

Appendix 1: Information on the genetic instruments used in this Mendelian randomization study for the breast cancer analyses in Breast Cancer Association Consortium

SNP	Exposure	EA	OA	EAF	Beta/Log odds	SE	Log odds (Overall)	SE (Overall)	Log odds (Positive)	SE (Positive)	Log odds (Negative)	SE (Negative)	Fstat
rs1046896	HbA1c	T	C	0.3162	0.028	0.0017	0.0053	0.0068	0.0058	0.0081	0.0075	0.0123	271.28
rs10830963	HbA1c	G	C	0.2938	0.02	0.002	0.008	0.0075	0.0032	0.0089	3.00E-04	0.0138	100
rs11248914	HbA1c	T	C	0.647	0.014	0.0019	0.0074	0.0068	0.0129	0.0081	0.0111	0.0123	54.29
rs11558471	HbA1c	A	G	0.6745	0.015	0.0017	0.0155	0.0067	0.018	0.008	0.0173	0.0122	77.85
rs11603334	HbA1c	G	A	0.815	0.012	0.0021	-0.0167	0.0086	-0.0173	0.0103	-0.0116	0.0158	32.65
rs11708067	HbA1c	A	G	0.7542	0.013	0.0019	0.0035	0.0075	0.0064	0.0089	0.0074	0.0137	46.81
rs11964178	HbA1c	A	G	0.5666	0.01	0.0016	0.0056	0.0063	0.0061	0.0075	-0.0016	0.0114	39.06
rs12621844	HbA1c	T	C	0.5999	0.01	0.0018	-0.0045	0.0064	-0.0072	0.0077	0.0323	0.0118	30.86
rs13134327	HbA1c	A	G	0.3335	0.013	0.0017	-6.00E-04	0.007	-0.0088	0.0083	-0.0068	0.0127	58.48
rs1558902	HbA1c	A	T	0.4128	0.01	0.0019	-0.0623	0.0063	-0.0593	0.0075	-0.0781	0.0115	27.7
rs17509001	HbA1c	C	T	0.1576	0.018	0.0023	-0.0126	0.009	-0.0036	0.0108	-0.03	0.0167	61.25
rs17533903	HbA1c	A	G	0.2428	0.015	0.0022	0.0133	0.0077	0.0095	0.0092	0.0198	0.014	46.49
rs17747324	HbA1c	C	T	0.2489	0.015	0.0023	0.0332	0.0074	0.0308	0.0089	0.0411	0.0136	42.53
rs2383208	HbA1c	A	G	0.7992	0.014	0.0021	-0.0146	0.0081	-0.0112	0.0097	-0.0111	0.0147	44.44
rs267738	HbA1c	T	G	0.7701	0.011	0.0019	-0.0182	0.0076	-0.0076	0.009	-0.0367	0.0138	33.52
rs282587	HbA1c	G	A	0.1513	0.019	0.0027	-3.00E-04	0.0099	-0.001	0.0117	0.0094	0.0179	49.52
rs3782123	HbA1c	C	A	0.3205	0.013	0.002	-0.0096	0.0069	-0.0083	0.0083	-0.002	0.0126	42.25
rs4607517	HbA1c	A	G	0.2017	0.031	0.0024	-5.00E-04	0.0089	0.0012	0.0107	0.0172	0.016	166.84
rs4737009	HbA1c	A	G	0.2531	0.021	0.002	0.0047	0.0079	0.0116	0.0093	-0.0189	0.0142	110.25
rs4745982	HbA1c	T	G	0.8726	0.095	0.0056	0.0055	0.0129	-0.003	0.0154	0.0212	0.0238	287.79
rs4820268	HbA1c	G	A	0.4606	0.016	0.0017	-0.0026	0.0064	-0.006	0.0076	0.0087	0.0116	88.58
rs560887	HbA1c	C	T	0.6843	0.028	0.0018	-0.0062	0.0072	-0.0019	0.0086	0.0019	0.013	241.98
rs579459	HbA1c	C	T	0.2389	0.011	0.0019	0.0374	0.0075	0.0398	0.009	0.0276	0.0137	33.52
rs592423	HbA1c	A	C	0.4566	0.009	0.0017	0.0029	0.0062	0.0077	0.0074	-0.0138	0.0113	28.03
rs6474359	HbA1c	T	C	0.953	0.044	0.0053	-0.0029	0.0186	0.0229	0.0224	-0.0259	0.0336	68.92

rs7040409	HbA1c	C	G	0.8953	0.028	0.0037	0.0045	0.0131	0.0027	0.0157	0.0224	0.024	57.27
rs7616006	HbA1c	A	G	0.5744	0.01	0.0017	0.015	0.0064	0.0179	0.0077	0.0078	0.0117	34.6
rs8192675	HbA1c	T	C	0.6906	0.011	0.0017	-0.0105	0.0071	1.00E-04	0.0085	-0.0447	0.0128	41.87
rs837763	HbA1c	T	C	0.5548	0.017	0.0016	0.0114	0.0066	0.0094	0.0078	0.0142	0.0119	112.89
rs857691	HbA1c	T	C	0.2715	0.019	0.0019	0.0035	0.0074	9.00E-04	0.0089	0.0448	0.0134	100
rs9818758	HbA1c	A	G	0.2028	0.012	0.002	-0.0273	0.0083	-0.0382	0.0099	-0.0409	0.0153	36
rs9914988	HbA1c	A	G	0.7877	0.013	0.002	-0.0109	0.0078	-0.0041	0.0093	-0.0172	0.0141	42.25
rs102275	Glucose	C	T	0.351	-0.019	0.003	-0.0069	0.0065	4.00E-04	0.0078	-0.0301	0.0119	40.11
rs10276674	Glucose	C	T	0.164	0.035	0.0043	-0.0079	0.0082	-0.0148	0.0098	-7.00E-04	0.0149	66.25
rs10814916	Glucose	A	C	0.434	-0.019	0.003	0.0058	0.0065	8.00E-04	0.0078	0.0173	0.0118	40.11
rs10830963	Glucose	C	G	0.7	-0.074	0.0035	-0.008	0.0075	-0.0032	0.0089	-3.00E-04	0.0138	447.02
rs11195502	Glucose	C	T	0.925	0.035	0.0052	0.0195	0.0111	0.018	0.0133	0.0136	0.0204	45.3
rs11619319	Glucose	A	G	0.788	-0.021	0.0034	0.0033	0.0075	0.0035	0.0089	-0.0106	0.0136	38.15
rs11708067	Glucose	A	G	0.774	0.027	0.0033	0.0035	0.0075	0.0064	0.0089	0.0074	0.0137	66.94
rs11924648	Glucose	A	G	0.863	0.029	0.0043	-0.0149	0.0092	-0.0056	0.0109	-0.0272	0.0166	45.48
rs12805422	Glucose	A	G	0.5	-0.018	0.003	0.0041	0.0063	0.0101	0.0075	-0.0013	0.0115	36
rs2383208	Glucose	A	G	0.792	0.026	0.0035	-0.0146	0.0081	-0.0112	0.0097	-0.0111	0.0147	55.18
rs2979422	Glucose	C	T	0.133	0.022	0.004	-0.002	0.0089	0.0071	0.0106	0.0049	0.0162	30.25
rs340874	Glucose	C	T	0.562	0.02	0.0028	-0.0185	0.0065	-0.0238	0.0078	-0.0245	0.0118	51.02
rs3802177	Glucose	A	G	0.239	-0.034	0.0031	-0.0161	0.0067	-0.0183	0.008	-0.0182	0.0122	120.29
rs4502156	Glucose	C	T	0.42	-0.023	0.003	0.0163	0.0066	0.0121	0.0079	0.0369	0.012	58.78
rs4506565	Glucose	A	T	0.704	-0.019	0.0031	-0.0338	0.0068	-0.0283	0.0081	-0.0437	0.0124	37.57
rs4607517	Glucose	A	G	0.195	0.058	0.004	-5.00E-04	0.0089	0.0012	0.0107	0.0172	0.016	210.25
rs560887	Glucose	C	T	0.674	0.067	0.0033	-0.0062	0.0072	-0.0019	0.0086	0.0019	0.013	412.21
rs7713317	Glucose	A	G	0.695	0.023	0.0031	-0.0051	0.0072	-0.0071	0.0086	-0.005	0.013	55.05
rs780094	Glucose	C	T	0.606	0.031	0.0029	0.0115	0.0063	0.0111	0.0076	0.0136	0.0115	114.27
rs7944584	Glucose	A	T	0.712	0.024	0.0034	0.0302	0.0071	0.0275	0.0084	0.013	0.0128	49.83
rs983309	Glucose	G	T	0.903	-0.032	0.0044	0.0198	0.0101	0.0241	0.0121	0.0286	0.0186	52.89

rs1005752	Type 2 diabetes	A	C	0.715	0.07696104	0.00705396	0.0134	0.0069	0.0143	0.0082	0.0041	0.0125	119.04
rs10096633	Type 2 diabetes	C	T	0.877	0.06765865	0.00953764	-0.016	0.0093	-0.0188	0.0111	-0.0284	0.0169	50.32
rs10097617	Type 2 diabetes	T	C	0.485	0.03922071	0.00732401	-7.00E-04	0.0062	0.0039	0.0075	-5.00E-04	0.0114	28.68
rs10193538	Type 2 diabetes	T	G	0.61	0.03922071	0.00739478	0.0014	0.0064	0.0047	0.0077	0.0091	0.0117	28.13
rs10195252	Type 2 diabetes	T	C	0.586	0.06765865	0.0047684	0.0089	0.0062	3.00E-04	0.0075	0.0171	0.0114	201.33
rs10228066	Type 2 diabetes	T	C	0.537	0.06765865	0.00711959	-0.0035	0.0062	-0.0024	0.0075	0.0106	0.0114	90.31
rs10406431	Type 2 diabetes	A	G	0.563	0.04879016	0.00485923	0.0138	0.0063	0.0162	0.0075	0.0154	0.0116	100.82
rs1061810	Type 2 diabetes	A	C	0.288	0.04879016	0.00725458	0.0063	0.0069	0.0071	0.0083	-0.003	0.0126	45.23
rs10750397	Type 2 diabetes	A	G	0.282	0.04879016	0.00725458	-4.00E-04	0.0076	0.0034	0.0091	0.0013	0.0137	45.23
rs10811660	Type 2 diabetes	G	A	0.828	0.2390169	0.0100844	-0.0119	0.0081	-0.0102	0.0097	-0.0071	0.0148	561.77
rs10830963	Type 2 diabetes	G	C	0.277	0.09531018	0.00692627	0.008	0.0075	0.0032	0.0089	3.00E-04	0.0138	189.36
rs10882101	Type 2 diabetes	T	C	0.587	0.05826891	0.00962763	-0.0045	0.0063	-0.0036	0.0075	0.0082	0.0115	36.63
rs10938398	Type 2 diabetes	A	G	0.429	0.04879016	0.00732401	-0.0144	0.0063	-0.0195	0.0075	-0.0248	0.0114	44.38
rs10954772	Type 2 diabetes	T	C	0.314	0.03922071	0.00732401	0.0072	0.0069	0.0126	0.0082	0.0062	0.0125	28.68
rs10974438	Type 2 diabetes	C	A	0.357	0.04879016	0.00725458	-0.0145	0.0069	-0.0097	0.0082	-0.0081	0.0124	45.23
rs11257655	Type 2 diabetes	T	C	0.218	0.0861777	0.00698953	-0.0148	0.0077	-0.0253	0.0092	0.0041	0.0141	152.02
rs1127215	Type 2 diabetes	C	T	0.584	0.04879016	0.00485923	-0.0074	0.0066	-0.0116	0.0077	-0.0186	0.0118	100.82
rs11496066	Type 2 diabetes	T	C	0.818	0.07696104	0.01417598	-0.0132	0.0079	-0.0178	0.0095	-0.0063	0.0145	29.47
rs115505614	Type 2 diabetes	T	C	0.0499	0.17395331	0.0150737	-0.0096	0.0152	0.0072	0.0181	-0.0812	0.0288	133.18
rs11642430	Type 2 diabetes	G	C	0.399	0.03922071	0.00490596	8.00E-04	0.0063	-0.0025	0.0075	0.0176	0.0115	63.91
rs11680058	Type 2 diabetes	A	G	0.863	0.05826891	0.00962763	0.0202	0.011	-0.0045	0.0131	0.0337	0.0201	36.63
rs11688682	Type 2 diabetes	G	C	0.728	0.04879016	0.00732401	-0.0205	0.0078	-0.0245	0.0092	-0.0162	0.0141	44.38
rs11699802	Type 2 diabetes	C	T	0.536	0.03922071	0.00732401	-0.0054	0.0065	0.0023	0.0078	-0.0194	0.0119	28.68
rs117001013	Type 2 diabetes	C	T	0.912	0.06765865	0.01197882	0.001	0.0118	7.00E-04	0.0142	-0.0022	0.0219	31.9
rs11708067	Type 2 diabetes	A	G	0.772	0.0861777	0.00698953	0.0035	0.0075	0.0064	0.0089	0.0074	0.0137	152.02
rs11709077	Type 2 diabetes	G	A	0.877	0.13102826	0.01123979	0.0172	0.0094	0.027	0.0113	-0.0168	0.0171	135.9
rs11759026	Type 2 diabetes	G	A	0.232	0.06765865	0.00718645	7.00E-04	0.0074	0.0061	0.0089	-0.0192	0.0137	88.64
rs11842871	Type 2 diabetes	G	T	0.735	0.03922071	0.00732401	0.0132	0.0083	0.008	0.0099	0.0146	0.0149	28.68

rs12001437	Type 2 diabetes	C	T	0.372	0.03922071	0.00732401	0.0054	0.0064	0.0073	0.0076	0.0068	0.0117	28.68
rs12140153	Type 2 diabetes	G	T	0.905	0.06765865	0.01197882	-0.0121	0.0116	-0.0286	0.0139	0.0244	0.0216	31.9
rs1260326	Type 2 diabetes	C	T	0.607	0.06765865	0.0047684	0.0106	0.0064	0.0101	0.0076	0.0102	0.0116	201.33
rs12640250	Type 2 diabetes	C	A	0.715	0.03922071	0.00490596	-0.0094	0.007	-0.0062	0.0084	-0.0161	0.0129	63.91
rs12719778	Type 2 diabetes	T	C	0.538	0.03922071	0.00490596	-0.0078	0.0065	-0.0032	0.0078	-0.0256	0.0118	63.91
rs12920022	Type 2 diabetes	A	T	0.158	0.04879016	0.00725458	-0.0179	0.009	-0.0212	0.0107	-0.0031	0.0164	45.23
rs1296328	Type 2 diabetes	A	C	0.446	0.03922071	0.00739478	-0.0028	0.0064	-0.005	0.0077	-0.0165	0.0117	28.13
rs13041756	Type 2 diabetes	C	T	0.107	0.05826891	0.00962763	-0.0134	0.0106	-0.0187	0.0126	-0.0038	0.0193	36.63
rs13262861	Type 2 diabetes	C	A	0.829	0.06765865	0.00953764	0.0099	0.0083	0.0073	0.0099	0.0095	0.015	50.32
rs13426680	Type 2 diabetes	A	G	0.937	0.0861777	0.01175794	-0.0214	0.0129	-0.026	0.0154	-0.0296	0.0237	53.72
rs1359790	Type 2 diabetes	G	A	0.72	0.0861777	0.00705396	-0.0049	0.0072	-0.0071	0.0085	0.0166	0.0131	149.25
rs1377807	Type 2 diabetes	C	G	0.312	0.04879016	0.00725458	0.0028	0.0067	0.0077	0.008	-0.0138	0.0123	45.23
rs1412234	Type 2 diabetes	C	T	0.323	0.03922071	0.00732401	-0.0031	0.0067	8.00E-04	0.008	-0.0107	0.0123	28.68
rs141521721	Type 2 diabetes	A	C	0.0236	0.12221763	0.02041906	-0.013	0.0228	-0.0146	0.027	0.0089	0.042	35.83
rs1421085	Type 2 diabetes	C	T	0.415	0.12221763	0.00674318	-0.0622	0.0063	-0.0591	0.0075	-0.0778	0.0115	328.5
rs145678014	Type 2 diabetes	G	T	0.957	0.10436002	0.01616572	-0.0056	0.0167	0.007	0.0199	-0.0173	0.0305	41.68
rs145904381	Type 2 diabetes	T	C	0.987	0.17395331	0.03004669	-0.0654	0.0311	-0.0487	0.0376	-0.1275	0.0584	33.52
rs1493694	Type 2 diabetes	T	C	0.109	0.0861777	0.00936259	0.0373	0.0102	0.0448	0.012	0.0473	0.0183	84.72
rs1531583	Type 2 diabetes	T	G	0.0458	0.12221763	0.01587814	0.0437	0.0168	0.0447	0.02	0.0438	0.0307	59.25
rs1561927	Type 2 diabetes	C	T	0.269	0.03922071	0.00732401	0.0013	0.0069	0.006	0.0083	-0.0083	0.0127	28.68
rs1562396	Type 2 diabetes	G	A	0.319	0.05826891	0.00718645	-0.0165	0.0072	-0.0277	0.0086	4.00E-04	0.0129	65.74
rs1580278	Type 2 diabetes	C	A	0.473	0.03922071	0.00490596	0.0136	0.0063	0.0196	0.0075	-0.0045	0.0115	63.91
rs1708302	Type 2 diabetes	C	T	0.512	0.09531018	0.00698953	-0.0223	0.0062	-0.0333	0.0074	-0.0065	0.0113	185.94
rs17122772	Type 2 diabetes	G	C	0.228	0.03922071	0.00732401	-0.0025	0.0079	0.0067	0.0094	-0.0119	0.0144	28.68
rs17168486	Type 2 diabetes	T	C	0.181	0.06765865	0.00711959	-0.0108	0.0084	-0.0158	0.01	-0.0069	0.0152	90.31
rs17250977	Type 2 diabetes	G	A	0.0376	0.11332869	0.01587814	-0.0078	0.0232	0.0028	0.0277	-0.0511	0.0429	50.94
rs17522122	Type 2 diabetes	T	G	0.474	0.03922071	0.00490596	-0.0074	0.0065	-0.0052	0.0077	0.0073	0.0116	63.91
rs17684074	Type 2 diabetes	G	C	0.74	0.03922071	0.00732401	-0.0039	0.0073	0.0038	0.0087	-0.0214	0.0132	28.68

rs17772814	Type 2 diabetes	G	A	0.915	0.07696104	0.01417598	-0.0059	0.0116	0.0021	0.0136	-0.0064	0.0217	29.47
rs17791513	Type 2 diabetes	A	G	0.932	0.09531018	0.01154505	0.0307	0.0127	0.0409	0.0152	0.0283	0.0236	68.15
rs1783541	Type 2 diabetes	T	C	0.204	0.05826891	0.00718645	0.0196	0.008	0.0147	0.0096	0.0168	0.0146	65.74
rs17836088	Type 2 diabetes	C	G	0.217	0.05826891	0.00962763	0.0138	0.0076	0.0155	0.0091	0.012	0.0139	36.63
rs1800961	Type 2 diabetes	T	C	0.0353	0.16551444	0.01715618	-0.0327	0.0175	-0.0272	0.0208	-0.0573	0.0334	93.07
rs184509201	Type 2 diabetes	C	G	0.982	0.19062036	0.02532014	0.0146	0.0229	0.0314	0.0271	-0.032	0.0419	56.68
rs2102278	Type 2 diabetes	G	A	0.319	0.03922071	0.00739478	0.02	0.0069	0.0145	0.0083	0.0194	0.0126	28.13
rs2237895	Type 2 diabetes	C	A	0.426	0.11332869	0.00680312	0.0047	0.0068	0.0065	0.0081	0.0087	0.0124	277.5
rs2268078	Type 2 diabetes	A	G	0.657	0.03922071	0.00732401	-0.0132	0.0066	3.00E-04	0.0079	-0.029	0.0121	28.68
rs2272163	Type 2 diabetes	C	A	0.618	0.03922071	0.00739478	0.0083	0.0069	0.0027	0.0082	0.0113	0.0124	28.13
rs2283220	Type 2 diabetes	A	G	0.69	0.04879016	0.00732401	0.0085	0.0072	0.0155	0.0087	0.0199	0.0131	44.38
rs2307111	Type 2 diabetes	T	C	0.605	0.04879016	0.00725458	-0.0162	0.0063	-0.0128	0.0075	-0.0247	0.0115	45.23
rs243024	Type 2 diabetes	A	G	0.46	0.05826891	0.00481339	0.008	0.0062	0.007	0.0074	0.015	0.0113	146.55
rs2796441	Type 2 diabetes	G	A	0.592	0.06765865	0.00718645	-0.0108	0.0069	-0.0096	0.0082	-0.0112	0.0124	88.64
rs28505901	Type 2 diabetes	G	A	0.752	0.0861777	0.00936259	-0.0071	0.0081	0	0.0095	-0.0244	0.0147	84.72
rs2925979	Type 2 diabetes	T	C	0.3	0.04879016	0.00725458	-0.008	0.0068	-0.0018	0.0081	6.00E-04	0.0124	45.23
rs2972144	Type 2 diabetes	G	A	0.639	0.09531018	0.00698953	0.0024	0.0065	-2.00E-04	0.0077	0.0091	0.0118	185.94
rs3111316	Type 2 diabetes	A	G	0.589	0.04879016	0.00732401	-0.0234	0.0065	-0.0206	0.0077	-0.0066	0.0118	44.38
rs329122	Type 2 diabetes	A	G	0.429	0.03922071	0.00490596	-0.0022	0.0063	-0.0036	0.0075	0.0132	0.0114	63.91
rs340874	Type 2 diabetes	C	T	0.556	0.06765865	0.00718645	-0.0185	0.0065	-0.0238	0.0078	-0.0245	0.0118	88.64
rs34584161	Type 2 diabetes	A	G	0.76	0.04879016	0.00732401	0.0011	0.0073	-8.00E-04	0.0087	-0.001	0.0134	44.38
rs34715063	Type 2 diabetes	C	T	0.124	0.09531018	0.01165052	-0.0081	0.0108	-0.0014	0.0129	0.0085	0.0197	66.92
rs348330	Type 2 diabetes	G	A	0.361	0.04879016	0.00725458	-0.0018	0.007	0.0024	0.0084	0.0049	0.0128	45.23
rs35352848	Type 2 diabetes	T	C	0.788	0.06765865	0.00953764	0.0147	0.0077	0.012	0.0092	0.0066	0.0141	50.32
rs35895680	Type 2 diabetes	C	A	0.678	0.05826891	0.00725458	-0.0016	0.007	-4.00E-04	0.0084	0.0047	0.0127	64.51
rs35999103	Type 2 diabetes	T	C	0.155	0.04879016	0.00971935	0.005	0.0092	0.0108	0.011	-0.018	0.0168	25.2
rs3751837	Type 2 diabetes	T	C	0.22	0.03922071	0.00732401	3.00E-04	0.0078	-6.00E-04	0.0093	-0.0103	0.0142	28.68
rs3768321	Type 2 diabetes	T	G	0.2	0.0861777	0.00705396	0.0164	0.0083	0.0154	0.0099	0.0167	0.015	149.25

rs3798519	Type 2 diabetes	C	A	0.184	0.05826891	0.00962763	0.0065	0.008	0.0163	0.0095	-0.0409	0.0147	36.63
rs3802177	Type 2 diabetes	G	A	0.685	0.10436002	0.00686415	0.0161	0.0067	0.0183	0.008	0.0182	0.0122	231.15
rs3845281	Type 2 diabetes	G	A	0.904	0.07696104	0.0094493	-0.0033	0.011	-0.0148	0.0131	-0.0302	0.02	66.33
rs3887925	Type 2 diabetes	T	C	0.547	0.06765865	0.00718645	-0.0227	0.0064	-0.0172	0.0076	-0.0276	0.0116	88.64
rs429358	Type 2 diabetes	T	C	0.846	0.07696104	0.0094493	0.0232	0.0092	0.023	0.0109	0.014	0.0169	66.33
rs4457053	Type 2 diabetes	G	A	0.304	0.05826891	0.00718645	-0.0017	0.007	-0.012	0.0084	0.0118	0.0127	65.74
rs4688760	Type 2 diabetes	T	C	0.684	0.03922071	0.00732401	0.0012	0.0067	2.00E-04	0.008	-2.00E-04	0.0122	28.68
rs4709746	Type 2 diabetes	C	T	0.868	0.05826891	0.00962763	-0.015	0.0104	-0.0157	0.0124	-0.0283	0.0186	36.63
rs474513	Type 2 diabetes	A	G	0.517	0.03922071	0.00490596	-0.0061	0.0062	-0.0106	0.0074	-0.0036	0.0113	63.91
rs4804833	Type 2 diabetes	A	G	0.39	0.04879016	0.00732401	-0.0086	0.0064	-0.0046	0.0076	0.0038	0.0115	44.38
rs4925109	Type 2 diabetes	A	G	0.316	0.04879016	0.00732401	0.0139	0.0066	0.0194	0.0079	0.0123	0.012	44.38
rs4929965	Type 2 diabetes	A	G	0.383	0.06765865	0.00711959	0.006	0.0064	0.0053	0.0076	-0.0019	0.0116	90.31
rs4932265	Type 2 diabetes	T	C	0.267	0.06765865	0.00718645	0.0027	0.0078	-5.00E-04	0.0093	0.0191	0.014	88.64
rs4946812	Type 2 diabetes	G	A	0.674	0.03922071	0.00490596	-0.0067	0.0076	-0.0111	0.009	-0.0041	0.0137	63.91
rs4977213	Type 2 diabetes	C	T	0.375	0.04879016	0.00725458	0.0031	0.0075	0.0093	0.009	-0.0175	0.0134	45.23
rs5213	Type 2 diabetes	C	T	0.362	0.06765865	0.00711959	-0.0115	0.0064	-0.0133	0.0077	-0.0056	0.0117	90.31
rs539515	Type 2 diabetes	C	A	0.198	0.04879016	0.00725458	-0.0303	0.0079	-0.0254	0.0094	-0.0164	0.0144	45.23
rs55653563	Type 2 diabetes	A	C	0.732	0.03922071	0.00732401	0.0115	0.007	0.0168	0.0084	0.0309	0.0128	28.68
rs56337234	Type 2 diabetes	C	T	0.503	0.05826891	0.00725458	-0.0138	0.0066	-0.0175	0.0079	-0.0172	0.0122	64.51
rs58432198	Type 2 diabetes	C	T	0.881	0.06765865	0.00953764	-0.0106	0.0099	-0.008	0.0118	-0.021	0.018	50.32
rs58730668	Type 2 diabetes	T	C	0.858	0.06765865	0.00953764	0.0028	0.0093	-0.0058	0.0111	0.0231	0.0169	50.32
rs601945	Type 2 diabetes	G	A	0.178	0.05826891	0.00962763	-0.0197	0.0085	-0.0311	0.0102	-2.00E-04	0.0161	36.63
rs60276348	Type 2 diabetes	T	C	0.14	0.04879016	0.00971935	0.0189	0.0104	0.0205	0.0125	0.0247	0.0189	25.2
rs61676547	Type 2 diabetes	C	G	0.192	0.05826891	0.00725458	0.0015	0.0077	-0.0022	0.0092	0.0203	0.014	64.51
rs62007683	Type 2 diabetes	G	T	0.653	0.03922071	0.00739478	-0.0094	0.0067	-0.0114	0.008	-0.0035	0.0122	28.13
rs62080313	Type 2 diabetes	C	T	0.123	0.05826891	0.00962763	0.0015	0.0094	0.0065	0.0112	-0.0196	0.0171	36.63
rs62107261	Type 2 diabetes	T	C	0.954	0.11332869	0.01602064	-0.0137	0.018	-0.0322	0.0213	-0.0133	0.0324	50.04
rs62271373	Type 2 diabetes	A	T	0.0553	0.0861777	0.01404586	-0.0119	0.0164	-0.013	0.0196	-3.00E-04	0.0293	37.64

rs6458354	Type 2 diabetes	C	T	0.289	0.04879016	0.00725458	0.0039	0.0069	0.0074	0.0082	-0.0026	0.0124	45.23
rs6459733	Type 2 diabetes	G	C	0.673	0.05826891	0.00481339	-0.0106	0.0066	-0.0127	0.0079	-0.0054	0.0121	146.55
rs6518681	Type 2 diabetes	G	A	0.914	0.0861777	0.01175794	0.0016	0.0115	-0.0055	0.0137	-0.0274	0.0207	53.72
rs6600191	Type 2 diabetes	T	C	0.825	0.05826891	0.00718645	4.00E-04	0.0083	-5.00E-04	0.0099	0.0158	0.015	65.74
rs67232546	Type 2 diabetes	T	C	0.207	0.05826891	0.00725458	0.0117	0.0081	0.0076	0.0096	0.0356	0.0146	64.51
rs6780171	Type 2 diabetes	A	T	0.314	0.13102826	0.00895187	-0.0163	0.0067	-0.0215	0.008	-0.011	0.0122	214.24
rs6821438	Type 2 diabetes	A	G	0.534	0.03922071	0.00732401	0.0121	0.0062	0.0122	0.0074	0.0346	0.0113	28.68
rs6976111	Type 2 diabetes	A	C	0.313	0.03922071	0.00732401	0.0035	0.0067	0.013	0.008	-0.0206	0.0123	28.68
rs7022807	Type 2 diabetes	G	A	0.401	0.03922071	0.00490596	-0.0076	0.0064	-0.0095	0.0076	-0.0084	0.0116	63.91
rs702634	Type 2 diabetes	A	G	0.69	0.04879016	0.00725458	0.0161	0.0067	0.019	0.008	-0.0014	0.0123	45.23
rs71372253	Type 2 diabetes	C	T	0.0642	0.07696104	0.01186735	-0.0357	0.0133	-0.0304	0.0158	-0.03	0.0245	42.06
rs7178762	Type 2 diabetes	C	T	0.46	0.03922071	0.00490596	-0.0207	0.0065	-0.0197	0.0077	-0.0262	0.0117	63.91
rs7222481	Type 2 diabetes	C	G	0.324	0.03922071	0.00490596	-0.0107	0.0072	-0.0099	0.0087	-0.0178	0.0132	63.91
rs7240767	Type 2 diabetes	C	T	0.376	0.03922071	0.00739478	0.0079	0.0065	0.0082	0.0078	0.0049	0.0119	28.13
rs72802342	Type 2 diabetes	C	A	0.923	0.15700375	0.01308502	0.0082	0.013	-2.00E-04	0.0154	0.0132	0.0234	143.97
rs72926932	Type 2 diabetes	C	A	0.0839	0.0861777	0.01165052	-0.0123	0.0115	-0.0139	0.0137	-0.0135	0.0211	54.71
rs738408	Type 2 diabetes	T	C	0.226	0.04879016	0.00971935	-0.0037	0.0077	-0.0019	0.0092	-0.0214	0.0141	25.2
rs7629630	Type 2 diabetes	A	T	0.857	0.04879016	0.00971935	-7.00E-04	0.0097	0.0036	0.0116	-0.0087	0.0174	25.2
rs7669833	Type 2 diabetes	T	A	0.705	0.05826891	0.00725458	-7.00E-04	0.007	0.0032	0.0083	-0.0164	0.0127	64.51
rs7719891	Type 2 diabetes	G	A	0.259	0.03922071	0.00732401	0.006	0.0072	0.0089	0.0086	-0.0046	0.0131	28.68
rs77464186	Type 2 diabetes	A	C	0.836	0.10436002	0.00919386	-0.0147	0.0086	-0.0129	0.0103	-0.0129	0.0158	128.85
rs7756992	Type 2 diabetes	G	A	0.274	0.13976194	0.00887401	0.0127	0.0069	0.0166	0.0082	-0.012	0.0126	248.05
rs7903146	Type 2 diabetes	T	C	0.295	0.31481074	0.00744876	0.0364	0.0069	0.0309	0.0083	0.039	0.0126	1786.2
rs7987740	Type 2 diabetes	T	C	0.609	0.03922071	0.00739478	5.00E-04	0.0065	-0.0059	0.0078	0.0096	0.0116	28.13
rs8010382	Type 2 diabetes	G	A	0.421	0.03922071	0.00490596	0.0162	0.0063	0.0093	0.0075	0.0126	0.0115	63.91
rs80147536	Type 2 diabetes	A	T	0.904	0.12221763	0.01123979	-0.0194	0.0104	-0.0227	0.0125	-0.0349	0.0189	118.24
rs8107974	Type 2 diabetes	T	A	0.0769	0.09531018	0.01165052	0.0174	0.0115	0.0251	0.0138	0.024	0.0211	66.92
rs878521	Type 2 diabetes	A	G	0.245	0.05826891	0.00725458	-8.00E-04	0.0077	-0.0053	0.0092	0.0067	0.0139	64.51

rs9379084	Type 2 diabetes	G	A	0.887	0.10436002	0.01154505	-0.0486	0.0103	-0.0506	0.0122	-0.0478	0.0185	81.71
rs9494624	Type 2 diabetes	A	G	0.29	0.03922071	0.00732401	0.0096	0.0075	0.017	0.009	-0.0034	0.0135	28.68
rs9563615	Type 2 diabetes	A	T	0.71	0.04879016	0.00732401	0.0083	0.0069	0.0181	0.0082	0.0074	0.0125	44.38
rs9687832	Type 2 diabetes	A	G	0.198	0.07696104	0.0094493	-0.0203	0.0081	-0.0284	0.0097	-0.0099	0.0147	66.33
rs9860730	Type 2 diabetes	A	G	0.704	0.05826891	0.00725458	-0.0055	0.0068	-0.0055	0.0081	0.0048	0.0123	64.51
rs9873618	Type 2 diabetes	G	A	0.71	0.06765865	0.00718645	-0.0112	0.0072	4.00E-04	0.0086	-0.0436	0.0129	88.64
rs9957145	Type 2 diabetes	G	A	0.829	0.04879016	0.00971935	-0.0078	0.0083	-0.0126	0.0099	3.00E-04	0.0152	25.2

EA: Effect allele; EAF: Effect allele frequency; Fstat: F statistics; OA: Other allele; SE: Standard error; SNP: Single nucleotide polymorphism

Appendix 2: Information on the genetic instruments used in this Mendelian randomization study for the breast cancer analyses in UK Biobank

SNP	Exposure	EA	OA	EAF	Beta/Log odds	SE	Log odds (Overall)	SE (Overall)	Fstat
rs1046896	HbA1c	T	C	0.3162	0.028	0.0017	0.02532379	0.01430374	271.28
rs10774625	HbA1c	G	A	0.5056	0.009	0.0016	0.06207209	0.01326543	31.64
rs10830963	HbA1c	G	C	0.2938	0.02	0.002	0.00767343	0.01486946	100
rs11248914	HbA1c	T	C	0.647	0.014	0.0019	-0.0004604	0.01410776	54.29
rs11558471	HbA1c	A	G	0.6745	0.015	0.0017	0.01926041	0.01426117	77.85
rs11603334	HbA1c	G	A	0.815	0.012	0.0021	-0.0459523	0.01834824	32.65
rs11708067	HbA1c	A	G	0.7542	0.013	0.0019	0.02195279	0.01539882	46.81
rs11964178	HbA1c	A	G	0.5666	0.01	0.0016	0.00440332	0.01340389	39.06
rs12621844	HbA1c	T	C	0.5999	0.01	0.0018	-0.0324197	0.01368679	30.86
rs13134327	HbA1c	A	G	0.3335	0.013	0.0017	-0.0077569	0.01425985	58.48
rs1558902	HbA1c	A	T	0.4128	0.01	0.0019	-0.0740661	0.01354091	27.7
rs17509001	HbA1c	C	T	0.1576	0.018	0.0023	-0.0383987	0.01883296	61.25
rs17533903	HbA1c	A	G	0.2428	0.015	0.0022	0.02841572	0.0164855	46.49
rs17747324	HbA1c	C	T	0.2489	0.015	0.0023	0.01251447	0.01589404	42.53
rs2110073	HbA1c	T	C	0.1097	0.015	0.0028	0.02532068	0.02328942	28.7
rs2383208	HbA1c	A	G	0.7992	0.014	0.0021	-0.0130012	0.0173114	44.44
rs267738	HbA1c	T	G	0.7701	0.011	0.0019	-0.0099435	0.01596529	33.52
rs282587	HbA1c	G	A	0.1513	0.019	0.0027	-0.0257171	0.02023635	49.52
rs3782123	HbA1c	C	A	0.3205	0.013	0.002	0.00244979	0.01506206	42.25
rs4607517	HbA1c	A	G	0.2017	0.031	0.0024	-0.0325824	0.0173634	166.84
rs4737009	HbA1c	A	G	0.2531	0.021	0.002	0.00234405	0.01561064	110.25
rs4745982	HbA1c	T	G	0.8726	0.095	0.0056	0.02567874	0.02530798	287.79
rs4820268	HbA1c	G	A	0.4606	0.016	0.0017	-0.0124075	0.01329665	88.58
rs560887	HbA1c	C	T	0.6843	0.028	0.0018	0.00130313	0.01448746	241.98
rs579459	HbA1c	C	T	0.2389	0.011	0.0019	0.04817141	0.01636897	33.52

rs592423	HbA1c	A	C	0.4566	0.009	0.0017	-0.0002845	0.01333223	28.03
rs6474359	HbA1c	T	C	0.953	0.044	0.0053	0.0162183	0.03473053	68.92
rs7040409	HbA1c	C	G	0.8953	0.028	0.0037	-0.0023996	0.02879151	57.27
rs7616006	HbA1c	A	G	0.5744	0.01	0.0017	0.03908628	0.01346561	34.6
rs8192675	HbA1c	T	C	0.6906	0.011	0.0017	0.01607875	0.0145958	41.87
rs837763	HbA1c	T	C	0.5548	0.017	0.0016	0.00650951	0.01335576	112.89
rs857691	HbA1c	T	C	0.2715	0.019	0.0019	-0.0384074	0.01539601	100
rs9818758	HbA1c	A	G	0.2028	0.012	0.002	-0.0305912	0.01762582	36
rs9914988	HbA1c	A	G	0.7877	0.013	0.002	0.01998472	0.01646603	42.25
rs102275	Glucose	C	T	0.351	-0.019	0.003	0.01267453	0.01388355	40.11
rs10276674	Glucose	C	T	0.164	0.035	0.0043	-0.0166178	0.01726452	66.25
rs10814916	Glucose	A	C	0.434	-0.019	0.003	-0.0122143	0.01325956	40.11
rs10830963	Glucose	C	G	0.7	-0.074	0.0035	-0.0076734	0.01486946	447.02
rs11195502	Glucose	C	T	0.925	0.035	0.0052	0.05199744	0.02314088	45.3
rs11619319	Glucose	A	G	0.788	-0.021	0.0034	-0.0105104	0.01604107	38.15
rs11708067	Glucose	A	G	0.774	0.027	0.0033	0.02195279	0.01539882	66.94
rs11924648	Glucose	A	G	0.863	0.029	0.0043	0.00371987	0.02010002	45.48
rs12805422	Glucose	A	G	0.5	-0.018	0.003	-0.0065101	0.01337608	36
rs2383208	Glucose	A	G	0.792	0.026	0.0035	-0.0130012	0.0173114	55.18
rs2979422	Glucose	C	T	0.133	0.022	0.004	0.03796557	0.0192611	30.25
rs340874	Glucose	C	T	0.562	0.02	0.0028	-0.0023698	0.01338905	51.02
rs3802177	Glucose	A	G	0.239	-0.034	0.0031	-0.0218899	0.01436025	120.29
rs4502156	Glucose	C	T	0.42	-0.023	0.003	-0.011857	0.01333963	58.78
rs4506565	Glucose	A	T	0.704	-0.019	0.0031	-0.0134923	0.01430761	37.57
rs4607517	Glucose	A	G	0.195	0.058	0.004	-0.0325824	0.0173634	210.25
rs560887	Glucose	C	T	0.674	0.067	0.0033	0.00130313	0.01448746	412.21
rs7713317	Glucose	A	G	0.695	0.023	0.0031	0.00410961	0.01469987	55.05
rs780094	Glucose	C	T	0.606	0.031	0.0029	0.00011327	0.01365014	114.27

rs7944584	Glucose	A	T	0.712	0.024	0.0034	-0.0095226	0.01483161	49.83
rs983309	Glucose	G	T	0.903	-0.032	0.0044	0.0600743	0.02054648	52.89
rs1005752	Type 2 diabetes	A	C	0.715	0.07696104	0.00705396	0.01699676	0.01479324	119.04
rs10096633	Type 2 diabetes	C	T	0.877	0.06765865	0.00953764	0.02174348	0.02018526	50.32
rs10097617	Type 2 diabetes	T	C	0.485	0.03922071	0.00732401	0.00754442	0.01329049	28.68
rs10193538	Type 2 diabetes	T	G	0.61	0.03922071	0.00739478	-0.0206196	0.01369079	28.13
rs10195252	Type 2 diabetes	T	C	0.586	0.06765865	0.0047684	-0.0110616	0.01353304	201.33
rs10228066	Type 2 diabetes	T	C	0.537	0.06765865	0.00711959	0.0012571	0.01333965	90.31
rs10406431	Type 2 diabetes	A	G	0.563	0.04879016	0.00485923	-0.0042485	0.01334646	100.82
rs1061810	Type 2 diabetes	A	C	0.288	0.04879016	0.00725458	0.01347239	0.01458218	45.23
rs10750397	Type 2 diabetes	A	G	0.282	0.04879016	0.00725458	0.00359369	0.01487903	45.23
rs10811660	Type 2 diabetes	G	A	0.828	0.2390169	0.0100844	-0.0145986	0.01749872	561.77
rs10830963	Type 2 diabetes	G	C	0.277	0.09531018	0.00692627	0.00767343	0.01486946	189.36
rs10842994	Type 2 diabetes	C	T	0.805	0.07696104	0.00711959	0.00317021	0.01666443	116.85
rs10882101	Type 2 diabetes	T	C	0.587	0.05826891	0.00962763	-0.0108151	0.01350371	36.63
rs10938398	Type 2 diabetes	A	G	0.429	0.04879016	0.00732401	-0.0125671	0.01345143	44.38
rs10954772	Type 2 diabetes	T	C	0.314	0.03922071	0.00732401	0.00689477	0.01441815	28.68
rs10974438	Type 2 diabetes	C	A	0.357	0.04879016	0.00725458	0.01645984	0.01392941	45.23
rs11063028	Type 2 diabetes	C	T	0.18	0.05826891	0.00725458	-0.0109384	0.01764748	64.51
rs11257655	Type 2 diabetes	T	C	0.218	0.0861777	0.00698953	-0.0055684	0.01632607	152.02
rs1127215	Type 2 diabetes	C	T	0.584	0.04879016	0.00485923	-0.0141059	0.01341672	100.82
rs11496066	Type 2 diabetes	T	C	0.818	0.07696104	0.01417598	-0.0064358	0.01702048	29.47
rs115505614	Type 2 diabetes	T	C	0.0499	0.17395331	0.0150737	0.01692	0.03030449	133.18
rs11642430	Type 2 diabetes	G	C	0.399	0.03922071	0.00490596	-0.0081178	0.01352829	63.91
rs11680058	Type 2 diabetes	A	G	0.863	0.05826891	0.00962763	-0.0210889	0.02133744	36.63
rs11688682	Type 2 diabetes	G	C	0.728	0.04879016	0.00732401	-0.0233078	0.01544224	44.38
rs11699802	Type 2 diabetes	C	T	0.536	0.03922071	0.00732401	-0.0127142	0.01338002	28.68
rs117001013	Type 2 diabetes	C	T	0.912	0.06765865	0.01197882	0.01948688	0.02351657	31.9

rs11708067	Type 2 diabetes	A	G	0.772	0.0861777	0.00698953	0.02195279	0.01539882	152.02
rs11709077	Type 2 diabetes	G	A	0.877	0.13102826	0.01123979	0.02464263	0.02049283	135.9
rs11759026	Type 2 diabetes	G	A	0.232	0.06765865	0.00718645	0.01886769	0.01589556	88.64
rs11842871	Type 2 diabetes	G	T	0.735	0.03922071	0.00732401	0.00681883	0.01510187	28.68
rs12001437	Type 2 diabetes	C	T	0.372	0.03922071	0.00732401	0.01419006	0.01376418	28.68
rs12140153	Type 2 diabetes	G	T	0.905	0.06765865	0.01197882	-0.0425909	0.02312156	31.9
rs1260326	Type 2 diabetes	C	T	0.607	0.06765865	0.0047684	0.00224996	0.0135657	201.33
rs12640250	Type 2 diabetes	C	A	0.715	0.03922071	0.00490596	0.01037487	0.01469111	63.91
rs12719778	Type 2 diabetes	T	C	0.538	0.03922071	0.00490596	-0.0118324	0.0132921	63.91
rs12811407	Type 2 diabetes	A	G	0.331	0.04879016	0.00725458	0.02226146	0.01411636	45.23
rs12920022	Type 2 diabetes	A	T	0.158	0.04879016	0.00725458	-0.0112726	0.01833733	45.23
rs1296328	Type 2 diabetes	A	C	0.446	0.03922071	0.00739478	-0.0039464	0.01343215	28.13
rs13041756	Type 2 diabetes	C	T	0.107	0.05826891	0.00962763	0.00310899	0.02167277	36.63
rs13262861	Type 2 diabetes	C	A	0.829	0.06765865	0.00953764	0.00460426	0.01771995	50.32
rs13426680	Type 2 diabetes	A	G	0.937	0.0861777	0.01175794	-0.0163505	0.0269806	53.72
rs1359790	Type 2 diabetes	G	A	0.72	0.0861777	0.00705396	0.00440368	0.01467359	149.25
rs1377807	Type 2 diabetes	C	G	0.312	0.04879016	0.00725458	-0.0058163	0.01428465	45.23
rs1412234	Type 2 diabetes	C	T	0.323	0.03922071	0.00732401	-0.0027819	0.01418643	28.68
rs141521721	Type 2 diabetes	A	C	0.0236	0.12221763	0.02041906	-0.0523934	0.04338577	35.83
rs1421085	Type 2 diabetes	C	T	0.415	0.12221763	0.00674318	-0.0738667	0.01354075	328.5
rs1426371	Type 2 diabetes	G	A	0.739	0.04879016	0.00725458	0.02157141	0.01528805	45.23
rs145678014	Type 2 diabetes	G	T	0.957	0.10436002	0.01616572	0.05568353	0.0322188	41.68
rs145904381	Type 2 diabetes	T	C	0.987	0.17395331	0.03004669	0.01885394	0.06007396	33.52
rs1493694	Type 2 diabetes	T	C	0.109	0.0861777	0.00936259	0.04919875	0.02140102	84.72
rs1531583	Type 2 diabetes	T	G	0.0458	0.12221763	0.01587814	-0.0439441	0.03429136	59.25
rs1561927	Type 2 diabetes	C	T	0.269	0.03922071	0.00732401	0.00152648	0.01506312	28.68
rs1562396	Type 2 diabetes	G	A	0.319	0.05826891	0.00718645	-0.0352539	0.01425703	65.74
rs1580278	Type 2 diabetes	C	A	0.473	0.03922071	0.00490596	-0.0112953	0.01335521	63.91

rs1708302	Type 2 diabetes	C	T	0.512	0.09531018	0.00698953	0.00927169	0.01325973	185.94
rs17122772	Type 2 diabetes	G	C	0.228	0.03922071	0.00732401	-0.0137126	0.01574409	28.68
rs17168486	Type 2 diabetes	T	C	0.181	0.06765865	0.00711959	-0.0070683	0.01757378	90.31
rs17250977	Type 2 diabetes	G	A	0.0376	0.11332869	0.01587814	0.01434836	0.03386017	50.94
rs17522122	Type 2 diabetes	T	G	0.474	0.03922071	0.00490596	-0.0083878	0.0133475	63.91
rs17684074	Type 2 diabetes	G	C	0.74	0.03922071	0.00732401	0.02364002	0.01536968	28.68
rs17772814	Type 2 diabetes	G	A	0.915	0.07696104	0.01417598	0.00852455	0.02507195	29.47
rs17791513	Type 2 diabetes	A	G	0.932	0.09531018	0.01154505	0.00203932	0.0275761	68.15
rs1783541	Type 2 diabetes	T	C	0.204	0.05826891	0.00718645	-0.0230811	0.01609371	65.74
rs17836088	Type 2 diabetes	C	G	0.217	0.05826891	0.00962763	0.03077556	0.01597649	36.63
rs1800961	Type 2 diabetes	T	C	0.0353	0.16551444	0.01715618	-0.0213656	0.03825815	93.07
rs184509201	Type 2 diabetes	C	G	0.982	0.19062036	0.02532014	0.04688834	0.04880571	56.68
rs2102278	Type 2 diabetes	G	A	0.319	0.03922071	0.00739478	0.01718087	0.01421943	28.13
rs2197973	Type 2 diabetes	T	C	0.538	0.03922071	0.00739478	-0.0149036	0.01328468	28.13
rs2237895	Type 2 diabetes	C	A	0.426	0.11332869	0.00680312	0.00378165	0.01343531	277.5
rs2258238	Type 2 diabetes	T	A	0.104	0.09531018	0.01154505	0.03143189	0.02173994	68.15
rs2268078	Type 2 diabetes	A	G	0.657	0.03922071	0.00732401	-0.0222087	0.0138526	28.68
rs2272163	Type 2 diabetes	C	A	0.618	0.03922071	0.00739478	-0.0080942	0.01369039	28.13
rs2283220	Type 2 diabetes	A	G	0.69	0.04879016	0.00732401	0.0157708	0.01451	44.38
rs2307111	Type 2 diabetes	T	C	0.605	0.04879016	0.00725458	0.01425408	0.01359908	45.23
rs243024	Type 2 diabetes	A	G	0.46	0.05826891	0.00481339	0.01398703	0.01336617	146.55
rs2796441	Type 2 diabetes	G	A	0.592	0.06765865	0.00718645	-0.0030291	0.01340754	88.64
rs28505901	Type 2 diabetes	G	A	0.752	0.0861777	0.00936259	0.00797905	0.0154328	84.72
rs2925979	Type 2 diabetes	T	C	0.3	0.04879016	0.00725458	-0.0167858	0.01446812	45.23
rs2972144	Type 2 diabetes	G	A	0.639	0.09531018	0.00698953	-0.022699	0.01387043	185.94
rs3111316	Type 2 diabetes	A	G	0.589	0.04879016	0.00732401	-0.0286797	0.01344846	44.38
rs329122	Type 2 diabetes	A	G	0.429	0.03922071	0.00490596	-0.0202728	0.01347087	63.91
rs340874	Type 2 diabetes	C	T	0.556	0.06765865	0.00718645	-0.0023698	0.01338905	88.64

rs34584161	Type 2 diabetes	A	G	0.76	0.04879016	0.00732401	0.00268349	0.01560159	44.38
rs34715063	Type 2 diabetes	C	T	0.124	0.09531018	0.01165052	-0.0093863	0.01983364	66.92
rs348330	Type 2 diabetes	G	A	0.361	0.04879016	0.00725458	0.00511701	0.01383766	45.23
rs34965774	Type 2 diabetes	A	G	0.144	0.05826891	0.00962763	0.00854314	0.01984507	36.63
rs35352848	Type 2 diabetes	T	C	0.788	0.06765865	0.00953764	0.00449352	0.01644166	50.32
rs35895680	Type 2 diabetes	C	A	0.678	0.05826891	0.00725458	0.04619491	0.01425503	64.51
rs35999103	Type 2 diabetes	T	C	0.155	0.04879016	0.00971935	0.00806663	0.01850013	25.2
rs3751837	Type 2 diabetes	T	C	0.22	0.03922071	0.00732401	0.01085967	0.01608687	28.68
rs3768321	Type 2 diabetes	T	G	0.2	0.0861777	0.00705396	0.04382013	0.01668616	149.25
rs3798519	Type 2 diabetes	C	A	0.184	0.05826891	0.00962763	-0.0179633	0.01734364	36.63
rs3802177	Type 2 diabetes	G	A	0.685	0.10436002	0.00686415	0.02188992	0.01436025	231.15
rs3845281	Type 2 diabetes	G	A	0.904	0.07696104	0.0094493	0.00066742	0.02241692	66.33
rs3887925	Type 2 diabetes	T	C	0.547	0.06765865	0.00718645	0.00378221	0.01337046	88.64
rs4238013	Type 2 diabetes	C	T	0.209	0.05826891	0.00725458	0.0204094	0.01667556	64.51
rs429358	Type 2 diabetes	T	C	0.846	0.07696104	0.0094493	-0.0124976	0.01835499	66.33
rs4457053	Type 2 diabetes	G	A	0.304	0.05826891	0.00718645	-0.001885	0.01425031	65.74
rs4688760	Type 2 diabetes	T	C	0.684	0.03922071	0.00732401	0.02266315	0.01438389	28.68
rs4709746	Type 2 diabetes	C	T	0.868	0.05826891	0.00962763	0.00797437	0.01959717	36.63
rs474513	Type 2 diabetes	A	G	0.517	0.03922071	0.00490596	-0.00304	0.0132874	63.91
rs4804833	Type 2 diabetes	A	G	0.39	0.04879016	0.00732401	-0.0135371	0.01363753	44.38
rs4925109	Type 2 diabetes	A	G	0.316	0.04879016	0.00732401	0.00656254	0.01448923	44.38
rs4929965	Type 2 diabetes	A	G	0.383	0.06765865	0.00711959	-0.0125712	0.01368411	90.31
rs4932265	Type 2 diabetes	T	C	0.267	0.06765865	0.00718645	-0.0124769	0.01505525	88.64
rs4946812	Type 2 diabetes	G	A	0.674	0.03922071	0.00490596	-0.0292896	0.01422963	63.91
rs4977213	Type 2 diabetes	C	T	0.375	0.04879016	0.00725458	-0.0019847	0.0136653	45.23
rs505922	Type 2 diabetes	C	T	0.332	0.04879016	0.00732401	0.03995873	0.01431991	44.38
rs5213	Type 2 diabetes	C	T	0.362	0.06765865	0.00711959	-0.0097381	0.01397663	90.31
rs539515	Type 2 diabetes	C	A	0.198	0.04879016	0.00725458	-0.0023401	0.01636168	45.23

rs55653563	Type 2 diabetes	A	C	0.732	0.03922071	0.00732401	0.00078328	0.01504942	28.68
rs56337234	Type 2 diabetes	C	T	0.503	0.05826891	0.00725458	0.00341986	0.01324798	64.51
rs56348580	Type 2 diabetes	G	C	0.689	0.04879016	0.00725458	-0.0136673	0.01440385	45.23
rs58432198	Type 2 diabetes	C	T	0.881	0.06765865	0.00953764	-0.0363978	0.0207554	50.32
rs58730668	Type 2 diabetes	T	C	0.858	0.06765865	0.00953764	0.02002138	0.01913658	50.32
rs601945	Type 2 diabetes	G	A	0.178	0.05826891	0.00962763	-0.0274028	0.01687357	36.63
rs60276348	Type 2 diabetes	T	C	0.14	0.04879016	0.00971935	-0.0043367	0.01953753	25.2
rs61676547	Type 2 diabetes	C	G	0.192	0.05826891	0.00725458	-0.0006467	0.01706069	64.51
rs62007683	Type 2 diabetes	G	T	0.653	0.03922071	0.00739478	-0.0080015	0.01397479	28.13
rs62080313	Type 2 diabetes	C	T	0.123	0.05826891	0.00962763	-0.0066121	0.01993596	36.63
rs62107261	Type 2 diabetes	T	C	0.954	0.11332869	0.01602064	0.0397289	0.03104192	50.04
rs62271373	Type 2 diabetes	A	T	0.0553	0.0861777	0.01404586	0.00949733	0.02857647	37.64
rs6458354	Type 2 diabetes	C	T	0.289	0.04879016	0.00725458	-0.0084827	0.01457595	45.23
rs6459733	Type 2 diabetes	G	C	0.673	0.05826891	0.00481339	-0.0421878	0.01405593	146.55
rs6518681	Type 2 diabetes	G	A	0.914	0.0861777	0.01175794	-0.0005226	0.02302557	53.72
rs6600191	Type 2 diabetes	T	C	0.825	0.05826891	0.00718645	-0.0137984	0.01724826	65.74
rs67232546	Type 2 diabetes	T	C	0.207	0.05826891	0.00725458	-0.0071888	0.01633055	64.51
rs6780171	Type 2 diabetes	A	T	0.314	0.13102826	0.00895187	-0.0099502	0.01432352	214.24
rs6821438	Type 2 diabetes	A	G	0.534	0.03922071	0.00732401	0.02234374	0.013269	28.68
rs6976111	Type 2 diabetes	A	C	0.313	0.03922071	0.00732401	-0.0255956	0.01457975	28.68
rs7022807	Type 2 diabetes	G	A	0.401	0.03922071	0.00490596	0.02185002	0.01356154	63.91
rs702634	Type 2 diabetes	A	G	0.69	0.04879016	0.00725458	0.00951983	0.01441251	45.23
rs71372253	Type 2 diabetes	C	T	0.0642	0.07696104	0.01186735	-0.0233105	0.02724902	42.06
rs7178762	Type 2 diabetes	C	T	0.46	0.03922071	0.00490596	-0.0298761	0.01337369	63.91
rs7222481	Type 2 diabetes	C	G	0.324	0.03922071	0.00490596	0.00097955	0.01411473	63.91
rs7240767	Type 2 diabetes	C	T	0.376	0.03922071	0.00739478	-0.0046132	0.01363004	28.13
rs72802342	Type 2 diabetes	C	A	0.923	0.15700375	0.01308502	0.00463784	0.02526857	143.97
rs72926932	Type 2 diabetes	C	A	0.0839	0.0861777	0.01165052	-0.0180445	0.02418134	54.71

rs738408	Type 2 diabetes	T	C	0.226	0.04879016	0.00971935	-0.027318	0.01611089	25.2
rs7629630	Type 2 diabetes	A	T	0.857	0.04879016	0.00971935	0.00476899	0.01913164	25.2
rs7669833	Type 2 diabetes	T	A	0.705	0.05826891	0.00725458	0.00994218	0.01467835	64.51
rs76895963	Type 2 diabetes	T	G	0.98	0.48242615	0.02671198	-0.0645826	0.05143181	326.17
rs7719891	Type 2 diabetes	G	A	0.259	0.03922071	0.00732401	0.01630429	0.01543121	28.68
rs77464186	Type 2 diabetes	A	C	0.836	0.10436002	0.00919386	-0.0504054	0.01825696	128.85
rs7756992	Type 2 diabetes	G	A	0.274	0.13976194	0.00887401	0.0103845	0.01501648	248.05
rs77864822	Type 2 diabetes	A	G	0.932	0.07696104	0.01417598	0.00608931	0.02718466	29.47
rs7903146	Type 2 diabetes	T	C	0.295	0.31481074	0.00744876	0.01589994	0.01461955	1786.2
rs7987740	Type 2 diabetes	T	C	0.609	0.03922071	0.00739478	-0.0154246	0.01360385	28.13
rs8010382	Type 2 diabetes	G	A	0.421	0.03922071	0.00490596	0.01307088	0.01381267	63.91
rs80147536	Type 2 diabetes	A	T	0.904	0.12221763	0.01123979	0.01400686	0.02199816	118.24
rs8107974	Type 2 diabetes	T	A	0.0769	0.09531018	0.01165052	-0.0062228	0.02497971	66.92
rs878521	Type 2 diabetes	A	G	0.245	0.05826891	0.00725458	-0.0133239	0.01532312	64.51
rs9379084	Type 2 diabetes	G	A	0.887	0.10436002	0.01154505	-0.0351087	0.0214353	81.71
rs9494624	Type 2 diabetes	A	G	0.29	0.03922071	0.00732401	-0.0059395	0.01477756	28.68
rs9563615	Type 2 diabetes	A	T	0.71	0.04879016	0.00732401	0.01900185	0.01456155	44.38
rs9687832	Type 2 diabetes	A	G	0.198	0.07696104	0.0094493	-0.0319388	0.01639026	66.33
rs9860730	Type 2 diabetes	A	G	0.704	0.05826891	0.00725458	0.01204026	0.01464659	64.51
rs9873618	Type 2 diabetes	G	A	0.71	0.06765865	0.00718645	0.01211412	0.01459297	88.64
rs9957145	Type 2 diabetes	G	A	0.829	0.04879016	0.00971935	0.01293339	0.01785345	25.2

EA: Effect allele; EAF: Effect allele frequency; Fstat: F statistics; OA: Other allele; SE: Standard error; SNP: Single nucleotide polymorphism

Appendix 3: Information on the genetic instruments used in this Mendelian randomization study for the prostate cancer analyses in Prostate Cancer Association Group to Investigate Cancer Associated Alterations in the Genome consortium

SNP	Exposure	EA	OA	EAF	Beta/Log odds	SE	Log odds	SE	Fstat
rs1046896	HbA1c	T	C	0.3162	0.028	0.0017	8.00E-04	0.0089	271.28
rs11248914	HbA1c	T	C	0.647	0.014	0.0019	2.00E-04	0.0089	54.29
rs11558471	HbA1c	A	G	0.6745	0.015	0.0017	0.0045	0.0087	77.85
rs11964178	HbA1c	A	G	0.5666	0.01	0.0016	-0.0119	0.0082	39.06
rs12621844	HbA1c	T	C	0.5999	0.01	0.0018	0.0072	0.0083	30.86
rs13134327	HbA1c	A	G	0.3335	0.013	0.0017	8.00E-04	0.0088	58.48
rs17509001	HbA1c	C	T	0.1576	0.018	0.0023	-0.031	0.0116	61.25
rs17533903	HbA1c	A	G	0.2428	0.015	0.0022	0.0141	0.0098	46.49
rs2383208	HbA1c	A	G	0.7992	0.014	0.0021	-0.0104	0.0105	44.44
rs282587	HbA1c	G	A	0.1513	0.019	0.0027	-0.0022	0.0126	49.52
rs3782123	HbA1c	C	A	0.3205	0.013	0.002	0.0057	0.009	42.25
rs579459	HbA1c	C	T	0.2389	0.011	0.0019	0.0062	0.0098	33.52
rs592423	HbA1c	A	C	0.4566	0.009	0.0017	-0.0254	0.0081	28.03
rs7040409	HbA1c	C	G	0.8953	0.028	0.0037	-0.025	0.0174	57.27
rs7616006	HbA1c	A	G	0.5744	0.01	0.0017	-0.0104	0.0083	34.6
rs8192675	HbA1c	T	C	0.6906	0.011	0.0017	0.0259	0.0092	41.87
rs857691	HbA1c	T	C	0.2715	0.019	0.0019	0.0158	0.0094	100
rs9818758	HbA1c	A	G	0.2028	0.012	0.002	-0.0216	0.0105	36
rs9914988	HbA1c	A	G	0.7877	0.013	0.002	-0.0043	0.0101	42.25
rs10276674	Glucose	C	T	0.164	0.035	0.0049	0.0075	0.0106	51.02
rs11558471	Glucose	A	G	0.748	0.022	0.0033	0.0045	0.0087	44.44
rs174549	Glucose	A	G	0.296	-0.021	0.0033	-0.0026	0.0087	40.5
rs4502156	Glucose	C	T	0.42	-0.019	0.0031	0.0082	0.0084	37.57
rs6113722	Glucose	A	G	0.04	-0.046	0.008	0.0119	0.0211	33.06

rs780093	Glucose	C	T	0.606	0.031	0.0032	-0.0217	0.0081	93.85
rs7945565	Glucose	A	G	0.541	0.028	0.0031	6.00E-04	0.0082	81.58
rs8192675	Glucose	C	T	0.296	-0.022	0.0034	-0.0259	0.0092	41.87
rs853787	Glucose	G	T	0.367	-0.065	0.0033	0.0104	0.0088	387.97
rs9356744	Glucose	C	T	0.308	0.019	0.0034	-0.0015	0.0085	31.23
rs983309	Glucose	G	T	0.903	-0.027	0.0046	-0.0107	0.0126	34.45
rs1005752	Type 2 diabetes	A	C	0.715	0.07696104	0.00705396	0.0034	0.0088	119.04
rs10096633	Type 2 diabetes	C	T	0.877	0.06765865	0.00953764	-0.0125	0.0122	50.32
rs10097617	Type 2 diabetes	T	C	0.485	0.03922071	0.00732401	0.0032	0.008	28.68
rs10193538	Type 2 diabetes	T	G	0.61	0.03922071	0.00739478	0.002	0.0083	28.13
rs10195252	Type 2 diabetes	T	C	0.586	0.06765865	0.0047684	0.0075	0.008	201.33
rs10228066	Type 2 diabetes	T	C	0.537	0.06765865	0.00711959	-0.0049	0.0081	90.31
rs10406431	Type 2 diabetes	A	G	0.563	0.04879016	0.00485923	0.0039	0.008	100.82
rs1061810	Type 2 diabetes	A	C	0.288	0.04879016	0.00725458	0.0123	0.0089	45.23
rs10750397	Type 2 diabetes	A	G	0.282	0.04879016	0.00725458	0.0222	0.0096	45.23
rs10811660	Type 2 diabetes	G	A	0.828	0.2390169	0.0100844	-0.0133	0.0106	561.77
rs10938398	Type 2 diabetes	A	G	0.429	0.04879016	0.00732401	5.00E-04	0.0081	44.38
rs10954772	Type 2 diabetes	T	C	0.314	0.03922071	0.00732401	-0.0069	0.0089	28.68
rs10974438	Type 2 diabetes	C	A	0.357	0.04879016	0.00725458	0.0161	0.0088	45.23
rs11257655	Type 2 diabetes	T	C	0.218	0.0861777	0.00698953	0.0197	0.0098	152.02
rs1127215	Type 2 diabetes	C	T	0.584	0.04879016	0.00485923	-0.0023	0.0083	100.82
rs11496066	Type 2 diabetes	T	C	0.818	0.07696104	0.01417598	-0.0051	0.0102	29.47
rs11680058	Type 2 diabetes	A	G	0.863	0.05826891	0.00962763	-0.0333	0.0142	36.63
rs11709077	Type 2 diabetes	G	A	0.877	0.13102826	0.01123979	-0.0127	0.012	135.9
rs11759026	Type 2 diabetes	G	A	0.232	0.06765865	0.00718645	-0.0044	0.0096	88.64
rs11842871	Type 2 diabetes	G	T	0.735	0.03922071	0.00732401	0.0034	0.0103	28.68
rs12001437	Type 2 diabetes	C	T	0.372	0.03922071	0.00732401	-0.0276	0.0083	28.68
rs12140153	Type 2 diabetes	G	T	0.905	0.06765865	0.01197882	-0.0079	0.0149	31.9

rs1260326	Type 2 diabetes	C	T	0.607	0.06765865	0.0047684	-0.0222	0.0082	201.33
rs12640250	Type 2 diabetes	C	A	0.715	0.03922071	0.00490596	-0.0086	0.009	63.91
rs12719778	Type 2 diabetes	T	C	0.538	0.03922071	0.00490596	0.0017	0.0085	63.91
rs1296328	Type 2 diabetes	A	C	0.446	0.03922071	0.00739478	-0.0047	0.0082	28.13
rs13041756	Type 2 diabetes	C	T	0.107	0.05826891	0.00962763	-0.0184	0.0137	36.63
rs13262861	Type 2 diabetes	C	A	0.829	0.06765865	0.00953764	-0.0125	0.0108	50.32
rs13426680	Type 2 diabetes	A	G	0.937	0.0861777	0.01175794	0.0294	0.0167	53.72
rs1359790	Type 2 diabetes	G	A	0.72	0.0861777	0.00705396	0.0066	0.0092	149.25
rs1377807	Type 2 diabetes	C	G	0.312	0.04879016	0.00725458	-0.01	0.0088	45.23
rs1412234	Type 2 diabetes	C	T	0.323	0.03922071	0.00732401	0.0041	0.0087	28.68
rs141521721	Type 2 diabetes	A	C	0.0236	0.12221763	0.02041906	0.0395	0.0301	35.83
rs145678014	Type 2 diabetes	G	T	0.957	0.10436002	0.01616572	-0.0272	0.0214	41.68
rs145904381	Type 2 diabetes	T	C	0.987	0.17395331	0.03004669	-0.0344	0.0402	33.52
rs1531583	Type 2 diabetes	T	G	0.0458	0.12221763	0.01587814	-0.0207	0.0214	59.25
rs1561927	Type 2 diabetes	C	T	0.269	0.03922071	0.00732401	0.0135	0.009	28.68
rs1562396	Type 2 diabetes	G	A	0.319	0.05826891	0.00718645	-0.0025	0.0092	65.74
rs1580278	Type 2 diabetes	C	A	0.473	0.03922071	0.00490596	0.0075	0.0081	63.91
rs1708302	Type 2 diabetes	C	T	0.512	0.09531018	0.00698953	-0.0134	0.0079	185.94
rs17122772	Type 2 diabetes	G	C	0.228	0.03922071	0.00732401	0.0066	0.0102	28.68
rs17168486	Type 2 diabetes	T	C	0.181	0.06765865	0.00711959	0.0082	0.0107	90.31
rs17684074	Type 2 diabetes	G	C	0.74	0.03922071	0.00732401	-0.003	0.0096	28.68
rs17772814	Type 2 diabetes	G	A	0.915	0.07696104	0.01417598	-0.0273	0.0145	29.47
rs17791513	Type 2 diabetes	A	G	0.932	0.09531018	0.01154505	0.0143	0.0158	68.15
rs1783541	Type 2 diabetes	T	C	0.204	0.05826891	0.00718645	0.0265	0.0106	65.74
rs2102278	Type 2 diabetes	G	A	0.319	0.03922071	0.00739478	0.0046	0.0088	28.13
rs2237895	Type 2 diabetes	C	A	0.426	0.11332869	0.00680312	-0.0016	0.0087	277.5
rs2268078	Type 2 diabetes	A	G	0.657	0.03922071	0.00732401	-0.0225	0.0085	28.68
rs2272163	Type 2 diabetes	C	A	0.618	0.03922071	0.00739478	-0.0048	0.0088	28.13

rs2283220	Type 2 diabetes	A	G	0.69	0.04879016	0.00732401	-0.0033	0.0092	44.38
rs243024	Type 2 diabetes	A	G	0.46	0.05826891	0.00481339	0.0037	0.008	146.55
rs2796441	Type 2 diabetes	G	A	0.592	0.06765865	0.00718645	2.00E-04	0.0087	88.64
rs28505901	Type 2 diabetes	G	A	0.752	0.0861777	0.00936259	-0.0194	0.01	84.72
rs2972144	Type 2 diabetes	G	A	0.639	0.09531018	0.00698953	0.0094	0.0084	185.94
rs3111316	Type 2 diabetes	A	G	0.589	0.04879016	0.00732401	-0.0136	0.0084	44.38
rs340874	Type 2 diabetes	C	T	0.556	0.06765865	0.00718645	0.0041	0.0084	88.64
rs34584161	Type 2 diabetes	A	G	0.76	0.04879016	0.00732401	-0.0083	0.0095	44.38
rs34715063	Type 2 diabetes	C	T	0.124	0.09531018	0.01165052	0.0068	0.0136	66.92
rs348330	Type 2 diabetes	G	A	0.361	0.04879016	0.00725458	-0.0111	0.0089	45.23
rs35352848	Type 2 diabetes	T	C	0.788	0.06765865	0.00953764	-0.0149	0.0098	50.32
rs35895680	Type 2 diabetes	C	A	0.678	0.05826891	0.00725458	-0.0039	0.0089	64.51
rs35999103	Type 2 diabetes	T	C	0.155	0.04879016	0.00971935	0.0078	0.0118	25.2
rs3751837	Type 2 diabetes	T	C	0.22	0.03922071	0.00732401	0.0208	0.0102	28.68
rs3768321	Type 2 diabetes	T	G	0.2	0.0861777	0.00705396	0.0179	0.0106	149.25
rs3798519	Type 2 diabetes	C	A	0.184	0.05826891	0.00962763	-0.0056	0.0102	36.63
rs3802177	Type 2 diabetes	G	A	0.685	0.10436002	0.00686415	0.0039	0.0087	231.15
rs3887925	Type 2 diabetes	T	C	0.547	0.06765865	0.00718645	0.0024	0.0082	88.64
rs429358	Type 2 diabetes	T	C	0.846	0.07696104	0.0094493	0.0374	0.0117	66.33
rs4688760	Type 2 diabetes	T	C	0.684	0.03922071	0.00732401	0.008	0.0087	28.68
rs4804833	Type 2 diabetes	A	G	0.39	0.04879016	0.00732401	-0.0185	0.0082	44.38
rs4925109	Type 2 diabetes	A	G	0.316	0.04879016	0.00732401	0.0294	0.0085	44.38
rs4929965	Type 2 diabetes	A	G	0.383	0.06765865	0.00711959	0.0592	0.0082	90.31
rs4932265	Type 2 diabetes	T	C	0.267	0.06765865	0.00718645	0.0286	0.0099	88.64
rs4946812	Type 2 diabetes	G	A	0.674	0.03922071	0.00490596	0.0109	0.0094	63.91
rs4977213	Type 2 diabetes	C	T	0.375	0.04879016	0.00725458	0	0.0092	45.23
rs5213	Type 2 diabetes	C	T	0.362	0.06765865	0.00711959	7.00E-04	0.0083	90.31
rs539515	Type 2 diabetes	C	A	0.198	0.04879016	0.00725458	0.014	0.0101	45.23

rs55653563	Type 2 diabetes	A	C	0.732	0.03922071	0.00732401	-0.0063	0.0091	28.68
rs56337234	Type 2 diabetes	C	T	0.503	0.05826891	0.00725458	0.0071	0.0085	64.51
rs58432198	Type 2 diabetes	C	T	0.881	0.06765865	0.00953764	-0.0218	0.0129	50.32
rs58730668	Type 2 diabetes	T	C	0.858	0.06765865	0.00953764	0.0065	0.0121	50.32
rs601945	Type 2 diabetes	G	A	0.178	0.05826891	0.00962763	0.0616	0.0104	36.63
rs60276348	Type 2 diabetes	T	C	0.14	0.04879016	0.00971935	-0.0342	0.0131	25.2
rs61676547	Type 2 diabetes	C	G	0.192	0.05826891	0.00725458	-0.0285	0.0099	64.51
rs62080313	Type 2 diabetes	C	T	0.123	0.05826891	0.00962763	0.0114	0.0122	36.63
rs62107261	Type 2 diabetes	T	C	0.954	0.11332869	0.01602064	-0.0472	0.0232	50.04
rs62271373	Type 2 diabetes	A	T	0.0553	0.0861777	0.01404586	0.0082	0.0209	37.64
rs6458354	Type 2 diabetes	C	T	0.289	0.04879016	0.00725458	-0.0173	0.0088	45.23
rs6459733	Type 2 diabetes	G	C	0.673	0.05826891	0.00481339	-0.0084	0.0086	146.55
rs6600191	Type 2 diabetes	T	C	0.825	0.05826891	0.00718645	-0.0068	0.0108	65.74
rs67232546	Type 2 diabetes	T	C	0.207	0.05826891	0.00725458	-0.0039	0.0104	64.51
rs6780171	Type 2 diabetes	A	T	0.314	0.13102826	0.00895187	-0.0165	0.0086	214.24
rs6821438	Type 2 diabetes	A	G	0.534	0.03922071	0.00732401	-0.0271	0.008	28.68
rs6976111	Type 2 diabetes	A	C	0.313	0.03922071	0.00732401	0.0053	0.0088	28.68
rs7022807	Type 2 diabetes	G	A	0.401	0.03922071	0.00490596	0.0528	0.0081	63.91
rs7178762	Type 2 diabetes	C	T	0.46	0.03922071	0.00490596	-0.0025	0.0081	63.91
rs7222481	Type 2 diabetes	C	G	0.324	0.03922071	0.00490596	0.0015	0.009	63.91
rs7240767	Type 2 diabetes	C	T	0.376	0.03922071	0.00739478	0.007	0.0084	28.13
rs72926932	Type 2 diabetes	C	A	0.0839	0.0861777	0.01165052	0.0417	0.0145	54.71
rs7629630	Type 2 diabetes	A	T	0.857	0.04879016	0.00971935	-0.0132	0.0121	25.2
rs7669833	Type 2 diabetes	T	A	0.705	0.05826891	0.00725458	-0.0032	0.009	64.51
rs77464186	Type 2 diabetes	A	C	0.836	0.10436002	0.00919386	-0.0025	0.011	128.85
rs7987740	Type 2 diabetes	T	C	0.609	0.03922071	0.00739478	0.0077	0.0085	28.13
rs80147536	Type 2 diabetes	A	T	0.904	0.12221763	0.01123979	0.0521	0.0137	118.24
rs8107974	Type 2 diabetes	T	A	0.0769	0.09531018	0.01165052	0.0085	0.0149	66.92

rs878521	Type 2 diabetes	A	G	0.245	0.05826891	0.00725458	-0.015	0.0098	64.51
rs9494624	Type 2 diabetes	A	G	0.29	0.03922071	0.00732401	0.0047	0.0094	28.68
rs9563615	Type 2 diabetes	A	T	0.71	0.04879016	0.00732401	-0.0052	0.0091	44.38
rs9860730	Type 2 diabetes	A	G	0.704	0.05826891	0.00725458	0.004	0.0088	64.51
rs9873618	Type 2 diabetes	G	A	0.71	0.06765865	0.00718645	0.0277	0.0093	88.64
rs9957145	Type 2 diabetes	G	A	0.829	0.04879016	0.00971935	0.0013	0.0106	25.2

EA: Effect allele; EAF: Effect allele frequency; Fstat: F statistics; OA: Other allele; SE: Standard error; SNP: Single nucleotide polymorphism

Appendix 4: Information on the genetic instruments used in this Mendelian randomization study related to AMPK

SNP	EA	OA	HbA1c (MAGIC)			Breast Cancer (Overall) BCAC		Breast Cancer (ER +) BCAC		Breast Cancer (ER -) BCAC		Breast Cancer (Overall) UK Biobank		Prostate Cancer PRACTICAL	
			EAF	Beta (%)	SE	Log odds	SE	Log odds	SE	Log odds	SE	Log odds	SE	Log odds	SE
rs10257529	A	G	0.531	0.0058	0.0023	0.0043	0.007	0.0046	0.0083	-0.0033	0.0126	-0.007032617	0.013281095	0.0079	0.0089
rs10277859	C	T	0.186	0.0084	0.0023	0.0057	0.0079	-2.00E-04	0.0094	0.0049	0.0144	0.010414709	0.017124282	0.0072	0.0102
rs17643028	A	C	0.2	0.0058	0.0025	-0.0045	0.0094	0.0068	0.0112	-0.0234	0.0169	0.000422096	0.019050005	0.0092	0.0122
rs2727527	A	C	0.741	-0.0056	0.0021	0.0078	0.0072	0.009	0.0085	0.0115	0.013	-0.021820352	0.014643452	0.0057	0.0091
rs2727565	A	C	0.223	0.0046	0.0022	-1.00E-04	0.0077	-0.0077	0.0092	0.0027	0.0139	0.017616318	0.015192597	-0.0037	0.0097
rs2796529	G	T	0.881	-0.0069	0.0027	0.0129	0.0099	0.0172	0.0119	-0.026	0.0176	0.015720451	0.019849512	7.00E-04	0.0126
rs6464160	G	T	0.692	-0.0044	0.0019	0.0053	0.0067	0.0049	0.008	0.0253	0.0122	-0.002236648	0.014438062	-0.0144	0.0087
rs6464161	C	T	0.325	0.0047	0.002	-0.0089	0.0066	-0.0126	0.0078	-0.0126	0.012	0.024936791	0.014041278	0.0078	0.0085
rs6593738	C	T	0.584	-0.0087	0.0036	-0.002	0.0065	3.00E-04	0.0077	0.0111	0.0116	0.017215619	0.013546254	-0.0073	0.0083

AMPK: AMP-activated protein kinase; BCAC: Breast cancer association consortium; EA: Effect allele; EAF: Effect allele frequency; MAGIC: Meta-Analyses of Glucose and Insulin-related traits Consortium; OA: Other allele; SE: Standard error; SNP: Single nucleotide polymorphism; PRACTICAL: Prostate Cancer Association Group to Investigate Cancer Associated Alterations in the Genome consortium

Supplemental Figure 1: Framework of Mendelian randomization design in this study