.60	0.32	0.06
rs115220580:246503083:T:C	1	246503083	0.986	T	C	0.027	0.071	0.053	1.12	0.24	3.49×10 ⁻⁶	0.70	0.31	0.02
rs9854389:25945806:G:A	3	25945806	0.832	G	A	0.017	0.059	0.024	1.40	0.30	3.59×10 ⁻⁶	0.46	0.48	0.33
rs4654242:246515522:T:C	1	246515522	0.975	T	C	0.970	0.924	0.943	-1.07	0.23	3.66×10 ⁻⁶	-0.67	0.30	0.02
rs6692293:246516011:T:G	1	246516011	0.975	T	G	0.970	0.924	0.943	-1.07	0.23	3.71×10 ⁻⁶	-0.67	0.30	0.02
rs35527492:97849464:C:T	7	97849464	0.983	C	T	0.482	0.603	0.514	0.51	0.11	4.45×10 ⁻⁶	0.15	0.14	0.28
rs34649939:97849359:CA:C	7	97849359	0.983	CA	C	0.482	0.603	0.514	0.51	0.11	4.45×10 ⁻⁶	0.15	0.14	0.28
rs73151177:97850340:G:A	7	97850340	0.985	G	A	0.483	0.603	0.514	0.50	0.11	4.61×10 ⁻⁶	0.15	0.14	0.28
rs62479823:97850406:G:A	7	97850406	0.986	G	A	0.483	0.603	0.514	0.50	0.11	4.62×10 ⁻⁶	0.15	0.14	0.28
rs7807218:97666578:C:T	7	97666578	0.962	C	T	0.378	0.497	0.433	0.51	0.11	4.64×10 ⁻⁶	0.28	0.14	0.04
rs67420939:97850599:A:C	7	97850599	0.975	A	C	0.447	0.566	0.482	0.50	0.11	4.72×10 ⁻⁶	0.17	0.14	0.22
rs7044440:99678687:A:G	9	99678687	0.662	A	G	0.073	0.128	0.070	0.98	0.21	4.89×10 ⁻⁶	-0.07	0.34	0.85
rs74957998:4216545:C:T	7	4216545	0.925	C	T	0.025	0.066	0.047	1.15	0.25	4.99×10 ⁻⁶	0.65	0.33	0.05
rs140472458:25953060:G:T	3	25953060	0.835	G	T	0.016	0.057	0.023	1.40	0.31	5.01×10 ⁻⁶	0.47	0.48	0.33
rs12184989:38857736:A:G	14	38857736	0.971	A	G	0.486	0.385	0.519	-0.52	0.11	5.11×10 ⁻⁶	0.14	0.14	0.30
rs78877512:246531610:A:T	1	246531610	0.894	A	T	0.041	0.090	0.067	0.99	0.22	5.11×10 ⁻⁶	0.56	0.28	0.05
rs10953245	7	97855462	1.000	C	A	0.484	0.605	0.514	0.50	0.11	5.46×10 ⁻⁶	0.14	0.13	0.30
rs7233873:27276847:G:A	18	27276847	0.98	G	A	0.024	0.065	0.042	1.14	0.25	5.49×10 ⁻⁶	0.62	0.34	0.07
rs2291747:97853795:G:T	7	97853795	0.999	G	T	0.484	0.604	0.514	0.50	0.11	5.51×10 ⁻⁶	0.14	0.13	0.30
rs200846185:104344971:CT:C	7	104344971	0.93	CT	C	0.420	0.312	0.362	-0.52	0.11	5.81×10 ⁻⁶	-0.21	0.13	0.11
1:246548618:G:A	1	246548618	0.949	G	A	0.034	0.079	0.056	1.03	0.23	5.95×10 ⁻⁶	0.55	0.30	0.07

SNP name	Chr ^a	Position ^b	r ^{2c}	Baseline allele	Effect allele	EAF ^d in controls	EAF ^d in breast cancer cases	EAF ^d in prostate cancer cases	Association with breast cancer			Association with prostate cancer		
									Beta ^e	s.e. ^f	p-value	Beta ^e	s.e. ^f	p-value
rs4643664:29591372:G:C	3	29591372	0.922	G	C	0.018	0.060	0.023	1.25	0.28	6.10×10 ⁻⁶	0.23	0.45	0.61
rs62479822:97850383:G:A	7	97850383	0.985	G	A	0.486	0.605	0.514	0.50	0.11	6.12×10 ⁻⁶	0.13	0.14	0.32
rs2698007:51730887:A:G	2	51730887	0.979	A	G	0.216	0.322	0.222	0.52	0.12	6.18×10 ⁻⁶	0.04	0.16	0.81
rs116834142:152303332:A:G	7	152303332	0.876	A	G	0.066	0.116	0.084	0.84	0.19	6.21×10 ⁻⁶	0.24	0.25	0.33
rs6967921:152304317:C:T	7	152304317	0.874	C	T	0.066	0.116	0.087	0.84	0.19	6.46×10 ⁻⁶	0.29	0.25	0.24
rs56377861:67223175:A:G	16	67223175	0.76	A	G	0.033	0.072	0.079	1.15	0.26	6.52×10 ⁻⁶	1.17	0.29	5.55×10 ⁻⁵
rs12406402:171136876:A:T	1	171136876	0.998	A	T	0.319	0.420	0.309	0.50	0.11	6.57×10 ⁻⁶	-0.04	0.14	0.77
rs148485142:100113448:C:T	8	100113448	0.96	C	T	0.012	0.038	0.020	1.54	0.34	6.57×10 ⁻⁶	0.46	0.50	0.36
rs77651504:246559703:G:A	1	246559703	0.946	G	A	0.033	0.077	0.043	1.04	0.23	6.78×10 ⁻⁶	0.26	0.34	0.43
rs149644518:246542149:A:ATATATT	1	246542149	0.948	A	ATATATT	0.036	0.083	0.055	1.01	0.22	6.84×10 ⁻⁶	0.45	0.30	0.14
rs2901512:171135391:T:C	1	171135391	0.993	T	C	0.321	0.422	0.309	0.50	0.11	6.90×10 ⁻⁶	-0.05	0.14	0.74
rs12134777:171138681:T:A	1	171138681	0.999	T	A	0.319	0.420	0.309	0.49	0.11	6.97×10 ⁻⁶	-0.04	0.14	0.77
rs150457326:29593825:C:T	3	29593825	0.949	C	T	0.017	0.057	0.018	1.26	0.28	7.09×10 ⁻⁶	0.07	0.49	0.89
rs115594689:246560484:C:A	1	246560484	0.945	C	A	0.033	0.077	0.042	1.04	0.23	7.10×10 ⁻⁶	0.26	0.34	0.44
rs4916410:171139541:A:G	1	171139541	1.000	A	G	0.319	0.420	0.309	0.49	0.11	7.13×10 ⁻⁶	-0.04	0.14	0.76
rs7887295	1	171139823	1.000	A	G	0.319	0.420	0.309	0.49	0.11	7.18×10 ⁻⁶	-0.04	0.14	0.76
rs7891433:171139758:T:C	1	171139758	1.000	T	C	0.319	0.420	0.309	0.49	0.11	7.18×10 ⁻⁶	-0.04	0.14	0.76
rs142875901:29603352:A:G	3	29603352	0.953	A	G	0.017	0.057	0.019	1.26	0.28	7.19×10 ⁻⁶	0.07	0.49	0.89
rs10912484:171140541:C:T	1	171140541	1.000	C	T	0.319	0.420	0.309	0.49	0.11	7.23×10 ⁻⁶	-0.04	0.14	0.76
rs2205730:171141268:A:G	1	171141268	1.000	A	G	0.319	0.420	0.309	0.49	0.11	7.28×10 ⁻⁶	-0.04	0.14	0.76
rs12132443:171142575:A:G	1	171142575	1.000	A	G	0.319	0.420	0.309	0.49	0.11	7.35×10 ⁻⁶	-0.04	0.14	0.76
rs2877972:29957030:G:A	14	29957030	0.988	G	A	0.913	0.842	0.871	-0.69	0.15	7.35×10 ⁻⁶	-0.41	0.20	0.04
rs147560545:44419185:G:T	22	44419185	0.81	G	T	0.112	0.181	0.107	0.74	0.17	7.40×10 ⁻⁶	-0.07	0.24	0.76
rs12744605:171145530:A:G	1	171145530	1.000	A	G	0.320	0.420	0.309	0.49	0.11	7.56×10 ⁻⁶	-0.04	0.14	0.76
rs184349162:67744291:C:T	16	67744291	0.86	C	T	0.006	0.031	0.029	2.01	0.45	7.60×10 ⁻⁶	1.89	0.51	2.18×10 ⁻⁴
rs371510225:149769529:C:A	7	149769529	0.655	C	A	0.646	0.729	0.681	0.67	0.15	7.66×10 ⁻⁶	0.28	0.17	0.11
rs2304066	5	145780692	1.000	C	T	0.756	0.855	0.826	0.63	0.14	7.71×10 ⁻⁶	0.43	0.17	0.01
rs17545565:29598970:G:A	3	29598970	0.954	G	A	0.017	0.057	0.020	1.25	0.28	7.72×10 ⁻⁶	0.13	0.48	0.79
rs150561703:246590829:A:T	1	246590829	0.948	A	T	0.032	0.077	0.042	1.04	0.23	7.75×10 ⁻⁶	0.25	0.34	0.46
rs1168550:38858444:A:T	14	38858444	0.971	A	T	0.487	0.388	0.519	-0.50	0.11	7.76×10 ⁻⁶	0.14	0.13	0.31
rs1546302:50931599:A:G	18	50931599	0.999	A	G	0.801	0.885	0.830	0.70	0.16	7.87×10 ⁻⁶	0.18	0.17	0.29
rs6946003:152304117:T:C	7	152304117	0.945	T	C	0.299	0.404	0.314	0.50	0.11	7.89×10 ⁻⁶	0.03	0.14	0.82
rs10066035:176716977:C:T	5	176716977	0.987	C	T	0.580	0.474	0.584	-0.48	0.11	7.92×10 ⁻⁶	0.04	0.13	0.75
rs35365717:171151203:GA:G	1	171151203	0.999	GA	G	0.320	0.420	0.309	0.49	0.11	7.93×10 ⁻⁶	-0.04	0.14	0.75
rs16947083:27273747:G:A	18	27273747	0.976	G	A	0.024	0.064	0.039	1.13	0.25	8.07×10 ⁻⁶	0.56	0.35	0.11
rs71532099:97850794:GT:G	7	97850794	0.935	GT	G	0.500	0.610	0.508	0.51	0.11	8.09×10 ⁻⁶	0.05	0.14	0.73

SNP name	Chr ^a	Position ^b	r2 ^c	Baseline allele	Effect allele	EAF ^d in controls	EAF ^d in breast cancer cases	EAF ^d in prostate cancer cases	Association with breast cancer			Association with prostate cancer		
									Beta ^e	s.e. ^f	p-value	Beta ^e	s.e. ^f	p-value
rs244725:176536402:T:C	5	176536402	0.967	T	C	0.389	0.499	0.386	0.47	0.11	8.11×10 ⁻⁶	-0.02	0.13	0.86
15:87803815:CTTTT:C	15	87803815	0.837	CTTTT	C	0.453	0.357	0.418	-0.54	0.12	8.39×10 ⁻⁶	-0.15	0.14	0.30
rs76412020	6	34149938	1.000	T	C	0.034	0.072	0.078	1.04	0.23	8.43×10 ⁻⁶	0.87	0.27	1.18×10 ⁻³
rs7145891:29954228:A:G	14	29954228	0.993	A	G	0.913	0.844	0.873	-0.68	0.15	8.50×10 ⁻⁶	-0.40	0.20	0.04
rs147605895:27303877:G:A	18	27303877	0.983	G	A	0.025	0.065	0.039	1.11	0.25	8.51×10 ⁻⁶	0.50	0.35	0.16
rs7653293:29593371:A:C	3	29593371	0.934	A	C	0.019	0.059	0.023	1.22	0.28	8.58×10 ⁻⁶	0.22	0.45	0.63
rs11600894:120478676:C:T	11	120478676	0.97	C	T	0.407	0.298	0.364	-0.51	0.12	8.68×10 ⁻⁶	-0.17	0.14	0.20
rs80224782:246518838:G:A	1	246518838	0.901	G	A	0.044	0.093	0.067	0.95	0.21	8.70×10 ⁻⁶	0.49	0.28	0.08
rs74367074:246563301:A:G	1	246563301	0.946	A	G	0.033	0.077	0.042	1.03	0.23	8.75×10 ⁻⁶	0.25	0.34	0.46
rs74862271:246519393:G:A	1	246519393	0.901	G	A	0.044	0.093	0.067	0.95	0.21	8.76×10 ⁻⁶	0.49	0.28	0.08
rs7719125:176689166:C:A	5	176689166	0.994	C	A	0.574	0.468	0.573	-0.47	0.11	8.79×10 ⁻⁶	0.01	0.13	0.94
rs11338402:246517952:CT:C	1	246517952	0.904	CT	C	0.952	0.900	0.925	-0.91	0.20	8.89×10 ⁻⁶	-0.50	0.27	0.06
rs116744657:246582158:C:T	1	246582158	0.952	C	T	0.032	0.077	0.042	1.03	0.23	9.01×10 ⁻⁶	0.25	0.34	0.46
rs141479235:246521490:TA:T	1	246521490	0.901	TA	T	0.044	0.093	0.067	0.94	0.21	9.03×10 ⁻⁶	0.49	0.28	0.08
rs7706612:176682734:C:T	5	176682734	0.995	C	T	0.575	0.469	0.572	-0.47	0.11	9.08×10 ⁻⁶	0.01	0.13	0.96
rs7724386:176682590:T:G	5	176682590	0.995	T	G	0.575	0.469	0.572	-0.47	0.11	9.08×10 ⁻⁶	0.01	0.13	0.96
rs16956678	18	50926704	1.000	T	C	0.801	0.885	0.830	0.69	0.16	9.24×10 ⁻⁶	0.18	0.17	0.30
11:11157069:CA:C	11	11157069	0.746	CA	C	0.499	0.402	0.438	-0.56	0.13	9.30×10 ⁻⁶	-0.35	0.15	0.02
rs2621322	6	32788712	1.000	T	G	0.159	0.248	0.184	0.57	0.13	9.64×10 ⁻⁶	0.17	0.17	0.32
rs79362349:246565632:A:G	1	246565632	0.948	A	G	0.033	0.077	0.042	1.02	0.23	9.65×10 ⁻⁶	0.24	0.34	0.47
rs11600354:120477883:G:A	11	120477883	0.966	G	A	0.405	0.297	0.360	-0.51	0.12	9.81×10 ⁻⁶	-0.18	0.14	0.19

^aChr: chromosome

^bPosition: Built 37 position

^cr2: imputation r2 in the samples (obtained from the info score from IMPUTEv2)

^dEAF: Effect Allele Frequency

^ebeta: per allele coefficient of association

^fs.e.: standard error

Supplementary Table 10: Results from the single SNP analysis. A total of 223 SNPs associated with prostate cancer risk with $p < 10^{-5}$ in *BRCA2* samples

SNP name	Chr ^a	Position ^b	r ² ^c	Baseline allele	Effect allele	EAF ^d in controls	EAF ^d in breast cancer cases	EAF ^d in prostate cancer cases	Association with breast cancer			Association with prostate cancer		
									Beta ^e	s.e. ^f	p-value	Beta ^e	s.e. ^f	p-value
rs11332659:166777503:TA:TAA	4	166777503	0.908	TA	TAA	0.030	0.038	0.094	0.24	0.30	0.43	1.57	0.27	1.11×10 ⁻⁸
rs62440960:5486032:G:C	7	5486032	0.949	G	C	0.086	0.098	0.182	0.18	0.18	0.34	1.02	0.19	8.47×10 ⁻⁸
rs841567:43468739:C:T	1	43468739	0.937	C	T	0.982	0.978	0.927	-0.18	0.38	0.63	-1.65	0.32	1.92×10 ⁻⁷
rs146719145:115468440:C:A	6	115468440	0.882	C	A	0.021	0.036	0.084	0.57	0.33	0.08	1.53	0.29	2.09×10 ⁻⁷
rs72868403:17480822:A:G	11	17480822	0.875	A	G	0.016	0.014	0.068	-0.08	0.47	0.87	1.74	0.34	2.15×10 ⁻⁷
rs111732525:115733779:C:T	6	115733779	0.878	C	T	0.021	0.037	0.084	0.60	0.32	0.06	1.50	0.29	2.89×10 ⁻⁷
rs79362055:115631294:G:A	6	115631294	0.885	G	A	0.021	0.036	0.084	0.59	0.32	0.07	1.50	0.29	3.04×10 ⁻⁷
6:115667739:C:CT	6	115667739	0.875	C	CT	0.022	0.037	0.084	0.61	0.32	0.06	1.48	0.29	3.92×10 ⁻⁷
rs200082060:115436294:GT:G	6	115436294	0.863	GT	G	0.020	0.034	0.080	0.59	0.34	0.08	1.53	0.30	4.38×10 ⁻⁷
rs841566:43469994:T:C	1	43469994	0.939	T	C	0.983	0.978	0.931	-0.19	0.38	0.61	-1.61	0.32	4.92×10 ⁻⁷
rs62443225:5482137:G:A	7	5482137	0.943	G	A	0.084	0.097	0.170	0.20	0.19	0.28	0.97	0.20	6.18×10 ⁻⁷
rs62313910:91144549:T:C	4	91144549	0.993	T	C	0.362	0.345	0.504	-0.09	0.11	0.41	0.66	0.13	6.79×10 ⁻⁷
rs62313911:91144557:A:T	4	91144557	0.993	A	T	0.362	0.345	0.504	-0.09	0.11	0.41	0.66	0.13	6.79×10 ⁻⁷
rs12667716:5489294:G:A	7	5489294	0.954	G	A	0.107	0.117	0.206	0.16	0.17	0.34	0.87	0.18	7.15×10 ⁻⁷
rs114689286:126226195:A:G	2	126226195	0.948	A	G	0.035	0.032	0.098	-0.21	0.31	0.49	1.24	0.25	7.62×10 ⁻⁷
rs113728495:115489289:A:G	6	115489289	0.894	A	G	0.054	0.071	0.138	0.27	0.22	0.22	1.06	0.22	8.21×10 ⁻⁷
rs13147804	4	91210048	1.000	C	T	0.362	0.346	0.504	-0.09	0.11	0.41	0.65	0.13	8.31×10 ⁻⁷
rs183672575:166799723:T:A	4	166799723	0.961	T	A	0.019	0.025	0.064	0.26	0.36	0.46	1.58	0.32	1.00×10 ⁻⁶
rs116469809:126189798:T:C	2	126189798	0.959	T	C	0.036	0.032	0.099	-0.21	0.30	0.49	1.22	0.25	1.02×10 ⁻⁶
rs80183817:91128139:C:T	4	91128139	0.997	C	T	0.360	0.343	0.500	-0.10	0.11	0.38	0.65	0.13	1.08×10 ⁻⁶
rs116035549:166804681:G:A	4	166804681	0.969	G	A	0.019	0.025	0.063	0.28	0.36	0.43	1.58	0.32	1.09×10 ⁻⁶
7:84908933:GTATCTATCTATC:GTATC	7	84908933	0.978	GTATCTATC TATC	GTATC	0.122	0.152	0.230	0.23	0.15	0.12	0.78	0.16	1.09×10 ⁻⁶
rs1540848:84969282:G:T	7	84969282	0.969	G	T	0.885	0.867	0.782	-0.10	0.16	0.51	-0.82	0.17	1.12×10 ⁻⁶
rs150449878:166804017:GCC:G	4	166804017	0.969	GCC	G	0.019	0.025	0.063	0.27	0.36	0.45	1.57	0.32	1.14×10 ⁻⁶
rs76991591:115228023:C:T	6	115228023	0.910	C	T	0.028	0.041	0.093	0.40	0.29	0.17	1.29	0.27	1.15×10 ⁻⁶
rs79786216:115604590:C:T	6	115604590	0.854	C	T	0.020	0.035	0.077	0.64	0.34	0.06	1.50	0.31	1.20×10 ⁻⁶
rs35906727:166842212:TA:T	4	166842212	0.971	TA	T	0.017	0.022	0.060	0.23	0.38	0.55	1.61	0.33	1.24×10 ⁻⁶
rs17689534:166807640:G:A	4	166807640	0.979	G	A	0.018	0.025	0.062	0.28	0.36	0.43	1.57	0.32	1.30×10 ⁻⁶
rs62459525:84944382:C:T	7	84944382	0.962	C	T	0.102	0.127	0.203	0.23	0.16	0.16	0.84	0.17	1.32×10 ⁻⁶
rs76542797:20581438:T:A	3	20581438	0.808	T	A	0.061	0.086	0.132	0.43	0.22	0.05	1.10	0.23	1.34×10 ⁻⁶
rs75221184:84936567:C:G	7	84936567	0.992	C	G	0.126	0.152	0.234	0.18	0.15	0.23	0.77	0.16	1.35×10 ⁻⁶
rs1350855:91194806:G:A	4	91194806	0.994	G	A	0.362	0.345	0.500	-0.10	0.11	0.38	0.64	0.13	1.35×10 ⁻⁶
rs1418025:119851227:C:T	1	119851227	0.933	C	T	0.991	0.987	0.953	-0.54	0.50	0.28	-1.94	0.40	1.37×10 ⁻⁶
rs1418024:119851271:A:G	1	119851271	0.934	A	G	0.991	0.987	0.953	-0.54	0.50	0.28	-1.94	0.40	1.37×10 ⁻⁶

SNP name	Chr ^a	Position ^b	r ² ^c	Baseline allele	Effect allele	EAF ^d in controls	EAF ^d in breast cancer cases	EAF ^d in prostate cancer cases	Association with breast cancer			Association with prostate cancer		
									Beta ^e	s.e. ^f	p-value	Beta ^e	s.e. ^f	p-value
rs115799144:166811693:C:T	4	166811693	0.978	C	T	0.018	0.025	0.062	0.28	0.36	0.45	1.56	0.32	1.46×10 ⁻⁶
rs6853354:91168401:T:G	4	91168401	0.993	T	G	0.363	0.348	0.500	-0.09	0.11	0.42	0.64	0.13	1.58×10 ⁻⁶
rs148508458:166821269:C:A	4	166821269	0.979	C	A	0.018	0.025	0.062	0.27	0.36	0.45	1.55	0.32	1.64×10 ⁻⁶
rs897488:101644331:G:C	15	101644331	0.927	G	C	0.308	0.315	0.458	0.07	0.12	0.58	0.67	0.14	1.67×10 ⁻⁶
rs75025658:166823640:C:T	4	166823640	0.979	C	T	0.018	0.025	0.062	0.27	0.36	0.46	1.55	0.32	1.68×10 ⁻⁶
rs77597882:166826425:A:G	4	166826425	0.979	A	G	0.018	0.025	0.062	0.27	0.36	0.46	1.55	0.32	1.73×10 ⁻⁶
rs117846454:166824212:C:T	4	166824212	0.966	C	T	0.019	0.026	0.062	0.30	0.36	0.40	1.55	0.32	1.75×10 ⁻⁶
rs6643379:113055900:G:C	23	113055900	0.468	G	C	0.024	0.036	0.085	0.54	0.35	0.13	1.44	0.30	1.81×10 ⁻⁶
rs78804960:115206191:C:A	6	115206191	0.894	C	A	0.027	0.040	0.090	0.40	0.30	0.18	1.29	0.27	1.82×10 ⁻⁶
rs112028535:115358656:C:T	6	115358656	0.904	C	T	0.065	0.084	0.154	0.26	0.20	0.20	0.94	0.20	1.82×10 ⁻⁶
rs6968184:84987757:C:T	7	84987757	0.965	C	T	0.111	0.132	0.212	0.14	0.16	0.39	0.81	0.17	1.83×10 ⁻⁶
rs62312868:91220507:A:T	4	91220507	0.988	A	T	0.390	0.378	0.528	-0.08	0.11	0.46	0.64	0.13	1.88×10 ⁻⁶
rs62460872:84974374:G:T	7	84974374	0.967	G	T	0.111	0.132	0.211	0.14	0.16	0.38	0.81	0.17	1.96×10 ⁻⁶
rs75875333:72790341:A:C	16	72790341	0.672	A	C	0.121	0.100	0.204	-0.36	0.22	0.11	0.97	0.21	1.98×10 ⁻⁶
rs62460204:84957746:A:G	7	84957746	0.975	A	G	0.111	0.132	0.211	0.14	0.16	0.38	0.80	0.17	2.01×10 ⁻⁶
rs1037926:91227681:C:T	4	91227681	0.986	C	T	0.390	0.378	0.528	-0.08	0.11	0.45	0.63	0.13	2.02×10 ⁻⁶
rs200419574:115592063:C:CT	6	115592063	0.804	C	CT	0.030	0.047	0.091	0.59	0.30	0.05	1.34	0.28	2.07×10 ⁻⁶
rs6950207:84987617:T:C	7	84987617	0.966	T	C	0.111	0.132	0.211	0.14	0.16	0.38	0.80	0.17	2.09×10 ⁻⁶
rs6950366:84987674:T:C	7	84987674	0.966	T	C	0.111	0.132	0.211	0.14	0.16	0.38	0.80	0.17	2.09×10 ⁻⁶
rs62459906:84907308:T:C	7	84907308	0.986	T	C	0.125	0.152	0.231	0.20	0.15	0.19	0.76	0.16	2.20×10 ⁻⁶
rs74397573:166832691:T:A	4	166832691	0.981	T	A	0.018	0.024	0.061	0.25	0.36	0.49	1.54	0.33	2.20×10 ⁻⁶
corect_rs117418571	7	5486051	1.000	C	T	0.057	0.059	0.128	0.11	0.23	0.63	1.04	0.22	2.23×10 ⁻⁶
rs143381056:67547363:C:T	16	67547363	0.827	C	T	0.009	0.034	0.047	1.68	0.40	3.12×10 ⁻⁵	2.00	0.42	2.25×10 ⁻⁶
rs11638427:101646236:C:T	15	101646236	0.982	C	T	0.345	0.361	0.502	0.11	0.11	0.31	0.63	0.13	2.38×10 ⁻⁶
rs75575481:166787295:G:A	4	166787295	0.986	G	A	0.026	0.035	0.073	0.29	0.31	0.35	1.39	0.30	2.38×10 ⁻⁶
rs16881847:53215330:G:T	5	53215330	0.869	G	T	0.167	0.211	0.277	0.31	0.14	0.03	0.77	0.16	2.48×10 ⁻⁶
rs75872127:101646898:GA:G	15	101646898	0.968	GA	G	0.351	0.363	0.507	0.10	0.11	0.39	0.64	0.13	2.50×10 ⁻⁶
rs28377198:16722552:G:A	17	16722552	0.517	G	A	0.076	0.098	0.136	0.44	0.25	0.08	1.24	0.26	2.57×10 ⁻⁶
rs12639685:166791606:T:C	4	166791606	0.976	T	C	0.026	0.035	0.073	0.25	0.31	0.42	1.39	0.30	2.71×10 ⁻⁶
rs74466901:166780896:C:G	4	166780896	0.980	C	G	0.026	0.035	0.073	0.29	0.31	0.35	1.38	0.30	2.71×10 ⁻⁶
rs4965785:101644490:T:C	15	101644490	0.995	T	C	0.348	0.360	0.504	0.09	0.11	0.40	0.63	0.13	2.73×10 ⁻⁶
rs148781392:166780144:A:AGCTC	4	166780144	0.979	A	AGCTC	0.026	0.035	0.073	0.28	0.31	0.36	1.38	0.30	2.74×10 ⁻⁶
rs72866862:17446647:C:T	11	17446647	0.848	C	T	0.019	0.019	0.067	0.13	0.41	0.74	1.50	0.32	2.83×10 ⁻⁶
rs12443426:101646710:G:A	15	101646710	0.969	G	A	0.351	0.363	0.506	0.10	0.11	0.39	0.63	0.13	2.89×10 ⁻⁶
rs12437545:101646774:C:T	15	101646774	0.968	C	T	0.352	0.364	0.507	0.10	0.11	0.39	0.63	0.13	2.91×10 ⁻⁶
rs12441305:101646693:T:C	15	101646693	0.968	T	C	0.351	0.363	0.506	0.10	0.11	0.39	0.63	0.13	2.92×10 ⁻⁶

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									Beta ^e	s.e. ^f	p-value	Beta ^e	s.e. ^f	p-value
rs897237:101644361:G:A	15	101644361	0.992	G	A	0.347	0.360	0.503	0.09	0.11	0.39	0.62	0.13	2.99×10 ⁻⁶
rs117048973:166842644:C:T	4	166842644	0.983	C	T	0.018	0.024	0.060	0.23	0.36	0.54	1.52	0.33	3.00×10 ⁻⁶
rs74442178:166846620:G:A	4	166846620	0.983	G	A	0.018	0.024	0.060	0.22	0.37	0.55	1.52	0.33	3.01×10 ⁻⁶
rs76487433:166776406:C:T	4	166776406	0.974	C	T	0.026	0.035	0.073	0.28	0.31	0.37	1.37	0.29	3.05×10 ⁻⁶
rs149355824:17543587:G:C	1	17543587	0.732	G	C	0.017	0.021	0.057	0.34	0.45	0.45	1.75	0.38	3.08×10 ⁻⁶
rs78770726:166773539:A:G	4	166773539	0.971	A	G	0.026	0.035	0.073	0.27	0.31	0.37	1.37	0.29	3.19×10 ⁻⁶
rs76199483:166773444:C:G	4	166773444	0.971	C	G	0.026	0.035	0.073	0.27	0.31	0.37	1.37	0.29	3.20×10 ⁻⁶
rs73477136:101647065:G:A	15	101647065	0.964	G	A	0.351	0.359	0.505	0.08	0.11	0.49	0.63	0.14	3.24×10 ⁻⁶
rs200777230:166777999:T:TTA	4	166777999	0.960	T	TTA	0.026	0.036	0.073	0.27	0.31	0.38	1.37	0.29	3.26×10 ⁻⁶
rs4965786	15	101644728	1.000	G	A	0.348	0.361	0.504	0.09	0.11	0.40	0.62	0.13	3.26×10 ⁻⁶
rs6687052:17543745:C:G	1	17543745	0.716	C	G	0.017	0.023	0.058	0.46	0.43	0.29	1.74	0.37	3.32×10 ⁻⁶
rs79856418:166785185:G:A	4	166785185	0.987	G	A	0.026	0.035	0.073	0.25	0.31	0.41	1.37	0.29	3.40×10 ⁻⁶
rs72943748:115707553:G:A	6	115707553	0.890	G	A	0.057	0.072	0.138	0.24	0.22	0.28	1.00	0.21	3.41×10 ⁻⁶
rs74909334:166782525:T:G	4	166782525	0.982	T	G	0.026	0.035	0.073	0.25	0.31	0.42	1.37	0.29	3.48×10 ⁻⁶
rs78110573:166781811:T:C	4	166781811	0.981	T	C	0.026	0.035	0.073	0.25	0.31	0.42	1.37	0.29	3.49×10 ⁻⁶
rs72058865:119802878:GTAATTACA:G	1	119802878	0.888	GTAATTACA	G	0.009	0.017	0.045	0.89	0.48	0.06	1.93	0.42	3.53×10 ⁻⁶
rs78117962:130933852:A:C	5	130933852	0.628	A	C	0.019	0.020	0.058	0.07	0.47	0.88	1.77	0.38	3.55×10 ⁻⁶
rs76657152:166836962:C:A	4	166836962	0.985	C	A	0.019	0.024	0.060	0.21	0.36	0.57	1.51	0.33	3.58×10 ⁻⁶
rs71672720:119802937:G:A	1	119802937	0.886	G	A	0.009	0.017	0.045	0.88	0.48	0.06	1.92	0.42	3.67×10 ⁻⁶
rs4367133:166846522:G:C	4	166846522	0.979	G	C	0.019	0.024	0.060	0.19	0.37	0.60	1.51	0.33	3.68×10 ⁻⁶
rs74962447:166793633:C:T	4	166793633	0.970	C	T	0.025	0.034	0.071	0.28	0.31	0.37	1.38	0.30	3.70×10 ⁻⁶
rs55670557:166786382:T:G	4	166786382	0.992	T	G	0.027	0.037	0.074	0.29	0.30	0.34	1.35	0.29	3.72×10 ⁻⁶
rs17047075:166839266:A:C	4	166839266	0.985	A	C	0.019	0.024	0.060	0.20	0.36	0.59	1.51	0.33	3.74×10 ⁻⁶
rs72970165:166839208:C:T	4	166839208	0.985	C	T	0.019	0.024	0.060	0.20	0.36	0.59	1.51	0.33	3.74×10 ⁻⁶
rs1460066:166787084:T:G	4	166787084	0.990	T	G	0.027	0.037	0.074	0.28	0.30	0.35	1.35	0.29	3.75×10 ⁻⁶
rs10517872:166849974:G:A	4	166849974	0.974	G	A	0.019	0.024	0.060	0.18	0.37	0.62	1.51	0.33	3.77×10 ⁻⁶
rs6847868:166787659:C:T	4	166787659	0.989	C	T	0.027	0.037	0.074	0.28	0.30	0.35	1.35	0.29	3.78×10 ⁻⁶
13:99207935:CT:C	13	99207935	0.648	CT	C	0.051	0.061	0.105	0.46	0.29	0.12	1.33	0.29	3.80×10 ⁻⁶
rs145039327:166794046:GA:G	4	166794046	0.969	GA	G	0.025	0.034	0.071	0.28	0.31	0.37	1.38	0.30	3.83×10 ⁻⁶
rs4965787:101644870:A:G	15	101644870	0.964	A	G	0.359	0.372	0.511	0.10	0.11	0.38	0.63	0.14	3.88×10 ⁻⁶
rs6642645:112955879:T:A	23	112955879	0.554	T	A	0.059	0.074	0.140	0.22	0.21	0.30	0.90	0.20	3.88×10 ⁻⁶
rs1461738:91228639:C:T	4	91228639	0.980	C	T	0.395	0.381	0.527	-0.09	0.11	0.40	0.62	0.13	3.90×10 ⁻⁶
rs12651576:166775729:G:A	4	166775729	0.973	G	A	0.026	0.037	0.073	0.33	0.30	0.27	1.35	0.29	3.95×10 ⁻⁶
rs11410329:166786232:C:CA	6	166786232	0.745	C	CA	0.570	0.624	0.697	0.28	0.13	0.03	0.77	0.17	4.03×10 ⁻⁶
rs11142199:71035703:T:C	9	71035703	0.990	T	C	0.557	0.566	0.419	0.04	0.11	0.69	-0.62	0.13	4.07×10 ⁻⁶
rs140789861:12545909:AG:A	20	12545909	0.811	AG	A	0.014	0.022	0.050	0.67	0.43	0.12	1.79	0.39	4.14×10 ⁻⁶

SNP name	Chr ^a	Position ^b	r ^{2c}	Baseline allele	Effect allele	EAF ^d in controls	EAF ^d in breast cancer cases	EAF ^d in prostate cancer cases	Association with breast cancer			Association with prostate cancer		
									Beta ^e	s.e. ^f	p-value	Beta ^e	s.e. ^f	p-value
chr10_26767000_A_T	10	26767000	1.000	A	T	0.050	0.068	0.121	0.35	0.22	0.11	1.00	0.22	4.22×10 ⁻⁶
rs12443412:101646658:G:A	15	101646658	0.963	G	A	0.349	0.361	0.501	0.10	0.11	0.39	0.62	0.13	4.28×10 ⁻⁶
rs111800065:17561411:G:A	1	17561411	0.792	G	A	0.050	0.062	0.115	0.27	0.25	0.28	1.12	0.24	4.31×10 ⁻⁶
rs9759809:91225024:A:C	4	91225024	0.938	A	C	0.360	0.345	0.488	-0.09	0.11	0.43	0.63	0.14	4.35×10 ⁻⁶
rs76960900:166778842:A:T	4	166778842	0.973	A	T	0.026	0.036	0.072	0.30	0.31	0.34	1.36	0.30	4.41×10 ⁻⁶
rs148783536:20776379:A:T	20	20776379	0.730	A	T	0.012	0.014	0.047	0.23	0.55	0.68	1.95	0.42	4.65×10 ⁻⁶
rs35907465:119803717:A:G	1	119803717	0.876	A	G	0.010	0.017	0.045	0.81	0.47	0.09	1.88	0.41	4.69×10 ⁻⁶
10:68027840:AATGATG:AATG	10	68027840	0.872	AATGATG	AATG	0.015	0.029	0.054	0.70	0.37	0.06	1.64	0.36	4.84×10 ⁻⁶
rs76617417:166776506:T:C	4	166776506	0.975	T	C	0.026	0.035	0.072	0.28	0.31	0.37	1.35	0.30	4.85×10 ⁻⁶
rs78224021:166776477:A:C	4	166776477	0.975	A	C	0.026	0.035	0.072	0.28	0.31	0.37	1.35	0.30	4.86×10 ⁻⁶
rs58217427:17558872:G:A	1	17558872	0.797	G	A	0.050	0.062	0.115	0.27	0.25	0.27	1.11	0.24	4.94×10 ⁻⁶
rs10923796:119845696:G:C	1	119845696	0.877	G	C	0.990	0.989	0.954	-0.30	0.55	0.58	-1.87	0.41	5.00×10 ⁻⁶
rs1799990:4680251:A:G	20	4680251	0.959	A	G	0.343	0.277	0.210	-0.38	0.12	1.34×10 ⁻³	-0.73	0.16	5.29×10 ⁻⁶
rs147580027:35053921:TTTTTATTTA:T	21	35053921	0.951	TTTTTATTTA	T	0.628	0.640	0.766	0.06	0.11	0.58	0.72	0.16	5.32×10 ⁻⁶
rs12594775:101647662:T:A	15	101647662	0.952	T	A	0.349	0.354	0.500	0.06	0.11	0.59	0.62	0.14	5.41×10 ⁻⁶
rs75473979:166771514:G:A	4	166771514	0.974	G	A	0.026	0.037	0.073	0.31	0.30	0.30	1.33	0.29	5.47×10 ⁻⁶
rs12591826:101647627:C:A	15	101647627	0.951	C	A	0.349	0.354	0.500	0.06	0.11	0.59	0.62	0.14	5.52×10 ⁻⁶
rs3046187:166792888:CTT:CT	4	166792888	0.774	CTT	CT	0.044	0.060	0.095	0.39	0.27	0.14	1.25	0.28	5.61×10 ⁻⁶
rs6684070:77592466:C:T	1	77592466	0.889	C	T	0.029	0.037	0.084	0.21	0.30	0.49	1.25	0.28	5.67×10 ⁻⁶
rs34349428:119821594:T:C	1	119821594	0.888	T	C	0.010	0.017	0.045	0.81	0.47	0.08	1.86	0.41	5.68×10 ⁻⁶
rs10754394:119847024:C:T	1	119847024	0.885	C	T	0.990	0.987	0.954	-0.47	0.50	0.35	-1.83	0.40	5.77×10 ⁻⁶
rs76945681:91217924:C:T	4	91217924	0.989	C	T	0.398	0.382	0.528	-0.10	0.11	0.36	0.60	0.13	5.87×10 ⁻⁶
rs12760009:119830294:G:A	1	119830294	0.887	G	A	0.010	0.017	0.045	0.81	0.47	0.09	1.85	0.41	5.89×10 ⁻⁶
rs71672721:119829453:T:C	1	119829453	0.887	T	C	0.010	0.017	0.045	0.81	0.47	0.09	1.85	0.41	5.89×10 ⁻⁶
rs12591851:101647675:C:T	15	101647675	0.952	C	T	0.350	0.354	0.500	0.06	0.11	0.61	0.61	0.14	6.05×10 ⁻⁶
rs78860126:77593672:C:T	1	77593672	0.890	C	T	0.029	0.037	0.083	0.21	0.30	0.49	1.25	0.28	6.21×10 ⁻⁶
rs7025140:71035938:A:G	9	71035938	0.995	A	G	0.546	0.558	0.411	0.05	0.11	0.64	-0.60	0.13	6.23×10 ⁻⁶
rs12591827:101647642:C:T	15	101647642	0.951	C	T	0.350	0.354	0.500	0.06	0.11	0.61	0.61	0.14	6.27×10 ⁻⁶
rs35215100:119830624:G:A	1	119830624	0.885	G	A	0.010	0.017	0.045	0.80	0.47	0.09	1.85	0.41	6.27×10 ⁻⁶
rs116672483:69873223:G:A	1	69873223	0.935	G	A	0.110	0.122	0.199	0.15	0.17	0.35	0.81	0.18	6.29×10 ⁻⁶
rs9684318:91225876:G:C	4	91225876	0.987	G	C	0.399	0.382	0.528	-0.10	0.11	0.36	0.60	0.13	6.33×10 ⁻⁶
rs3055361:53221031:AT:A	5	53221031	0.794	AT	A	0.040	0.063	0.100	0.71	0.26	0.01	1.22	0.27	6.52×10 ⁻⁶
rs1320795:86124093:C:T	7	86124093	0.998	C	T	0.787	0.779	0.660	-0.12	0.13	0.36	-0.64	0.14	6.55×10 ⁻⁶
rs79547552:77685603:A:G	1	77685603	0.887	A	G	0.030	0.037	0.083	0.20	0.30	0.51	1.25	0.28	6.70×10 ⁻⁶
rs841834:43460400:C:T	1	43460400	0.910	C	T	0.971	0.972	0.923	0.03	0.34	0.92	-1.32	0.29	6.76×10 ⁻⁶
rs116351678:16013510:T:A	3	16013510	0.966	T	A	0.008	0.010	0.043	0.29	0.55	0.59	1.86	0.41	6.85×10 ⁻⁶

SNP name	Chr ^a	Position ^b	r ² ^c	Baseline allele	Effect allele	EAF ^d in controls	EAF ^d in breast cancer cases	EAF ^d in prostate cancer cases	Association with breast cancer			Association with prostate cancer		
									Beta ^e	s.e. ^f	p-value	Beta ^e	s.e. ^f	p-value
rs114916775:127386863:G:C	2	127386863	0.811	G	C	0.023	0.036	0.066	0.36	0.34	0.28	1.48	0.33	7.00×10 ⁻⁶
rs4796539	17	6586754	1.000	G	A	0.372	0.379	0.511	-0.02	0.11	0.83	0.60	0.13	7.24×10 ⁻⁶
rs6428814:119840645:A:G	1	119840645	0.854	A	G	0.989	0.988	0.954	-0.28	0.54	0.60	-1.83	0.41	7.24×10 ⁻⁶
rs2885445:119837466:T:A	1	119837466	0.851	T	A	0.989	0.988	0.954	-0.29	0.54	0.60	-1.83	0.41	7.31×10 ⁻⁶
rs75268766:166764497:T:A	4	166764497	0.972	T	A	0.027	0.035	0.072	0.24	0.30	0.43	1.31	0.29	7.57×10 ⁻⁶
rs4857958:20583264:C:T	3	20583264	0.972	C	T	0.263	0.300	0.391	0.19	0.12	0.11	0.64	0.14	7.60×10 ⁻⁶
rs56257608:101647368:C:T	15	101647368	0.918	C	T	0.374	0.376	0.521	0.05	0.11	0.67	0.61	0.14	7.71×10 ⁻⁶
rs200790287:119866842:TTGTGTGTG TGTG:TTGTGTGTGTGTG	1	119866842	0.740	TTGTGTGT GTGTG	TTGTGTGTG TGTGTG	0.072	0.064	0.141	-0.15	0.25	0.54	0.99	0.22	7.80×10 ⁻⁶
rs79959135:166758637:C:T	4	166758637	0.970	C	T	0.027	0.035	0.071	0.24	0.30	0.43	1.31	0.29	7.81×10 ⁻⁶
rs10868803:71046370:A:G	9	71046370	0.998	A	G	0.545	0.557	0.412	0.05	0.11	0.64	-0.60	0.13	7.83×10 ⁻⁶
rs201391305:126168953:CTT:C	2	126168953	0.944	CTT	C	0.040	0.036	0.099	-0.22	0.29	0.43	1.09	0.24	7.85×10 ⁻⁶
rs79750859:102575614:AG:A	11	102575614	0.610	AG	A	0.020	0.021	0.054	0.08	0.49	0.87	1.81	0.40	8.07×10 ⁻⁶
rs2001251:119838741:T:C	1	119838741	0.857	T	C	0.989	0.986	0.954	-0.46	0.50	0.36	-1.80	0.40	8.11×10 ⁻⁶
X:22193464:CGT:CT	23	22193464	0.829	CGT	CT	0.061	0.074	0.167	0.12	0.16	0.43	0.65	0.15	8.26×10 ⁻⁶
rs113745941:53222767:G:T	5	53222767	0.840	G	T	0.035	0.055	0.092	0.69	0.27	0.01	1.23	0.28	8.52×10 ⁻⁶
rs2412074:101647925:C:T	15	101647925	0.948	C	T	0.344	0.345	0.491	0.04	0.11	0.70	0.61	0.14	8.54×10 ⁻⁶
rs73860865:166772061:A:G	4	166772061	0.978	A	G	0.026	0.037	0.072	0.31	0.30	0.30	1.30	0.29	8.56×10 ⁻⁶
rs77764976:16052270:C:A	3	16052270	0.975	C	A	0.010	0.010	0.046	0.04	0.53	0.94	1.72	0.39	8.75×10 ⁻⁶
rs116459391:16052252:T:C	3	16052252	0.986	T	C	0.010	0.010	0.046	0.06	0.53	0.91	1.72	0.39	8.90×10 ⁻⁶
rs74429993:16051730:T:C	3	16051730	0.987	T	C	0.010	0.010	0.046	0.06	0.53	0.92	1.72	0.39	8.91×10 ⁻⁶
rs76987425:16052505:T:C	3	16052505	0.986	T	C	0.010	0.010	0.046	0.06	0.53	0.91	1.72	0.39	8.91×10 ⁻⁶
rs75767976:16052591:T:C	3	16052591	0.986	T	C	0.010	0.010	0.046	0.06	0.53	0.92	1.72	0.39	8.93×10 ⁻⁶
rs75121895:16051416:G:A	3	16051416	0.987	G	A	0.010	0.010	0.046	0.05	0.53	0.92	1.71	0.39	8.93×10 ⁻⁶
rs79696906:16051393:G:A	3	16051393	0.987	G	A	0.010	0.010	0.046	0.05	0.53	0.92	1.71	0.39	8.93×10 ⁻⁶
rs80315738:16051191:T:C	3	16051191	0.987	T	C	0.010	0.010	0.046	0.05	0.53	0.92	1.71	0.39	8.95×10 ⁻⁶
rs112319949:16053642:GT:G	3	16053642	0.985	GT	G	0.010	0.010	0.046	0.06	0.53	0.91	1.72	0.39	8.95×10 ⁻⁶
rs56273895:16026154:T:A	3	16026154	0.990	T	A	0.010	0.010	0.046	0.03	0.53	0.95	1.71	0.39	8.95×10 ⁻⁶
rs61352267:16054039:T:C	3	16054039	0.985	T	C	0.010	0.010	0.046	0.06	0.53	0.91	1.72	0.39	8.96×10 ⁻⁶
rs73818190:16049770:T:G	3	16049770	0.989	T	G	0.010	0.010	0.046	0.05	0.53	0.92	1.71	0.39	8.96×10 ⁻⁶
rs73818189:16049733:C:T	3	16049733	0.989	C	T	0.010	0.010	0.046	0.05	0.53	0.92	1.71	0.39	8.96×10 ⁻⁶
rs57985076:16054140:G:C	3	16054140	0.985	G	C	0.010	0.010	0.046	0.06	0.53	0.91	1.72	0.39	8.96×10 ⁻⁶
rs111433735:16050489:A:G	3	16050489	0.988	A	G	0.010	0.010	0.046	0.05	0.53	0.92	1.71	0.39	8.96×10 ⁻⁶
rs73818188:16049674:G:A	3	16049674	0.989	G	A	0.010	0.010	0.046	0.05	0.53	0.92	1.71	0.39	8.97×10 ⁻⁶
rs73818191:16049804:G:A	3	16049804	0.989	G	A	0.010	0.010	0.046	0.05	0.53	0.92	1.71	0.39	8.97×10 ⁻⁶
rs73818197:16055116:A:G	3	16055116	0.984	A	G	0.010	0.010	0.046	0.06	0.53	0.91	1.72	0.39	8.97×10 ⁻⁶
rs73818196:16053943:C:T	3	16053943	0.985	C	T	0.010	0.010	0.046	0.06	0.53	0.91	1.72	0.39	8.97×10 ⁻⁶

SNP name	Chr ^a	Position ^b	r ^{2c}	Baseline allele	Effect allele	EAF ^d in controls	EAF ^d in breast cancer cases	EAF ^d in prostate cancer cases	Association with breast cancer			Association with prostate cancer		
									Beta ^e	s.e. ^f	p-value	Beta ^e	s.e. ^f	p-value
rs73818183:16048203:G:T	3	16048203	0.990	G	T	0.010	0.010	0.046	0.05	0.53	0.93	1.71	0.39	8.97×10 ⁻⁶
rs73818187:16049086:G:A	3	16049086	0.989	G	A	0.010	0.010	0.046	0.05	0.53	0.92	1.71	0.39	8.97×10 ⁻⁶
rs77330858:16050400:T:C	3	16050400	0.988	T	C	0.010	0.010	0.046	0.05	0.53	0.92	1.71	0.39	8.97×10 ⁻⁶
rs73818184:16048551:A:G	3	16048551	0.990	A	G	0.010	0.010	0.046	0.05	0.53	0.93	1.71	0.39	8.98×10 ⁻⁶
rs57943623:16049972:A:G	3	16049972	0.988	A	G	0.010	0.010	0.046	0.05	0.53	0.92	1.71	0.39	8.98×10 ⁻⁶
rs113709774:16054949:A:G	3	16054949	0.984	A	G	0.010	0.010	0.046	0.06	0.53	0.91	1.72	0.39	8.98×10 ⁻⁶
rs56028901:16055599:G:A	3	16055599	0.983	G	A	0.010	0.010	0.046	0.06	0.53	0.91	1.72	0.39	8.98×10 ⁻⁶
rs73818185:16048609:T:C	3	16048609	0.990	T	C	0.010	0.010	0.046	0.05	0.53	0.93	1.71	0.39	8.98×10 ⁻⁶
rs73818199:16056005:T:G	3	16056005	0.983	T	G	0.010	0.010	0.046	0.06	0.53	0.91	1.72	0.39	8.98×10 ⁻⁶
rs73818192:16050264:C:T	3	16050264	0.988	C	T	0.010	0.010	0.046	0.05	0.53	0.92	1.71	0.39	8.98×10 ⁻⁶
rs77980098:16050297:T:C	3	16050297	0.988	T	C	0.010	0.010	0.046	0.05	0.53	0.92	1.71	0.39	8.98×10 ⁻⁶
rs56218402:16050115:T:A	3	16050115	0.988	T	A	0.010	0.010	0.046	0.05	0.53	0.92	1.71	0.39	8.98×10 ⁻⁶
rs144792041:16046840:GA:G	3	16046840	0.992	GA	G	0.010	0.010	0.046	0.05	0.53	0.93	1.71	0.39	8.99×10 ⁻⁶
rs113549629:16047537:A:G	3	16047537	0.991	A	G	0.010	0.010	0.046	0.05	0.53	0.93	1.71	0.39	8.99×10 ⁻⁶
rs79185557:16046805:A:G	3	16046805	0.992	A	G	0.010	0.010	0.046	0.05	0.53	0.93	1.71	0.39	8.99×10 ⁻⁶
rs55972710:16056641:A:G	3	16056641	0.983	A	G	0.010	0.010	0.046	0.06	0.53	0.91	1.72	0.39	9.00×10 ⁻⁶
rs57839867:16056654:A:G	3	16056654	0.983	A	G	0.010	0.010	0.046	0.06	0.53	0.91	1.72	0.39	9.00×10 ⁻⁶
rs59244046:16047152:G:T	3	16047152	0.991	G	T	0.010	0.010	0.046	0.05	0.53	0.93	1.71	0.39	9.00×10 ⁻⁶
rs58818020:16047283:A:G	3	16047283	0.991	A	G	0.010	0.010	0.046	0.05	0.53	0.93	1.71	0.39	9.01×10 ⁻⁶
rs59403458:16047339:T:C	3	16047339	0.991	T	C	0.010	0.010	0.046	0.05	0.53	0.93	1.71	0.39	9.01×10 ⁻⁶
rs73818180:16046500:G:A	3	16046500	0.991	G	A	0.010	0.010	0.046	0.05	0.53	0.93	1.71	0.38	9.01×10 ⁻⁶
rs73818181:16046712:G:T	3	16046712	0.992	G	T	0.010	0.010	0.046	0.05	0.53	0.93	1.71	0.39	9.01×10 ⁻⁶
rs74553675:16047652:A:G	3	16047652	0.991	A	G	0.010	0.010	0.046	0.05	0.53	0.93	1.71	0.39	9.01×10 ⁻⁶
rs112579529:16047922:T:G	3	16047922	0.991	T	G	0.010	0.010	0.046	0.05	0.53	0.93	1.71	0.39	9.01×10 ⁻⁶
rs77053535:16047889:G:A	3	16047889	0.991	G	A	0.010	0.010	0.046	0.05	0.53	0.93	1.71	0.39	9.02×10 ⁻⁶
rs73818179:16046421:C:T	3	16046421	0.992	C	T	0.010	0.010	0.046	0.05	0.53	0.93	1.71	0.38	9.03×10 ⁻⁶
rs76150268:77640103:T:C	1	77640103	0.883	T	C	0.030	0.039	0.084	0.25	0.29	0.40	1.23	0.28	9.17×10 ⁻⁶
rs5846892:16028035:TA:TAA	3	16028035	0.967	TA	TAA	0.010	0.013	0.046	0.25	0.49	0.61	1.71	0.39	9.26×10 ⁻⁶
rs181761543:87251692:G:A	9	87251692	0.862	G	A	0.009	0.013	0.039	0.32	0.54	0.55	1.98	0.45	9.27×10 ⁻⁶
rs76804245:166749558:T:C	4	166749558	0.960	T	C	0.027	0.035	0.070	0.23	0.31	0.44	1.31	0.30	9.33×10 ⁻⁶
17:76588008:A:ACG	17	76588008	0.589	A	ACG	0.548	0.531	0.436	-0.12	0.14	0.38	-0.75	0.17	9.48×10 ⁻⁶
rs112973650:115943183:T:C	6	115943183	0.862	T	C	0.018	0.023	0.067	0.18	0.39	0.65	1.44	0.33	9.55×10 ⁻⁶
rs11142305:71037776:C:T	9	71037776	0.998	C	T	0.543	0.555	0.411	0.05	0.11	0.61	-0.59	0.13	9.60×10 ⁻⁶
rs2085160:101648076:C:G	15	101648076	0.948	C	G	0.344	0.346	0.490	0.05	0.11	0.67	0.60	0.14	9.62×10 ⁻⁶
rs28469685:166786046:C:T	4	166786046	0.995	C	T	0.028	0.039	0.074	0.29	0.29	0.32	1.28	0.29	9.63×10 ⁻⁶
rs2036602:20605021:G:A	3	20605021	0.982	G	A	0.262	0.297	0.389	0.19	0.12	0.11	0.63	0.14	9.64×10 ⁻⁶

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									Beta ^e	s.e. ^f	p-value	Beta ^e	s.e. ^f	p-value
rs10868795	9	71040170	1.000	A	C	0.543	0.555	0.411	0.05	0.11	0.63	-0.59	0.13	9.66×10 ⁻⁶
rs11142334:71038459:G:T	9	71038459	0.998	G	T	0.543	0.555	0.411	0.05	0.11	0.62	-0.59	0.13	9.69×10 ⁻⁶
rs11937331:165781716:T:C	4	165781716	0.891	T	C	0.031	0.041	0.090	0.39	0.29	0.18	1.19	0.27	9.79×10 ⁻⁶
rs6847875:166787673:C:G	4	166787673	0.992	C	G	0.028	0.039	0.074	0.29	0.29	0.32	1.28	0.29	9.80×10 ⁻⁶
rs3046181:166788398:T:TACTA	4	166788398	0.991	T	TACTA	0.028	0.039	0.074	0.29	0.29	0.33	1.28	0.29	9.88×10 ⁻⁶
rs10868796:71040499:G:C	9	71040499	1.000	G	C	0.543	0.555	0.411	0.05	0.11	0.62	-0.59	0.13	9.89×10 ⁻⁶
rs2085161:101648029:T:C	15	101648029	0.947	T	C	0.345	0.345	0.491	0.04	0.11	0.71	0.60	0.14	9.90×10 ⁻⁶
rs145687496:74362446:TC:T	11	74362446	0.877	TC	T	0.016	0.022	0.056	0.51	0.40	0.20	1.54	0.35	9.90×10 ⁻⁶
rs60597012:166772408:A:G	4	166772408	0.975	A	G	0.027	0.039	0.073	0.33	0.29	0.26	1.29	0.29	9.95×10 ⁻⁶

^aChr: chromosome

^bPosition: Built 37 position

^cr²: imputation r² in the samples (obtained from the info score from IMPUTEv2)

^dEAF: Effect Allele Frequency

^ebeta: per allele coefficient of association

^fs.e.: standard error

Supplementary Table 11: results for the SNPs included in any of the breast cancer PRS for *BRCA1* and *BRCA2* mutation carriers

SNP name	Position ^a	Reference Allele	Effect Allele	Locus	EAF ^b in controls	EAF ^b in breast cancer cases	EAF ^b in prostate cancer cases	Association with breast cancer			Association with prostate cancer		
								OR ^c	95%CI ^d	p-value	OR ^c	95%CI ^d	p-value
rs616488	10566215	A	G	1p36.22	0.305	0.289	0.368	0.97	0.78-1.19	0.748	1.28	1.02-1.61	0.031
rs11552449	114448389	C	T	1p13.2	0.161	0.150	0.156	0.93	0.73-1.20	0.589	0.96	0.71-1.29	0.762
rs11249433	121280613	A	G	1p11.2	0.412	0.375	0.413	0.86	0.72-1.02	0.089	1.01	0.82-1.23	0.948
rs12405132	145644984	C	T	1q21.1	0.378	0.319	0.333	0.79	0.64-0.97	0.025	0.82	0.66-1.02	0.071
rs12048493	149927034	A	C	1q21.2	0.368	0.372	0.336	0.97	0.80-1.18	0.764	0.84	0.67-1.06	0.142
rs6678914	202187176	G	A	1q32.1	0.406	0.404	0.403	0.94	0.78-1.14	0.544	0.98	0.79-1.23	0.879
rs4245739	204518842	A	C	1q32.1	0.271	0.251	0.285	0.86	0.69-1.06	0.162	1.08	0.86-1.35	0.508
rs72755295	242034263	A	G	1q43	0.032	0.027	0.047	0.94	0.53-1.67	0.826	1.37	0.83-2.25	0.220
rs12710696	19320803	C	T	2p24.1	0.367	0.347	0.361	0.93	0.76-1.13	0.468	0.99	0.80-1.23	0.941
rs4577244	29120733	C	T	2p23.2	0.216	0.249	0.241	1.18	0.95-1.47	0.128	1.16	0.90-1.49	0.247
rs4849887	121245122	C	T	2q14.2	0.111	0.099	0.099	0.84	0.60-1.17	0.302	0.90	0.65-1.26	0.548
rs2016394	172972971	G	A	2q31.1	0.445	0.480	0.453	1.19	0.98-1.44	0.077	1.00	0.81-1.24	0.967
rs1550623	174212894	A	G	2q31.1	0.160	0.130	0.153	0.81	0.62-1.07	0.134	0.94	0.70-1.27	0.694
rs1830298	202181247	T	C	2q33	0.303	0.345	0.323	1.20	0.98-1.47	0.075	1.16	0.93-1.45	0.192
rs4442975	217920769	G	T	2q35	0.482	0.428	0.450	0.81	0.67-0.99	0.035	0.84	0.67-1.05	0.119
rs16857609	218296508	C	T	2q35	0.264	0.316	0.300	1.34	1.09-1.66	0.006	1.16	0.92-1.47	0.210
rs6762644	4742276	A	G	3p26.1	0.347	0.386	0.408	1.22	1.00-1.48	0.048	1.25	1.01-1.54	0.039
rs4973768	27416013	C	T	3p24.1	0.485	0.522	0.550	1.19	0.98-1.44	0.079	1.37	1.11-1.68	0.003
rs12493607	30682939	G	C	3p24.1	0.308	0.310	0.321	1.01	0.82-1.24	0.960	1.05	0.84-1.32	0.667
rs6796502	46866866	G	A	3p21.3	0.105	0.112	0.130	1.07	0.80-1.43	0.667	1.33	0.96-1.84	0.082
rs9790517	106084778	C	T	4q24	0.225	0.206	0.222	0.88	0.70-1.10	0.259	1.01	0.79-1.29	0.936
rs6828523	175846426	C	A	4q34.1	0.106	0.069	0.111	0.61	0.42-0.87	0.007	1.04	0.74-1.44	0.838
rs56963355	1251503	G	T	5p15.33	0.056	0.063	0.061	1.11	0.74-1.68	0.612	1.05	0.67-1.64	0.831
rs10069690	1279790	C	T	5p15.33	0.278	0.298	0.255	1.12	0.91-1.37	0.292	0.89	0.70-1.13	0.345
rs2242652	1280028	G	A	5p15.33	0.206	0.233	0.193	1.20	0.96-1.49	0.103	0.93	0.70-1.22	0.593
rs7734992	1280128	T	C	5p15.33	0.433	0.440	0.427	1.02	0.84-1.24	0.848	0.99	0.80-1.22	0.919
rs3215401	1296255	A	AG	5p15.33	0.297	0.285	0.354	0.94	0.76-1.16	0.575	1.33	1.06-1.66	0.012
rs2736108	1297488	C	T	5p15.33	0.287	0.280	0.337	0.97	0.78-1.20	0.761	1.28	1.03-1.61	0.028
rs2736107	1297854	C	T	5p15.33	0.272	0.264	0.316	0.95	0.76-1.18	0.634	1.25	1.00-1.56	0.055

SNP name	Position ^a	Reference Allele	Effect Allele	Locus	EAF ^b in controls	EAF ^b in breast cancer cases	EAF ^b in prostate cancer cases	Association with breast cancer			Association with prostate cancer		
								OR ^c	95%CI ^d	p-value	OR ^c	95%CI ^d	p-value
rs13162653	16187528	G	T	5p15.1	0.448	0.439	0.460	0.94	0.79-1.14	0.545	1.02	0.83-1.27	0.829
rs2012709	32567732	C	T	5p13.3	0.497	0.478	0.488	0.88	0.73-1.07	0.205	0.95	0.76-1.17	0.619
rs10941679	44706498	A	G	5p12	0.261	0.249	0.267	0.95	0.77-1.17	0.620	1.02	0.81-1.29	0.849
rs889312	56031884	A	C	5q11.2	0.300	0.307	0.278	1.04	0.85-1.26	0.721	0.91	0.73-1.14	0.408
rs10472076	58184061	T	C	5q11.3	0.390	0.384	0.349	0.99	0.82-1.20	0.936	0.84	0.67-1.05	0.123
rs1353747	58337481	T	G	5q11.3	0.088	0.106	0.090	1.31	0.95-1.81	0.104	0.99	0.69-1.42	0.940
rs7707921	81538046	A	T	5q14	0.241	0.247	0.224	1.09	0.87-1.37	0.456	0.88	0.69-1.12	0.305
rs1432679	158244083	T	C	5q33.3	0.439	0.440	0.425	1.00	0.82-1.20	0.960	0.96	0.77-1.19	0.694
rs11242675	1318878	T	C	6p25.3	0.364	0.375	0.373	1.08	0.89-1.32	0.431	1.03	0.82-1.28	0.821
rs9348512	10456706	C	A	6p24.3	0.335	0.328	0.359	0.95	0.78-1.15	0.595	1.07	0.86-1.33	0.545
rs204247	13722523	A	G	6p23	0.466	0.482	0.467	1.04	0.85-1.28	0.671	1.02	0.82-1.27	0.865
rs9257408	28926220	G	C	6p22.1	0.421	0.426	0.429	1.02	0.84-1.23	0.866	1.03	0.82-1.28	0.827
rs17530068	82193109	T	C	6q14	0.242	0.245	0.250	1.00	0.80-1.25	0.994	1.07	0.83-1.39	0.599
rs3757322	151942194	T	G	6q25.1	0.355	0.375	0.292	1.10	0.91-1.33	0.326	0.77	0.61-0.98	0.030
rs9397437	151952332	G	A	6q25.1	0.095	0.132	0.068	1.43	1.07-1.91	0.016	0.76	0.51-1.14	0.189
rs851984	152023191	G	A	6q25.1	0.404	0.422	0.439	1.06	0.87-1.29	0.543	1.10	0.89-1.36	0.378
rs9918437	152072718	G	T	6q25.1	0.070	0.096	0.073	1.35	0.99-1.83	0.055	1.00	0.66-1.50	0.998
rs2747652	152437016	C	T	6q25.1	0.498	0.440	0.491	0.79	0.66-0.95	0.011	0.99	0.81-1.21	0.921
rs4593472	130667121	C	T	7q32.3	0.351	0.352	0.340	1.01	0.82-1.23	0.941	0.94	0.75-1.17	0.557
rs720475	144074929	G	A	7q35	0.267	0.280	0.236	1.07	0.86-1.32	0.562	0.84	0.65-1.09	0.189
rs9693444	29509616	C	A	8p12	0.347	0.359	0.356	1.06	0.88-1.28	0.548	1.07	0.85-1.34	0.577
rs13365225	36858483	A	G	8p11.23	0.185	0.146	0.177	0.72	0.55-0.94	0.016	1.01	0.76-1.33	0.953
rs6472903	76230301	T	G	8q21.11	0.165	0.152	0.153	0.90	0.70-1.17	0.431	0.93	0.70-1.25	0.646
rs2943559	76417937	A	G	8q21.11	0.077	0.083	0.113	1.03	0.74-1.43	0.869	1.59	1.13-2.22	0.007
rs13267382	117209548	G	A	8q23.3	0.341	0.350	0.337	1.06	0.87-1.29	0.571	1.01	0.81-1.24	0.959
rs13281615	128355618	A	G	8q24.21	0.429	0.453	0.432	1.10	0.91-1.33	0.341	1.06	0.85-1.31	0.613
rs11780156	129194641	C	T	8q24.21	0.175	0.191	0.196	1.10	0.87-1.39	0.439	1.21	0.93-1.57	0.148
rs1011970	22062134	G	T	9p21.3	0.180	0.173	0.182	0.98	0.76-1.25	0.856	1.01	0.76-1.34	0.941
rs10759243	110306115	C	A	9q31.2	0.291	0.325	0.300	1.23	1.01-1.49	0.040	1.06	0.85-1.33	0.577
rs865686	110888478	T	G	9q31.2	0.379	0.372	0.351	0.97	0.78-1.19	0.741	0.87	0.70-1.10	0.245

SNP name	Position ^a	Reference Allele	Effect Allele	Locus	EAF ^b in controls	EAF ^b in breast cancer cases	EAF ^b in prostate cancer cases	Association with breast cancer			Association with prostate cancer		
								OR ^c	95%CI ^d	p-value	OR ^c	95%CI ^d	p-value
rs7072776	22032942	G	A	10p12.31	0.294	0.323	0.295	1.08	0.89-1.33	0.434	1.05	0.85-1.31	0.640
rs11814448	22315843	A	C	10p12.31	0.018	0.022	0.024	1.27	0.65-2.47	0.482	1.39	0.66-2.93	0.384
rs10995190	64278682	G	A	10q21.2	0.142	0.153	0.125	1.03	0.79-1.35	0.828	0.84	0.62-1.15	0.282
rs704010	80841148	C	T	10q22.3	0.388	0.375	0.373	0.92	0.75-1.13	0.431	0.94	0.76-1.17	0.581
rs7904519	114773927	A	G	10q25.2	0.478	0.505	0.465	1.10	0.91-1.33	0.308	0.97	0.80-1.18	0.787
rs11199914	123093901	C	T	10q26.12	0.330	0.298	0.337	0.83	0.68-1.01	0.061	1.05	0.83-1.33	0.666
rs35054928	123340431	G	GC	10q26.12	0.424	0.445	0.396	1.08	0.89-1.32	0.424	0.91	0.73-1.13	0.398
rs45631563	123349324	A	T	10q26.12	0.049	0.038	0.054	0.68	0.42-1.09	0.107	1.16	0.71-1.89	0.558
rs3817198	1909006	T	C	11p15.5	0.338	0.366	0.349	1.10	0.90-1.35	0.337	1.06	0.84-1.32	0.625
rs3903072	65583066	G	T	11q13.1	0.480	0.468	0.450	0.97	0.81-1.17	0.777	0.91	0.73-1.13	0.388
rs554219	69331642	C	G	11q13.3	0.115	0.146	0.111	1.31	0.99-1.73	0.062	0.94	0.65-1.36	0.759
rs494406	69344241	C	T	11q13.3	0.253	0.271	0.238	1.07	0.86-1.33	0.538	0.93	0.73-1.20	0.594
rs75915166	69379161	C	A	11q13.3	0.051	0.079	0.061	1.53	1.04-2.25	0.032	1.26	0.79-2.00	0.340
rs11820646	129461171	C	T	11q24.3	0.364	0.357	0.406	0.94	0.77-1.15	0.549	1.17	0.93-1.47	0.171
rs12422552	14413931	G	C	12p13.1	0.294	0.280	0.292	0.92	0.75-1.13	0.421	0.97	0.77-1.22	0.798
rs805510	28139846	C	T	12p11.22	0.123	0.116	0.127	0.97	0.73-1.29	0.844	1.01	0.72-1.41	0.954
rs7297051	28174817	C	T	12p11.22	0.230	0.240	0.233	1.08	0.87-1.35	0.460	1.02	0.80-1.29	0.884
rs17356907	96027759	A	G	12q22	0.303	0.303	0.307	1.02	0.83-1.25	0.876	1.04	0.83-1.30	0.711
rs4767280	115363953	C	T	12q24.22	0.415	0.430	0.425	1.05	0.86-1.27	0.661	1.04	0.83-1.29	0.746
rs1391721	115836132	T	C	12q24.21	0.411	0.406	0.462	0.98	0.81-1.18	0.815	1.29	1.04-1.59	0.022
rs11571833	32972626	A	T	13q13.1	0.019	0.020	0.035	0.96	0.47-1.98	0.918	1.80	1.02-3.18	0.042
rs8002929	73964519	G	A	13q22	0.246	0.240	0.255	0.95	0.76-1.18	0.645	1.02	0.81-1.30	0.843
rs2236007	37132769	G	A	14q13.3	0.199	0.166	0.198	0.82	0.64-1.04	0.097	0.99	0.76-1.28	0.918
rs2588809	68660428	C	T	14q24.1	0.195	0.226	0.182	1.16	0.91-1.47	0.221	0.98	0.75-1.29	0.879
rs999737	69034682	C	T	14q24.1	0.206	0.157	0.231	0.70	0.54-0.90	0.006	1.14	0.88-1.47	0.316
rs941764	91841069	A	G	14q32.11	0.323	0.332	0.342	1.08	0.88-1.33	0.458	1.07	0.86-1.34	0.556
rs11627032	93104072	T	C	14q32.12	0.251	0.253	0.269	0.99	0.80-1.23	0.923	1.11	0.88-1.40	0.369
rs4784227	52599188	C	T	16q12.1	0.270	0.278	0.236	1.01	0.81-1.26	0.923	0.85	0.67-1.06	0.147
rs17817449	53813367	T	G	16q12.1	0.403	0.428	0.408	1.09	0.90-1.32	0.372	1.04	0.83-1.29	0.738
rs11075995	53855291	A	T	16q12.1	0.764	0.773	0.781	1.02	0.82-1.28	0.839	1.13	0.88-1.44	0.342

SNP name	Position ^a	Reference Allele	Effect Allele	Locus	EAF ^b in controls	EAF ^b in breast cancer cases	EAF ^b in prostate cancer cases	Association with breast cancer			Association with prostate cancer		
								OR ^c	95%CI ^d	p-value	OR ^c	95%CI ^d	p-value
rs13329835	80650805	A	G	16q23.2	0.232	0.227	0.217	0.97	0.77-1.21	0.764	0.92	0.71-1.19	0.523
chr17:29230520: D	29230520	GGT	G	17q11.2	0.274	0.229	0.288	0.83	0.67-1.04	0.101	1.07	0.84-1.35	0.586
rs6504950	53056471	G	A	17q22	0.271	0.274	0.292	1.08	0.87-1.34	0.471	1.10	0.88-1.37	0.413
rs745570	77781725	A	G	17q25.3	0.492	0.505	0.531	1.01	0.84-1.21	0.940	1.16	0.94-1.43	0.178
rs527616	24337424	G	C	18q11.2	0.366	0.366	0.356	0.97	0.80-1.18	0.779	0.96	0.78-1.19	0.717
rs1436904	24570667	T	G	18q11.2	0.393	0.374	0.425	0.89	0.73-1.08	0.236	1.10	0.89-1.36	0.355
rs6507583	42399590	A	G	18q12.3	0.070	0.069	0.073	0.98	0.68-1.42	0.923	1.02	0.68-1.53	0.925
c19_pos172628 59	17401859	G	A	19p13.11	0.297	0.276	0.300	0.94	0.76-1.16	0.537	0.97	0.78-1.20	0.772
rs4808801	18571141	A	G	19p13.11	0.325	0.310	0.330	0.94	0.77-1.15	0.541	1.01	0.81-1.26	0.918
rs3760982	44286513	G	A	19q13.31	0.478	0.466	0.458	0.96	0.79-1.15	0.637	0.92	0.74-1.14	0.439
rs2823093	16520832	G	A	21q21.1	0.278	0.242	0.262	0.82	0.66-1.02	0.079	0.94	0.73-1.20	0.609
rs132390	29621477	T	C	22q12.2	0.032	0.032	0.012	1.05	0.62-1.79	0.856	0.36	0.15-0.86	0.021
rs6001930	40876234	T	C	22q13.1	0.096	0.097	0.134	1.08	0.77-1.50	0.667	1.36	0.99-1.87	0.062

^aPosition: Built 37 position

^bEAF: Effect Allele Frequency

^cOR: per allele odds ratio of association

^d95%CI: 95% confidence interval

The SNPs associated with breast cancer risk at p<5% are displayed in bold

Supplementary Table 12: Associations between the Overall PRS, ER-negative PRS and ER-positive PRS with male breast cancer risk for *BRCA1* and *BRCA2* mutation carriers using a logistic regression with the definition of the control group (1) (supplementary methods)

	All Samples					<i>BRCA1</i> Samples					<i>BRCA2</i> Samples				
	Number of controls	Number of breast cancer cases	OR ^a	95%CI ^b	p-value	Number of controls	Number of breast cancer cases	OR ^a	95%CI ^b	p-value	Number of controls	Number of breast cancer cases	OR ^a	95%CI ^b	p-value
Overall PRS															
1 st Quartile	378	45	1.00	-	-	123	3	1.00	-	-	255	42	1.00	-	-
2 nd Quartile	379	58	1.27	0.82-1.94	0.281	112	12	4.53	1.24-16.55	0.022	267	46	1.05	0.66-1.68	0.837
3 rd Quartile	378	79	1.69	1.13-2.53	0.011	99	5	2.16	0.50-9.27	0.301	279	74	1.66	1.08-2.56	0.021
4 th Quartile	379	106	2.31	1.56-3.41	2.92×10 ⁻⁵	117	13	4.71	1.31-16.88	0.017	262	93	2.15	1.41-3.29	3.85×10 ⁻⁴
Trend	1514	288	1.36 ^c	1.19-1.56	5.63×10 ⁻⁶	451	33	1.51 ^c	1.08-2.09	0.015	1063	255	1.35 ^c	1.17-1.56	6.61×10 ⁻⁵
ER-negative PRS															
1 st Quartile	379	56	1.00	-	-	106	5	1.00	-	-	273	51	1.00	-	-
2 nd Quartile	378	70	1.34	0.90-1.97	0.146	117	10	1.88	0.6-5.85	0.277	261	60	1.31	0.86-1.99	0.216
3 rd Quartile	378	77	1.49	1.02-2.18	0.04	121	11	1.99	0.66-5.99	0.219	257	66	1.46	0.96-2.2	0.074
4 th Quartile	379	85	1.55	1.06-2.27	0.023	107	7	1.32	0.40-4.37	0.647	272	78	1.64	1.09-2.47	0.019
Trend	1514	288	1.20 ^c	1.06-1.36	4.00×10 ⁻³	451	33	1.16 ^c	0.83-1.63	0.377	1063	255	1.22 ^c	1.06-1.4	5.00×10 ⁻³
ER-positive PRS															
1 st Quartile	379	43	1.00	-	-	122	2	1.00	-	-	257	41	1.00	-	-
2 nd Quartile	378	58	1.33	0.87-2.05	0.189	110	12	6.78	1.46-31.52	0.015	268	46	1.07	0.67-1.71	0.775
3 rd Quartile	379	81	1.83	1.21-2.75	0.004	107	7	4.19	0.83-21.15	0.083	272	74	1.72	1.11-2.67	0.015
4 th Quartile	378	106	2.40	1.62-3.57	1.42×10 ⁻⁵	112	12	6.78	1.46-31.56	0.015	266	94	2.19	1.44-3.35	2.73×10 ⁻⁴
Trend	1514	288	1.37 ^c	1.20-1.56	3.84×10 ⁻⁶	451	33	1.61 ^c	1.17-2.22	4.00×10 ⁻³	1063	255	1.34 ^c	1.16-1.55	8.85×10 ⁻⁵

^a OR: odds ratio for male breast cancer

^b 95% CI: 95% confidence interval

^cOR for male breast cancer per standard deviation increase in the standardised PRS

Supplementary Table 13: Associations between the Overall PRS, ER-negative PRS and ER-positive PRS with male breast cancer risk for *BRCA1* and *BRCA2* mutation carriers using a logistic regression with the definition of the control group (2) (supplementary methods)

	All Samples					<i>BRCA1</i> Samples					<i>BRCA2</i> Samples				
	Number of controls	Number of breast cancer cases	OR ^a	95%CI ^b	p-value	Number of controls	Number of breast cancer cases	OR ^a	95%CI ^b	p-value	Number of controls	Number of breast cancer cases	OR ^a	95%CI ^b	p-value
Overall PRS															
1 st Quartile	329	45	1.00	-	-	106	3	1.00	-	-	223	42	1.00	-	-
2 nd Quartile	328	58	1.25	0.81-1.92	0.312	92	12	4.90	1.34-17.94	0.017	236	46	1.01	0.63-1.62	0.967
3 rd Quartile	328	80	1.69	1.12-2.53	0.012	83	5	2.25	0.52-9.66	0.275	245	75	1.64	1.06-2.53	0.026
4 th Quartile	328	105	2.27	1.53-3.38	4.70×10 ⁻⁵	99	13	4.88	1.36-17.53	0.015	229	92	2.07	1.35-3.18	1.00×10 ⁻³
Trend	1313	288	1.36 ^c	1.19-1.55	9.87×10 ⁻⁶	380	33	1.47 ^c	1.06-2.03	0.021	933	255	1.34 ^c	1.16-1.56	1.09×10 ⁻⁴
ER-negative PRS															
1 st Quartile	328	56	1.00	-	-	84	5	1.00	-	-	244	51	1.00	-	-
2 nd Quartile	329	70	1.36	0.92-2.02	0.125	105	10	1.70	0.55-5.33	0.359	224	60	1.35	0.88-2.07	0.165
3 rd Quartile	328	78	1.51	1.03-2.21	0.036	101	11	1.96	0.64-5.96	0.236	227	67	1.48	0.97-2.24	0.068
4 th Quartile	328	84	1.57	1.07-2.31	0.022	90	7	1.27	0.38-4.22	0.696	238	77	1.67	1.10-2.54	0.016
Trend	1313	288	1.19 ^c	1.05-1.35	7.00×10 ⁻³	380	33	1.14 ^c	0.81-1.62	0.455	933	255	1.21 ^c	1.05-1.39	7.00×10 ⁻³
ER-positive PRS															
1 st Quartile	328	43	1.00	-	-	103	2	1.00	-	-	225	41	1.00	-	-
2 nd Quartile	329	58	1.34	0.86-2.06	0.192	91	12	7.15	1.51-33.79	0.013	238	46	1.05	0.66-1.68	0.836
3 rd Quartile	328	85	1.89	1.25-2.84	0.002	87	7	4.44	0.87-22.8	0.074	241	78	1.76	1.14-2.72	0.011
4 th Quartile	328	102	2.32	1.55-3.47	4.13×10 ⁻⁵	99	12	6.54	1.39-30.82	0.018	229	90	2.09	1.36-3.22	0.001
Trend	1313	288	1.36 ^c	1.19-1.56	5.36×10 ⁻⁶	380	33	1.57 ^c	1.14-2.15	5.00×10 ⁻³	933	255	1.34 ^c	1.15-1.55	1.18×10 ⁻⁴

^aOR: odds ratio for male breast cancer

^b95% CI: 95% confidence interval

^cOR for male breast cancer per standard deviation increase in the standardised PRS

Supplementary Table 14: Association between the Overall PRS, the ER-positive PRS and the Prostate Cancer PRS with male breast cancer risk and prostate cancer risk for *BRCA1* and *BRCA2* mutation carriers when considering the cases with both cancers as a separate group in the multinomial regression.

	All Samples					<i>BRCA1</i> Samples					<i>BRCA2</i> Samples				
	Number of controls	Number of cases	OR ^a	95%CI ^b	p-value	Number of controls	Number of cases	OR ^a	95%CI ^b	p-value	Number of controls	Number of cases	OR ^a	95%CI ^b	p-value
Overall PRS / Breast cancer cases only															
1 st Quartile	329	36	1.00			106	3	1.00			223	33	1.00		
2 nd Quartile	328	53	1.45	0.91-2.30	0.12	92	11	4.37	1.18-16.2	0.03	236	42	1.20	0.72-2.01	0.48
3 rd Quartile	327	64	1.73	1.11-2.72	0.02	82	5	2.24	0.52-9.75	0.28	245	59	1.69	1.04-2.75	0.03
4 th Quartile	329	93	2.55	1.66-3.91	2.0×10 ⁻⁵	100	12	4.44	1.23-16.0	0.02	229	81	2.40	1.50-3.83	2.5×10 ⁻⁴
trend	1313	246	1.38	1.20-1.60	1.3×10 ⁻⁵	380	31	1.49	1.05-2.11	0.03	933	215	1.38	1.17-1.62	1.0×10 ⁻⁴
Overall PRS / Patients with both breast and prostate cancer															
1 st Quartile	329	9	1.00			106	0	1.00			223	9	1.00		
2 nd Quartile	328	5	0.55	0.18-1.66	0.29	92	1	na	na	na	236	4	0.42	0.13-1.39	0.16
3 rd Quartile	327	16	1.68	0.73-3.84	0.22	82	0	na	na	na	245	16	1.64	0.71-3.78	0.25
4 th Quartile	329	12	1.33	0.55-3.20	0.52	100	1	na	na	na	229	11	1.20	0.49-2.93	0.690
trend	1313	42	1.24	0.93-1.66	0.15	380	2	na	na	na	933	40	1.24	0.91-1.68	0.17
ER-positive PRS / Breast cancer cases only															
1 st Quartile	328	35	1.00			103	2	1.00			225	33	1.00		
2 nd Quartile	329	50	1.42	0.89-2.27	0.15	91	11	6.35	1.35-29.9	0.02	238	39	1.12	0.67-1.86	0.674
3 rd Quartile	328	71	1.98	1.26-3.10	3.0×10 ⁻³	87	7	4.37	0.86-22.2	0.08	241	64	1.85	1.15-3.00	0.01
4 th Quartile	328	90	2.54	1.64-3.92	2.9×10 ⁻⁵	99	11	5.96	1.26-28.1	0.02	229	79	2.36	1.47-3.77	3.4×10 ⁻⁴
trend	1313	246	1.40	1.21-1.61	5.6×10 ⁻⁶	380	31	1.59	1.13-2.23	8.0×10 ⁻³	933	215	1.38	1.17-1.62	8.2×10 ⁻⁵
ER-positive PRS / Patients with both breast and prostate cancer															
1 st Quartile	328	8	1.00			103	0	1.00			225	8	1.00		
2 nd Quartile	329	8	1.00	0.37-2.72	1.000	91	1	na	na	na	238	7	0.83	0.30-2.36	0.73
3 rd Quartile	328	14	1.67	0.69-4.04	0.25	87	0	na	na	na	241	14	1.64	0.68-3.99	0.27
4 th Quartile	328	12	1.50	0.61-3.69	0.38	99	1	na	na	na	229	11	1.36	0.54-3.40	0.51
trend	1313	42	1.20	0.90-1.60	0.2	380	2	na	na	na	933	40	1.19	0.88-1.60	0.26
Prostate Cancer PRS / Prostate cancer cases only															
1 st Quartile	328	25.00	1.00			88	9	1.00			240	16	1.00		
2 nd Quartile	329	43.00	1.73	1.01-2.95	0.05	94	14	1.45	0.59-3.58	0.42	235	29	1.89	0.97-3.66	0.06
3 rd Quartile	328	52	2.19	1.29-3.70	4.0×10 ⁻³	106	15	1.46	0.59-3.58	0.41	222	37	2.65	1.39-5.09	3.0×10 ⁻³
4 th Quartile	328	81	3.34	2.03-5.49	2.0×10 ⁻⁶	92	33	3.46	1.50-7.97	4.0×10 ⁻³	236	48	3.25	1.74-6.05	2.1×10 ⁻⁴
trend	1313	201	1.59	1.36-1.85	2.9×10 ⁻⁹	380	71	1.72	1.30-2.29	1.8×10 ⁻⁴	933	130	1.52	1.27-1.82	4.4×10 ⁻⁶
Prostate Cancer PRS / Patients with both breast and prostate cancer															
1 st Quartile	328	3	1.00			88	0	1.00			240	3	1.00		
2 nd Quartile	329	15	5.14	1.48-17.8	0.01	94	0	na	na	na	235	15	5.13	1.47-17.9	0.01
3 rd Quartile	328	7	2.52	0.65-9.81	0.18	106	1	na	na	na	222	6	2.21	0.55-8.95	0.27

4 th Quartile	328	17	6.40	1.86-22.0	3.0×10 ⁻³	92	1	na	na	na	236	16	6.03	1.73-21.0	5.0×10 ⁻³
trend	1313	42	1.50	1.17-1.92	1.0×10 ⁻³	380	2	na	na	na	933	40	1.47	1.14-1.90	3.5×10 ⁻³

^aOR: odds ratio for male breast cancer.

^b95%CI: 95% confidence interval.

^cOR for male breast cancer per standard deviation increase in the standardised PRS.

Supplementary Table 15: Single SNP association results for the SNPs included in the Prostate cancer PRS

SNP name	Position ^a	Reference Allele	Effect Allele	Locus	EAF ^b in controls	EAF ^b in breast cancer cases	EAF ^b in prostate cancer cases	Association with breast cancer			Association with prostate cancer		
								OR ^c	95%CI ^d	p-value	OR ^c	95%CI ^d	p-value
rs636291	10556097	G	A	1p36.22	0.703	0.724	0.665	1.06	0.86-1.32	0.576	0.85	0.68-1.07	0.161
rs17599629	150658287	A	G	1q21.3	0.217	0.186	0.208	0.82	0.64-1.06	0.137	0.95	0.73-1.22	0.668
rs4845695	154911798	G	A	1q21.3	0.611	0.625	0.611	1.05	0.86-1.29	0.609	0.98	0.79-1.21	0.845
rs4245739	204518842	C	A	1q32.1	0.729	0.749	0.715	1.17	0.94-1.45	0.162	0.93	0.74-1.16	0.508
rs1775148	205757824	T	C	1q32.1	0.340	0.357	0.374	1.06	0.86-1.31	0.564	1.13	0.90-1.44	0.297
rs11902236	10117868	C	T	2p25.1	0.311	0.309	0.295	1.03	0.83-1.27	0.786	0.96	0.77-1.21	0.750
rs9287719	10710730	T	C	2p25.1	0.510	0.507	0.533	1.00	0.82-1.23	0.990	1.13	0.92-1.39	0.227
rs9306895	20878153	C	T	2p24.1	0.605	0.588	0.634	0.93	0.77-1.12	0.454	1.11	0.90-1.37	0.345
rs7591218	43637998	G	A	2p21	0.281	0.348	0.300	1.38	1.13-1.68	0.002	1.07	0.86-1.34	0.522
rs901532	62763347	C	T	2p15	0.125	0.114	0.151	0.92	0.69-1.23	0.587	1.32	0.98-1.78	0.067
rs58235267	63277843	G	C	2p15	0.540	0.579	0.546	1.15	0.95-1.40	0.154	1.03	0.84-1.26	0.791
rs2028900	85767735	C	T	2p11.2	0.449	0.458	0.420	1.02	0.85-1.24	0.803	0.90	0.73-1.11	0.325
rs13410475	173309618	C	A	2q31.1	0.058	0.065	0.052	1.23	0.83-1.82	0.302	0.85	0.52-1.41	0.536
rs12151618	173415560	C	T	2q31.1	0.224	0.251	0.193	1.15	0.93-1.43	0.184	0.84	0.65-1.08	0.167
rs11891348	238440449	G	T	2q37.3	0.774	0.758	0.748	0.86	0.69-1.06	0.161	0.88	0.69-1.11	0.265
rs111770284	242157087	C	T	2q37.3	0.167	0.151	0.187	0.90	0.70-1.16	0.419	1.14	0.86-1.51	0.358
rs183997311	242420971	G	A	2q37.3	0.011	0.009	0.002	0.82	0.30-2.22	0.697	0.20	0.03-1.52	0.119
rs143351723	87142064	G	C	3p12.1	0.912	0.910	0.896	0.93	0.67-1.30	0.679	0.79	0.56-1.12	0.183
rs2088396	87192778	G	C	3p12.1	0.480	0.477	0.476	0.96	0.80-1.15	0.660	0.97	0.79-1.20	0.799
rs114278123	87372756	G	A	3p11.2	0.039	0.028	0.019	0.68	0.37-1.23	0.200	0.43	0.20-0.92	0.030
rs6769767	113282326	G	A	3q13.2	0.450	0.484	0.441	1.15	0.95-1.39	0.160	0.93	0.74-1.17	0.536
rs10934853	128038373	C	A	3q21.3	0.264	0.296	0.257	1.22	0.99-1.52	0.065	1.00	0.80-1.24	0.968
rs6763931	141102833	G	A	3q23	0.409	0.422	0.467	1.09	0.90-1.33	0.366	1.22	0.99-1.50	0.060
rs78416326	170074517	G	C	3q26.2	0.213	0.209	0.193	0.98	0.77-1.24	0.858	0.89	0.68-1.16	0.389
rs11288195	170092053	AG	A	3q26.2	0.859	0.852	0.833	0.96	0.73-1.25	0.742	0.80	0.60-1.06	0.116
rs1894292	74349158	G	A	4q13.3	0.465	0.460	0.453	0.95	0.78-1.16	0.644	0.94	0.78-1.14	0.519
rs7682375	95505592	T	A	4q22.3	0.694	0.681	0.705	0.93	0.76-1.14	0.481	1.07	0.84-1.37	0.583
rs6853490	95544718	G	A	4q22.3	0.552	0.590	0.573	1.18	0.98-1.42	0.085	1.09	0.87-1.37	0.440
rs7679673	106061534	A	C	4q24	0.583	0.587	0.632	1.03	0.85-1.25	0.745	1.19	0.97-1.47	0.095

SNP name	Position ^a	Reference Allele	Effect Allele	Locus	EAF ^b in controls	EAF ^b in breast cancer cases	EAF ^b in prostate cancer cases	Association with breast cancer			Association with prostate cancer		
								OR ^c	95%CI ^d	p-value	OR ^c	95%CI ^d	p-value
rs2242652	1280028	A	G	5p15.33	0.794	0.767	0.807	0.83	0.67-1.04	0.103	1.08	0.82-1.42	0.593
rs10866527	1891800	C	T	5p15.33	0.481	0.462	0.446	0.91	0.75-1.10	0.337	0.91	0.75-1.12	0.382
rs1482679	44385415	G	A	5p12	0.681	0.690	0.653	1.04	0.85-1.27	0.727	0.90	0.72-1.12	0.328
rs6869841	172939426	C	T	5q35.2	0.219	0.179	0.250	0.75	0.59-0.95	0.015	1.18	0.93-1.51	0.180
rs4713266	11219030	T	C	6p24.2	0.488	0.448	0.515	0.84	0.69-1.02	0.078	1.12	0.91-1.38	0.276
rs115457135	30073776	G	A	6p22.1	0.187	0.152	0.205	0.79	0.60-1.02	0.075	1.03	0.80-1.32	0.814
rs2596546	31329386	G	A	6p21.33	0.653	0.626	0.666	0.91	0.74-1.12	0.368	1.04	0.84-1.28	0.718
rs115306967	32400939	G	C	6p21.32	0.289	0.278	0.262	0.95	0.77-1.17	0.649	0.83	0.66-1.04	0.111
rs6458228	41543793	C	A	6p21.1	0.279	0.283	0.276	1.04	0.84-1.28	0.727	0.97	0.77-1.22	0.793
rs9443189	76495882	G	A	6q14.1	0.865	0.863	0.853	0.91	0.68-1.20	0.487	0.91	0.68-1.21	0.507
rs12209480	109279211	G	A	6q21	0.081	0.085	0.123	1.07	0.75-1.53	0.691	1.55	1.09-2.20	0.014
rs339331	117210052	C	T	6q22.1	0.719	0.715	0.712	1.05	0.84-1.31	0.675	0.97	0.77-1.22	0.792
rs3968480b	153432566	G	A	6q25.2	0.441	0.469	0.392	1.12	0.93-1.34	0.235	0.83	0.68-1.03	0.090
rs4646284	160581543	TG	T	6q25.3	0.711	0.740	0.719	1.14	0.92-1.40	0.233	1.09	0.87-1.37	0.459
rs2063347	160882029	G	A	6q25.3	0.332	0.357	0.358	1.15	0.95-1.40	0.153	1.10	0.89-1.38	0.381
rs10713532	20996952	TG	T	7p15.3	0.795	0.788	0.790	0.93	0.74-1.16	0.522	0.99	0.78-1.26	0.958
rs200362064	27591214	TGATA	T	7p15.2	0.562	0.579	0.550	1.11	0.91-1.36	0.312	0.93	0.75-1.15	0.505
rs10486567	27976563	G	A	7p15.2	0.243	0.238	0.222	1.01	0.81-1.26	0.919	0.84	0.66-1.08	0.170
rs56232506	47437244	G	A	7p12.3	0.469	0.437	0.448	0.92	0.76-1.11	0.393	0.93	0.75-1.14	0.479
rs6965016	97807882	C	A	7q21.3	0.522	0.601	0.509	1.35	1.10-1.65	0.004	0.96	0.77-1.19	0.703
rs2928679	23438975	G	A	8p21.2	0.481	0.469	0.502	0.95	0.78-1.16	0.631	1.11	0.90-1.36	0.330
rs1512268	23526463	C	T	8p21.2	0.452	0.394	0.479	0.83	0.68-1.01	0.062	1.14	0.92-1.41	0.232
rs6984769	25910156	C	T	8p21.2	0.150	0.123	0.184	0.78	0.58-1.03	0.078	1.19	0.90-1.58	0.220
rs16901979	128124916	C	A	8q24.21	0.035	0.025	0.059	0.77	0.41-1.45	0.419	1.71	1.07-2.72	0.024
rs6983267	128413305	T	G	8q24.21	0.524	0.502	0.575	0.92	0.76-1.11	0.370	1.20	0.97-1.48	0.095
rs1447295	128485038	C	A	8q24.21	0.088	0.076	0.120	0.86	0.61-1.22	0.405	1.39	1.01-1.92	0.041
rs17694493	22041998	C	G	9p21.3	0.150	0.148	0.142	0.98	0.76-1.27	0.872	0.95	0.70-1.29	0.735
rs1771718	110151379	C	T	9q31.2	0.692	0.682	0.675	0.91	0.75-1.12	0.383	0.93	0.75-1.15	0.481
rs76934034	46082985	C	T	10q11.21	0.920	0.912	0.932	0.86	0.62-1.19	0.356	1.21	0.81-1.82	0.345
rs10993994	51549496	C	T	10q11.23	0.416	0.424	0.425	1.03	0.85-1.24	0.779	1.07	0.87-1.32	0.495
rs34032774	104415093	C	CT	10q24.32	0.701	0.661	0.719	0.80	0.65-0.98	0.032	1.14	0.90-1.44	0.269

SNP name	Position ^a	Reference Allele	Effect Allele	Locus	EAF ^b in controls	EAF ^b in breast cancer cases	EAF ^b in prostate cancer cases	Association with breast cancer			Association with prostate cancer		
								OR ^c	95%CI ^d	p-value	OR ^c	95%CI ^d	p-value
rs67609008	126640936	C	T	10q26.13	0.723	0.708	0.708	0.92	0.75-1.14	0.453	0.95	0.76-1.19	0.653
rs11043143	2234093	C	T	11p15.5	0.178	0.209	0.186	1.28	1.02-1.61	0.036	1.02	0.78-1.34	0.866
rs12275055	68981359	G	A	11q13.3	0.812	0.814	0.807	1.03	0.81-1.31	0.802	0.94	0.73-1.22	0.656
rs10792032	68984602	G	A	11q13.3	0.550	0.572	0.550	1.09	0.90-1.33	0.393	1.07	0.85-1.33	0.571
rs36225067	69453985	C	A	11q13.3	0.972	0.966	0.954	0.97	0.56-1.68	0.911	0.57	0.34-0.95	0.032
rs11568818	102401661	C	T	11q22.2	0.554	0.532	0.583	0.92	0.75-1.13	0.429	1.10	0.89-1.37	0.378
rs11214775	113807181	A	G	11q23.2	0.704	0.704	0.703	0.98	0.79-1.20	0.832	0.99	0.78-1.25	0.920
rs80130819	48419618	C	A	12q13.11	0.914	0.908	0.927	0.90	0.64-1.27	0.557	1.26	0.86-1.84	0.227
rs10875943	49676010	C	T	12q13.12	0.723	0.711	0.731	0.97	0.79-1.19	0.759	1.02	0.82-1.29	0.836
rs73110471	53316821	G	A	12q13.13	0.126	0.133	0.115	1.11	0.85-1.46	0.442	0.91	0.65-1.27	0.565
rs1270884	114685571	G	A	12q24.21	0.487	0.453	0.495	0.85	0.71-1.02	0.082	1.05	0.87-1.28	0.596
rs61933115	115084059	G	A	12q24.21	0.336	0.338	0.376	0.98	0.80-1.20	0.828	1.26	1.01-1.57	0.040
rs62003539	53389699	C	T	14q22.1	0.866	0.875	0.844	1.06	0.80-1.41	0.663	0.84	0.62-1.14	0.269
rs7153648	61122526	G	C	14q23.1	0.083	0.083	0.090	1.07	0.76-1.52	0.687	1.14	0.78-1.67	0.494
rs2189517	69002988	G	A	14q24.1	0.461	0.491	0.446	1.16	0.96-1.41	0.125	0.93	0.76-1.14	0.503
rs17105852	69030652	C	A	14q24.1	0.036	0.064	0.028	1.81	1.20-2.73	0.005	0.79	0.43-1.47	0.458
rs7141529	69126744	C	T	14q24.1	0.476	0.462	0.474	0.96	0.80-1.15	0.634	0.96	0.78-1.18	0.681
rs8014671	71092256	A	G	14q24.2	0.546	0.570	0.552	1.12	0.93-1.35	0.222	0.97	0.79-1.20	0.790
rs12051443	71691329	G	A	16q22.2	0.330	0.325	0.399	1.03	0.83-1.27	0.813	1.28	1.05-1.56	0.017
rs461251	619162	G	A	17p13.3	0.619	0.641	0.585	1.07	0.88-1.31	0.489	0.88	0.72-1.08	0.222
rs2229295	36047276	G	T	17q12	0.176	0.193	0.200	1.06	0.83-1.35	0.622	1.24	0.95-1.61	0.109
rs718961	36077099	G	A	17q12	0.241	0.224	0.217	0.91	0.72-1.16	0.450	0.85	0.65-1.11	0.236
rs11263763	36103565	G	A	17q12	0.510	0.496	0.540	1.00	0.83-1.20	0.982	1.10	0.89-1.36	0.357
rs138263737	46915735	C	T	17q21.32	0.008	0.003	0.004	0.38	0.07-2.08	0.263	0.37	0.06-2.16	0.271
rs11655191	47452263	C	T	17q21.33	0.084	0.081	0.083	0.97	0.68-1.38	0.871	0.99	0.69-1.42	0.943
rs8072735	69117214	C	T	17q24.3	0.462	0.480	0.514	1.06	0.88-1.28	0.533	1.26	1.02-1.56	0.032
rs9959454	76770820	G	A	18q23	0.740	0.715	0.743	0.91	0.73-1.13	0.381	0.98	0.78-1.24	0.888
rs12610267	38744733	G	A	19q13.2	0.510	0.504	0.526	0.95	0.78-1.16	0.633	1.10	0.90-1.35	0.355
rs74738513	41985931	T	A	19q13.2	0.252	0.247	0.257	0.97	0.78-1.20	0.764	1.00	0.79-1.27	0.982
rs2735839	51364623	A	G	19q13.33	0.850	0.845	0.863	0.97	0.74-1.27	0.844	1.10	0.82-1.49	0.523
rs12480328	49527922	C	T	20q13.13	0.924	0.926	0.948	1.13	0.78-1.65	0.521	1.43	0.90-2.28	0.128

SNP name	Position ^a	Reference Allele	Effect Allele	Locus	EAF ^b in controls	EAF ^b in breast cancer cases	EAF ^b in prostate cancer cases	Association with breast cancer			Association with prostate cancer		
								OR ^c	95%CI ^d	p-value	OR ^c	95%CI ^d	p-value
rs2427345	61015611	T	C	20q13.33	0.625	0.610	0.623	0.95	0.78-1.16	0.609	0.99	0.80-1.24	0.950
rs1058319	62374389	C	T	20q13.33	0.140	0.164	0.137	1.23	0.94-1.61	0.139	0.97	0.71-1.32	0.860
rs1041449	42901421	A	G	21q22.3	0.406	0.376	0.404	0.86	0.70-1.05	0.148	0.95	0.77-1.17	0.619
rs2238776	19757892	A	G	22q11.21	0.786	0.799	0.821	1.09	0.85-1.39	0.486	1.22	0.94-1.58	0.138
rs11704314	40797933	G	A	22q13.1	0.812	0.814	0.844	1.04	0.81-1.33	0.746	1.29	0.98-1.71	0.073
rs5759167	43500212	G	T	22q13.2	0.488	0.516	0.453	1.10	0.91-1.33	0.314	0.86	0.70-1.06	0.157
rs5751435	43513156	C	T	22q13.2	0.154	0.129	0.146	0.85	0.63-1.13	0.255	0.97	0.73-1.28	0.814
rs2405943	9814284	C	T	23p22.2	0.214	0.191	0.203	0.92	0.78-1.10	0.369	0.95	0.80-1.14	0.615
rs1541241	51287789	G	T	23p11.22	0.347	0.343	0.373	0.99	0.86-1.14	0.867	1.06	0.91-1.24	0.428
rs2807031	52896949	T	C	23p11.22	0.177	0.152	0.193	0.90	0.75-1.08	0.257	1.08	0.90-1.31	0.398
rs4446868	66881583	G	T	23q12	0.164	0.220	0.151	1.22	1.03-1.44	0.024	0.98	0.80-1.20	0.830
rs4844289	70407983	A	G	23q13.1	0.430	0.444	0.425	1.04	0.91-1.19	0.579	1.00	0.86-1.17	0.996

^aPosition: Built 37 position

^bEAF: Effect Allele Frequency

^cOR: per allele odds ratio of association

^d95%CI: 95% confidence interval

The SNPs associated with prostate cancer risk at p<5% are displayed in bold

Supplementary Table 16: Interaction between the investigated PRSs and the age at diagnosis/observation

PRS investigated	p-value
Overall PRS	0.886
ER-negative PRS	0.392
ER-positive PRS	0.882
CIMBA <i>BRCA1</i> PRS	0.882
CIMBA <i>BRCA2</i> PRS	0.450
Prostate Cancer PRS	0.423

Supplementary Table 17: Association between the breast cancer PRSs and male breast cancer risk for *BRCA1* and *BRCA2* mutation carriers by breast cancer grade

	All Samples				<i>BRCA1</i> Samples				<i>BRCA2</i> Samples			
	Numbers of samples	OR ^a	95%CI ^b	p-value	Numbers of samples	OR ^a	95%CI ^b	p-value	Numbers of samples	OR ^a	95%CI ^b	p-value
Overall PRS												
Controls	1313	-	-	-	380	-	-	-	933	-	-	-
Breast cancer grade 1 ^c	12	1.12	0.65-1.94	0.683	1	0.97	0.52-1.80	0.928	11	1.28	1.03-1.58	0.025
Breast cancer grade 2 ^c	74	1.26	1.02-1.57	0.033	6				68			
Breast cancer grade 3	110	1.45	1.18-1.79	4.16×10 ⁻⁴	12	2.07	1.17-3.67	0.012	98	1.41	1.13-1.76	0.003
Breast cancer with a missing grade	81	1.37	1.08-1.73	0.009	14	1.40	0.85-2.29	0.184	67	1.37	1.05-1.79	0.021
Case only analysis : grade 3 vs grade 1 and 2		1.16	0.87-1.56	0.310		3.36	0.84-13.39	0.086		1.10	0.81-1.49	0.536
ER-negative PRS												
Controls	1313	-	-	-	380	-	-	-	933	-	-	-
Breast cancer grade 1 ^c	12	1.30	0.90-1.88	0.161	1	1.40	1.00-1.96	0.047	11	1.21	0.99-1.49	0.068
Breast cancer grade 2 ^c	74	1.20	0.97-1.48	0.095	6				68			
Breast cancer grade 3	110	1.22	1.01-1.47	0.043	12	1.38	0.69-2.75	0.364	98	1.22	1.00-1.49	0.052
Breast cancer with a missing grade	81	1.14	0.91-1.42	0.263	14	0.87	0.55-1.39	0.569	67	1.22	0.94-1.57	0.137
Case only analysis : grade 3 vs grade 1 and 2		1.01	0.75-1.36	0.950		1.00	0.37-2.70	0.994		1.03	0.75-1.41	0.870
ER-positive PRS												
Controls	1313	-	-	-	380	-	-	-	933	-	-	-
Breast cancer grade 1 ^c	12	1.16	0.64-2.10	0.615	1	0.95	0.53-1.70	0.867	11	1.26	1.01-1.57	0.038
Breast cancer grade 2 ^c	74	1.24	1.00-1.54	0.054	6				68			
Breast cancer grade 3	110	1.43	1.17-1.75	0.001	12	2.12	1.23-3.66	0.007	98	1.38	1.11-1.71	0.004
Breast cancer with a missing grade	81	1.43	1.14-1.79	0.002	14	1.63	1.02-2.62	0.043	67	1.40	1.08-1.81	0.010
Case only analysis : grade 3 vs grade 1 and 2		1.17	0.87-1.57	0.302		4.05	1.01-16.25	0.048		1.10	0.81-1.49	0.551

^aOR: odds ratio for male breast cancer per standard deviation increase in the standardised PRS

^b95%CI: 95% confidence interval

^cBecause of the small sample size, breast cancer grade 1 and grade 2 have been combined for the analyses by gene mutated

Supplementary Table 18: Association between the CIMBA *BRCA1* PRS and the CIMBA *BRCA2* PRS with male breast cancer risk for male *BRCA1* and *BRCA2* mutation carriers

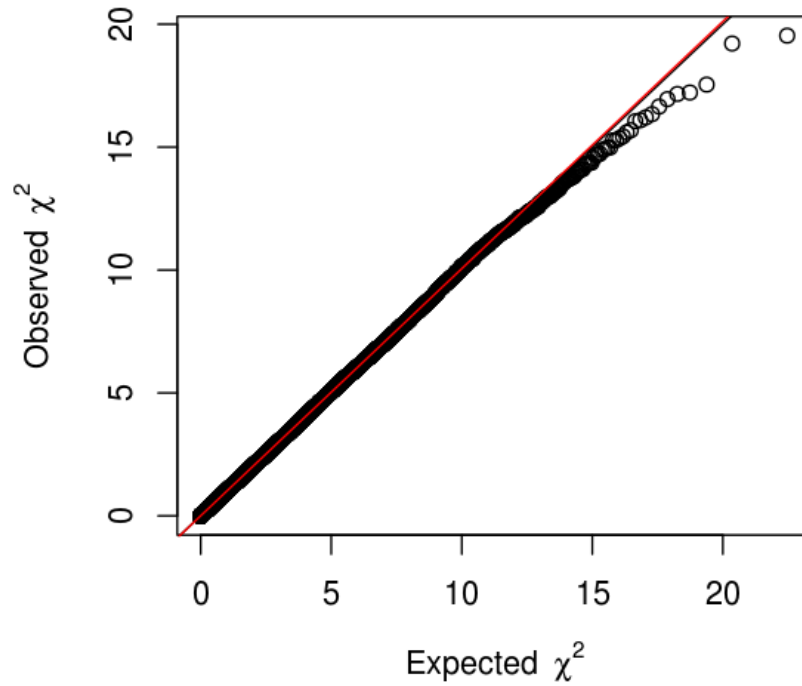
	All Samples					<i>BRCA1</i> Samples					<i>BRCA2</i> Samples				
	Number of controls	Number of breast cancer cases	OR ^a	95%CI ^b	p-value	Number of controls	Number of breast cancer cases	OR ^a	95%CI ^b	p-value	Number of controls	Number of breast cancer cases	OR ^a	95%CI ^b	p-value
CIMBA <i>BRCA1</i> PRS															
1 st Quartile	328	70	1.00	-	-	86	8	1.00	-	-	242	62	1.00	-	-
2 nd Quartile	329	54	0.79	0.53-1.17	0.236	103	7	0.72	0.24-2.14	0.556	226	47	0.82	0.53-1.25	0.357
3 rd Quartile	328	77	1.12	0.77-1.62	0.559	99	10	1.05	0.39-2.83	0.918	229	67	1.17	0.78-1.76	0.459
4 th Quartile	328	76	1.10	0.76-1.59	0.607	92	8	0.97	0.35-2.70	0.948	236	68	1.14	0.76-1.70	0.521
Trend	1313	277	1.11 ^c	0.97-1.27	0.129	380	33	1.10 ^c	0.74-1.64	0.624	933	244	1.13 ^c	0.97-1.31	0.115
CIMBA <i>BRCA2</i> PRS															
1 st Quartile	328	64	1.00	-	-	102	7	1.00	-	-	226	57	1.00	-	-
2 nd Quartile	328	53	0.81	0.54-1.21	0.298	86	6	1.07	0.35-3.29	0.902	242	47	0.76	0.49-1.18	0.222
3 rd Quartile	329	76	1.23	0.85-1.78	0.279	104	8	1.21	0.42-3.45	0.722	225	68	1.23	0.82-1.86	0.318
4 th Quartile	328	84	1.29	0.89-1.88	0.185	88	12	2.06	0.78-5.47	0.146	240	72	1.21	0.80-1.83	0.371
Trend	1313	277	1.16 ^c	1.02-1.33	0.029	380	33	1.26 ^c	0.84-1.91	0.267	933	244	1.16 ^c	1.00-1.34	0.054

^aOR: odds ratio for male breast cancer

^b95% CI: 95% confidence interval

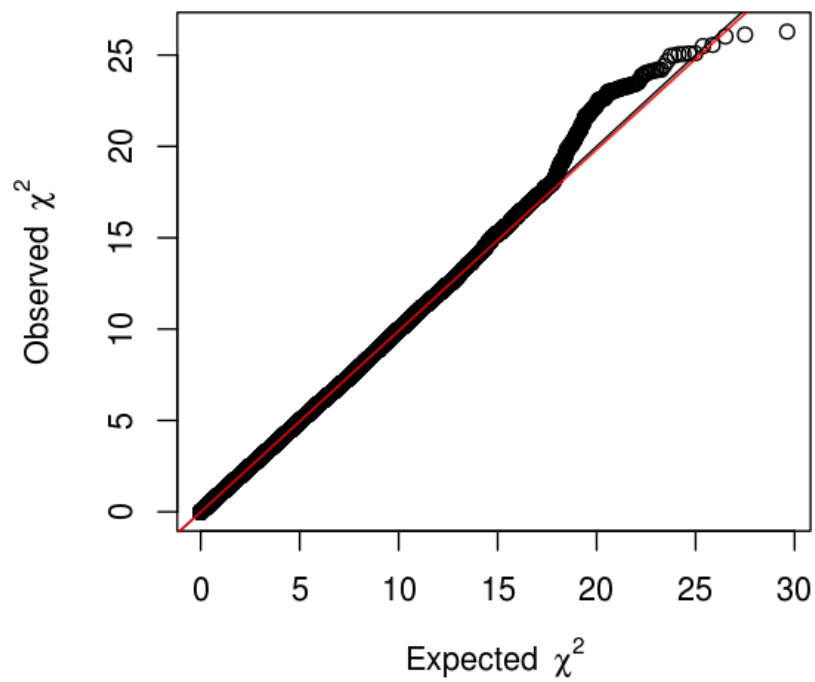
^cOR for male breast cancer per standard deviation increase in the standardised PRS

Supplementary figure 1: Quantile-Quantile (QQ) plots for the breast cancer association analysis in the combined sample of *BRCA1* and *BRCA2* mutation carriers using the GWAS-backbone SNPs (N=233,244, $\lambda=1.008$)



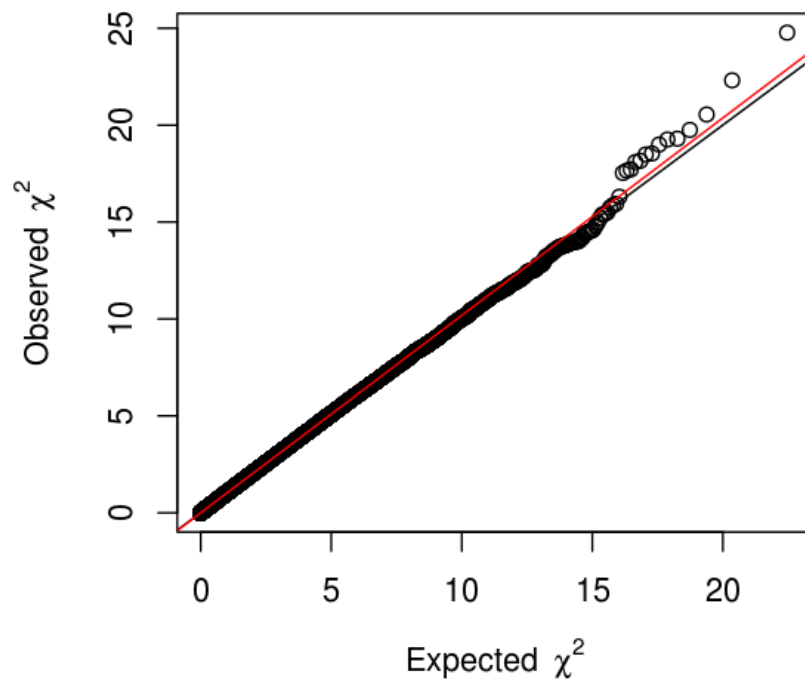
The p values for breast cancer associations were obtained from the multinomial logistic regression models adjusted for the first three principal components, the age at censoring and gene (*BRCA1* or *BRCA2*).

Supplementary figure 2: Quantile-Quantile (QQ) plots for the breast cancer association analysis in the combined sample of *BRCA1* and *BRCA2* mutation carriers using all imputed and genotyped SNPs selected for the analyses (N=9,530,887, $\lambda=0.994$)



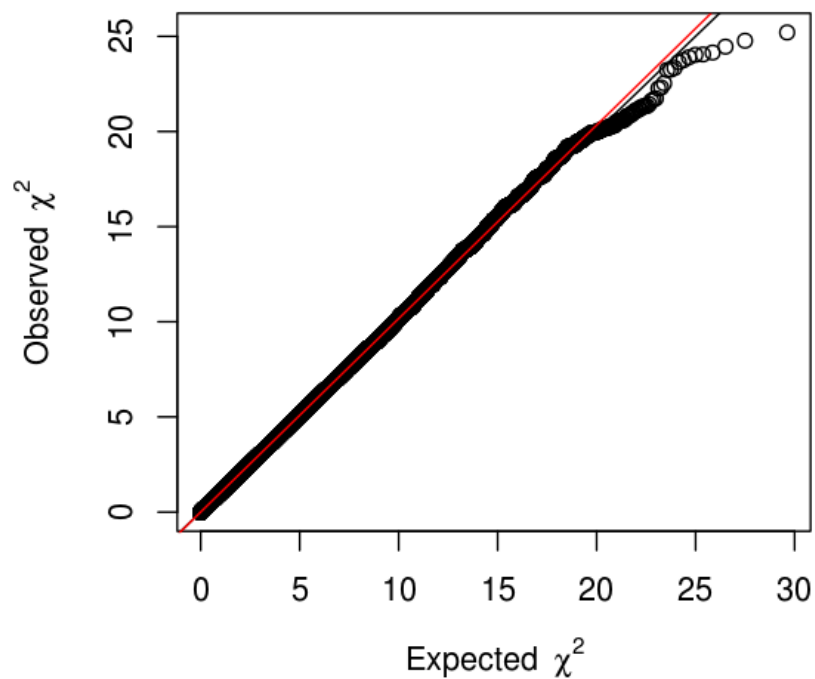
The p values for the breast cancer associations were obtained from the multinomial logistic regression models adjusted for the first three principal components, the age at censoring and gene (*BRCA1* or *BRCA2*).

Supplementary figure 3: Quantile-Quantile (QQ) plots for the prostate cancer association analysis in the combined sample of *BRCA1* and *BRCA2* mutation carriers using the GWAS backbone SNPs (N=233,244, $\lambda=1.028$)



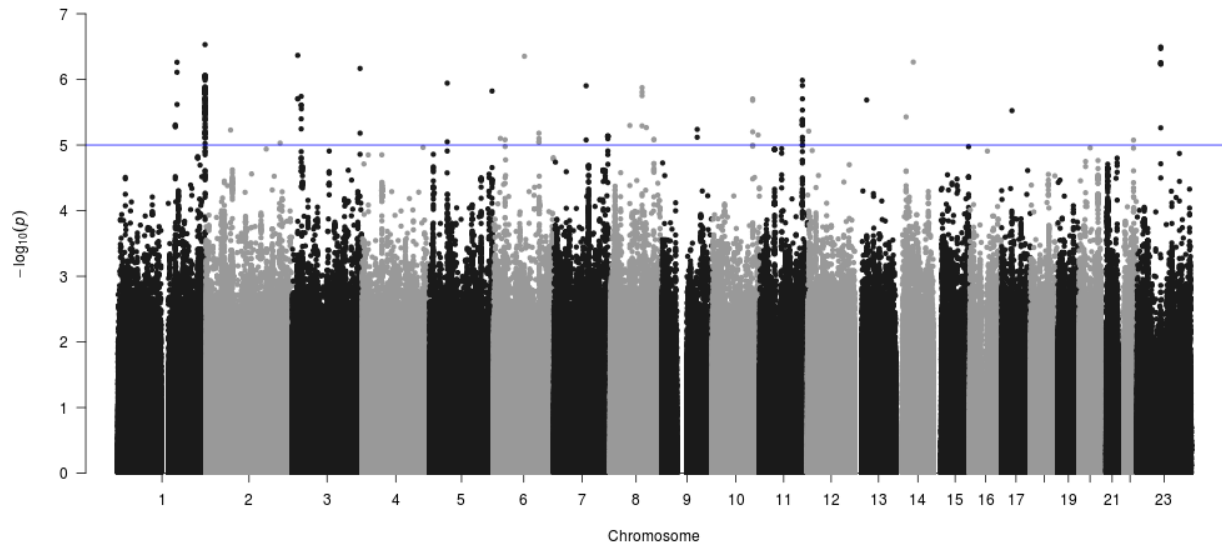
The p values for the prostate cancer associations were obtained from the multinomial logistic regression models adjusted for the first three principal components, the age at censoring and gene (*BRCA1* or *BRCA2*).

Supplementary figure 4: Quantile-Quantile (QQ) plots for the prostate cancer association analyses in the combined sample of *BRCA1* and *BRCA2* mutation carriers using all imputed and genotyped SNPs selected for the analyses (N=9,530,887, $\lambda=1.016$)



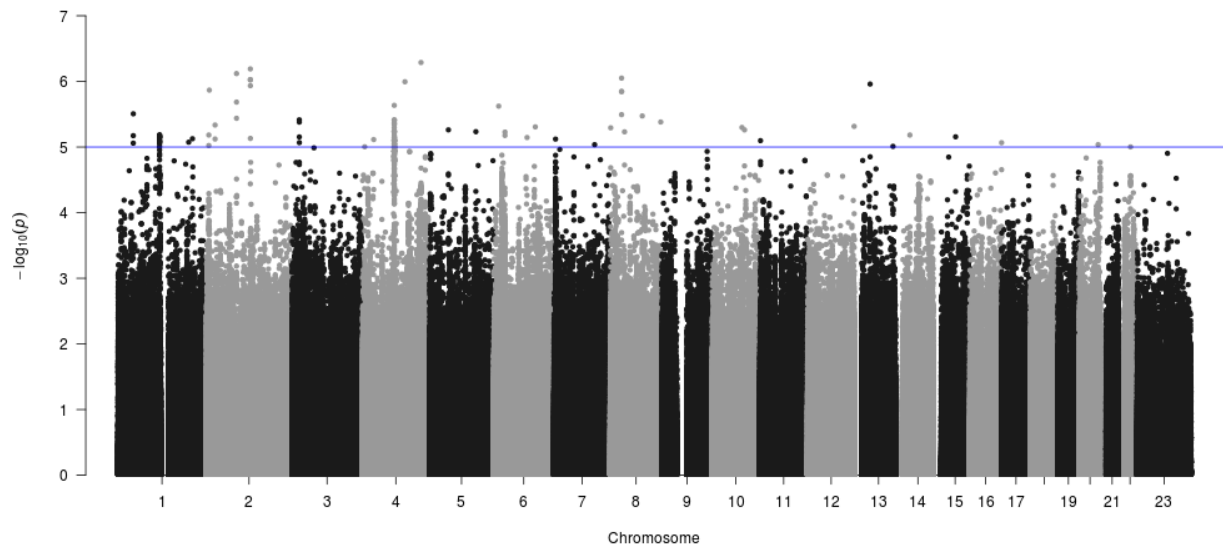
The p values for the prostate cancer associations were obtained from the multinomial logistic regression models adjusted for the first three principal components, the age at censoring and gene (*BRCA1* or *BRCA2*).

Supplementary figure 5: Manhattan plots for the breast cancer association analysis in the combined sample of *BRCA1* and *BRCA2* mutation carriers



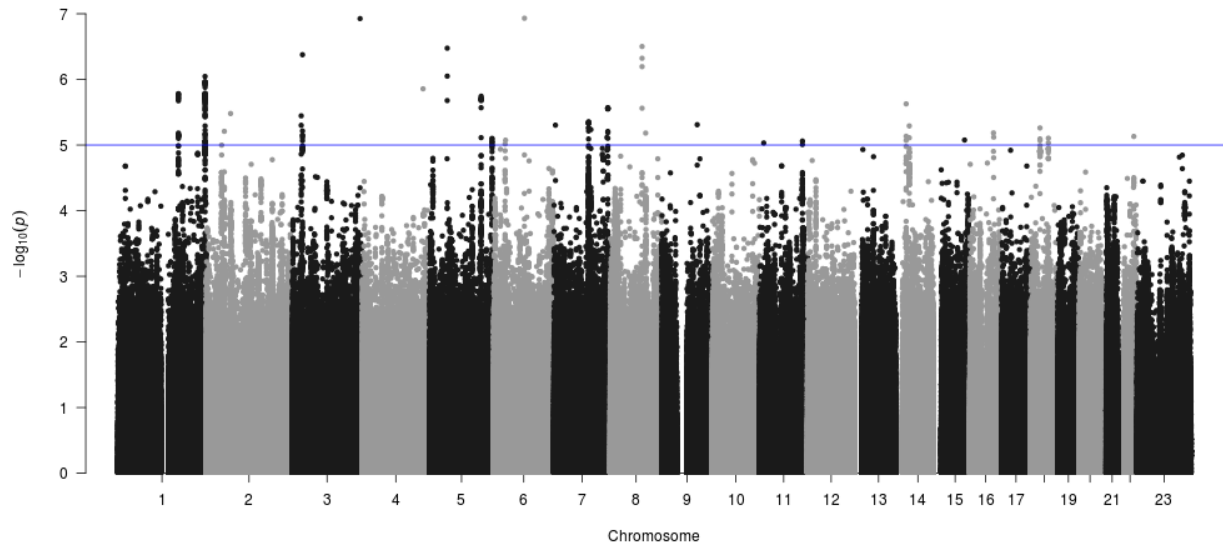
The p values for breast cancer associations were obtained from the multinomial logistic regression models adjusted for the first three principal components, the age at censoring and gene (*BRCA1* or *BRCA2*).

Supplementary figure 6: Manhattan plots for the prostate cancer association analysis in the combined sample of *BRCA1* and *BRCA2* mutation carriers



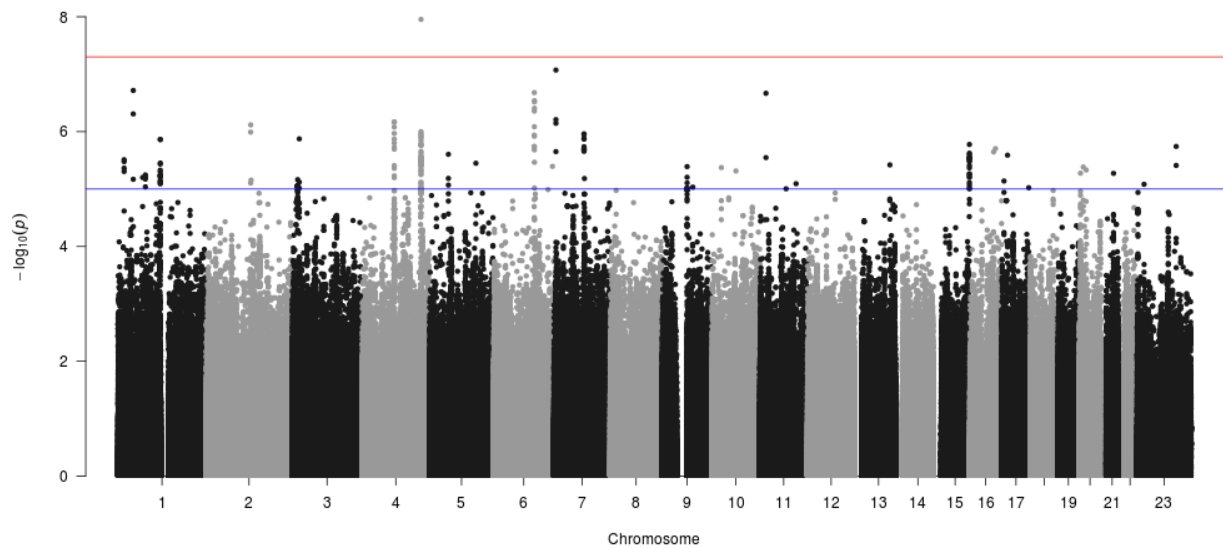
The p values for prostate cancer associations were obtained from the multinomial logistic regression models adjusted for the first three principal components, the age at censoring and gene (*BRCA1* or *BRCA2*).

Supplementary figure 7: Manhattan plots for the breast cancer association analyses in the *BRCA2* samples



The p values for breast cancer associations were obtained from the multinomial logistic regression models adjusted for the first three principal components and the age at censoring.

Supplementary figure 8: Manhattan plots for the prostate cancer association analyses in *BRCA2* samples



The p values for prostate cancer associations were obtained from the multinomial logistic regression models adjusted for the first three principal components and the age at censoring.

Supplementary figure 9: Predicted breast cancer cumulative risk for male *BRCA1* mutation carriers by percentile of the Overall PRS constructed using results from population-based studies.

