

Supplementary Table legends

Supplementary Table S1. Association of Multiple sclerosis with Type 1 diabetes GWAS dataset

Supplementary Table S2. Association of Type 1 diabetes with Multiple sclerosis GWAS dataset

Supplementary Table S3. Heterogeneity and pleiotropy results

Supplementary Table S4. Leave one out for Multiple sclerosis on Type 1 diabetes

Supplementary Table S5. Leave one out for Type 1 diabetes on Multiple sclerosis

Supplement Table S1 Association of Multiple sclerosis with Type 1 diabetes GWAS dataset

SNP	chr	pos	F statistics	F Mean	R ²	Exposure						Outcome					
						effect allele	other allele	eaf	beta	se	pval	effect allele	other allele	eaf	beta	se	pval
rs10801908	1	117090493	1288.659	1051.486	0.011	T	C	0.138	-0.215	0.026	0.000	T	C	0.132	-0.071	0.022	0.001
rs10914539	1	32715641	598.638	1051.486	0.005	T	G	0.176	0.133	0.027	0.000	T	G	0.181	-0.008	0.020	0.679
rs11809700	1	93152635	993.807	1051.486	0.009	T	C	0.285	0.144	0.018	0.000	T	C	0.260	0.044	0.016	0.005
rs17313062	1	160717741	347.105	1051.486	0.003	G	A	0.291	-0.085	0.018	0.000	G	A	0.306	0.000	0.015	0.980
rs2317231	1	157686337	586.044	1051.486	0.005	T	G	0.467	-0.101	0.017	0.000	T	G	0.440	-0.036	0.014	0.011
rs35486093	1	85729820	592.452	1051.486	0.005	G	A	0.086	0.179	0.028	0.000	G	A	0.090	0.051	0.026	0.046
rs3737798	1	160389984	440.337	1051.486	0.004	G	A	0.471	-0.087	0.017	0.000	G	A	0.485	-0.010	0.014	0.462
rs478093	1	120255126	554.197	1051.486	0.005	G	A	0.314	0.105	0.018	0.000	G	A	0.677	-0.002	0.016	0.918
rs59655222	1	200875897	702.459	1051.486	0.006	C	T	0.273	-0.123	0.019	0.000	C	T	0.277	-0.041	0.016	0.009
rs6670198	1	2520527	1092.146	1051.486	0.009	C	T	0.333	-0.145	0.018	0.000	C	T	0.359	-0.034	0.015	0.019
rs74449127	1	101290432	1778.638	1051.486	0.015	G	A	0.265	-0.197	0.026	0.000	G	A	0.308	0.006	0.016	0.712
rs1177228	2	61242410	495.753	1051.486	0.004	G	A	0.244	0.107	0.019	0.000	G	A	0.732	0.017	0.016	0.285
rs12612620	2	112488876	1839.273	1051.486	0.016	A	G	0.225	0.212	0.036	0.000	A	G	0.218	-0.008	0.018	0.670
rs13428812	2	25492467	356.003	1051.486	0.003	G	A	0.350	0.082	0.018	0.000	G	A	0.310	0.045	0.015	0.003
rs35540610	2	231121829	710.227	1051.486	0.006	C	T	0.212	0.135	0.019	0.000	C	T	0.218	0.034	0.017	0.044
rs62195662	2	209561980	2455.499	1051.486	0.021	C	T	0.046	0.488	0.095	0.000	C	T	0.063	0.017	0.032	0.595

rs7592560	2	68647001	619.502	1051.486	0.005	A	G	0.433	0.104	0.017	0.000	A	G	0.545	-0.023	0.014	0.104
rs1014486	3	159691112	638.571	1051.486	0.005	C	T	0.459	0.105	0.016	0.000	C	T	0.429	0.002	0.014	0.876
rs1145160	3	9250645	375.832	1051.486	0.003	C	A	0.402	-0.082	0.017	0.000	C	A	0.402	-0.003	0.016	0.874
rs11711621	3	169524016	464.402	1051.486	0.004	T	C	0.243	-0.104	0.019	0.000	T	C	0.250	-0.009	0.017	0.597
rs1992382	3	16928092	314.374	1051.486	0.003	A	G	0.063	-0.152	0.032	0.000	A	G	0.070	0.018	0.027	0.518
rs2289746	3	105455955	378.211	1051.486	0.003	C	T	0.340	0.085	0.018	0.000	C	T	0.661	-0.034	0.016	0.035
rs2681424	3	121769522	856.054	1051.486	0.007	C	T	0.494	-0.121	0.017	0.000	C	T	0.484	-0.031	0.015	0.032
rs4325907	3	101749022	519.384	1051.486	0.004	T	C	0.347	-0.099	0.017	0.000	T	C	0.644	0.020	0.015	0.178
rs438613	3	28072086	1112.851	1051.486	0.010	C	T	0.487	0.138	0.017	0.000	C	T	0.461	-0.015	0.014	0.288
rs6763437	3	119145390	5911.999	1051.486	0.049	A	G	0.042	-0.779	0.132	0.000	A	G	0.031	-0.031	0.038	0.418
rs9844930	3	56953174	351.946	1051.486	0.003	C	A	0.374	-0.080	0.017	0.000	C	A	0.355	-0.006	0.015	0.662
rs9878602	3	71535338	406.138	1051.486	0.003	G	T	0.500	-0.084	0.016	0.000	G	T	0.482	0.025	0.015	0.081
rs17051321	4	122119449	357.884	1051.486	0.003	T	C	0.221	0.095	0.019	0.000	T	C	0.231	-0.005	0.017	0.786
rs2007403	4	106131210	359.600	1051.486	0.003	T	C	0.374	0.081	0.017	0.000	T	C	0.620	0.015	0.015	0.319
rs6837324	4	48127262	406.619	1051.486	0.003	G	A	0.377	0.086	0.017	0.000	G	A	0.391	-0.009	0.014	0.510
rs7698247	4	40192049	402.032	1051.486	0.003	A	G	0.317	-0.089	0.019	0.000	A	G	0.649	0.020	0.016	0.227
rs9992763	4	109058718	464.959	1051.486	0.004	T	G	0.442	-0.090	0.016	0.000	T	G	0.548	-0.025	0.015	0.089
rs10063294	5	35877505	563.185	1051.486	0.005	A	G	0.442	-0.099	0.016	0.000	A	G	0.554	-0.010	0.014	0.459
rs11749040	5	40396425	1057.770	1051.486	0.009	A	G	0.135	0.197	0.023	0.000	A	G	0.144	-0.027	0.020	0.189
rs2084007	5	133891282	365.768	1051.486	0.003	T	C	0.492	-0.079	0.016	0.000	T	C	0.481	-0.018	0.014	0.198

rs2546890	5	158759900	797.574	1051.486	0.007	G	A	0.491	-0.117	0.016	0.000	G	A	0.465	0.008	0.014	0.564
rs9327104	5	118883648	436.253	1051.486	0.004	G	A	0.020	0.310	0.061	0.000	G	A	0.019	-0.049	0.058	0.396
rs12211604	6	7100029	472.792	1051.486	0.004	A	G	0.376	-0.093	0.018	0.000	A	G	0.627	0.000	0.016	0.998
rs4707386	6	88406656	348.929	1051.486	0.003	A	G	0.268	-0.087	0.019	0.000	A	G	0.285	0.017	0.016	0.299
rs56272720	6	135532832	2412.758	1051.486	0.020	G	A	0.047	0.479	0.091	0.000	G	A	0.053	0.025	0.034	0.456
rs58546351	6	32483611	35457.102	1051.486	0.234	G	A	0.034	-1.894	0.053	0.000	G	A	0.010	-0.505	0.201	0.012
rs62420820	6	137438057	771.942	1051.486	0.007	A	G	0.228	0.137	0.019	0.000	A	G	0.227	0.014	0.017	0.407
rs10951042	7	3139417	334.223	1051.486	0.003	C	T	0.371	0.079	0.017	0.000	C	T	0.426	0.027	0.015	0.060
rs11762408	7	150373728	1665.010	1051.486	0.014	A	C	0.032	-0.480	0.105	0.000	A	C	0.035	-0.015	0.041	0.707
rs2242508	7	56151489	444.920	1051.486	0.004	G	A	0.414	-0.089	0.017	0.000	G	A	0.415	-0.016	0.015	0.296
rs354033	7	149289464	522.199	1051.486	0.004	A	G	0.260	-0.108	0.019	0.000	A	G	0.243	-0.003	0.016	0.829
rs55970742	7	2441337	510.898	1051.486	0.004	T	C	0.321	-0.100	0.018	0.000	T	C	0.666	-0.021	0.016	0.193
rs57532281	7	20488882	400.284	1051.486	0.003	T	C	0.440	0.084	0.017	0.000	T	C	0.405	0.030	0.016	0.058
rs28703878	8	79417222	907.349	1051.486	0.008	G	A	0.320	0.134	0.021	0.000	G	A	0.271	0.002	0.016	0.903
rs6990534	8	128814091	591.716	1051.486	0.005	G	A	0.331	0.107	0.018	0.000	G	A	0.697	0.039	0.016	0.013
rs7830997	8	71442114	382.973	1051.486	0.003	G	A	0.369	-0.084	0.017	0.000	G	A	0.654	-0.043	0.015	0.004
rs290260	9	93554953	425.280	1051.486	0.004	T	C	0.217	-0.104	0.021	0.000	T	C	0.191	0.028	0.018	0.125
rs7855251	9	100868189	574.174	1051.486	0.005	C	T	0.284	-0.110	0.020	0.000	C	T	0.251	-0.010	0.016	0.522
rs1112718	10	94479107	619.408	1051.486	0.005	G	A	0.393	-0.106	0.017	0.000	G	A	0.406	-0.054	0.015	0.000
rs11256593	10	6117322	2020.488	1051.486	0.017	T	C	0.445	0.186	0.017	0.000	T	C	0.519	0.024	0.014	0.089

rs1323657	10	6072427	341.314	1051.486	0.003	G	A	0.489	-0.077	0.017	0.000	G	A	0.569	0.008	0.014	0.592
rs34299154	10	64423416	1367.134	1051.486	0.012	A	C	0.097	-0.258	0.055	0.000	A	C	0.094	-0.016	0.024	0.484
rs1204649	11	65702776	442.382	1051.486	0.004	C	A	0.436	-0.088	0.017	0.000	C	A	0.449	-0.002	0.015	0.896
rs2269434	11	47360412	390.320	1051.486	0.003	C	T	0.347	0.086	0.017	0.000	C	T	0.367	0.004	0.015	0.795
rs4944014	11	72527180	345.065	1051.486	0.003	T	C	0.224	-0.092	0.019	0.000	T	C	0.260	-0.008	0.016	0.634
rs56232455	11	321235	1452.242	1051.486	0.012	A	G	0.443	0.158	0.028	0.000	A	G	0.489	-0.030	0.038	0.436
rs6589706	11	118747813	409.722	1051.486	0.004	G	A	0.453	-0.084	0.017	0.000	G	A	0.538	0.025	0.014	0.076
rs1860545	12	6446777	772.527	1051.486	0.007	A	G	0.423	0.117	0.017	0.000	A	G	0.401	0.016	0.015	0.261
rs701006	12	58106836	720.500	1051.486	0.006	G	A	0.393	0.114	0.017	0.000	G	A	0.584	0.039	0.014	0.006
rs7975763	12	123604053	576.868	1051.486	0.005	T	C	0.216	0.121	0.021	0.000	T	C	0.198	-0.001	0.017	0.953
rs3783196	13	42039288	403.445	1051.486	0.003	A	C	0.498	-0.083	0.016	0.000	A	C	0.518	-0.008	0.014	0.588
rs9557185	13	99895107	415.957	1051.486	0.004	T	C	0.114	-0.133	0.027	0.000	T	C	0.121	-0.013	0.056	0.824
rs9591325	13	50811220	542.343	1051.486	0.005	C	T	0.055	-0.212	0.034	0.000	C	T	0.067	-0.067	0.029	0.020
rs9599826	13	71894040	338.244	1051.486	0.003	T	C	0.440	-0.077	0.016	0.000	T	C	0.490	0.018	0.015	0.230
rs11852059	14	52306091	338.032	1051.486	0.003	C	A	0.194	0.097	0.021	0.000	C	A	0.177	-0.026	0.018	0.165
rs12147246	14	103265844	519.122	1051.486	0.004	G	A	0.345	-0.099	0.017	0.000	G	A	0.644	-0.019	0.016	0.245
rs17124032	14	88546009	820.778	1051.486	0.007	A	G	0.082	-0.217	0.032	0.000	A	G	0.075	0.019	0.026	0.467
rs34695601	14	76014298	522.159	1051.486	0.004	C	T	0.250	-0.109	0.020	0.000	C	T	0.241	-0.042	0.017	0.012
rs11629628	15	89261248	1184.139	1051.486	0.010	A	G	0.042	0.356	0.071	0.000	A	G	0.046	-0.038	0.039	0.330
rs62013236	15	79247482	452.251	1051.486	0.004	T	C	0.145	-0.125	0.026	0.000	T	C	0.139	-0.067	0.021	0.001

rs6496663	15	90887584	507.123	1051.486	0.004	C	A	0.314	0.101	0.018	0.000	C	A	0.305	0.003	0.018	0.884
rs12925972	16	79111297	518.048	1051.486	0.004	C	T	0.467	0.095	0.017	0.000	C	T	0.541	0.028	0.015	0.061
rs17724508	16	79350204	393.369	1051.486	0.003	C	T	0.041	-0.208	0.038	0.000	C	T	0.055	-0.008	0.031	0.803
rs34550882	16	31274875	558.493	1051.486	0.005	T	C	0.144	0.139	0.028	0.000	T	C	0.115	-0.024	0.022	0.278
rs3809627	16	30103160	531.491	1051.486	0.005	A	C	0.417	-0.097	0.018	0.000	A	C	0.418	-0.005	0.015	0.723
rs415759	16	1066917	502.859	1051.486	0.004	C	T	0.189	0.119	0.022	0.000	C	T	0.167	-0.002	0.020	0.913
rs6564681	16	79652720	447.328	1051.486	0.004	T	C	0.315	-0.094	0.018	0.000	T	C	0.704	0.006	0.016	0.690
rs7190580	16	11403470	435.588	1051.486	0.004	G	A	0.265	-0.098	0.018	0.000	G	A	0.705	-0.025	0.015	0.097
rs8062446	16	57077094	402.608	1051.486	0.003	T	C	0.405	0.085	0.017	0.000	T	C	0.378	-0.024	0.015	0.119
rs1026916	17	40529835	910.286	1051.486	0.008	G	A	0.366	-0.130	0.017	0.000	G	A	0.643	0.026	0.015	0.070
rs2150879	17	57859210	616.109	1051.486	0.005	A	G	0.443	-0.104	0.016	0.000	A	G	0.540	-0.022	0.014	0.119
rs4796224	17	34842521	420.104	1051.486	0.004	G	A	0.450	0.085	0.016	0.000	G	A	0.473	0.020	0.037	0.584
rs11152081	18	56213438	358.049	1051.486	0.003	G	A	0.334	0.083	0.018	0.000	G	A	0.664	0.021	0.015	0.182
rs9955954	18	56348044	484.337	1051.486	0.004	G	A	0.221	-0.110	0.019	0.000	G	A	0.227	-0.037	0.017	0.027
rs1077667	19	6668972	949.606	1051.486	0.008	T	C	0.229	-0.152	0.021	0.000	T	C	0.233	-0.036	0.018	0.039
rs11666263	19	10590684	525.335	1051.486	0.005	G	A	0.309	-0.103	0.018	0.000	G	A	0.354	-0.031	0.015	0.038
rs1465697	19	49837246	652.035	1051.486	0.006	T	C	0.238	0.124	0.019	0.000	T	C	0.230	0.031	0.017	0.077
rs6509314	19	47696626	461.941	1051.486	0.004	T	C	0.272	0.100	0.020	0.000	T	C	0.713	0.011	0.018	0.544
rs2248461	20	52792202	642.771	1051.486	0.006	A	G	0.382	-0.108	0.017	0.000	A	G	0.360	0.015	0.015	0.299
rs6012503	20	47251852	447.233	1051.486	0.004	G	A	0.489	0.088	0.017	0.000	G	A	0.454	-0.026	0.015	0.079

rs6032662	20	44734310	798.572	1051.486	0.007	T	C	0.257	-0.134	0.018	0.000	T	C	0.749	-0.001	0.016	0.967
rs6742	20	62374441	978.909	1051.486	0.008	C	T	0.209	0.159	0.030	0.000	C	T	0.787	-0.026	0.018	0.153
rs73902837	21	36464229	395.605	1051.486	0.003	T	C	0.028	-0.251	0.054	0.000	T	C	0.029	-0.026	0.046	0.579
rs9977672	21	40463283	371.932	1051.486	0.003	A	G	0.252	-0.092	0.019	0.000	A	G	0.254	-0.010	0.016	0.534
rs134490	22	28730175	409.384	1051.486	0.004	T	C	0.114	0.132	0.027	0.000	T	C	0.864	0.020	0.021	0.344
rs140522	22	50971266	619.827	1051.486	0.005	C	T	0.320	-0.111	0.018	0.000	C	T	0.674	-0.034	0.015	0.026
rs9610458	22	22205353	755.032	1051.486	0.006	T	C	0.458	0.114	0.017	0.000	T	C	0.525	0.001	0.015	0.958

Supplement Table S2 Association of Type 1 diabetes with Multiple sclerosis GWAS dataset

SNP	chr	pos	F statistics	F_Mean	R ²	Exposure						Outcome					
						effect allele	other allele	eaf	beta	se	pval	effect allele	other allele	eaf	beta	se	pval
rs12742756	1	38347417	1766.453	4289.054	0.003	G	A	0.428	-0.083	0.015	0.000	G	A	0.443	-0.014	0.019	0.451
rs17623914	1	198670555	1705.922	4289.054	0.003	C	T	0.100	-0.135	0.023	0.000	C	T	0.102	0.005	0.027	0.842
rs2493411	1	120506786	1933.114	4289.054	0.004	C	T	0.132	0.127	0.022	0.000	C	T	0.129	-0.008	0.025	0.736
rs3024493	1	206943968	3667.543	4289.054	0.007	A	C	0.154	-0.164	0.020	0.000	A	C	0.166	-0.002	0.023	0.945
rs574384	1	36087661	1752.320	4289.054	0.003	A	C	0.895	-0.134	0.024	0.000	A	C	0.114	-0.019	0.027	0.499
rs6679677	1	114303808	47235.134	4289.054	0.083	A	C	0.114	0.642	0.021	0.000	A	C	0.091	-0.001	0.034	0.986
rs7511678	1	200832857	1612.301	4289.054	0.003	A	G	0.229	0.094	0.017	0.000	A	G	0.238	0.014	0.020	0.488
rs855330	1	64113889	2482.975	4289.054	0.005	C	T	0.259	0.111	0.017	0.000	C	T	0.265	-0.038	0.020	0.054
rs12464462	2	60636416	1955.695	4289.054	0.004	G	A	0.410	-0.088	0.014	0.000	G	A	0.424	-0.015	0.017	0.375
rs2111485	2	163110536	4088.441	4289.054	0.008	G	A	0.604	0.128	0.014	0.000	G	A	0.398	-0.040	0.017	0.017
rs28648882	2	242278547	1770.137	4289.054	0.003	A	G	0.224	0.099	0.018	0.000	A	G	0.267	0.004	0.019	0.829
rs3087243	2	204738919	10268.636	4289.054	0.019	A	G	0.422	-0.199	0.014	0.000	A	G	0.470	0.035	0.017	0.036
rs6434435	2	191953864	2120.672	4289.054	0.004	A	G	0.160	-0.123	0.019	0.000	A	G	0.170	-0.026	0.022	0.227
rs13147049	4	123193870	2889.849	4289.054	0.006	G	A	0.641	-0.110	0.015	0.000	G	A	0.345	-0.016	0.017	0.366
rs2611211	4	166575439	3143.505	4289.054	0.006	T	C	0.824	-0.144	0.019	0.000	T	C	0.158	0.014	0.022	0.520
rs7668577	4	26123319	1967.575	4289.054	0.004	C	A	0.312	0.094	0.015	0.000	C	A	0.320	-0.002	0.019	0.913

rs2188962	5	131770805	1587.680	4289.054	0.003	T	C	0.404	0.079	0.014	0.000	T	C	0.387	-0.031	0.016	0.060
rs1050979	6	410417	2949.407	4289.054	0.006	G	A	0.515	0.106	0.014	0.000	G	A	0.475	0.003	0.017	0.846
rs238873	6	29351641	9523.897	4289.054	0.018	G	A	0.015	0.793	0.053	0.000	G	A	0.022	0.134	0.067	0.044
rs6908236	6	33628922	7272.185	4289.054	0.014	C	A	0.514	0.166	0.014	0.000	C	A	0.470	-0.007	0.016	0.673
rs73432769	6	30716170	2294.185	4289.054	0.004	T	C	0.020	0.335	0.046	0.000	T	C	0.018	0.264	0.117	0.024
rs9260802	6	29941064	4533.446	4289.054	0.009	G	A	0.035	-0.356	0.042	0.000	G	A	NA	0.042	0.042	0.321
rs9468618	6	29750776	5849.627	4289.054	0.011	T	C	0.082	-0.272	0.026	0.000	T	C	NA	-0.004	0.028	0.876
rs10224046	7	20386338	1684.599	4289.054	0.003	G	T	0.324	0.086	0.015	0.000	G	T	0.355	0.029	0.017	0.098
rs10275896	7	26858395	2738.363	4289.054	0.005	C	T	0.232	-0.121	0.017	0.000	C	T	0.222	-0.041	0.019	0.034
rs7776597	7	51015582	2457.038	4289.054	0.005	G	A	0.959	0.244	0.036	0.000	G	A	0.027	0.043	0.041	0.299
rs7795896	7	117086613	4102.452	4289.054	0.008	T	C	0.692	-0.135	0.016	0.000	T	C	0.336	0.016	0.018	0.366
rs13259300	8	120082941	2135.986	4289.054	0.004	C	A	0.598	-0.092	0.015	0.000	C	A	0.366	-0.007	0.017	0.673
rs1947178	8	59872177	1835.507	4289.054	0.004	G	A	0.792	-0.103	0.017	0.000	G	A	0.220	-0.015	0.019	0.453
rs3802214	8	141616183	1907.369	4289.054	0.004	C	T	0.799	-0.107	0.019	0.000	C	T	0.180	0.019	0.021	0.387
rs1574285	9	4283137	4061.744	4289.054	0.008	T	G	0.591	-0.127	0.014	0.000	T	G	0.447	0.002	0.016	0.912
rs7068821	10	90051035	5390.828	4289.054	0.010	T	G	0.251	-0.165	0.016	0.000	T	G	0.245	0.009	0.019	0.631
rs722988	10	33426147	1629.398	4289.054	0.003	C	T	0.353	0.083	0.014	0.000	C	T	0.388	0.013	0.017	0.438
rs607703	11	128604174	2210.898	4289.054	0.004	T	C	0.484	0.092	0.014	0.000	T	C	0.464	0.025	0.016	0.126
rs7130222	11	2090456	1884.412	4289.054	0.004	G	T	0.308	-0.092	0.016	0.000	G	T	0.318	-0.025	0.019	0.187
rs1701704	12	56412487	14276.350	4289.054	0.027	G	T	0.339	0.244	0.015	0.000	G	T	0.328	-0.003	0.017	0.885

rs7301381	12	9123932	2277.902	4289.054	0.004	C	T	0.464	-0.094	0.014	0.000	C	T	NA	-0.006	0.016	0.711
rs238265	13	42930659	1826.976	4289.054	0.003	G	T	0.695	-0.091	0.015	0.000	G	T	0.276	0.023	0.018	0.206
rs9517712	13	100079833	2089.827	4289.054	0.004	C	T	0.741	-0.102	0.016	0.000	C	T	0.248	0.046	0.019	0.015
rs1350275	14	98489306	1932.601	4289.054	0.004	G	T	0.698	-0.094	0.015	0.000	G	T	0.275	-0.011	0.018	0.546
rs56994090	14	101306447	4643.257	4289.054	0.009	C	T	0.431	-0.134	0.015	0.000	C	T	0.402	0.002	0.018	0.931
rs34593439	15	79234957	4813.908	4289.054	0.009	A	G	0.108	-0.218	0.024	0.000	A	G	0.106	-0.002	0.029	0.954
rs231972	16	28538336	3185.651	4289.054	0.006	C	A	0.118	0.171	0.021	0.000	C	A	0.122	0.028	0.026	0.289
rs35327136	17	43487574	1954.943	4289.054	0.004	A	C	0.156	-0.119	0.019	0.000	A	C	0.193	-0.038	0.022	0.076
rs57209021	17	66164918	1853.135	4289.054	0.004	T	C	0.226	0.101	0.018	0.000	T	C	0.249	0.022	0.020	0.277
rs61759532	17	7240391	2636.260	4289.054	0.005	T	C	0.235	0.118	0.019	0.000	T	C	0.206	-0.048	0.023	0.037
rs1808094	18	67526026	3376.043	4289.054	0.006	C	T	0.524	-0.114	0.015	0.000	C	T	0.475	-0.046	0.016	0.006
rs7237497	18	12777325	6926.717	4289.054	0.013	C	T	0.839	-0.220	0.019	0.000	C	T	0.138	-0.007	0.023	0.771
rs202535	20	1666989	2983.200	4289.054	0.006	A	C	0.828	-0.141	0.018	0.000	A	C	0.171	0.018	0.021	0.413
rs11203203	21	43836186	4938.082	4289.054	0.009	A	G	0.349	0.144	0.014	0.000	A	G	0.352	-0.049	0.017	0.004
rs229527	22	37581485	2754.377	4289.054	0.005	A	C	0.416	0.104	0.014	0.000	A	C	0.423	-0.036	0.016	0.030
rs4820827	22	30477589	4152.302	4289.054	0.008	C	T	0.621	-0.130	0.014	0.000	C	T	0.399	0.009	0.017	0.588

Supplement Table S3 Heterogeneity and pleiotropy results

Exposures	nSNPs	Cochran's Q			MR-Egger		
		Q value	P value	I²	Intercept	Se	pval
Multiple sclerosis	102	196.324	0.000	48.045	0.003	0.005	0.585
Type 1 diabetes	51	87.914	0.001	41.989	-0.001	0.008	0.914

Supplement Table S4 Leave one out for Multiple sclerosis on Type 1 diabetes

SNP	beta	se	pval
rs10063294	0.075	0.018	0.000
rs1014486	0.076	0.018	0.000
rs1026916	0.079	0.018	0.000
rs1077667	0.073	0.018	0.000
rs10801908	0.071	0.018	0.000
rs10914539	0.076	0.018	0.000
rs10951042	0.074	0.018	0.000
rs1112718	0.071	0.018	0.000
rs11152081	0.074	0.018	0.000
rs11256593	0.073	0.018	0.000
rs1145160	0.075	0.018	0.000
rs11629628	0.078	0.018	0.000
rs11666263	0.073	0.018	0.000
rs11711621	0.075	0.018	0.000
rs11749040	0.078	0.018	0.000
rs11762408	0.076	0.018	0.000
rs1177228	0.074	0.018	0.000
rs11809700	0.072	0.018	0.000

rs11852059	0.077	0.018	0.000
rs1204649	0.075	0.018	0.000
rs12147246	0.074	0.018	0.000
rs12211604	0.076	0.018	0.000
rs12612620	0.078	0.018	0.000
rs12925972	0.074	0.018	0.000
rs1323657	0.076	0.018	0.000
rs13428812	0.073	0.018	0.000
rs134490	0.075	0.018	0.000
rs140522	0.073	0.018	0.000
rs1465697	0.074	0.018	0.000
rs17051321	0.076	0.018	0.000
rs17124032	0.077	0.018	0.000
rs17313062	0.075	0.018	0.000
rs17724508	0.075	0.018	0.000
rs1860545	0.074	0.018	0.000
rs1992382	0.076	0.018	0.000
rs2007403	0.075	0.018	0.000
rs2084007	0.074	0.018	0.000
rs2150879	0.074	0.018	0.000

rs2242508	0.075	0.018	0.000
rs2248461	0.077	0.018	0.000
rs2269434	0.075	0.018	0.000
rs2289746	0.077	0.018	0.000
rs2317231	0.073	0.018	0.000
rs2546890	0.077	0.018	0.000
rs2681424	0.073	0.018	0.000
rs28703878	0.076	0.018	0.000
rs290260	0.077	0.018	0.000
rs34299154	0.075	0.018	0.000
rs34550882	0.077	0.018	0.000
rs34695601	0.073	0.018	0.000
rs354033	0.075	0.018	0.000
rs35486093	0.073	0.018	0.000
rs35540610	0.073	0.018	0.000
rs3737798	0.075	0.018	0.000
rs3783196	0.075	0.018	0.000
rs3809627	0.075	0.018	0.000
rs415759	0.076	0.018	0.000
rs4325907	0.077	0.018	0.000

rs438613	0.078	0.018	0.000
rs4707386	0.076	0.018	0.000
rs478093	0.076	0.018	0.000
rs4796224	0.075	0.018	0.000
rs4944014	0.075	0.018	0.000
rs55970742	0.074	0.018	0.000
rs56232455	0.076	0.018	0.000
rs56272720	0.076	0.018	0.000
rs57532281	0.074	0.018	0.000
rs58546351	0.072	0.018	0.000
rs59655222	0.072	0.018	0.000
rs6012503	0.077	0.018	0.000
rs6032662	0.076	0.018	0.000
rs62013236	0.072	0.018	0.000
rs62195662	0.077	0.018	0.000
rs62420820	0.075	0.018	0.000
rs6496663	0.075	0.018	0.000
rs6509314	0.075	0.018	0.000
rs6564681	0.076	0.018	0.000
rs6589706	0.077	0.018	0.000

rs6670198	0.072	0.018	0.000
rs6742	0.078	0.018	0.000
rs6763437	0.078	0.019	0.000
rs6837324	0.076	0.018	0.000
rs6990534	0.073	0.018	0.000
rs701006	0.072	0.018	0.000
rs7190580	0.074	0.018	0.000
rs73902837	0.075	0.018	0.000
rs74449127	0.078	0.018	0.000
rs7592560	0.078	0.018	0.000
rs7698247	0.077	0.018	0.000
rs7830997	0.073	0.018	0.000
rs7855251	0.075	0.018	0.000
rs7975763	0.076	0.018	0.000
rs8062446	0.077	0.018	0.000
rs9327104	0.076	0.018	0.000
rs9557185	0.075	0.018	0.000
rs9591325	0.073	0.018	0.000
rs9599826	0.076	0.018	0.000
rs9610458	0.076	0.018	0.000

rs9844930	0.075	0.018	0.000
rs9878602	0.077	0.018	0.000
rs9955954	0.073	0.018	0.000
rs9977672	0.075	0.018	0.000
rs9992763	0.074	0.018	0.000
All	0.075	0.018	0.000

Supplement Table S5 Leave one out for Type 1 diabetes on Multiple sclerosis

SNP	beta	se	pval
rs10224046	-0.009	0.025	0.724
rs10275896	-0.011	0.025	0.663
rs1050979	-0.006	0.025	0.804
rs11203203	0.003	0.024	0.898
rs12464462	-0.007	0.025	0.765
rs12742756	-0.007	0.025	0.780
rs13147049	-0.008	0.025	0.754
rs13259300	-0.007	0.025	0.793
rs1350275	-0.007	0.025	0.782
rs1574285	-0.006	0.025	0.826
rs1701704	-0.005	0.026	0.835
rs17623914	-0.005	0.025	0.829
rs1808094	-0.013	0.024	0.596
rs1947178	-0.007	0.025	0.773
rs202535	-0.004	0.025	0.878
rs2111485	0.001	0.025	0.977
rs2188962	-0.003	0.025	0.919
rs229527	-0.001	0.025	0.974

rs231972	-0.008	0.025	0.739
rs238265	-0.004	0.025	0.888
rs238873	-0.015	0.025	0.547
rs2493411	-0.005	0.025	0.837
rs2611211	-0.004	0.025	0.864
rs28648882	-0.006	0.025	0.806
rs3024493	-0.006	0.025	0.812
rs3087243	0.003	0.025	0.890
rs34593439	-0.006	0.025	0.812
rs35327136	-0.009	0.025	0.705
rs3802214	-0.004	0.025	0.866
rs4820827	-0.004	0.025	0.864
rs56994090	-0.006	0.025	0.824
rs57209021	-0.008	0.025	0.756
rs574384	-0.007	0.025	0.781
rs607703	-0.009	0.025	0.719
rs61759532	-0.002	0.025	0.936
rs6434435	-0.008	0.025	0.740
rs6679677	-0.006	0.027	0.810
rs6908236	-0.004	0.026	0.864

rs7068821	-0.004	0.025	0.864
rs7130222	-0.008	0.025	0.745
rs722988	-0.007	0.025	0.775
rs7237497	-0.007	0.025	0.784
rs7301381	-0.007	0.025	0.793
rs73432769	-0.008	0.024	0.740
rs7511678	-0.007	0.025	0.782
rs7668577	-0.006	0.025	0.824
rs7776597	-0.008	0.025	0.748
rs7795896	-0.003	0.025	0.895
rs855330	-0.002	0.025	0.939
rs9260802	-0.003	0.025	0.910
rs9468618	-0.007	0.025	0.799
rs9517712	-0.001	0.024	0.963
All	-0.006	0.025	0.817
