

Table S1 Summary of the GWAS included in this Mendelian randomization study

Phenotype	GWAS ID	Sample size	Consortium	Year	Ethnicity	Number of SNPs	PMID
Urate levels	ebi-a-GCST90025965	437,354	NA	2021	European	4,231,909	34226706
Gout	ebi-a-GCST90038687	484,598	NA	2021	European	9,587,836	33959723
Overall breast cancer	ieu-a-1129	106,776	BCAC	2017	European	10,680,257	29059683
ER+ breast cancer	ieu-a-1132	83,691	BCAC	2017	European	10,680,257	29059683
ER- breast cancer	ieu-a-1135	55,149	BCAC	2017	European	10,680,257	29059683
Smoking status	ebi-a-GCST90029014	468,170	NA	2018	European	11,973,425	29892013
Alcohol intake frequency	ukb-b-5779	462,346	MRC-IEU	2018	European	9,851,867	NA
BMI	ukb-b-2303	454,884	MRC-IEU	2018	European	9,851,867	NA

Table S2 Results of the Steiger directionality test

Exposure	Outcome	Correct causal direction	Steiger P value
Urate levels	Overall breast cancer	TRUE	<0.001
	ER+ breast cancer	TRUE	<0.001
	ER- breast cancer	TRUE	<0.001
Gout	Overall breast cancer	TRUE	<0.001
	ER+ breast cancer	TRUE	<0.001
	ER- breast cancer	TRUE	<0.001

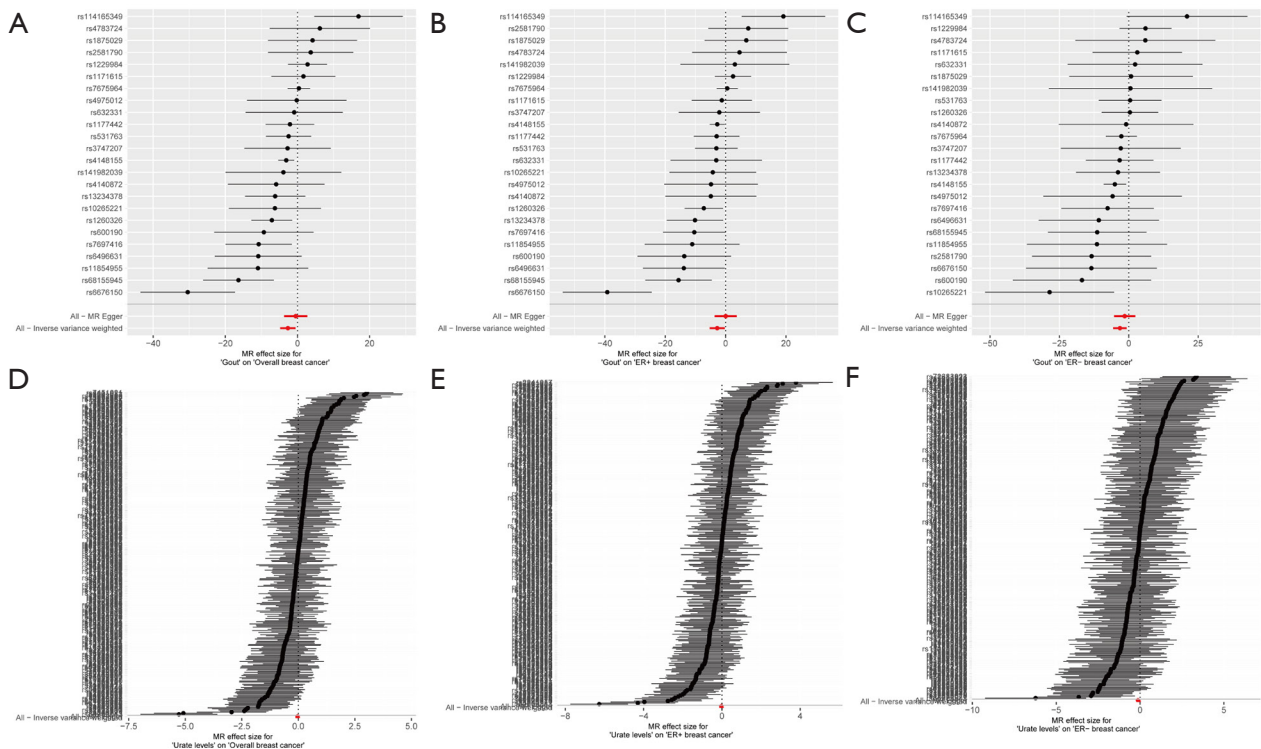


Figure S1 Forrest plot of MR analyses. (A) Gout on overall breast cancer. (B) Gout on ER+ breast cancer. (C) Gout on ER- breast cancer. (D) Urate levels on overall breast cancer. (E) Urate levels on ER+ breast cancer. (F) Urate levels on ER- breast cancer.

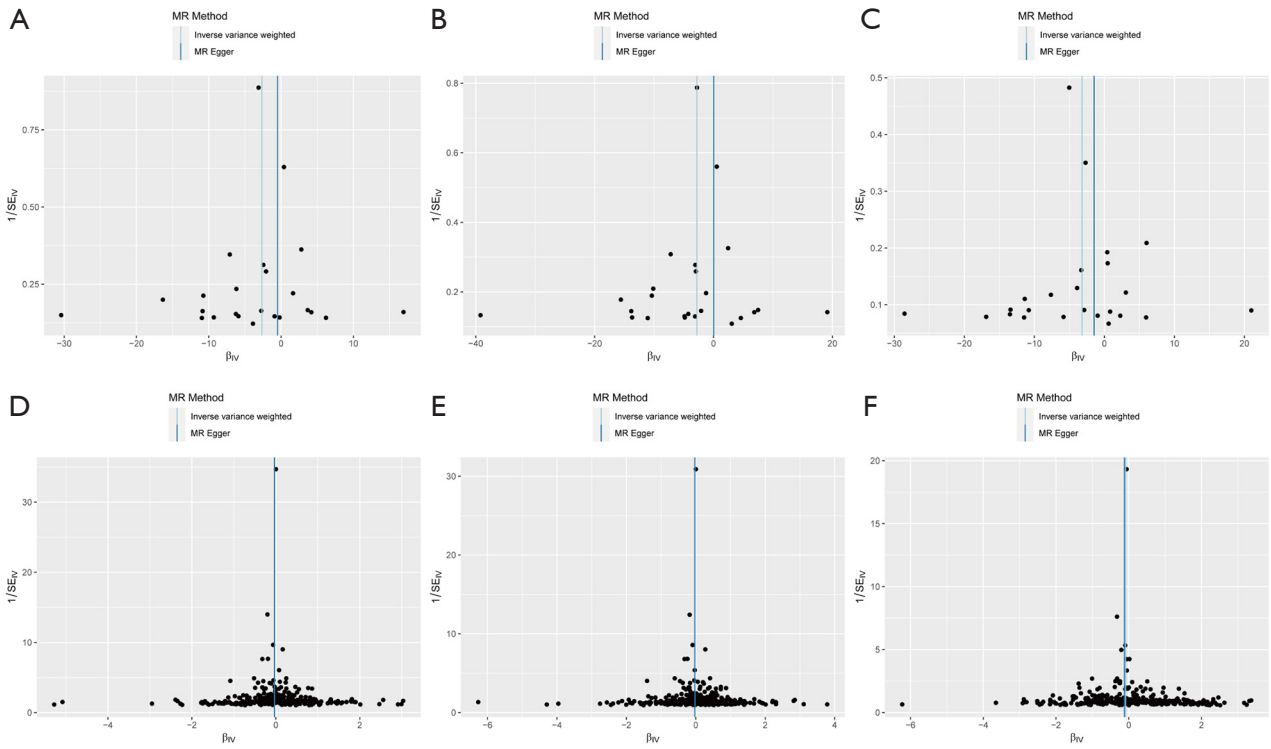


Figure S2 Funnel plot of MR analyses. (A) Gout on overall breast cancer. (B) Gout on ER+ breast cancer. (C) Gout on ER- breast cancer. (D) Urate levels on overall breast cancer. (E) Urate levels on ER+ breast cancer. (F) Urate levels on ER- breast cancer.

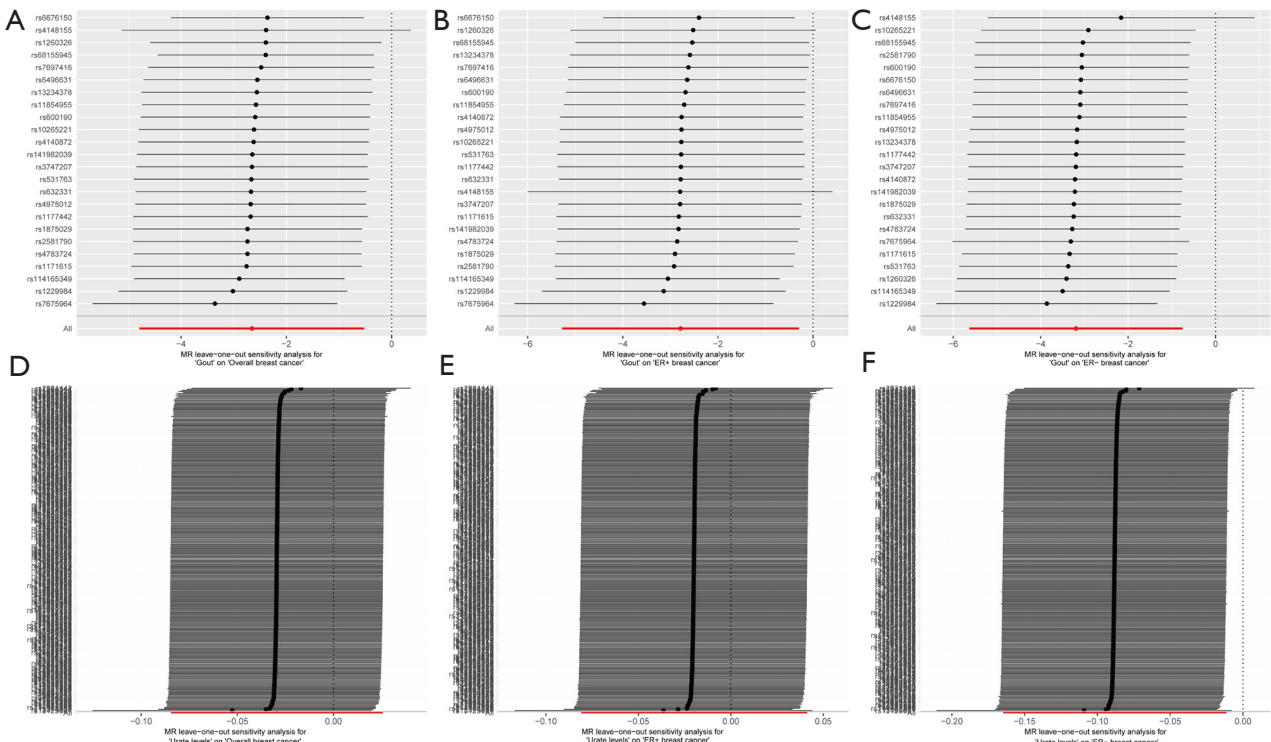


Figure S3 Leave-one-out plot of MR analyses. (A) Gout on overall breast cancer. (B) Gout on ER+ breast cancer. (C) Gout on ER- breast cancer. (D) Urate levels on overall breast cancer. (E) Urate levels on ER+ breast cancer. (F) Urate levels on ER- breast cancer.