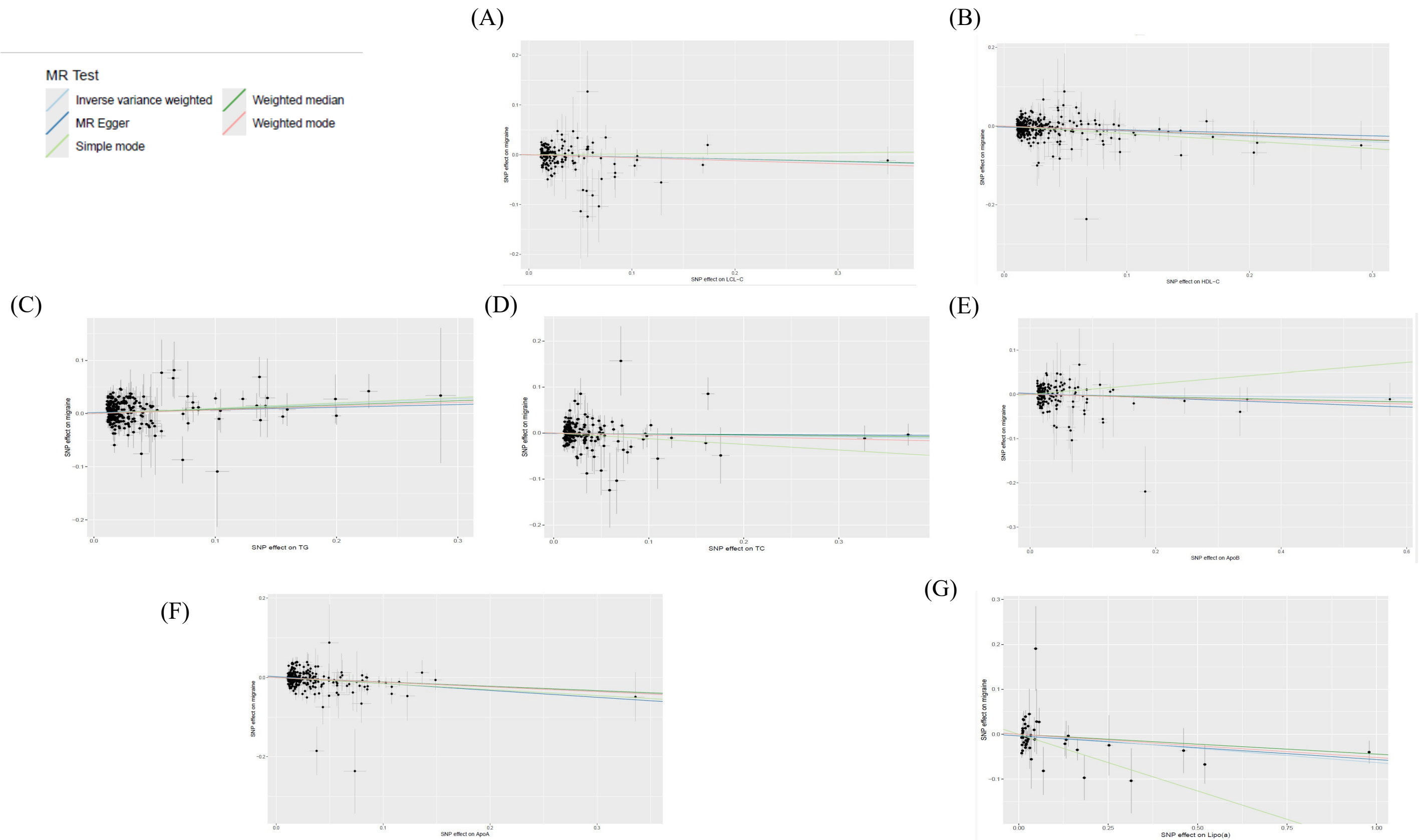
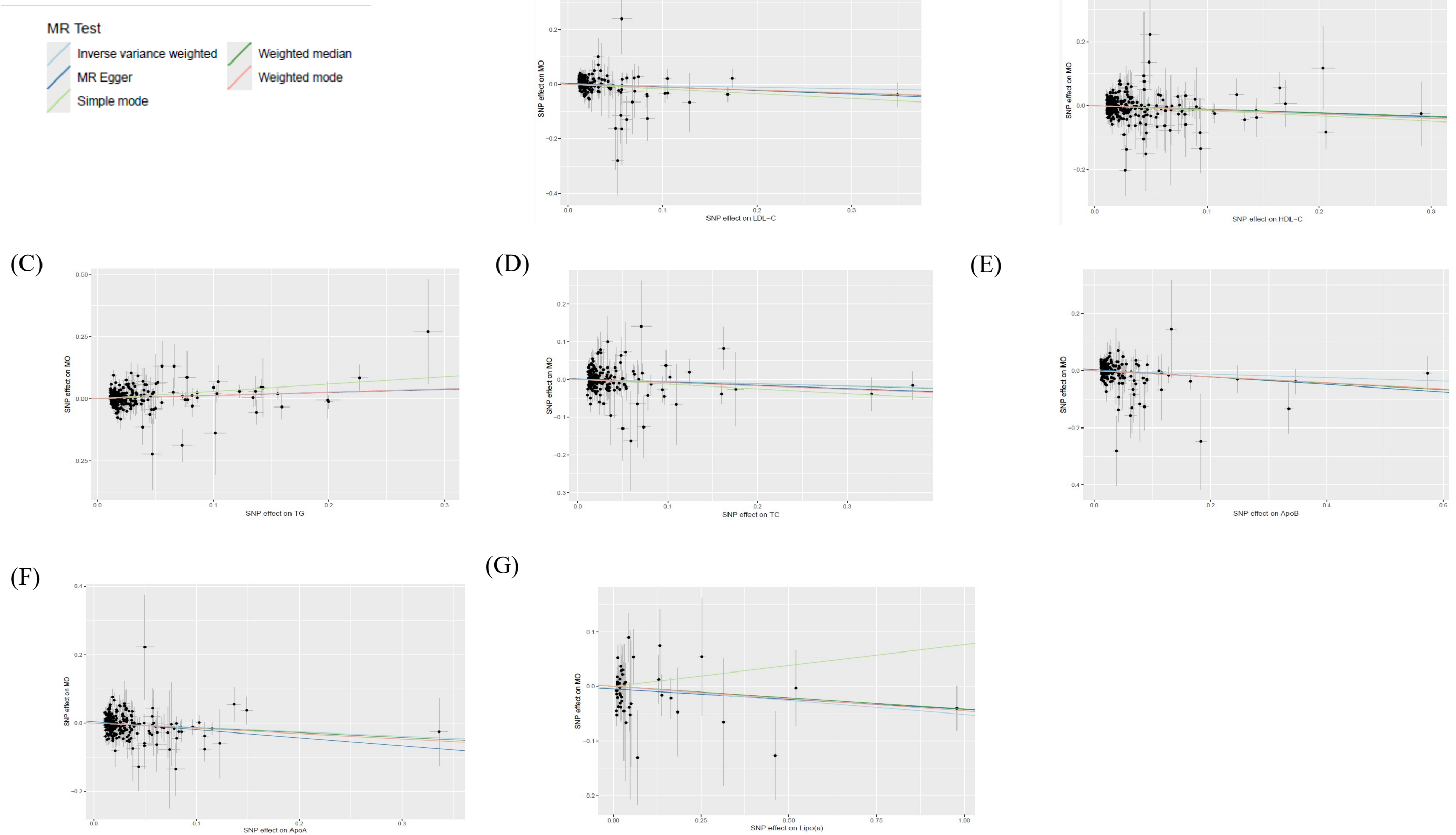
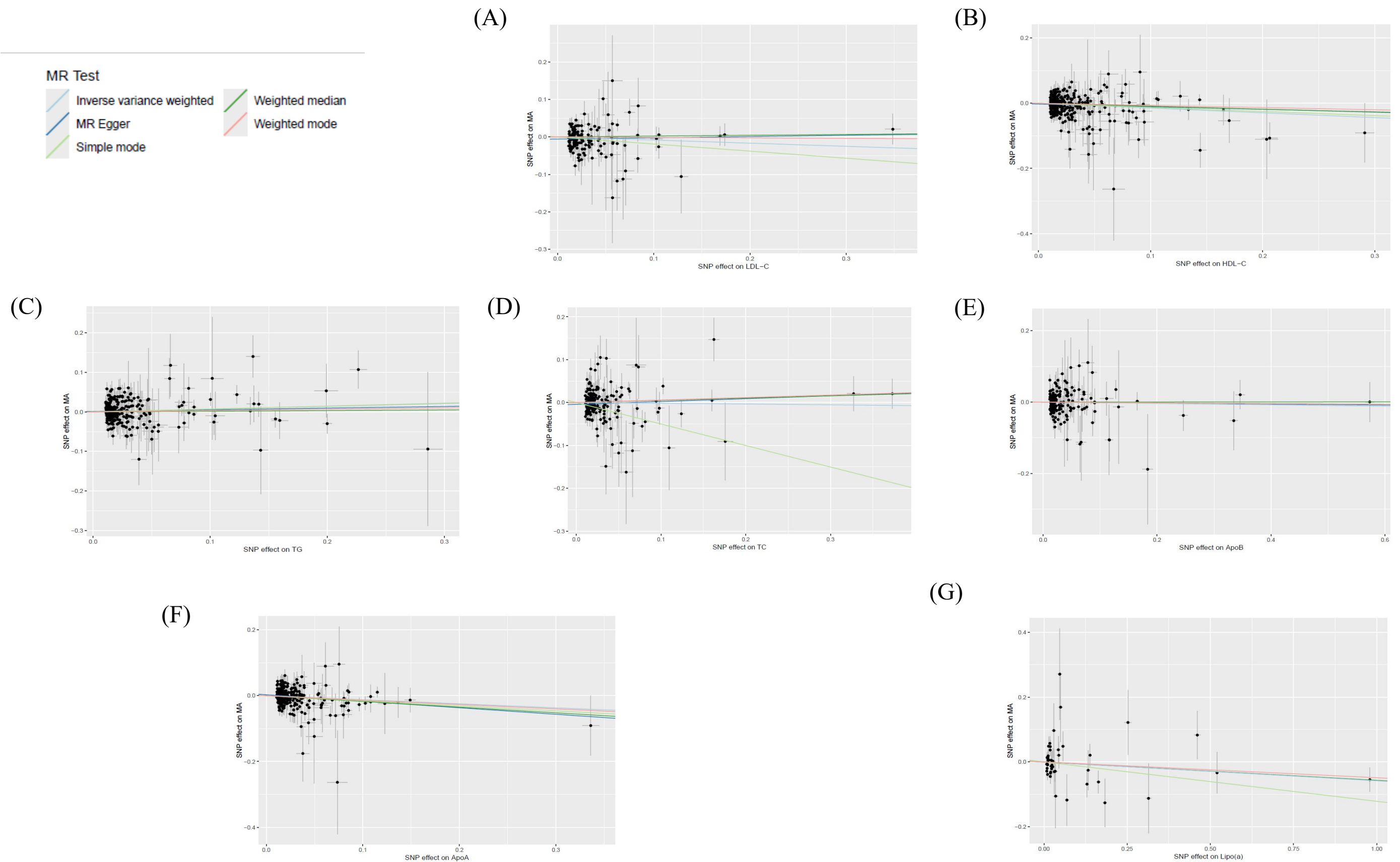




Supplementary Fig. 1. Scatter plots to show MR estimates of (A) LDL-C, (B) HDL-C, (C) TG, (D) TC, (E) ApoB, (F) ApoA1 and (G) lipoprotein (a) on migraine.

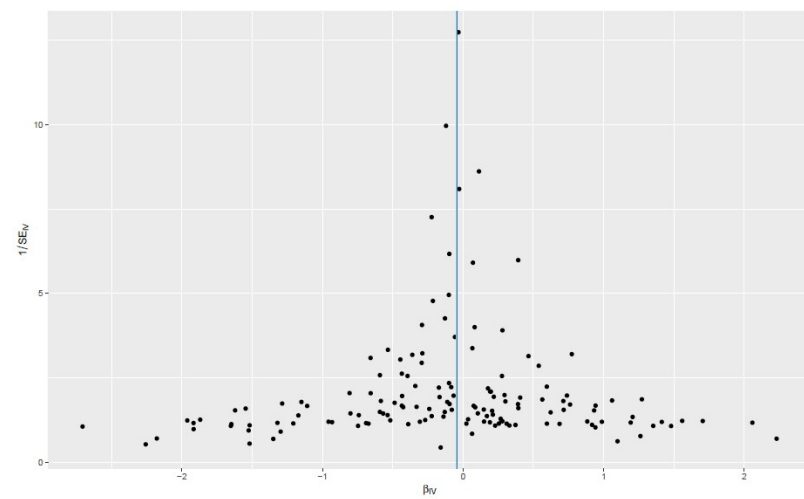


Supplementary Fig. 2. Scatter plots to show MR estimates of (A) LDL-C, (B) HDL-C, (C) TG, (D) TC, (E) ApoB, (F) ApoA1 and (G) lipoprotein (a) on migraine without aura (MO).

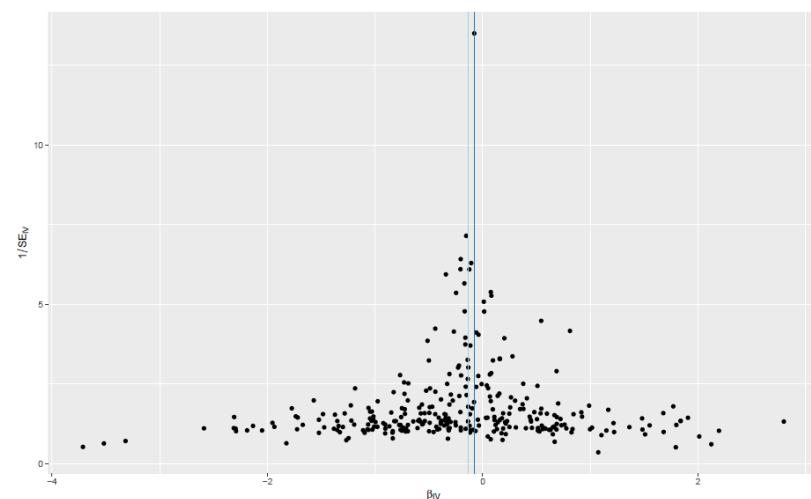


Supplementary Fig. 3. Scatter plots to show MR estimates of (A) LDL-C, (B) HDL-C, (C) TG, (D) TC, (E) ApoB, (F) ApoA1 and (G) lipoprotein (a) on migraine with aura (MA).

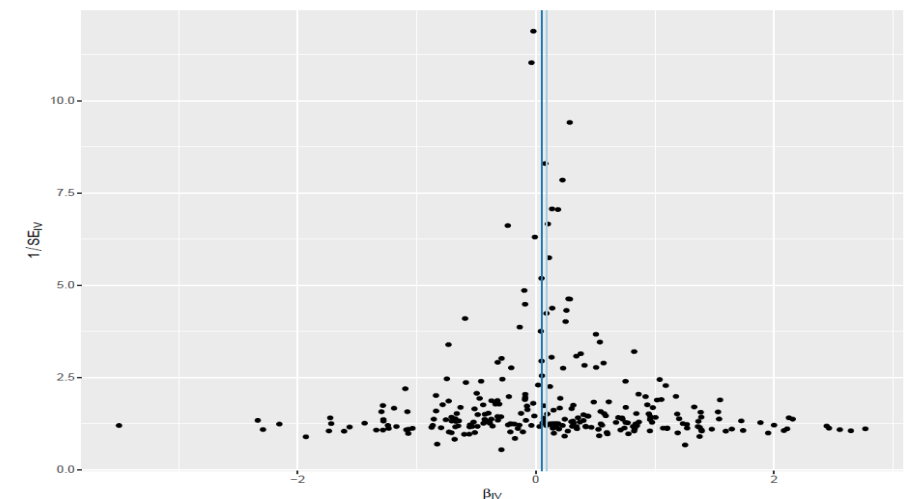
(A)



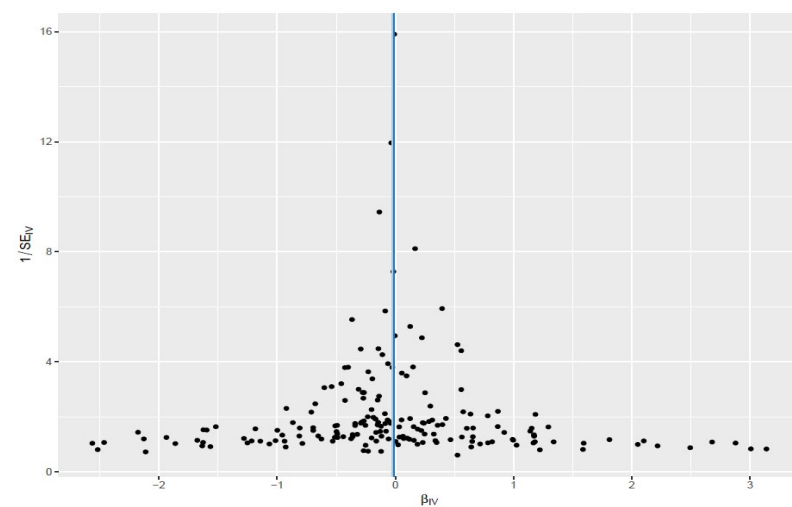
(B)



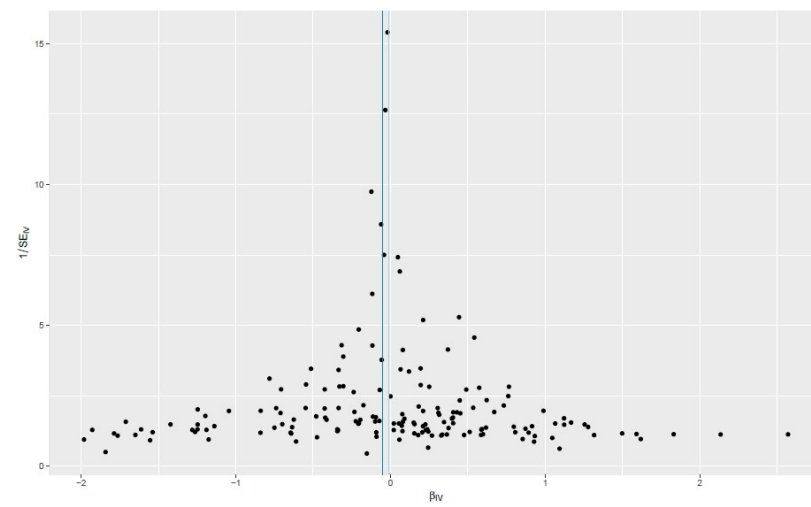
(C)



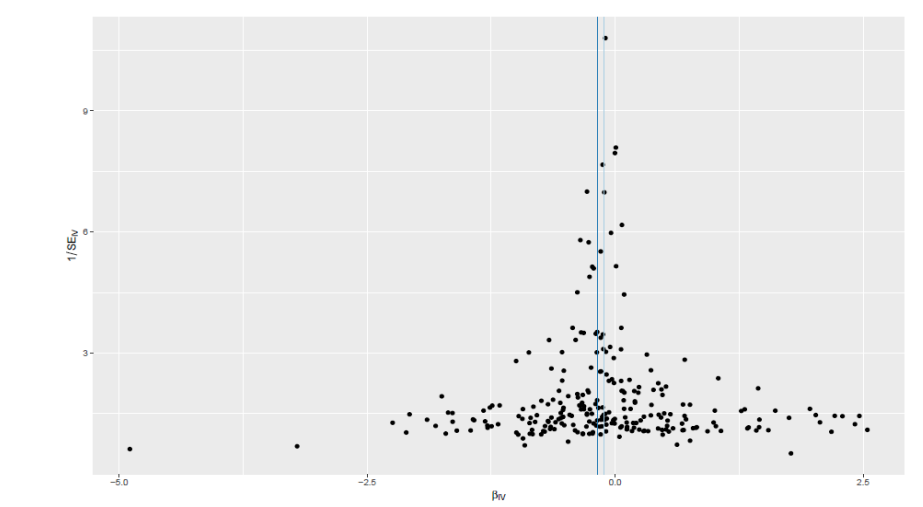
(D)



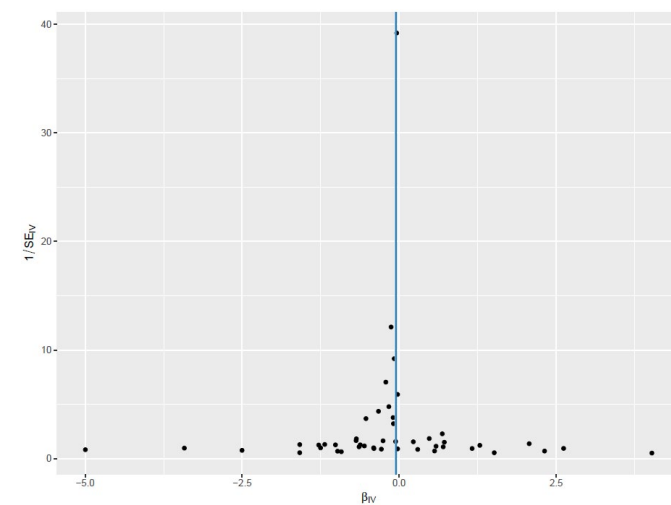
(E)



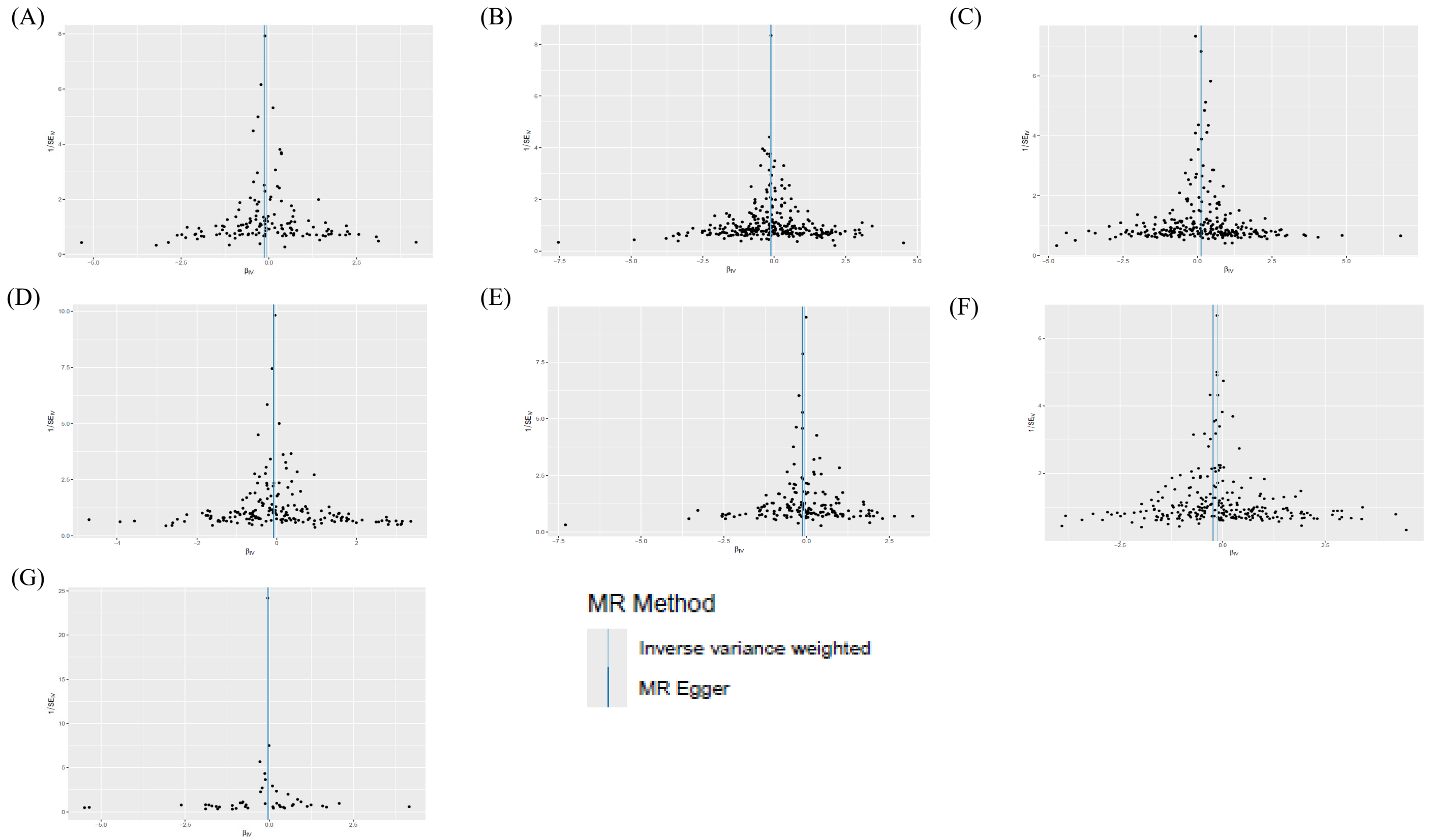
(F)



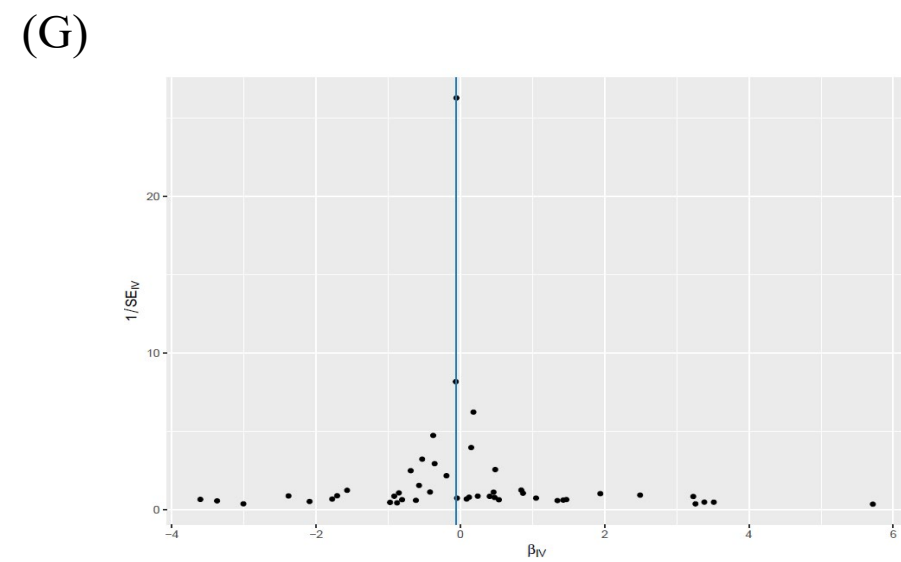
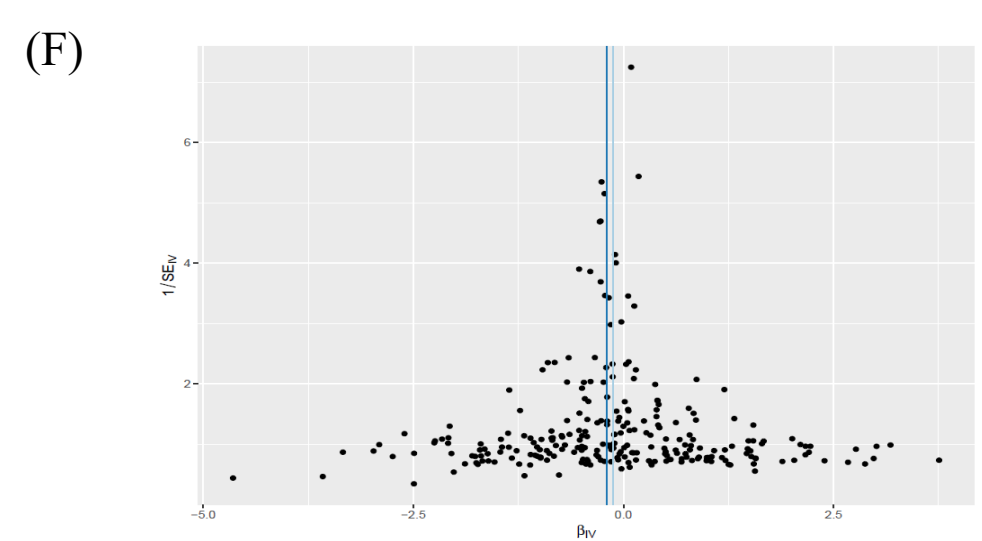
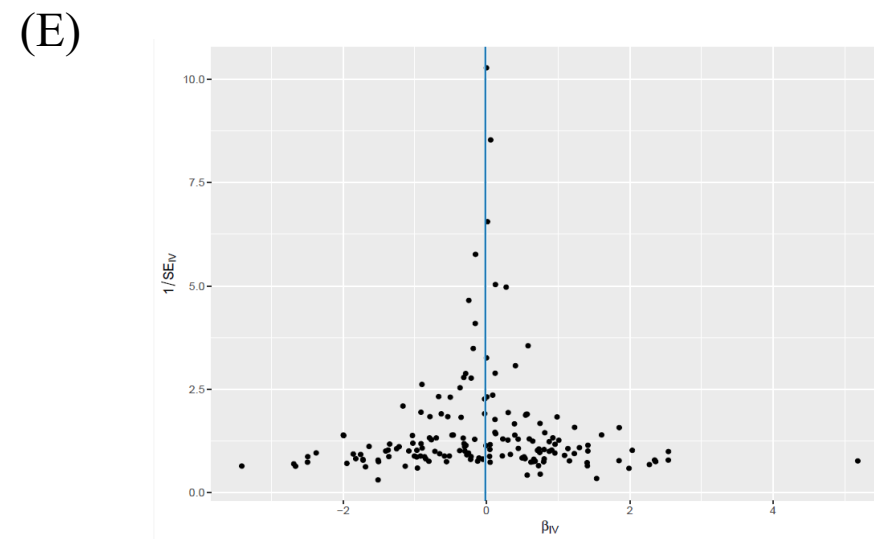
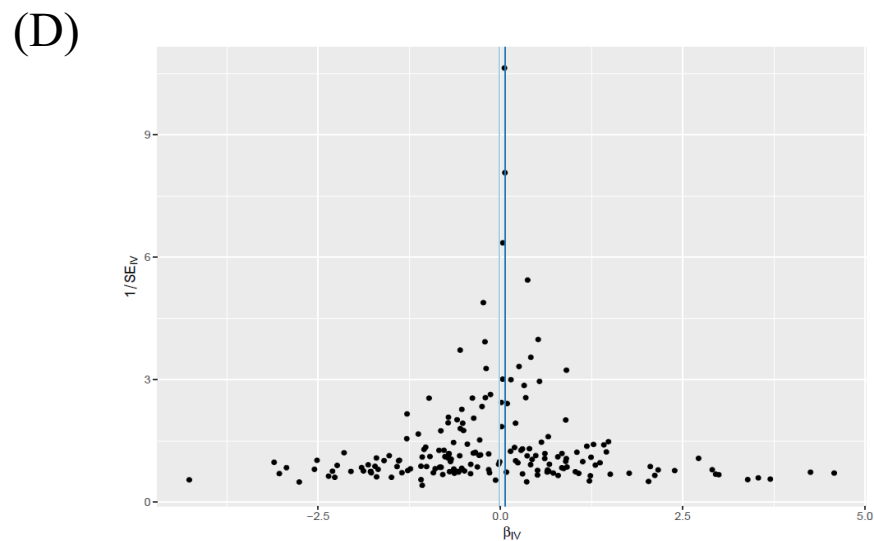
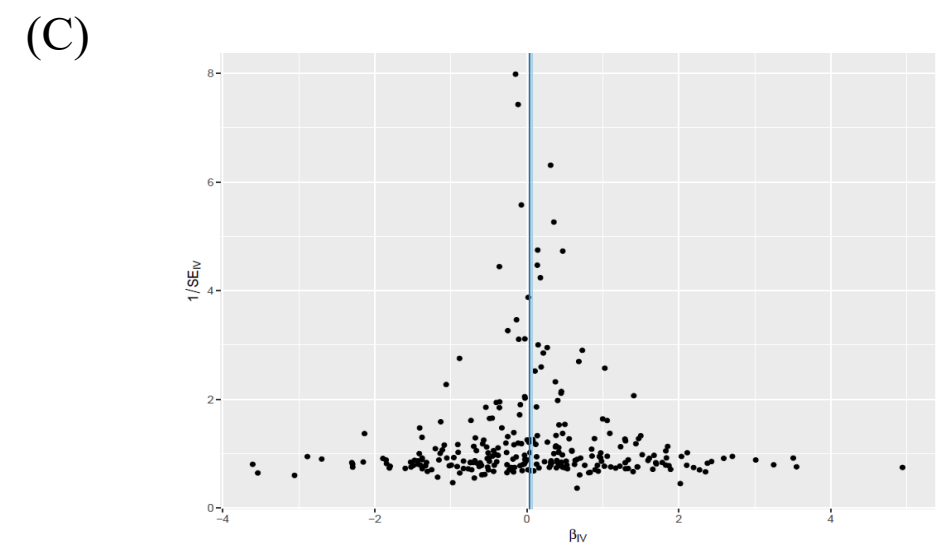
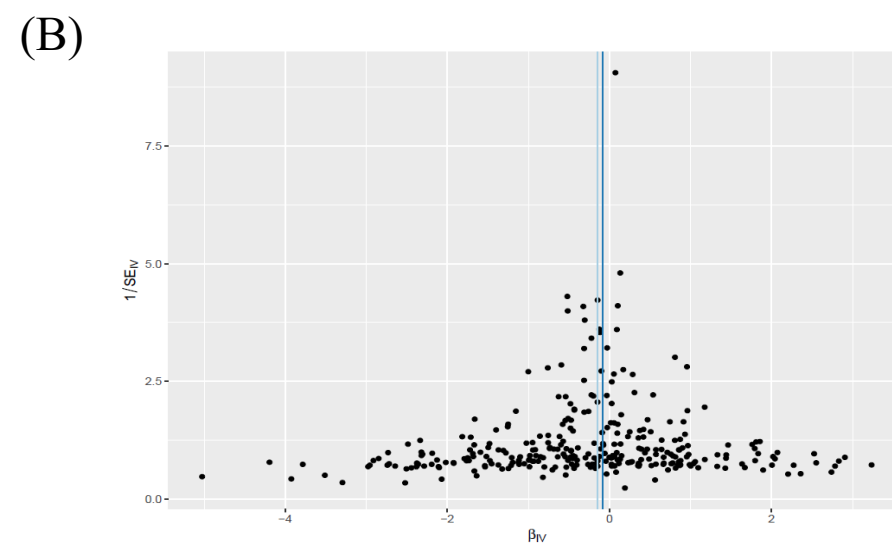
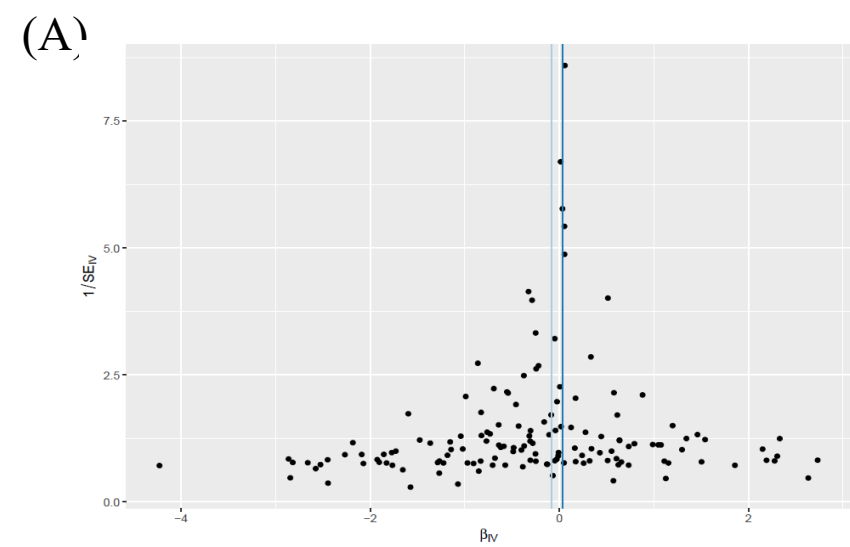
(G)



Supplementary Fig. 4. Funnel plots of MR analyses of (A) LDL-C, (B) HDL-C, (C) TG, (D) TC, (E) ApoB, (F) ApoA1 and (G) lipoprotein (a) on migraine.



Supplementary Fig. 5. Funnel plots of MR analyses of (A) LDL-C, (B) HDL-C, (C) TG, (D) TC, (E) ApoB, (F) ApoA1 and (G) lipoprotein (a) on migraine without aura (MO).



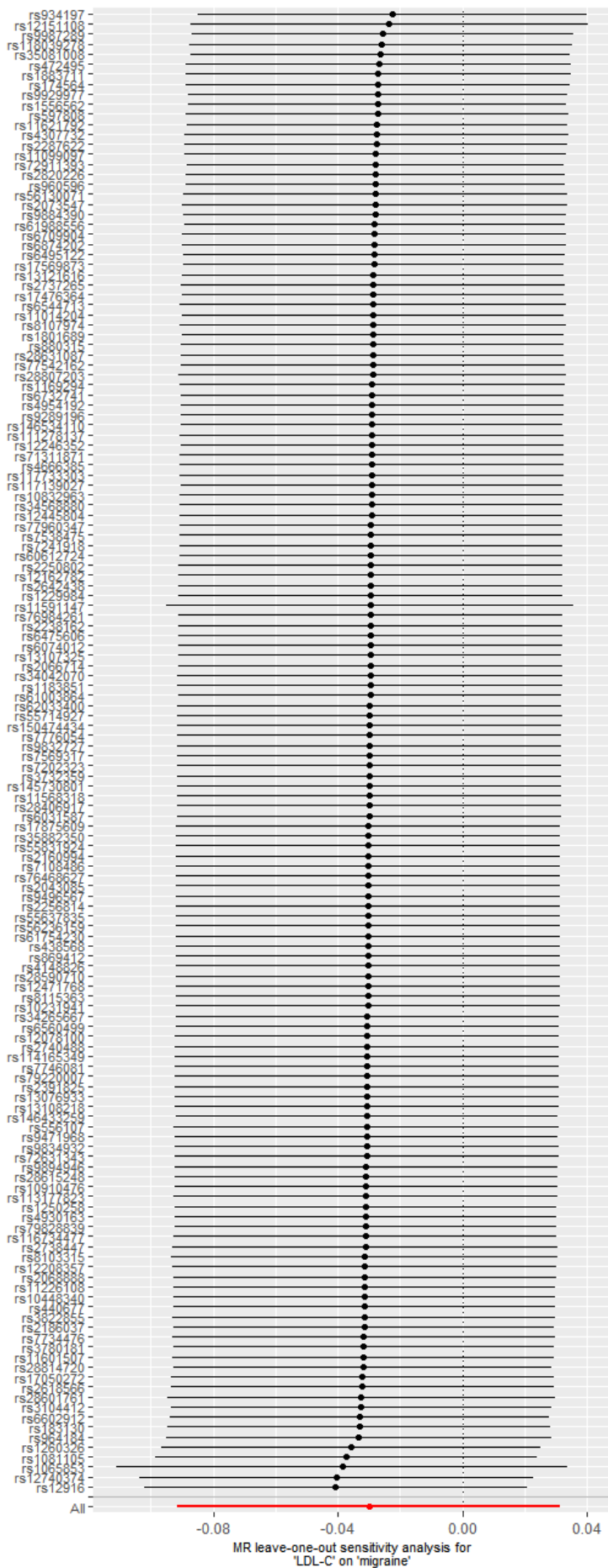
MR Method

Inverse variance weighted

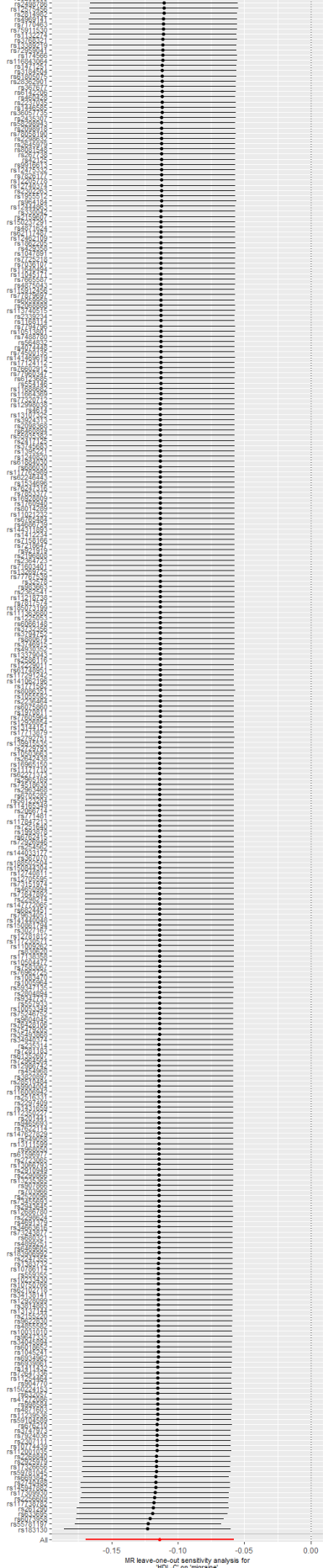
MR Egger

Supplementary Fig. 6. Funnel plots of MR analyses of (A) LDL-C, (B) HDL-C, (C) TG, (D) TC, (E) ApoB, (F) ApoA1 and (G) lipoprotein (a) on migraine migraine with aura (MA).

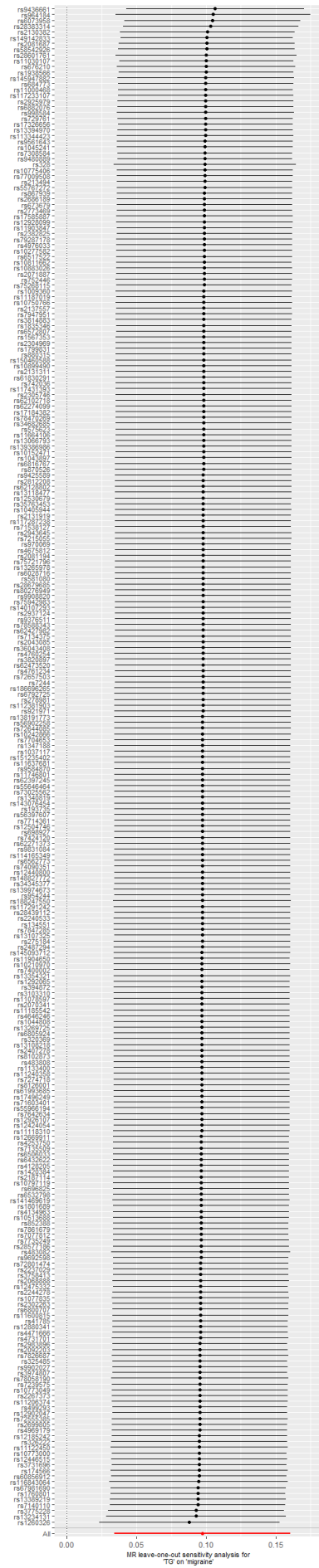
(A)



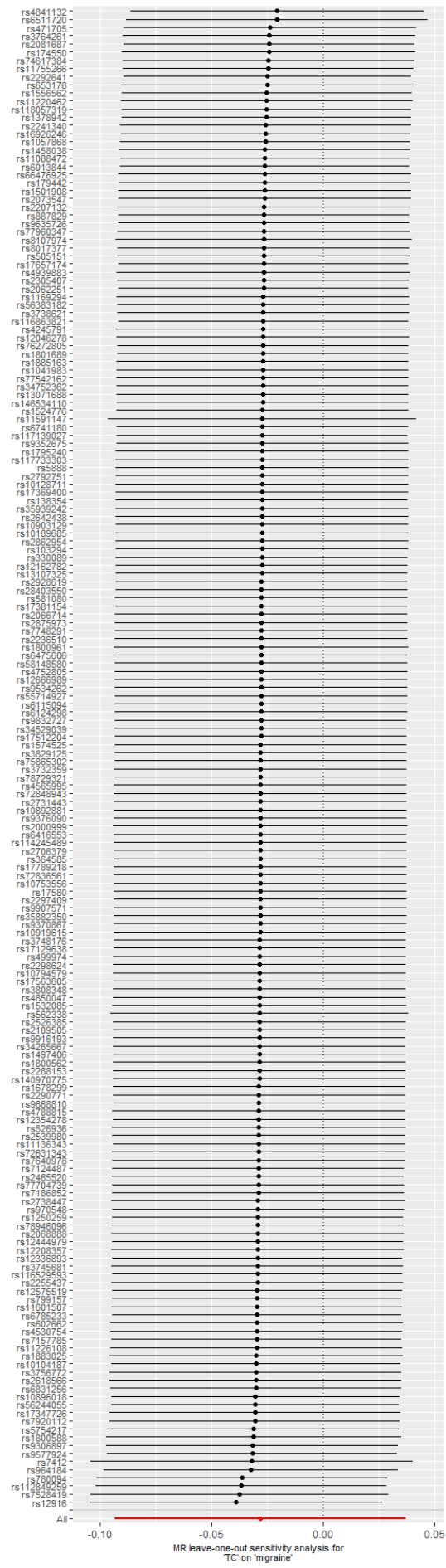
(B)



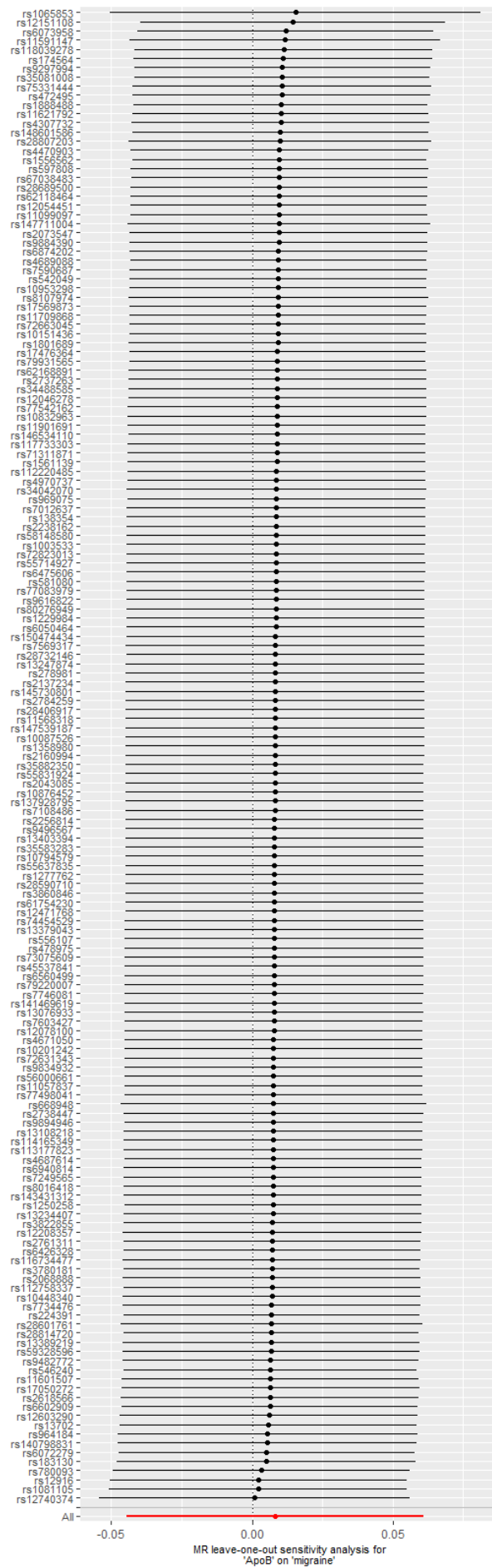
(C)



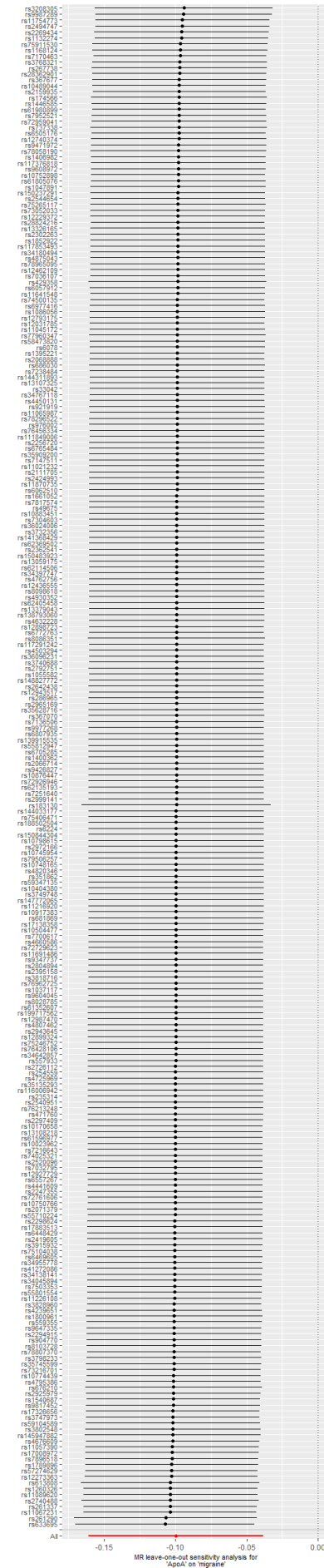
(D)



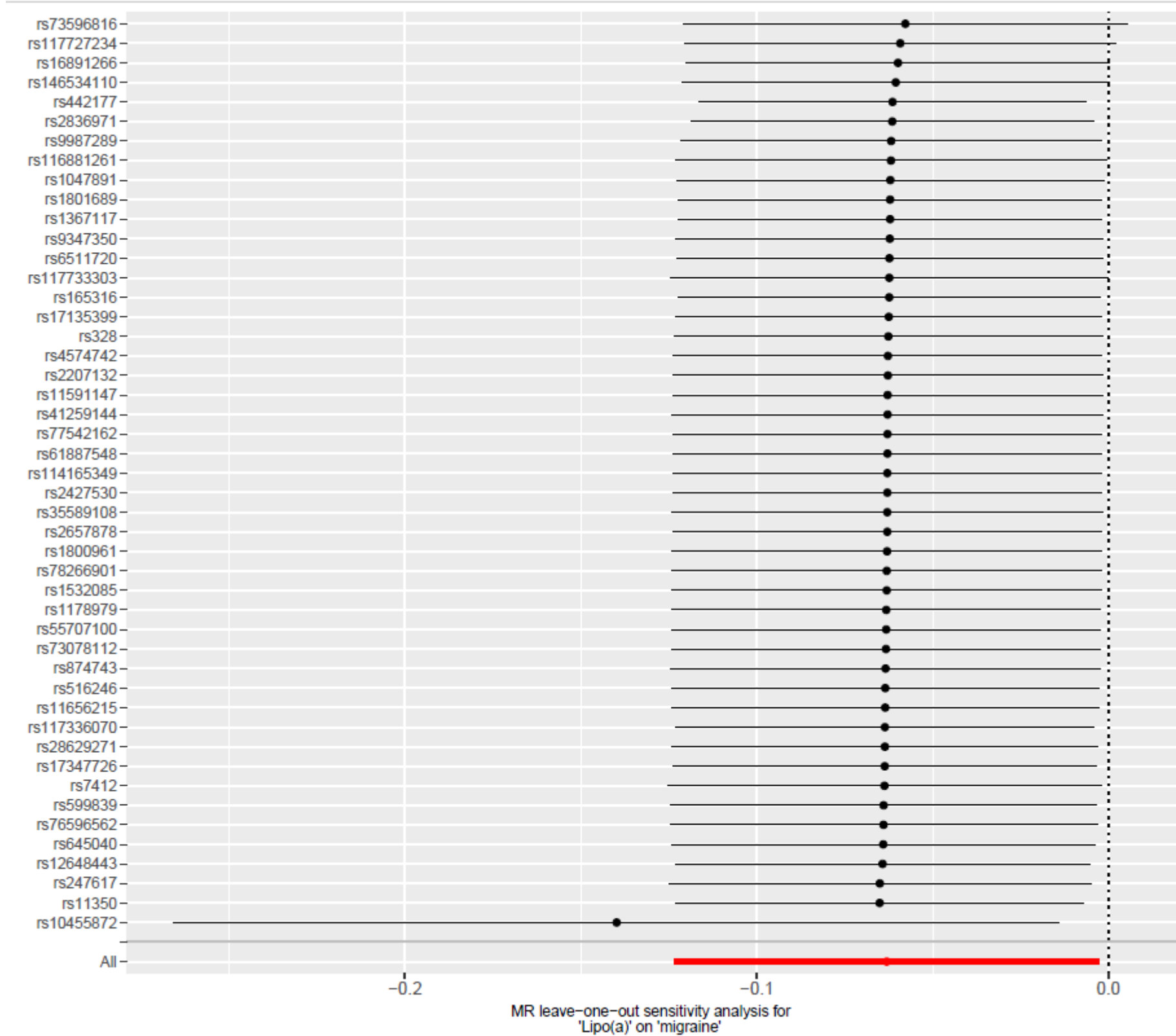
(E)



(F)

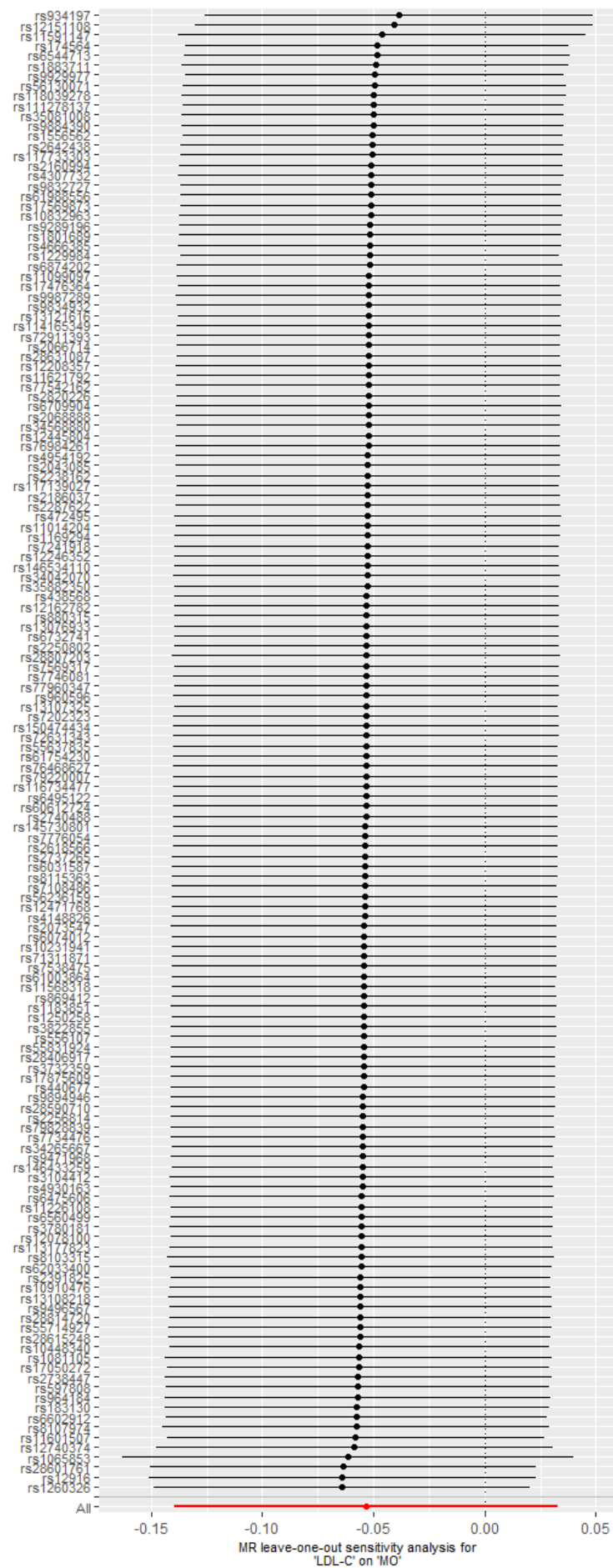


(G)

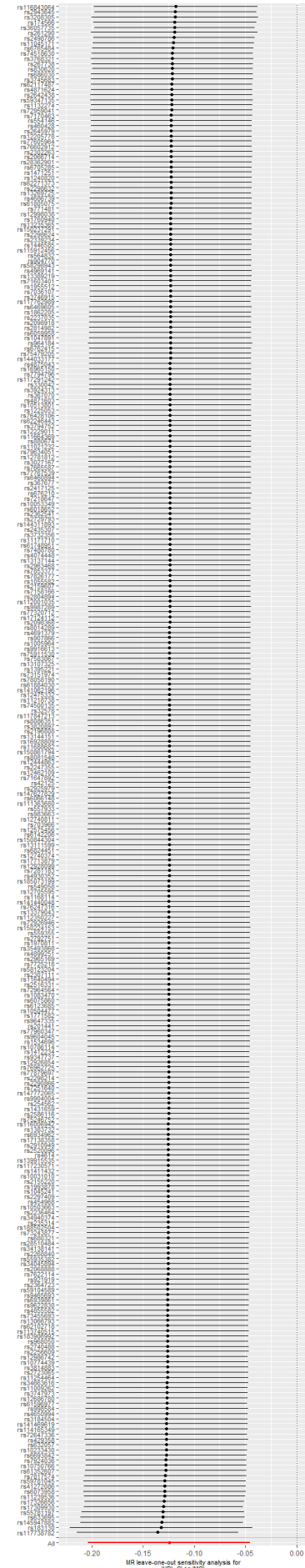


Supplementary Fig. 7. Leave-one-out analysis of MR analyses of (A) LDL-C, (B) HDL-C, (C) TG, (D) TC, (E) ApoB, (F) ApoA1 and (G) lipoprotein (a) on migraine.

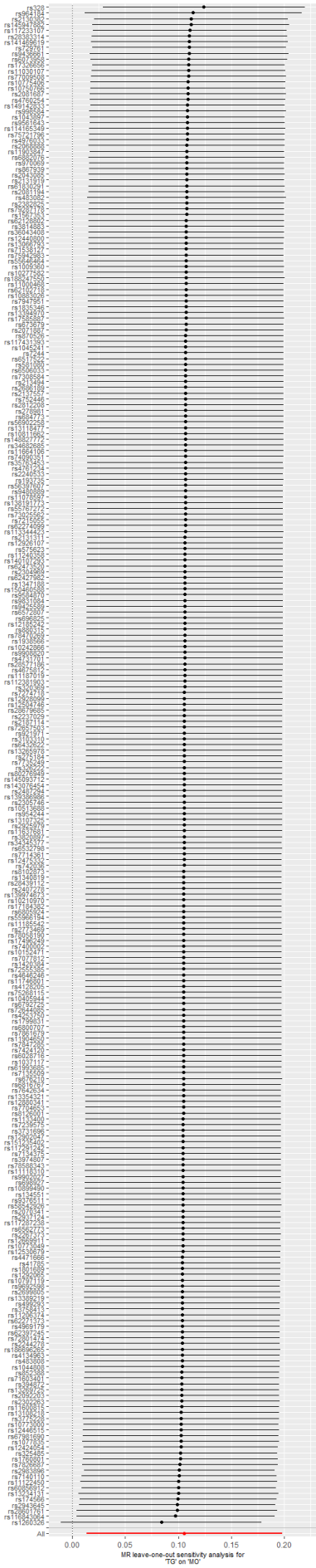
(A)



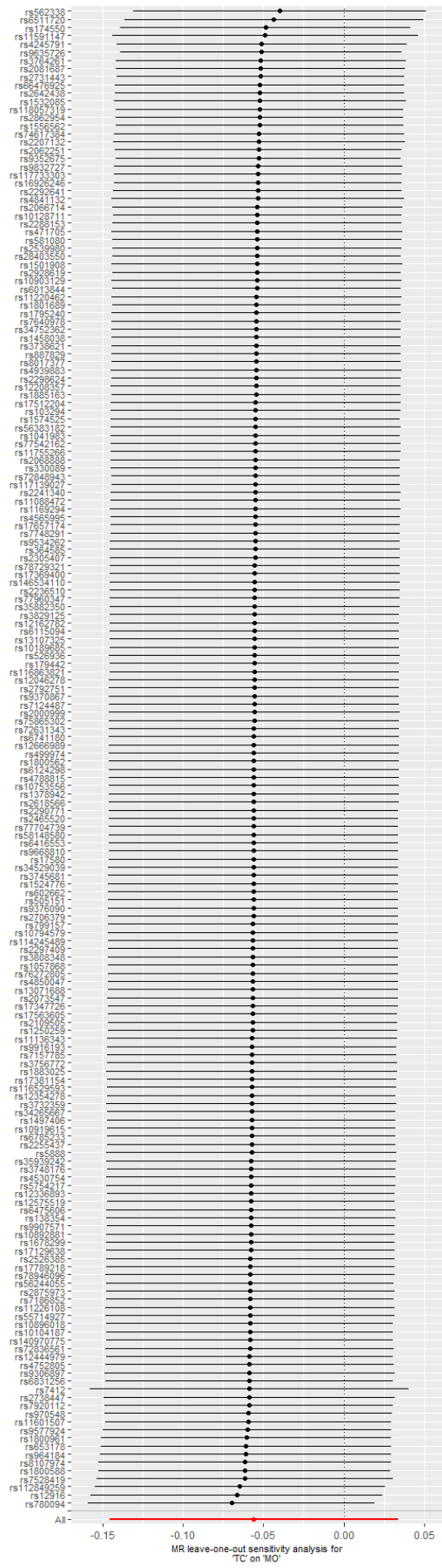
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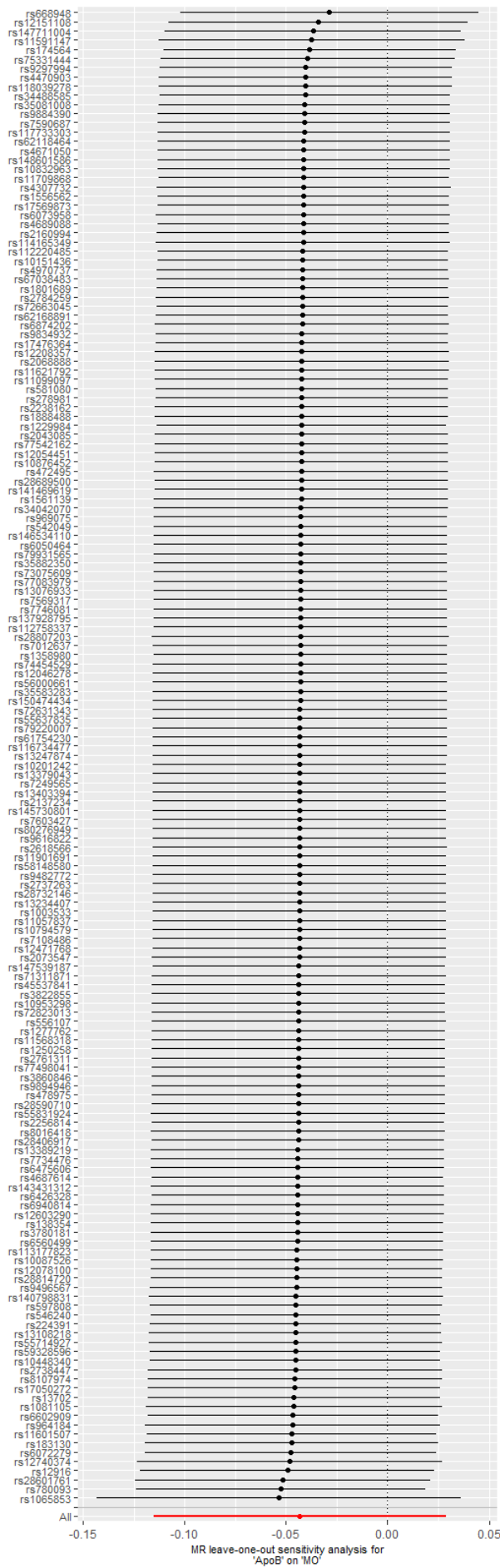
(C)



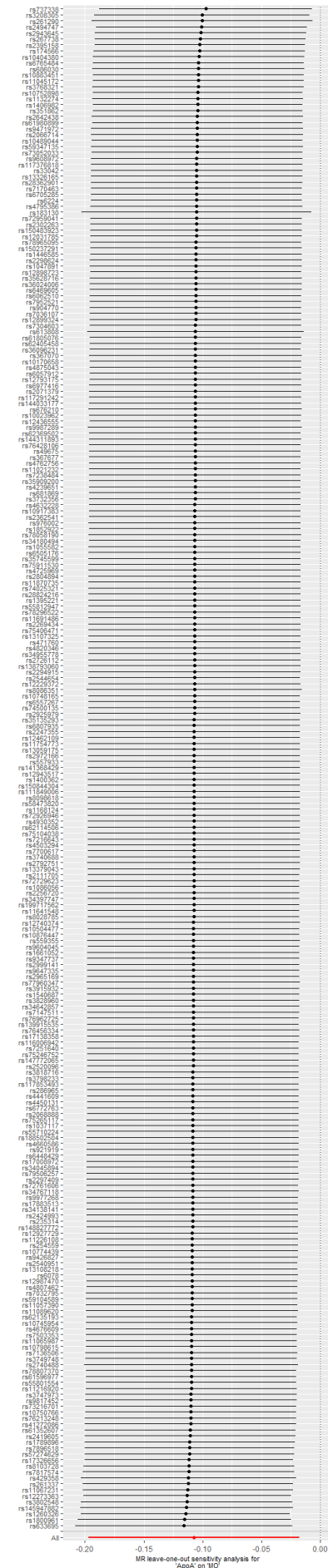
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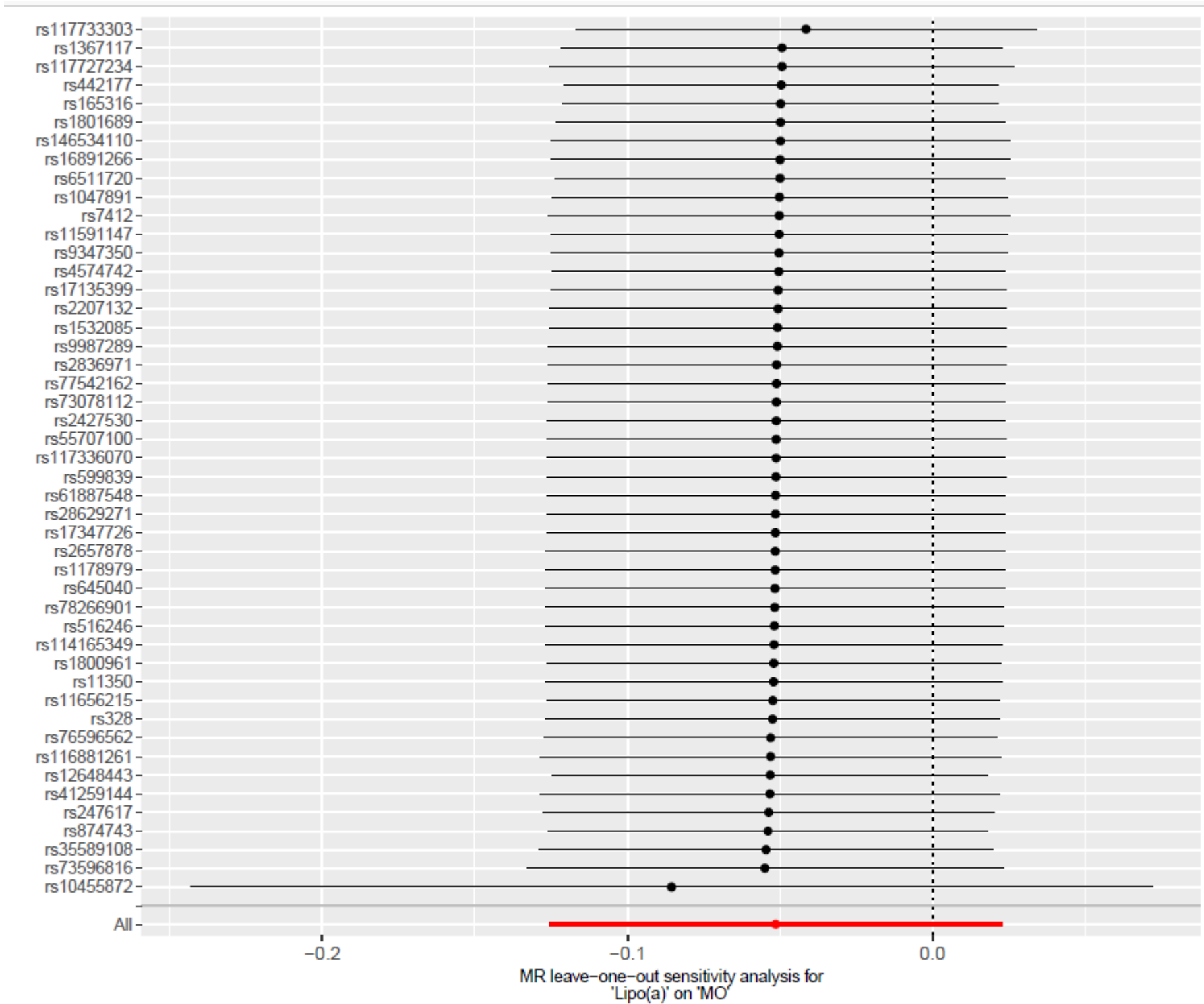
(E)



(F)

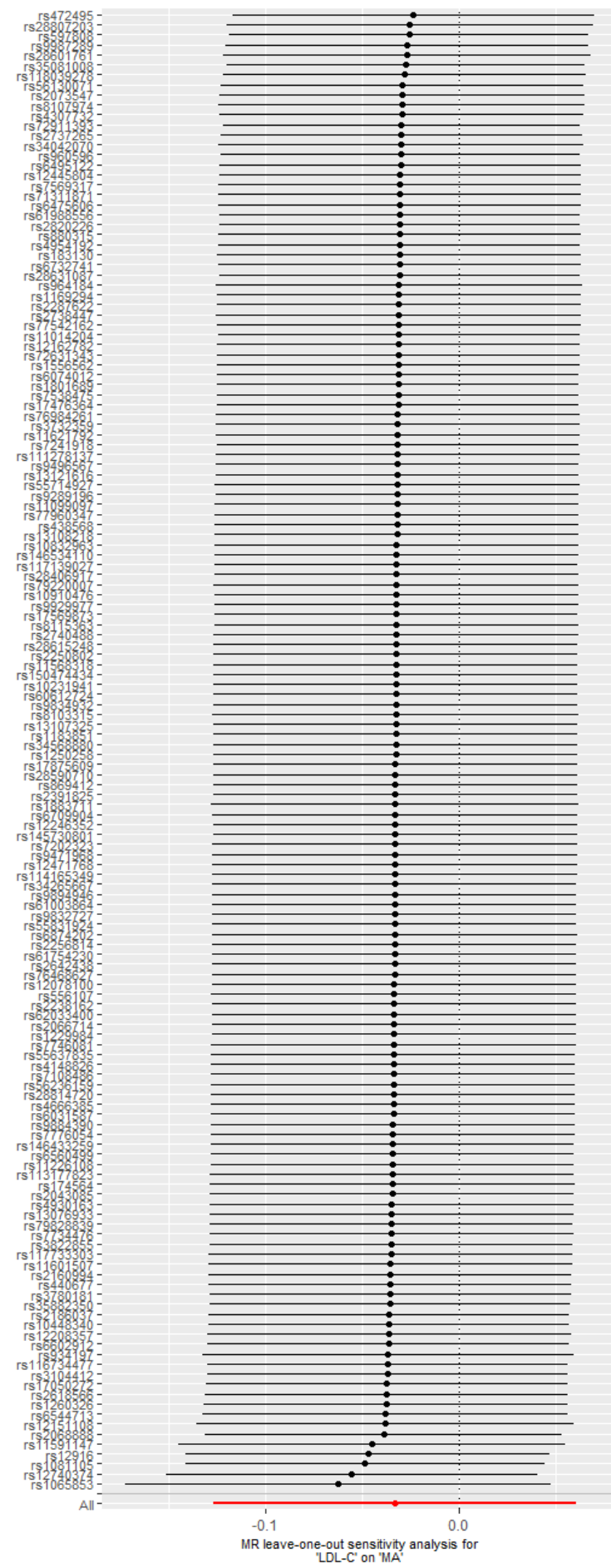


(G)

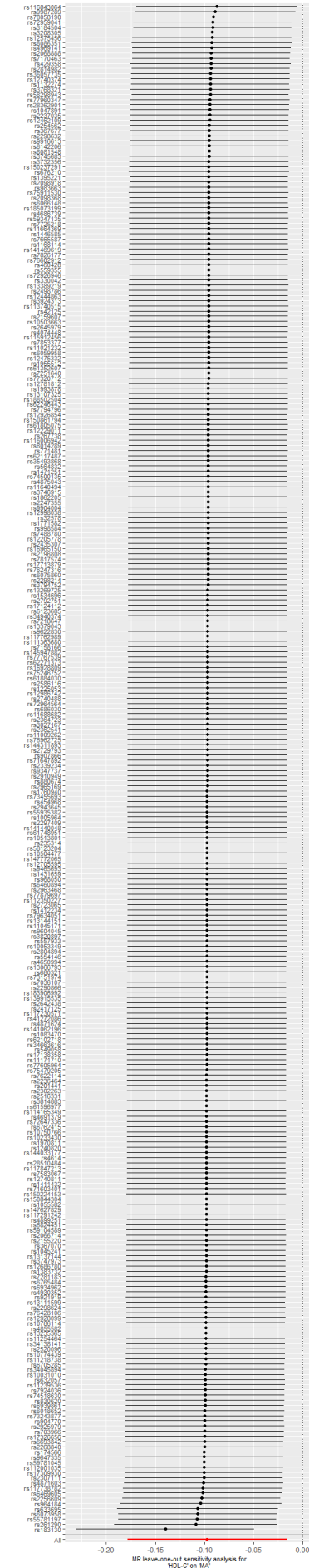


Supplementary Fig. 8. Leave-one-out analysis of MR analyses of (A) LDL-C, (B) HDL-C, (C) TG, (D) TC, (E) ApoB, (F) ApoA1 and (G) lipoprotein (a) on migraine without aura (MO).

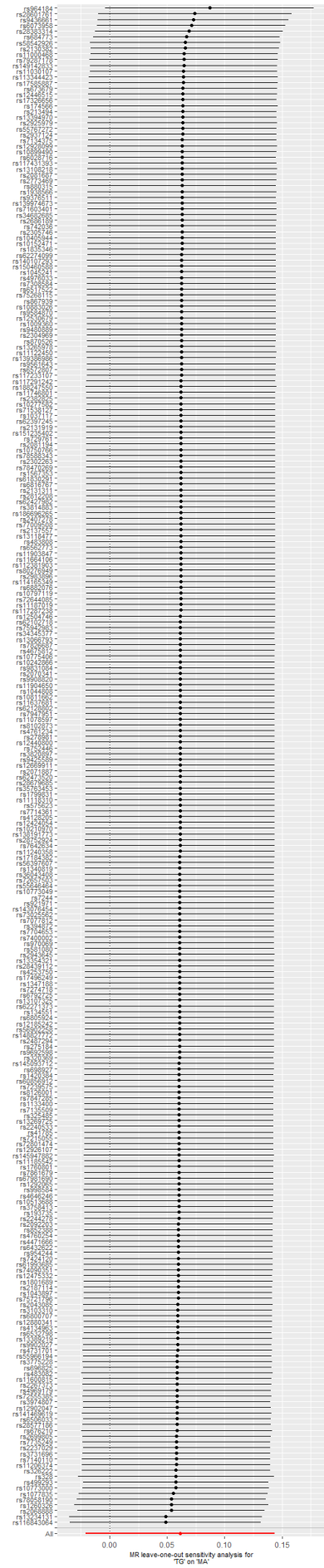
(A)



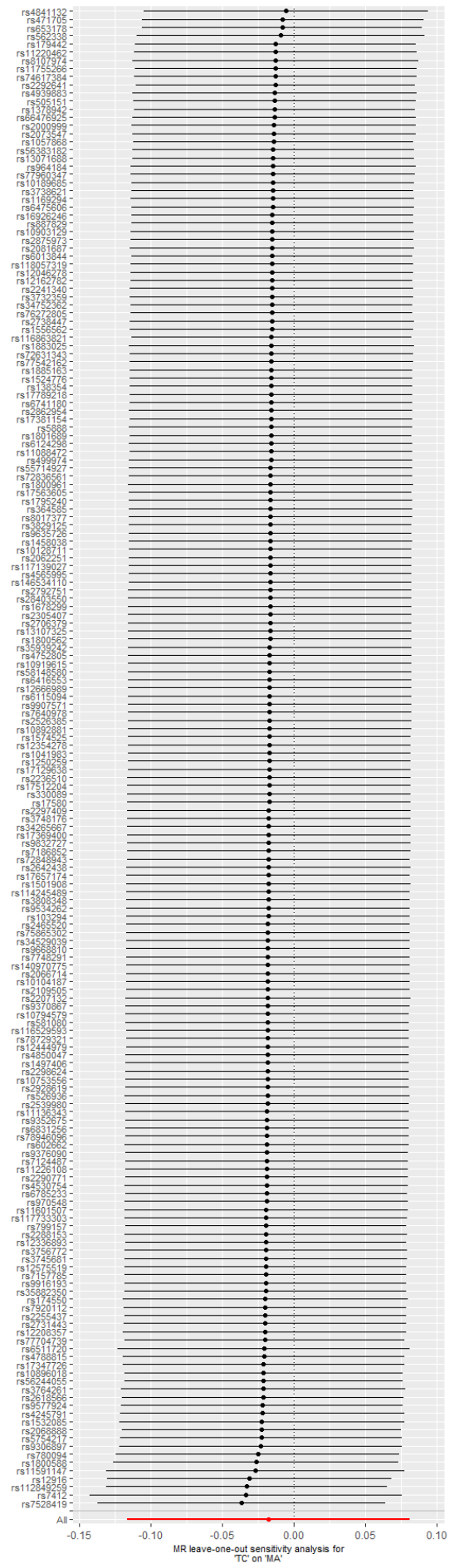
(B)



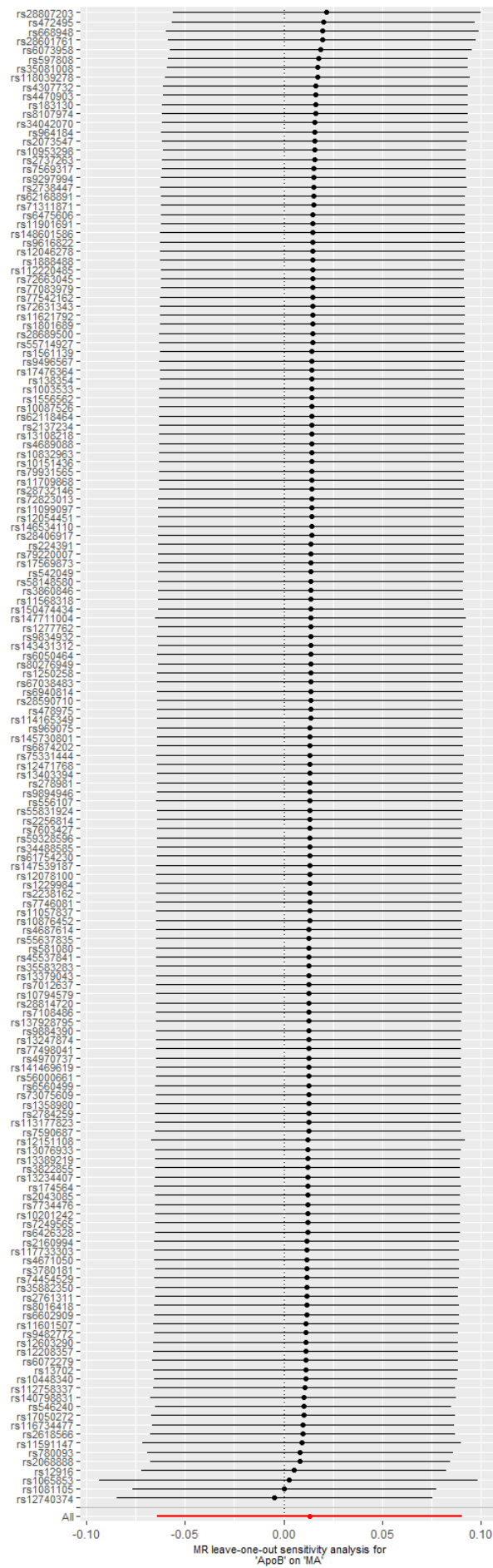
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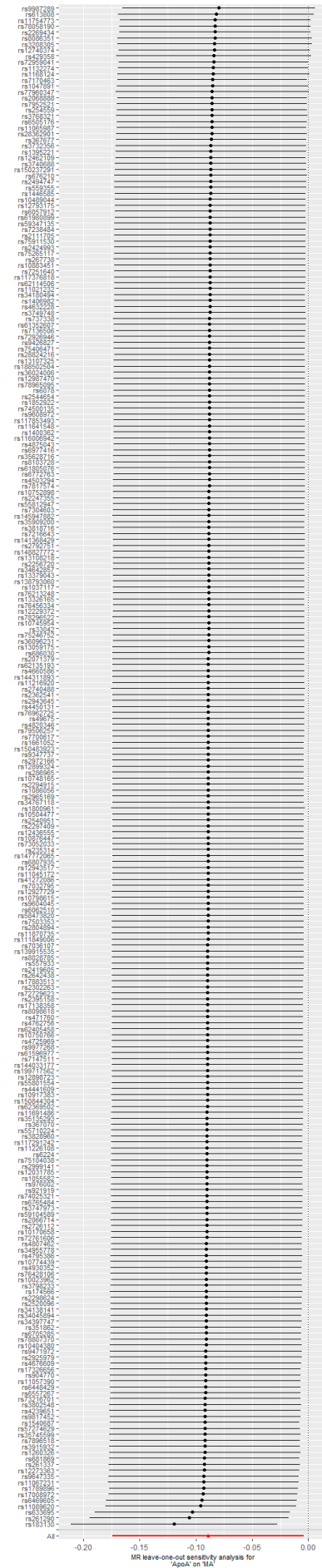
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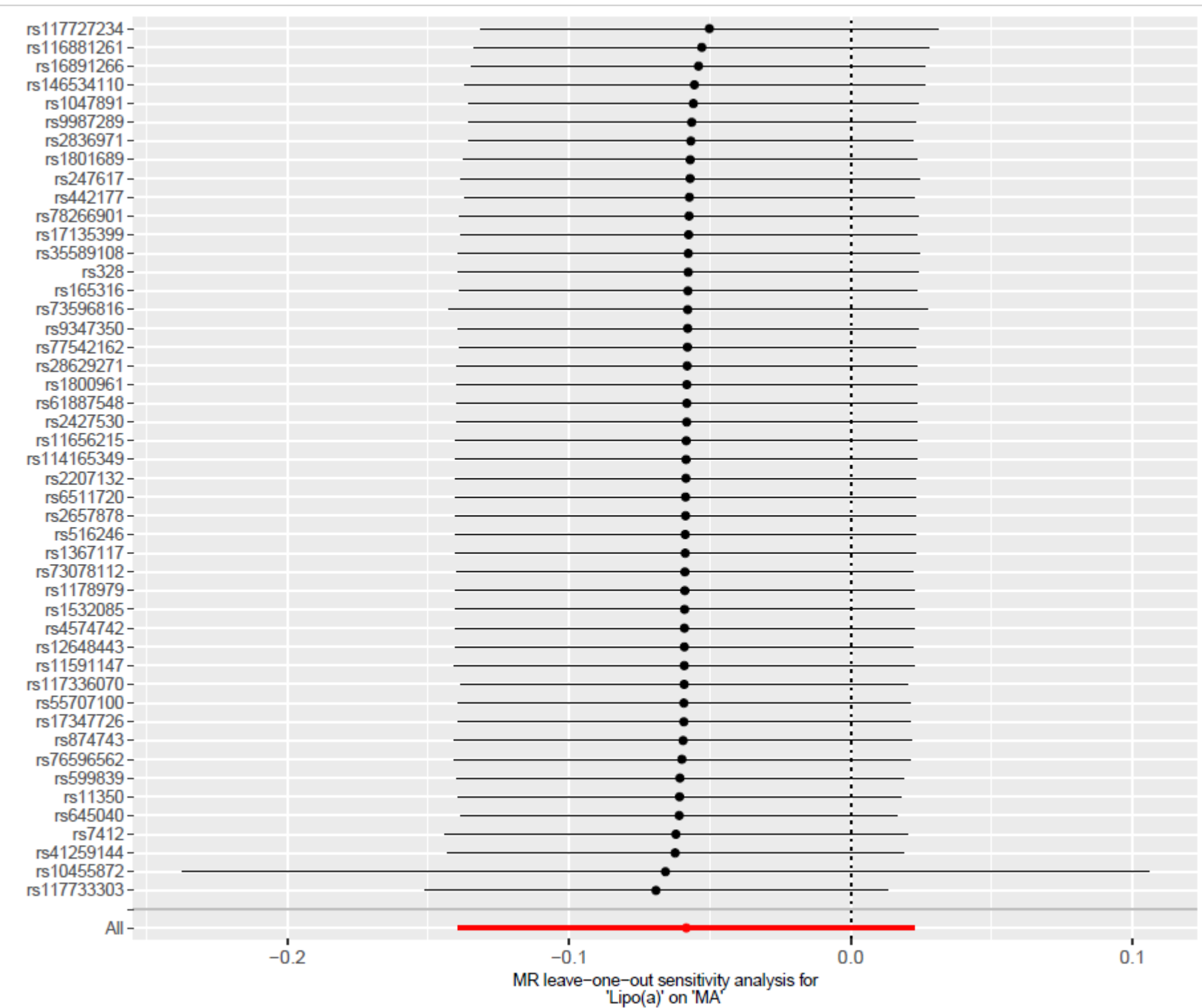
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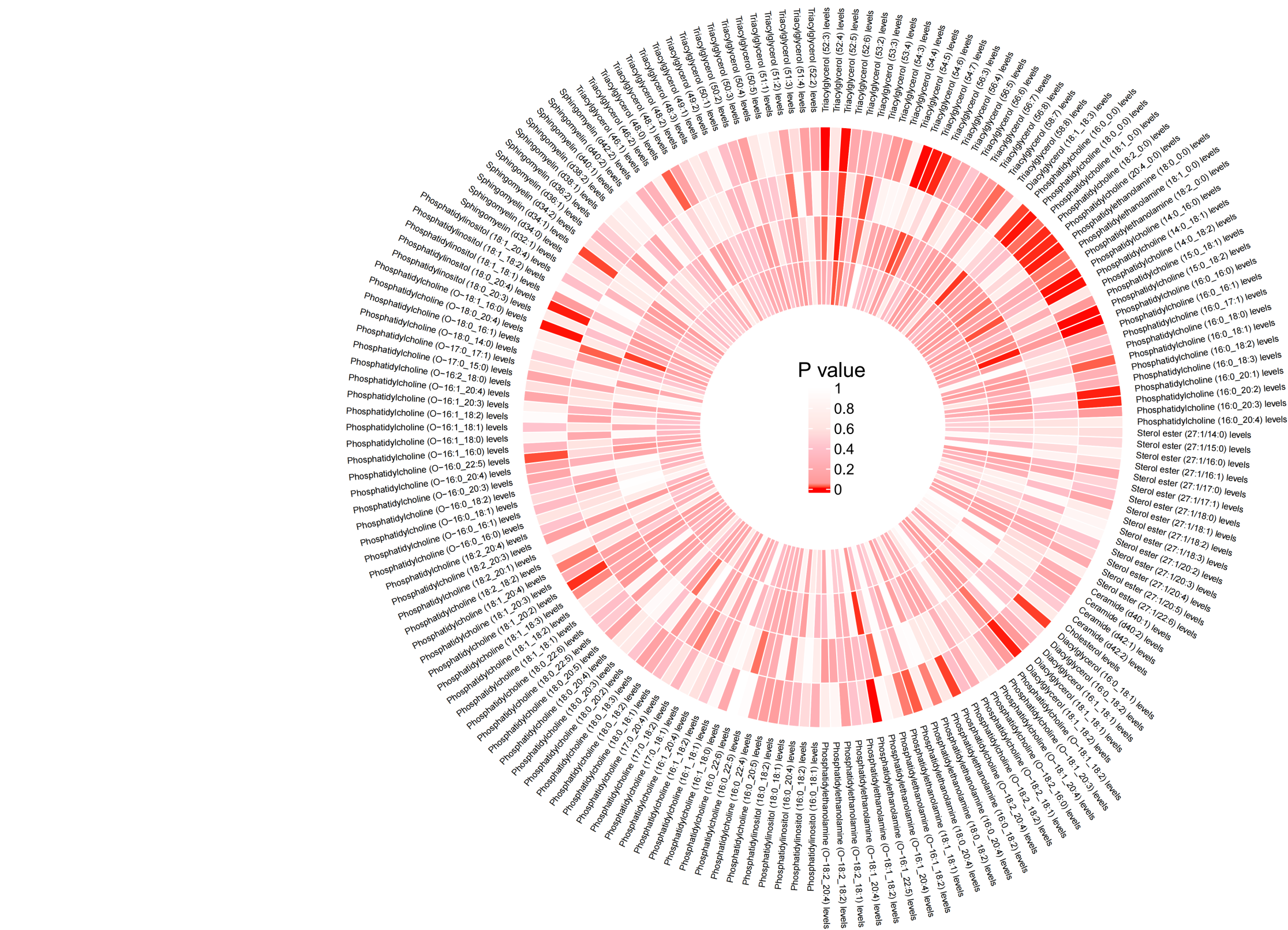
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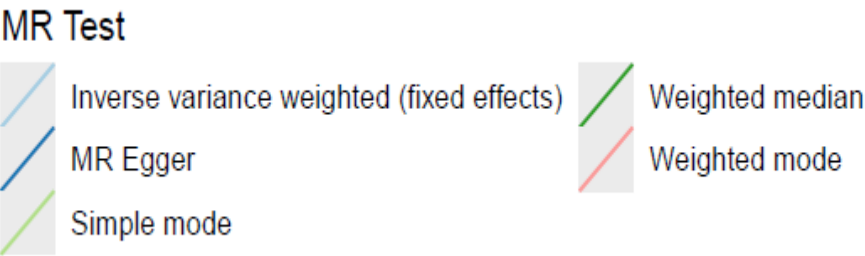
(G)



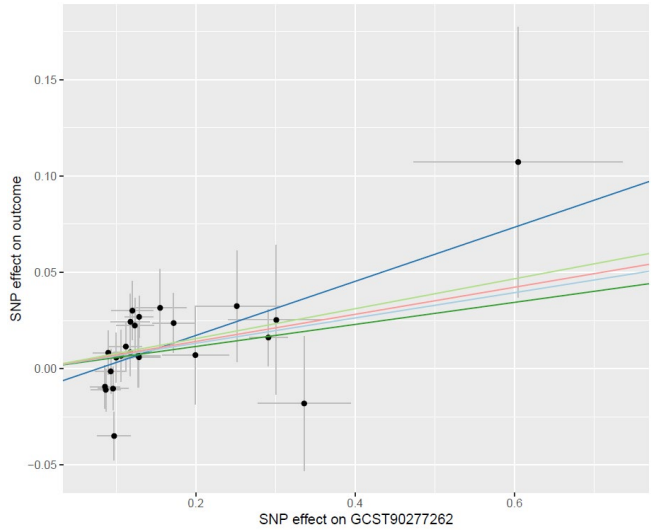
Supplementary Fig. 9. Leave-one-out analysis of MR analyses of (A) LDL-C, (B) HDL-C, (C) TG, (D) TC, (E) ApoB, (F) ApoA1 and (G) lipoprotein (a) on migraine with aura (MA).



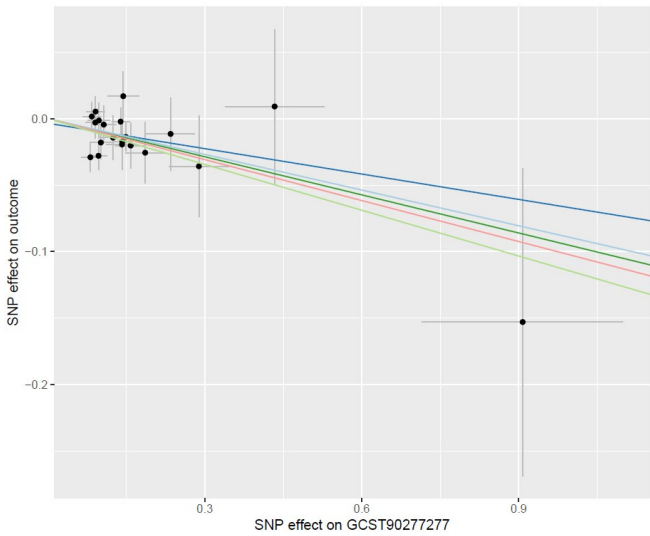
Supplementary Fig. 10. Circular heatmap of the causal effect of 179 lipid species components on overall migraine. The circular heat map represents the four MR methods, including IVW, Weighted Median, MR-Egger, Weighted mode, in order from the outer ring to the inner ring.



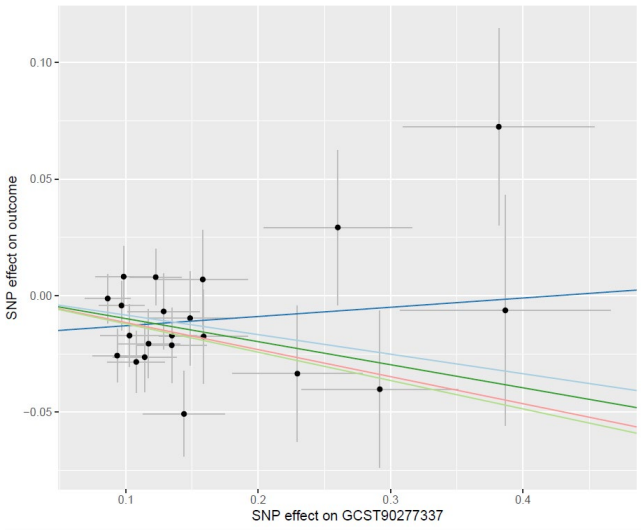
(A)



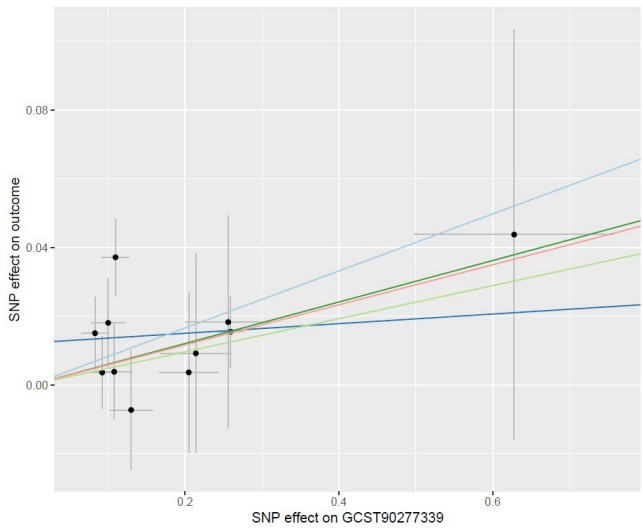
(B)



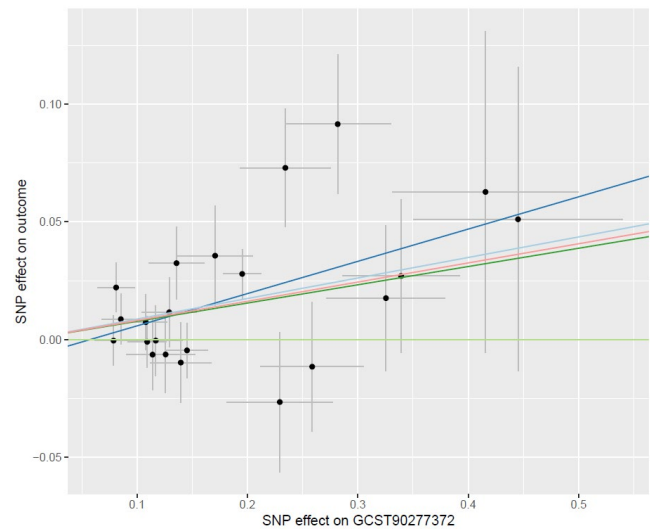
(C)



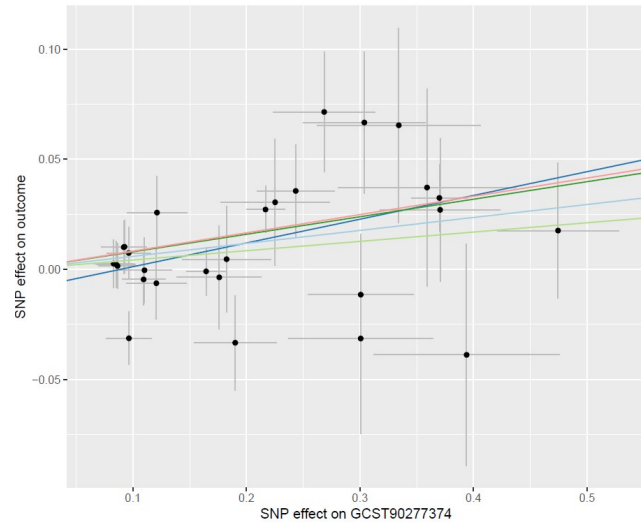
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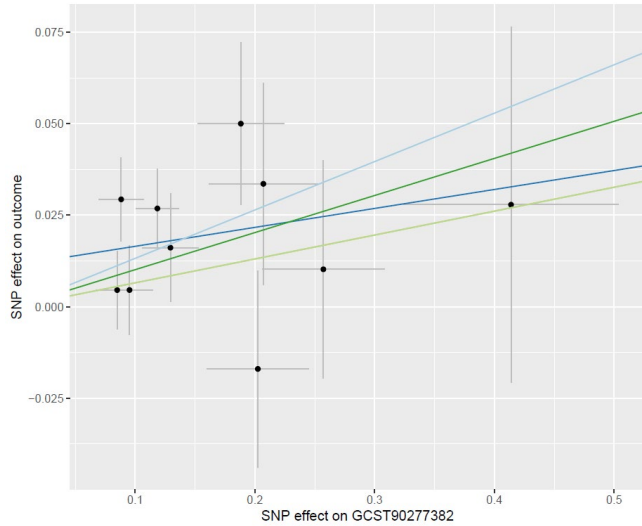
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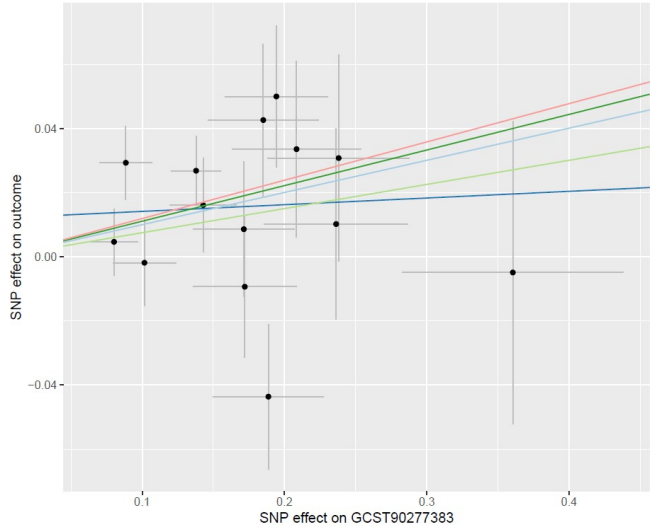
(F)

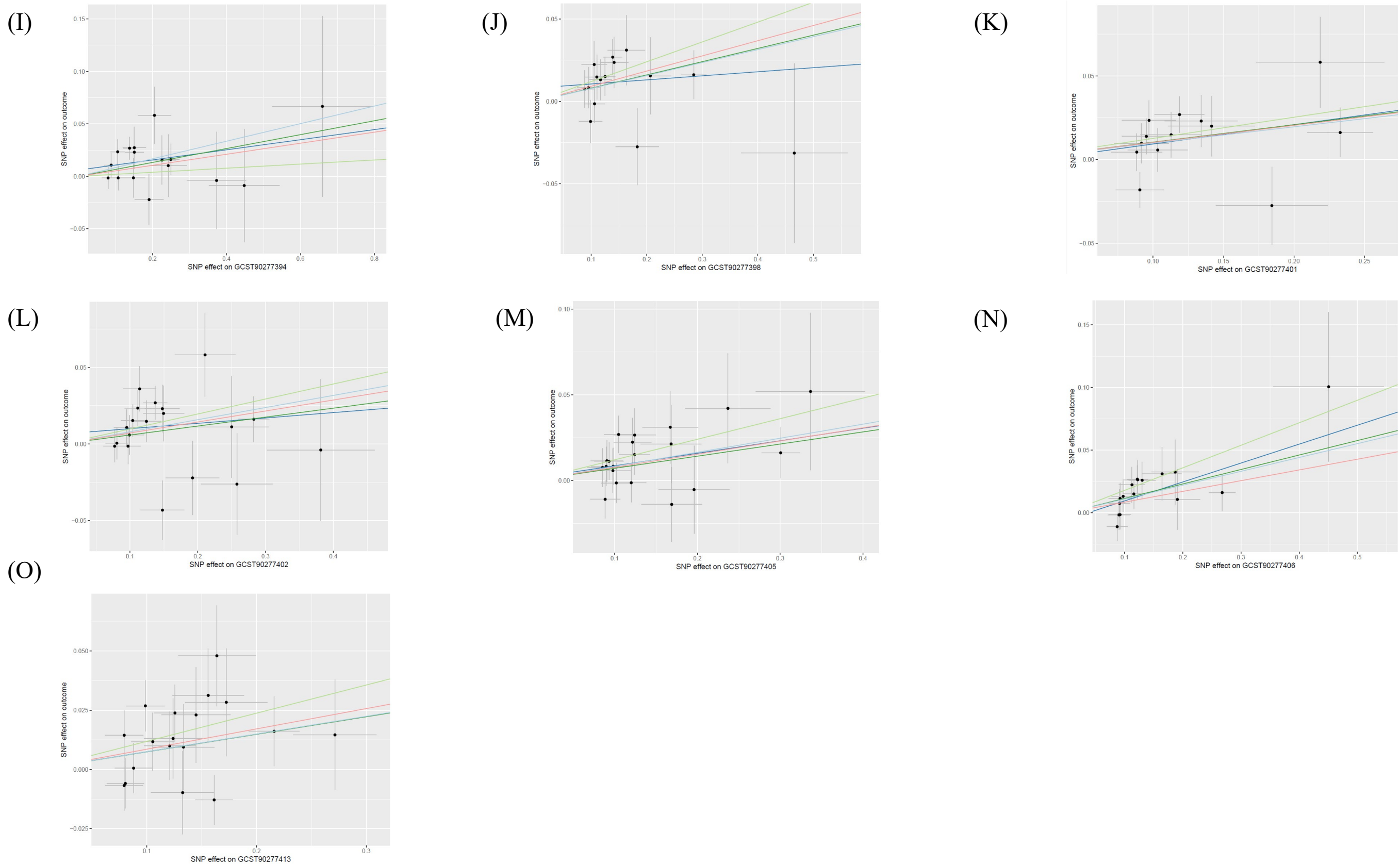


(G)



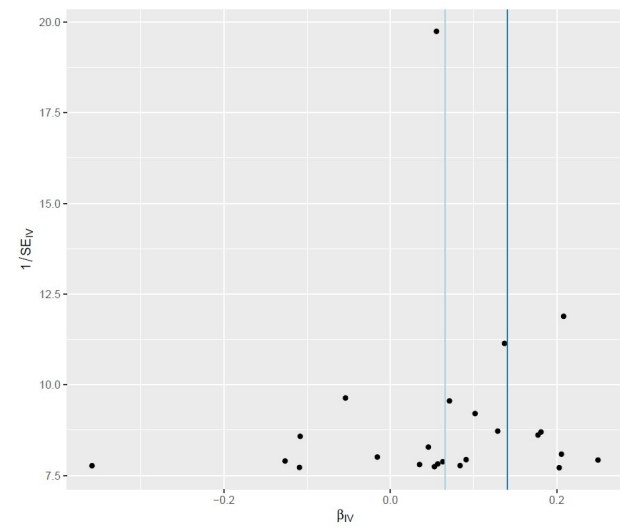
(H)



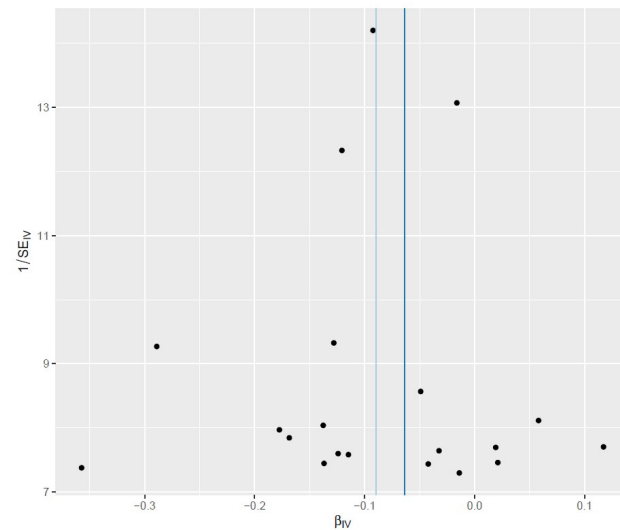


Supplementary Fig. 11. Scatter plots to show MR estimates of (A) DAG(18:1_18:2), (B) PEO (O-16:1_22:5), (C) PC(O-18:1_16:0), (D) PI(18:0_20:4), (E) TAG(52:3), (F) TAG(52:5), (G) TAG(54:6), (H) TAG(54:7), (I) PC(18:0_0:0), (J) PE(18:0_0:0), (K) PC(14:0_16:0), (L) PC(14:0_18:1), (M) PC(15:0_18:2), (N) PC(16:0_16:0) and (O) PC(16:0_20:1) on migraine.

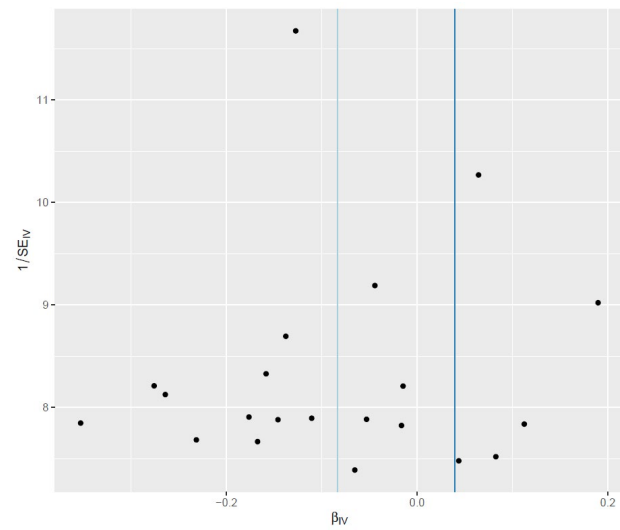
(A)



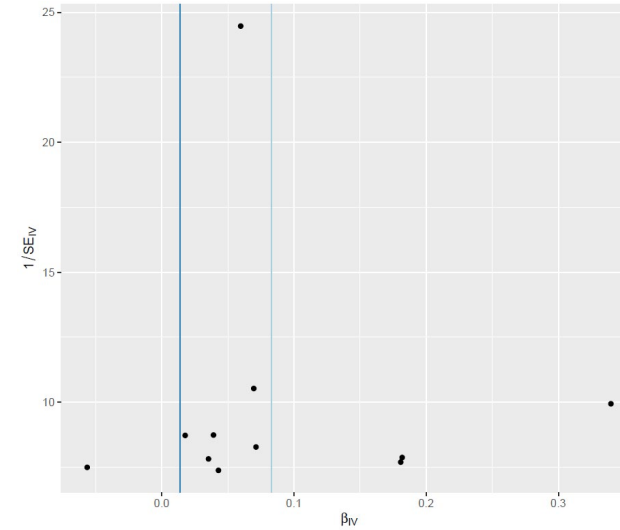
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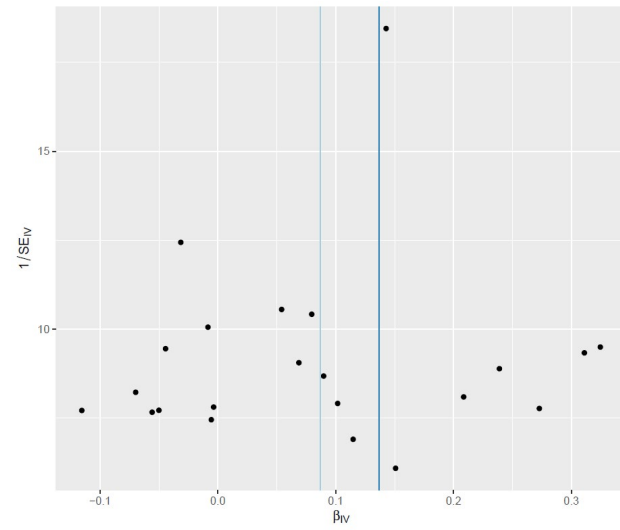
(C)



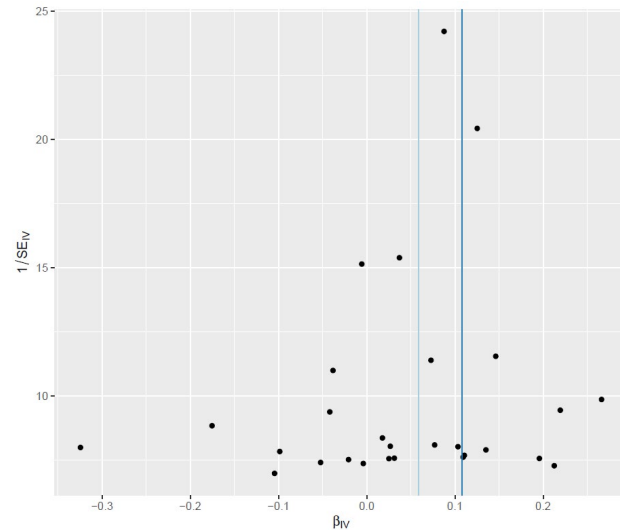
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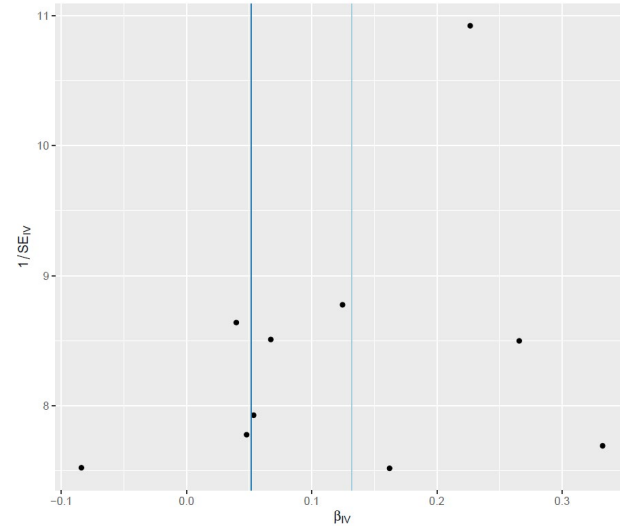
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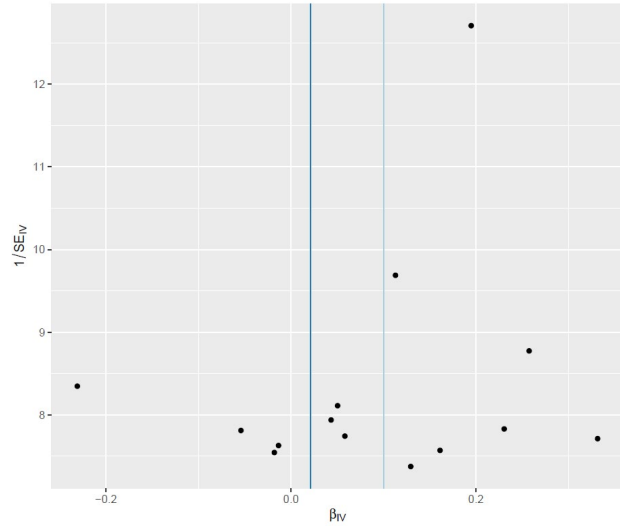
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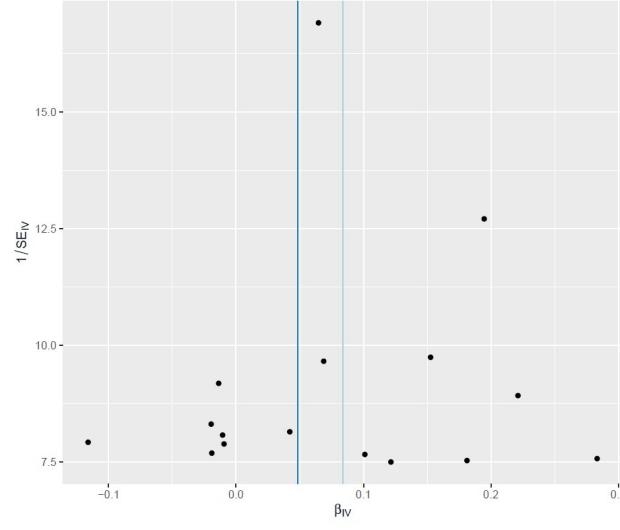
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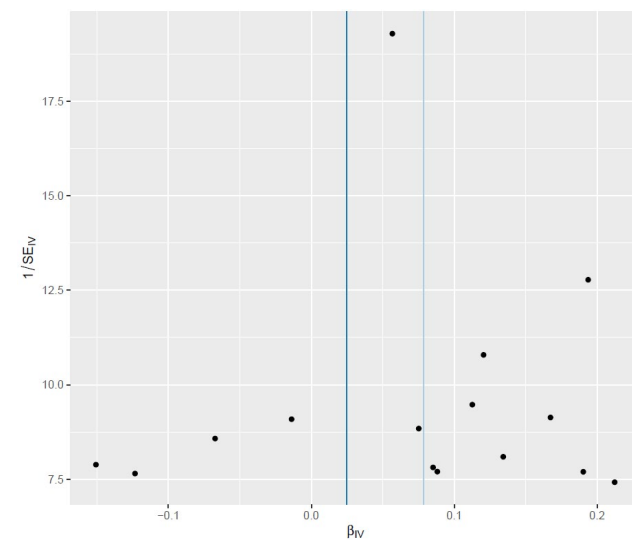
(H)



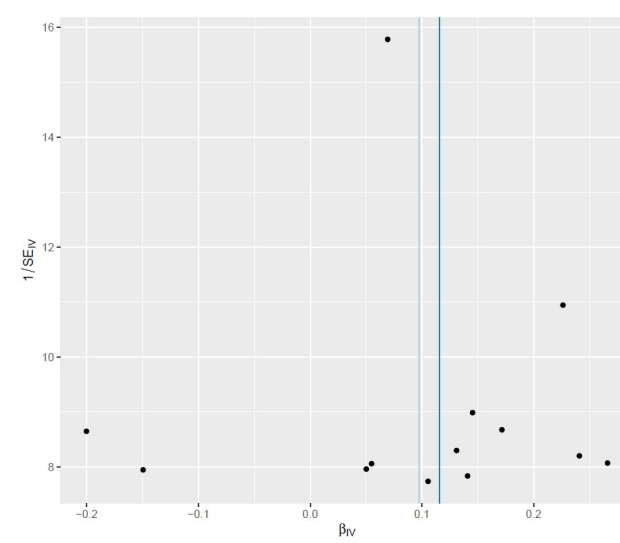
(I)



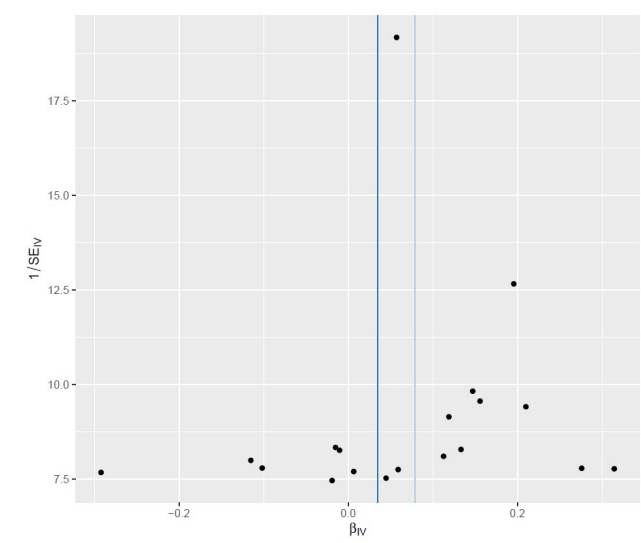
(J)



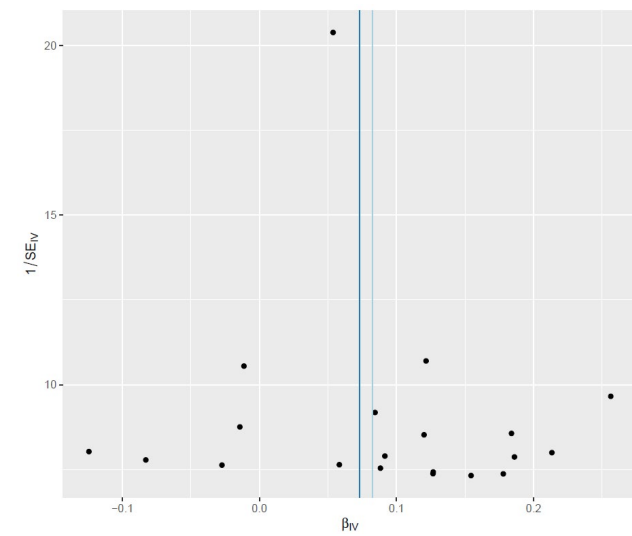
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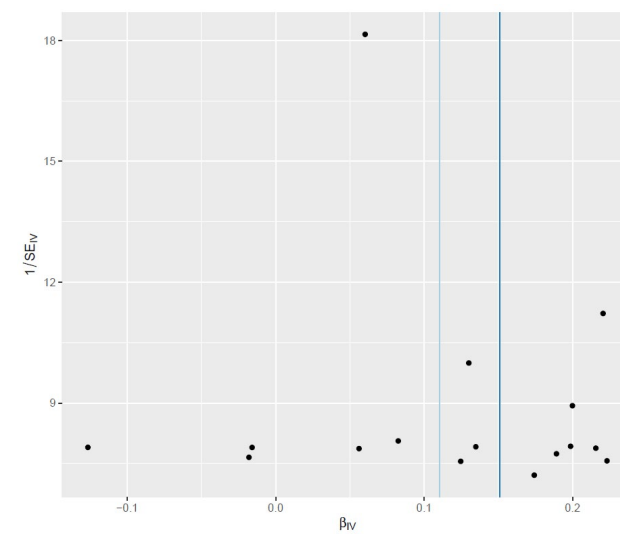
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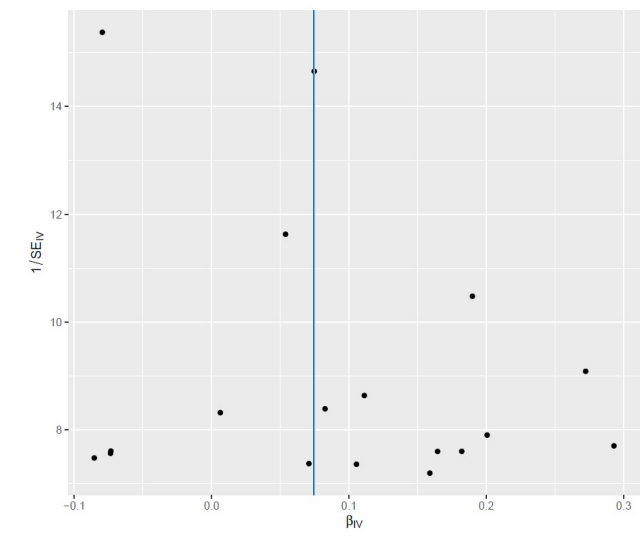
(M)



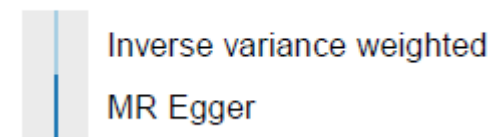
(N)



(O)

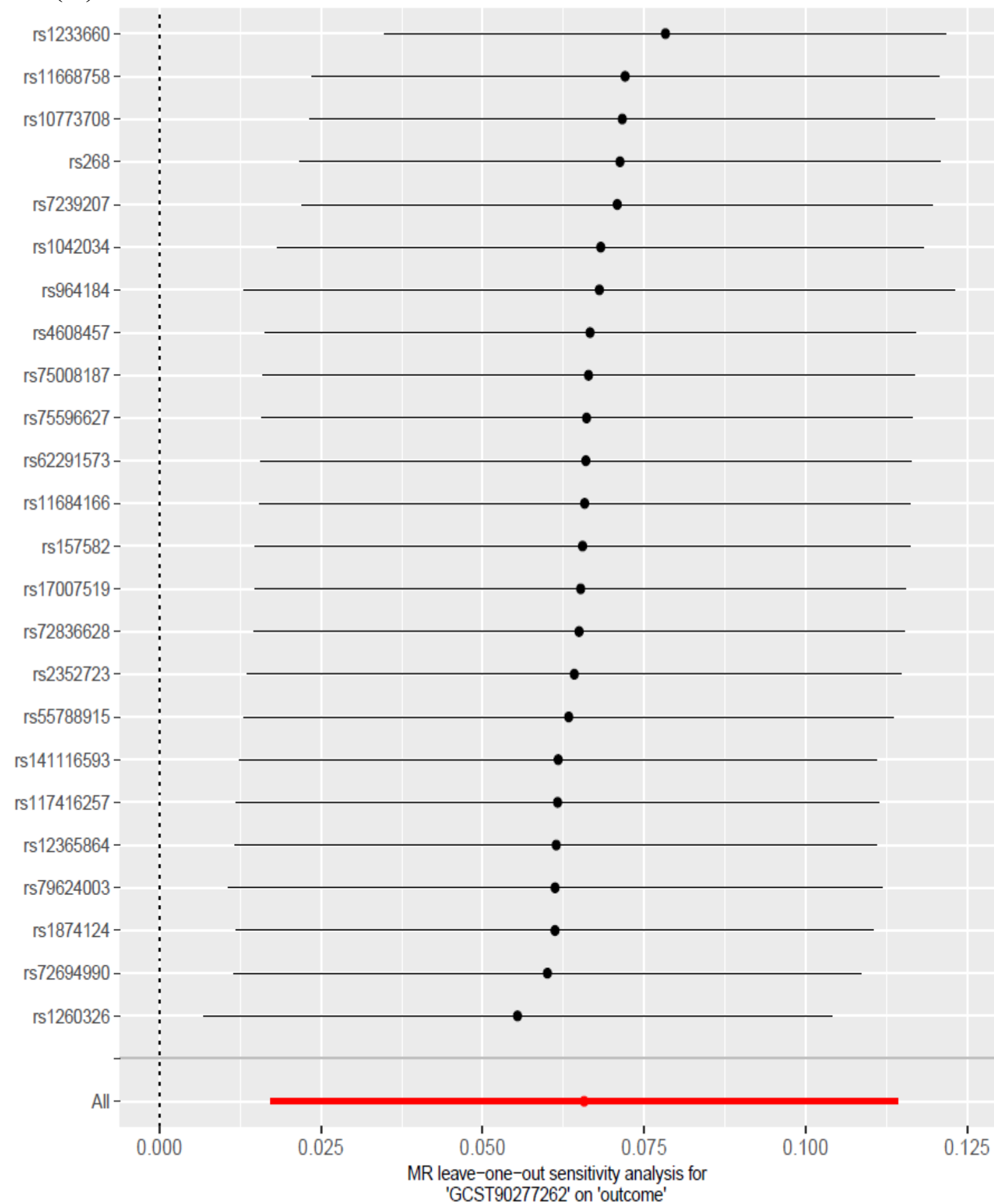


MR Method

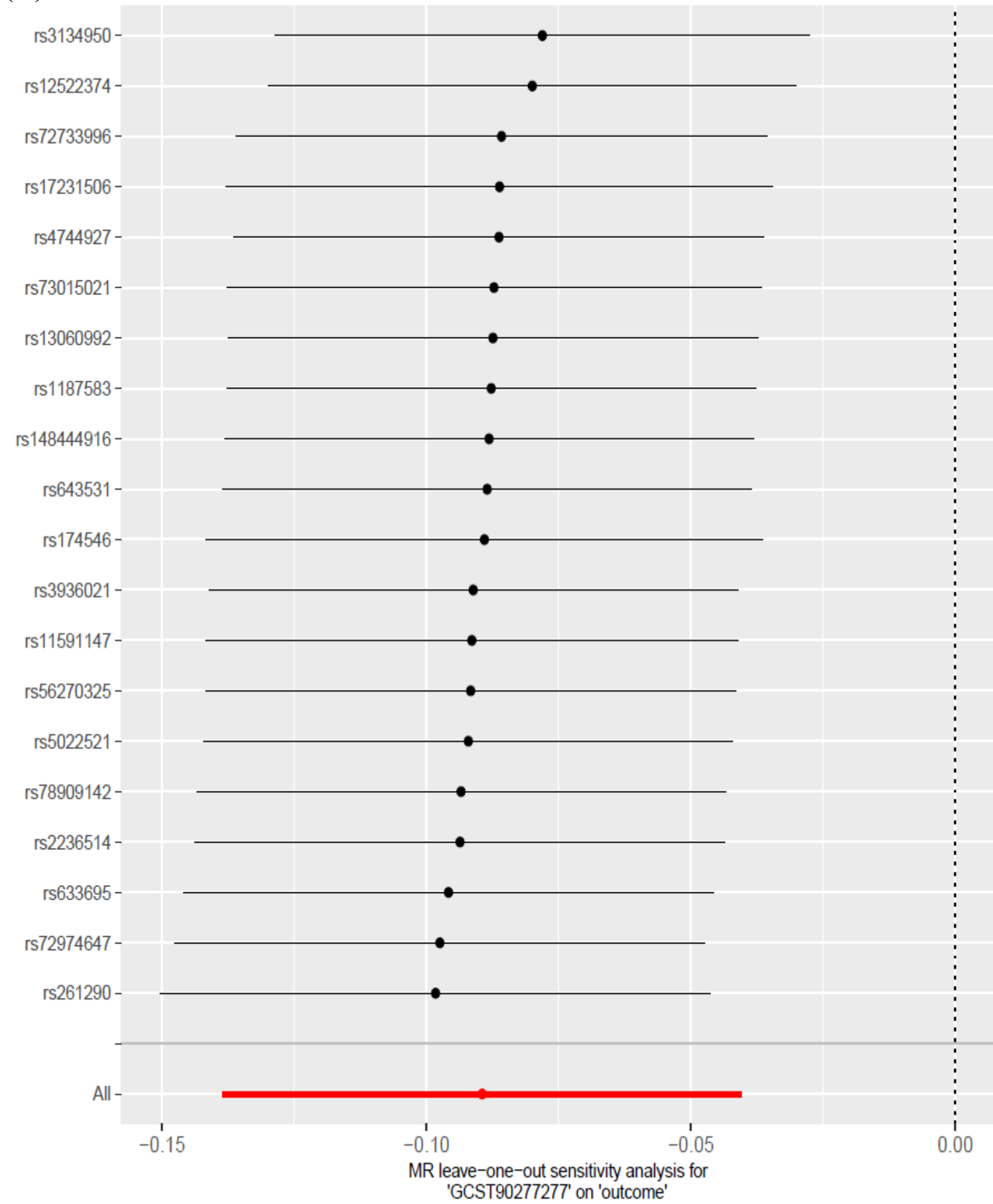


Supplementary Fig. 12. Funnel plots of MR analyses of (A) DAG(18:1_18:2), (B)PEO (O-16:1_22:5), (C) PC(O-18:1_16:0), (D) PI(18:0_20:4), (E) TAG(52:3), (F) TAG(52:5), (G) TAG(54:6), (H) TAG(54:7), (I) PC(18:0_0:0),(J) PE(18:0_0:0), (K) PC(14:0_16:0), (L) PC(14:0_18:1), (M) PC(15:0_18:2), (N) PC(16:0_16:0) and (O) PC(16:0_20:1) on migraine.

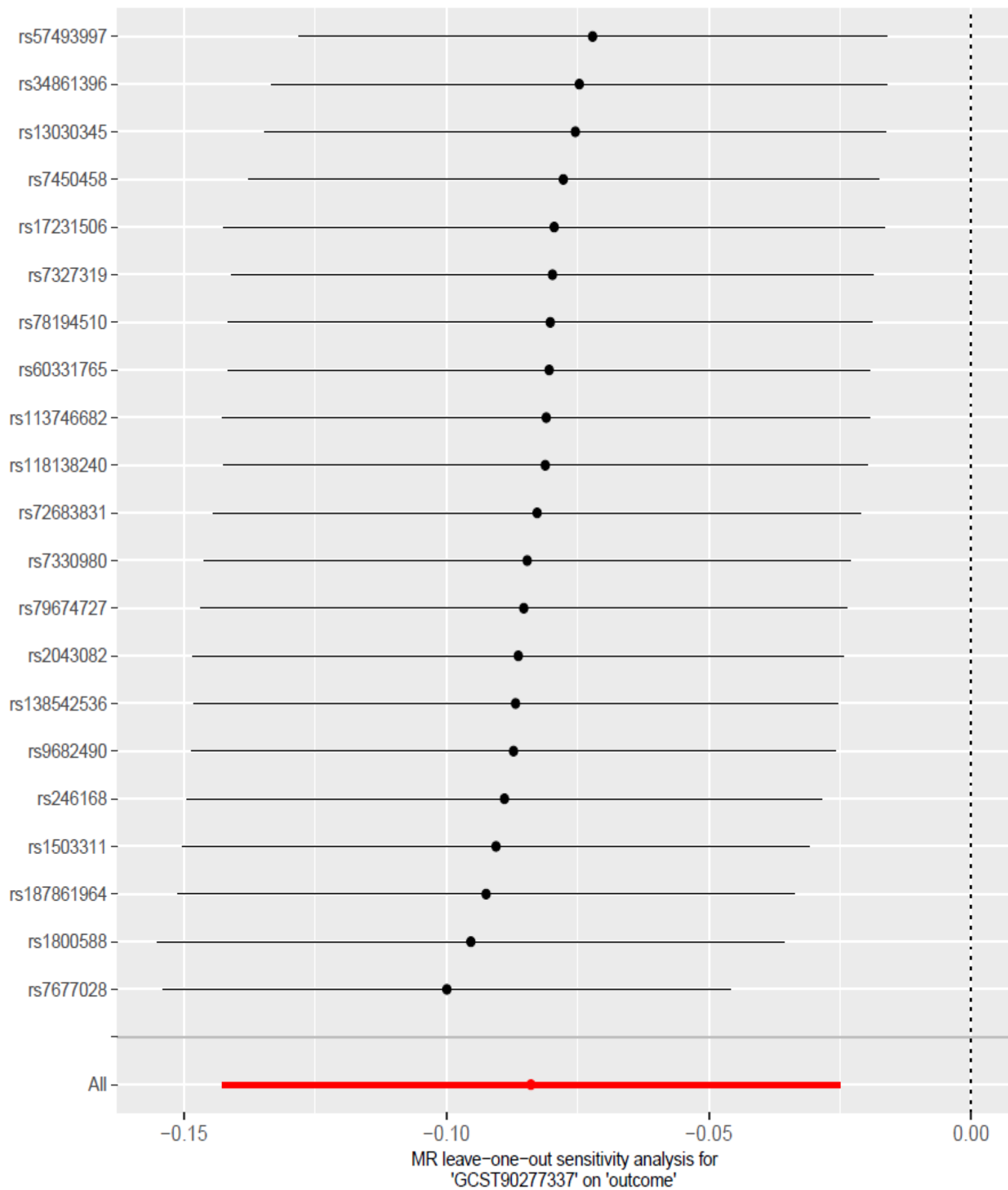
(A)



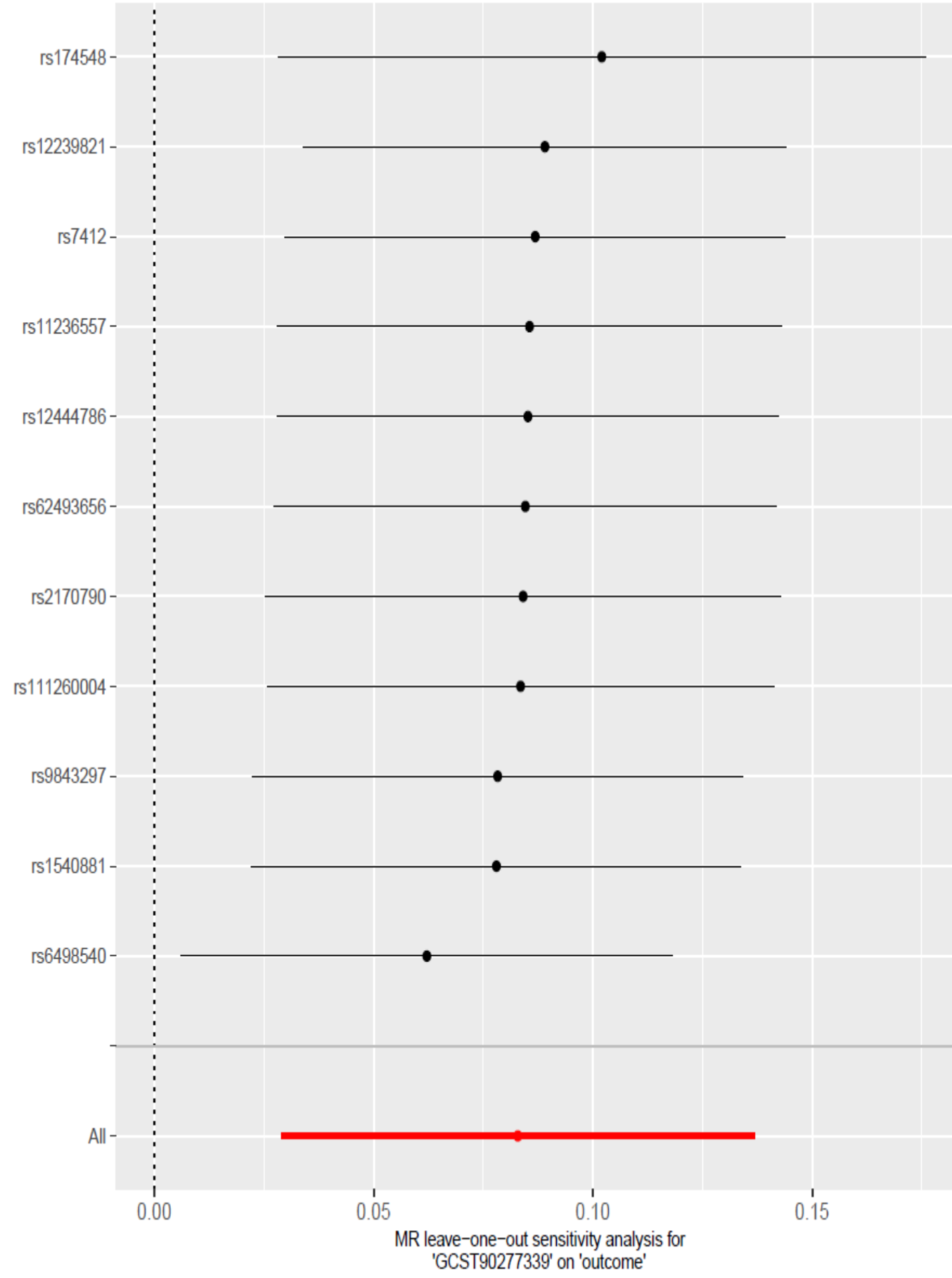
(B)



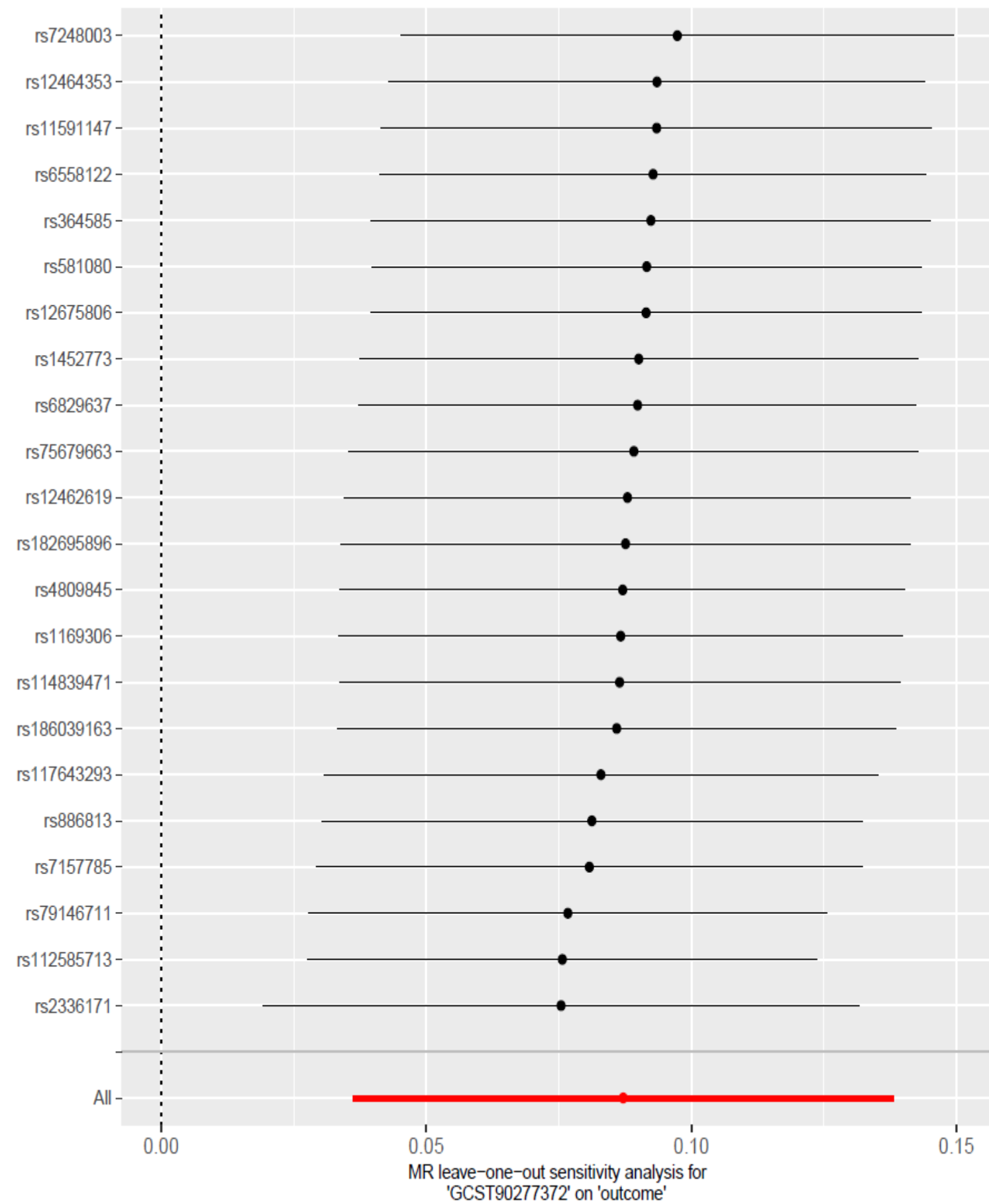
(C)



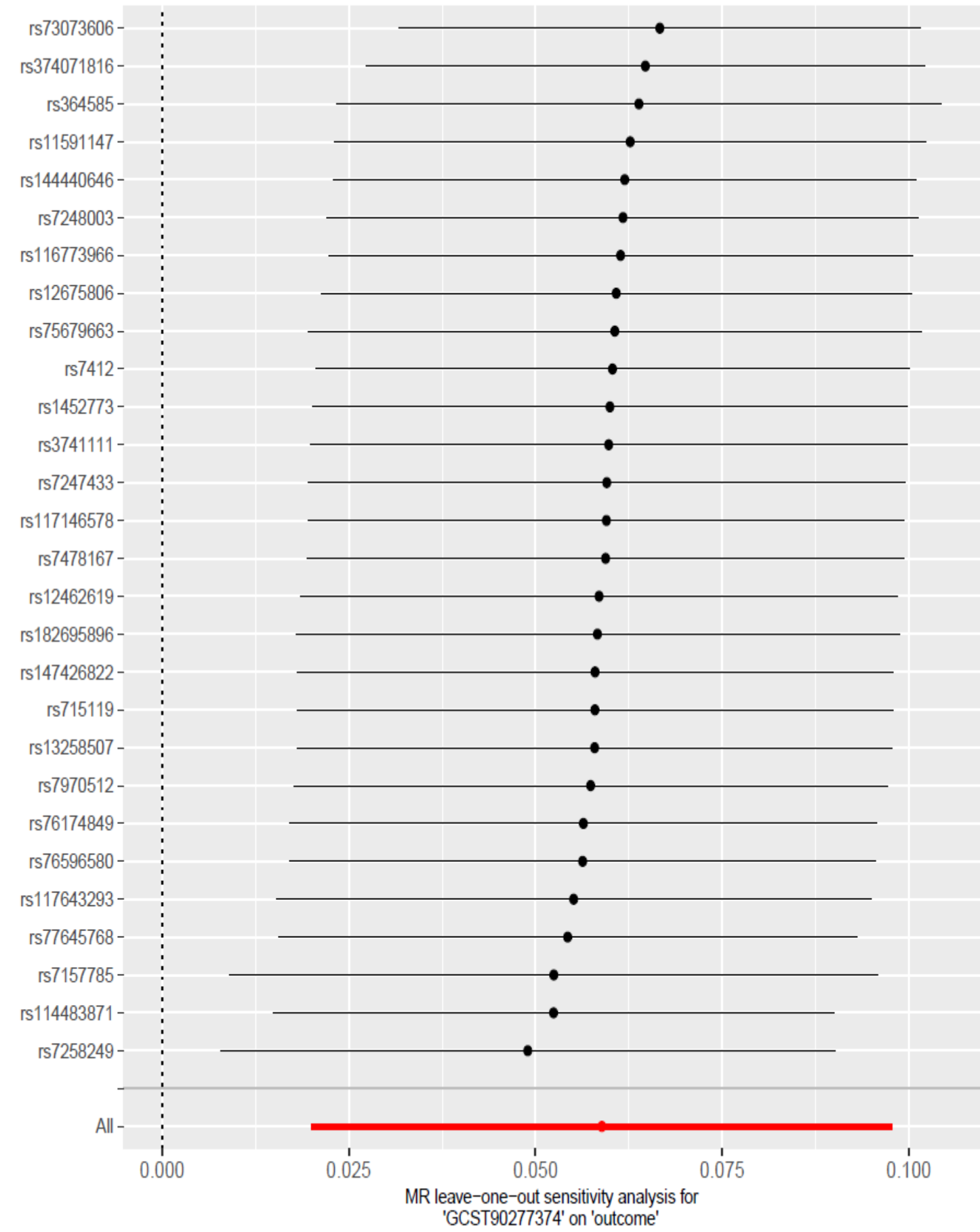
(D)



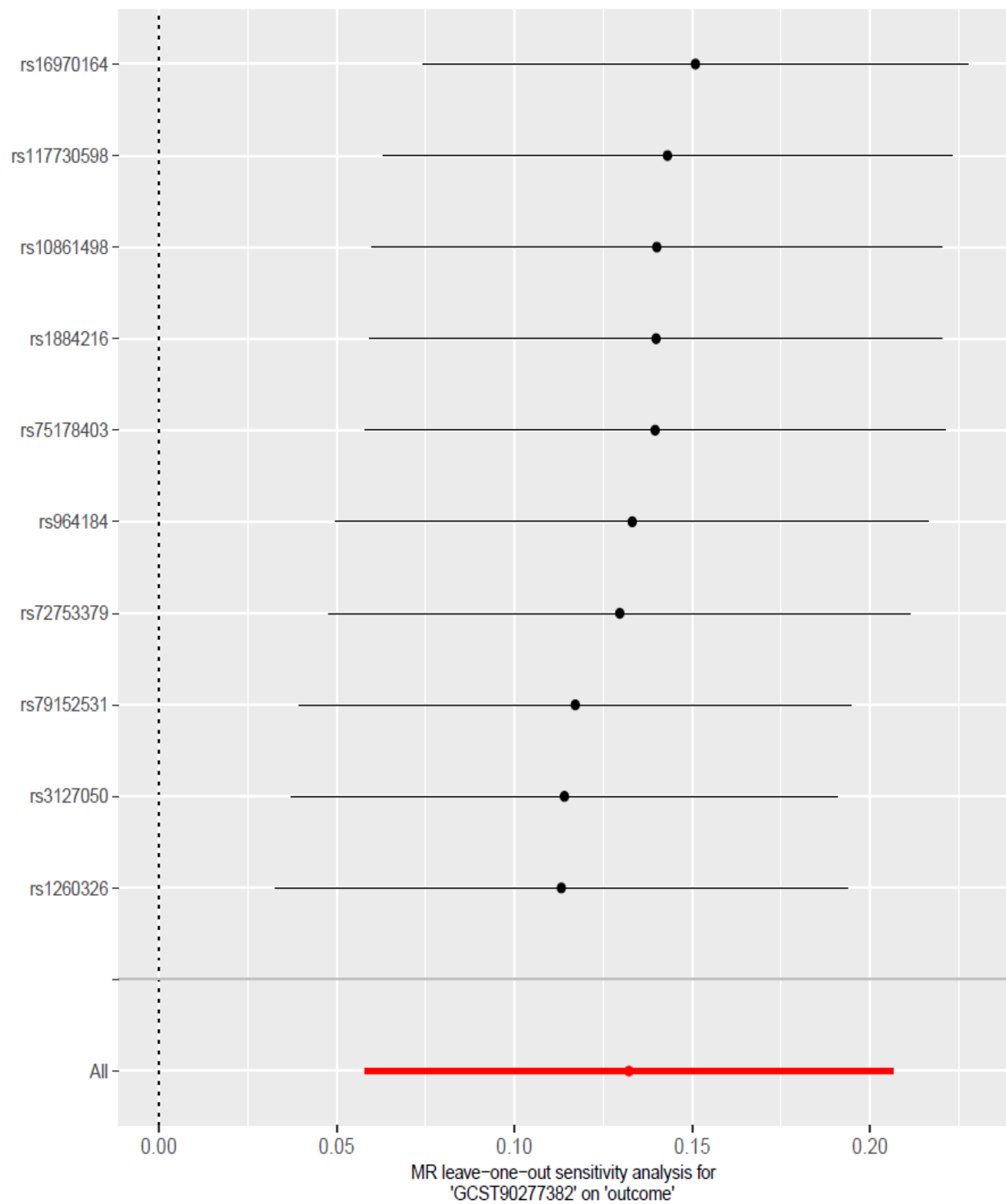
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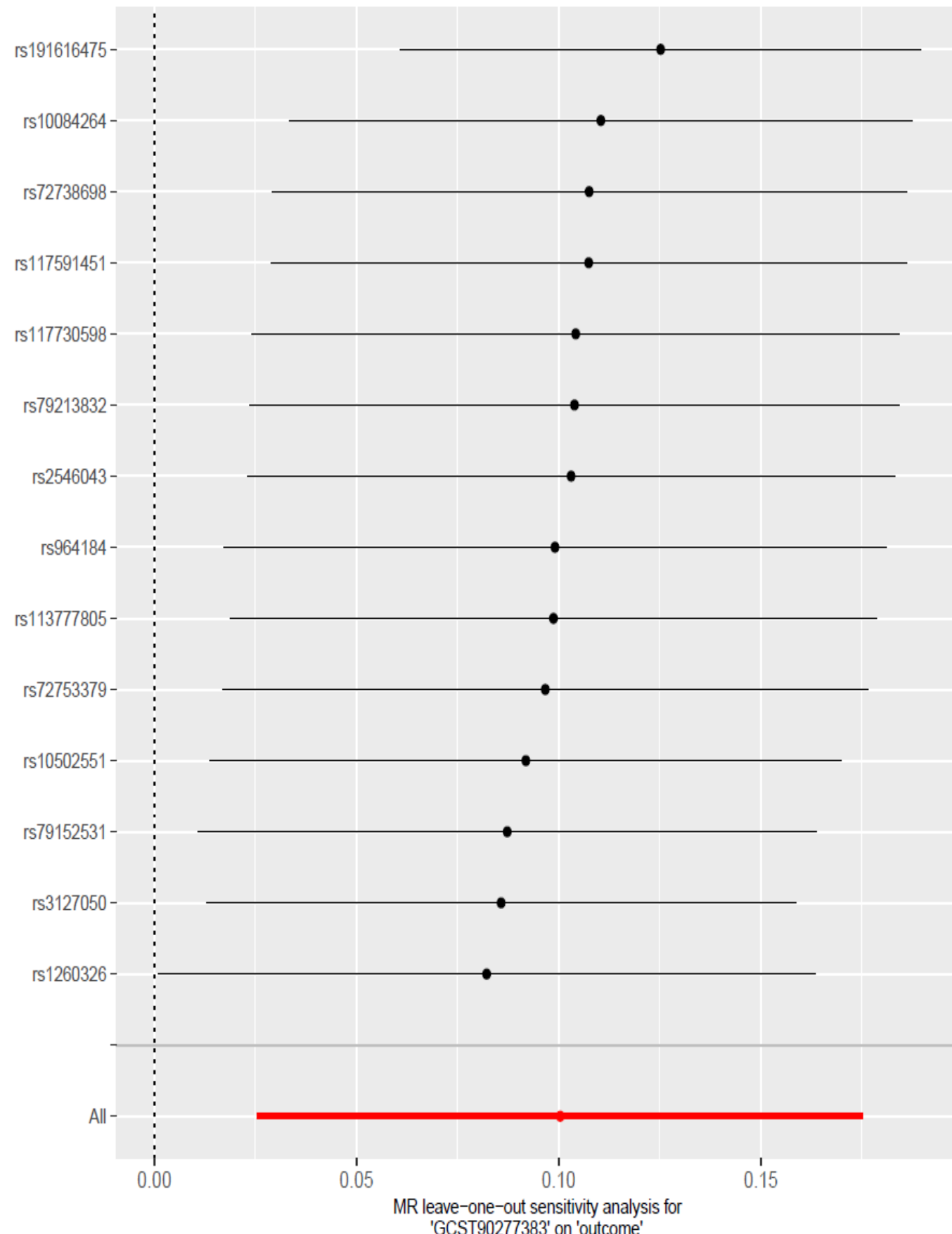
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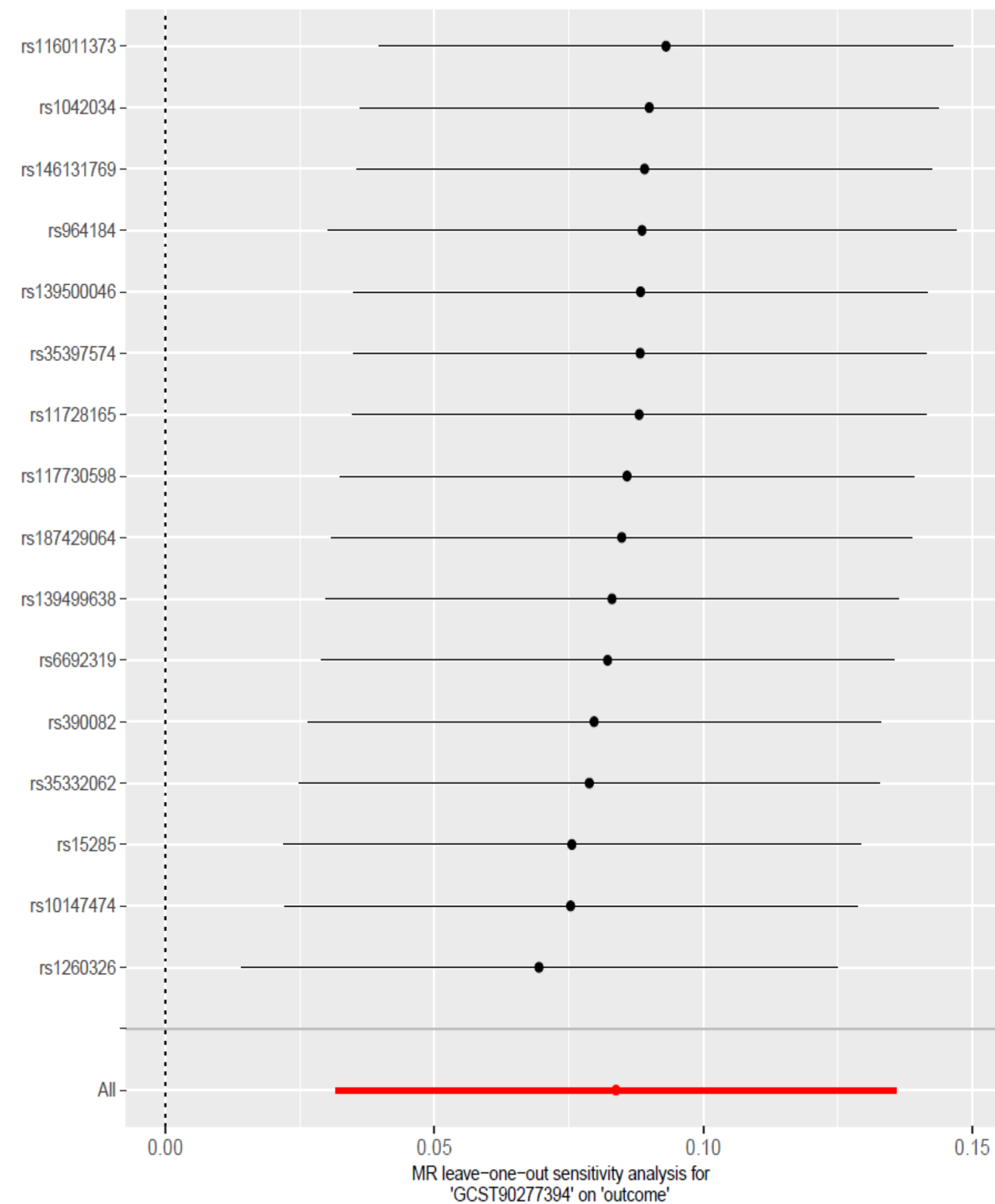
(G)



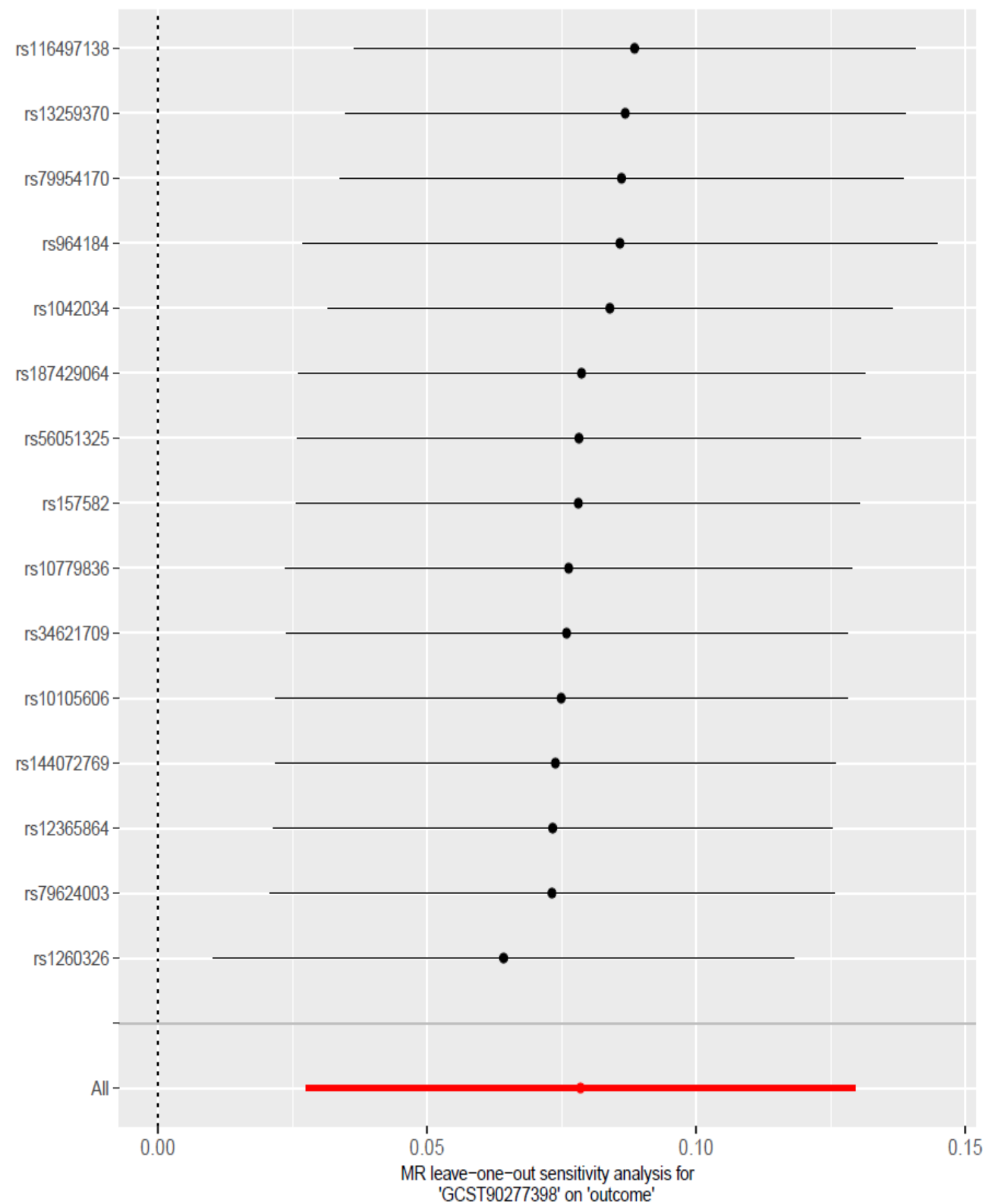
(H)



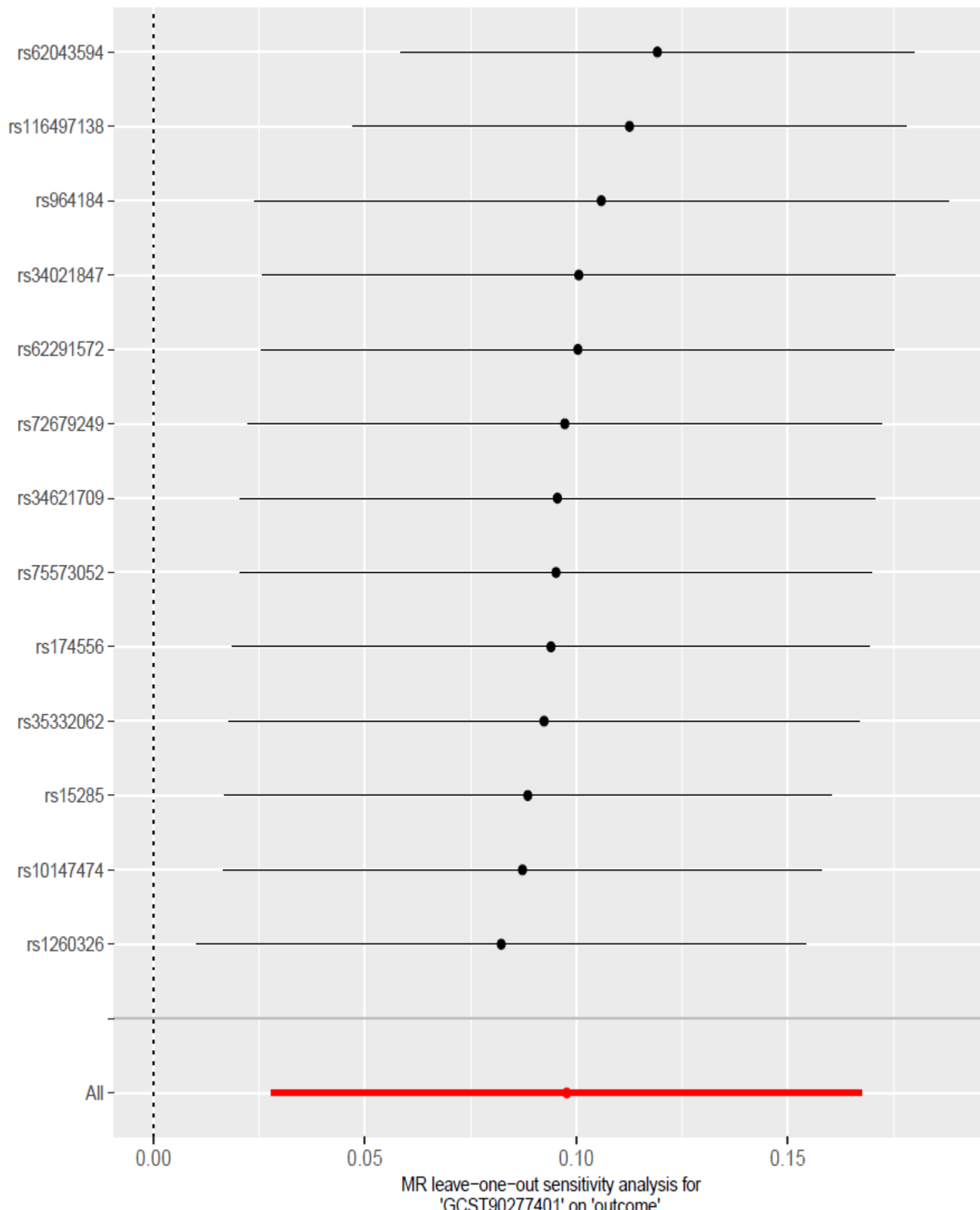
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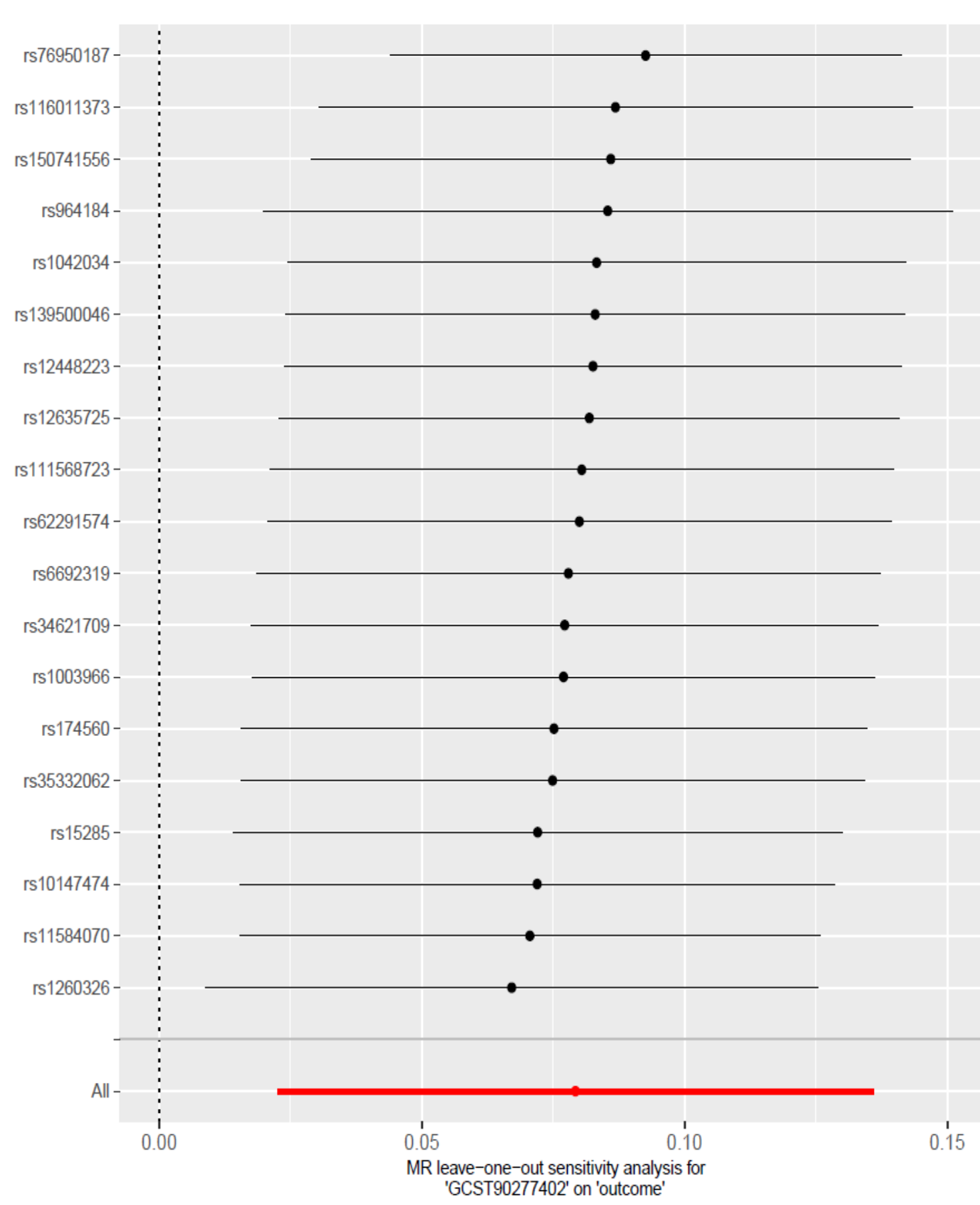
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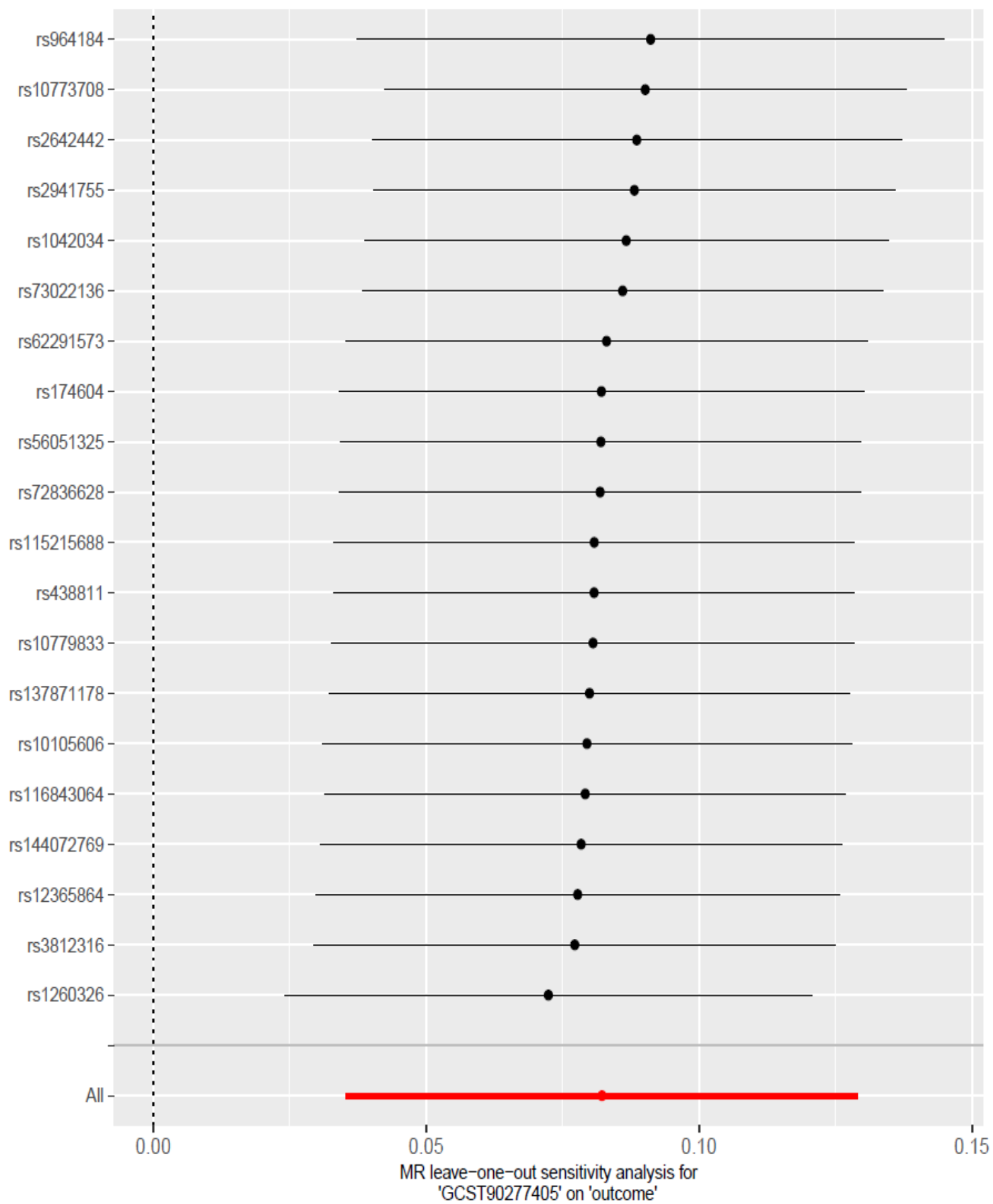
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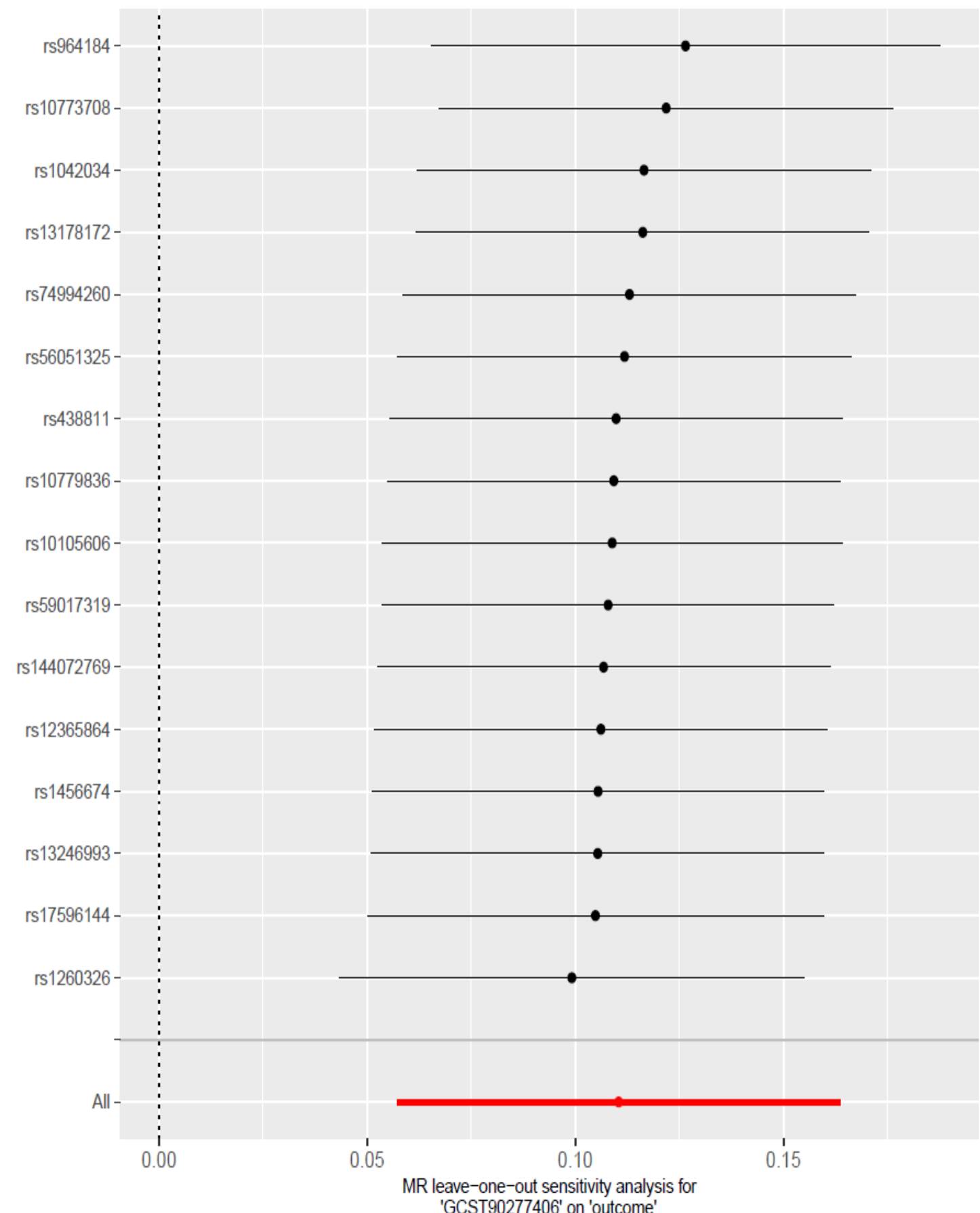
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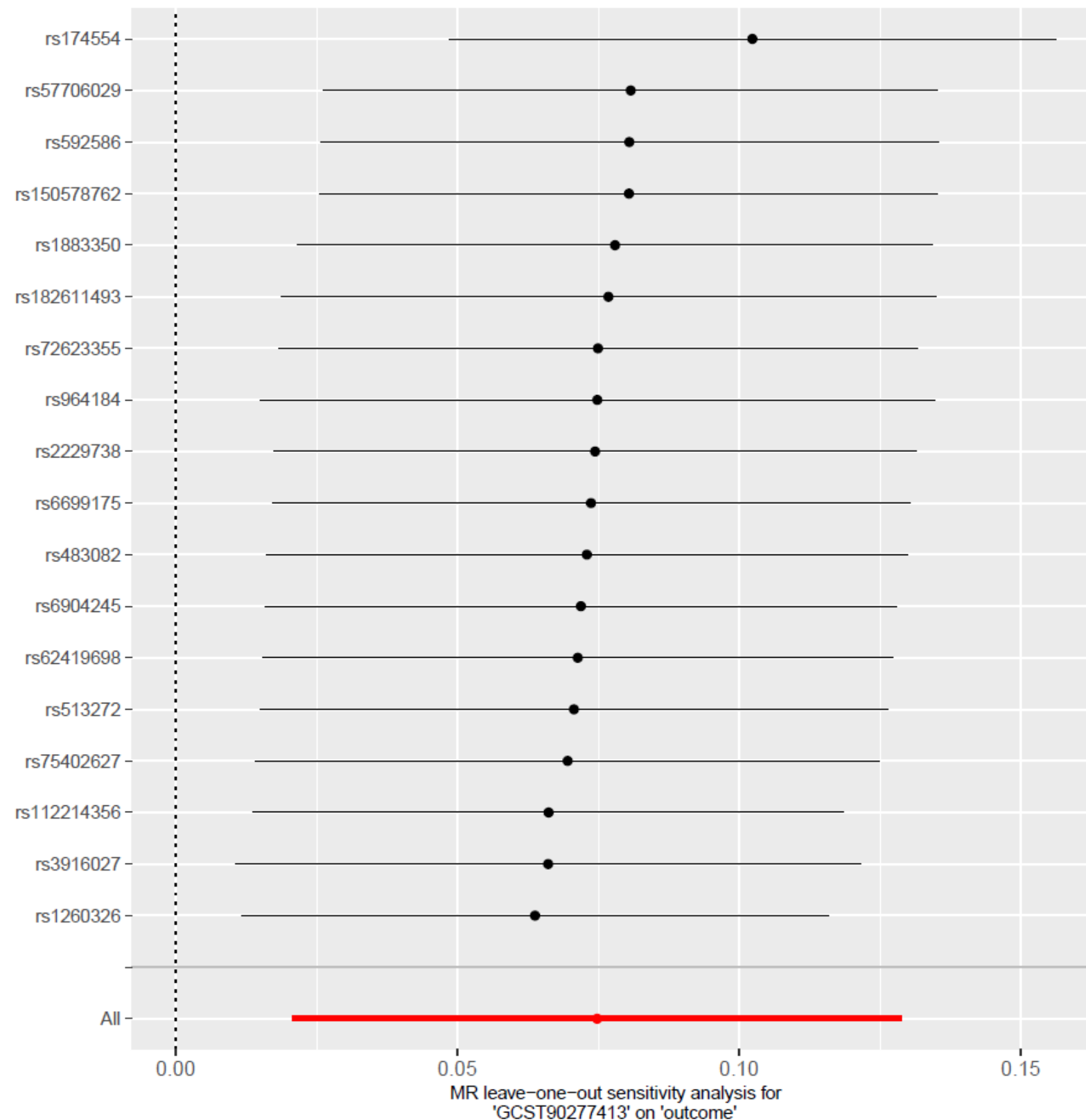
(M)



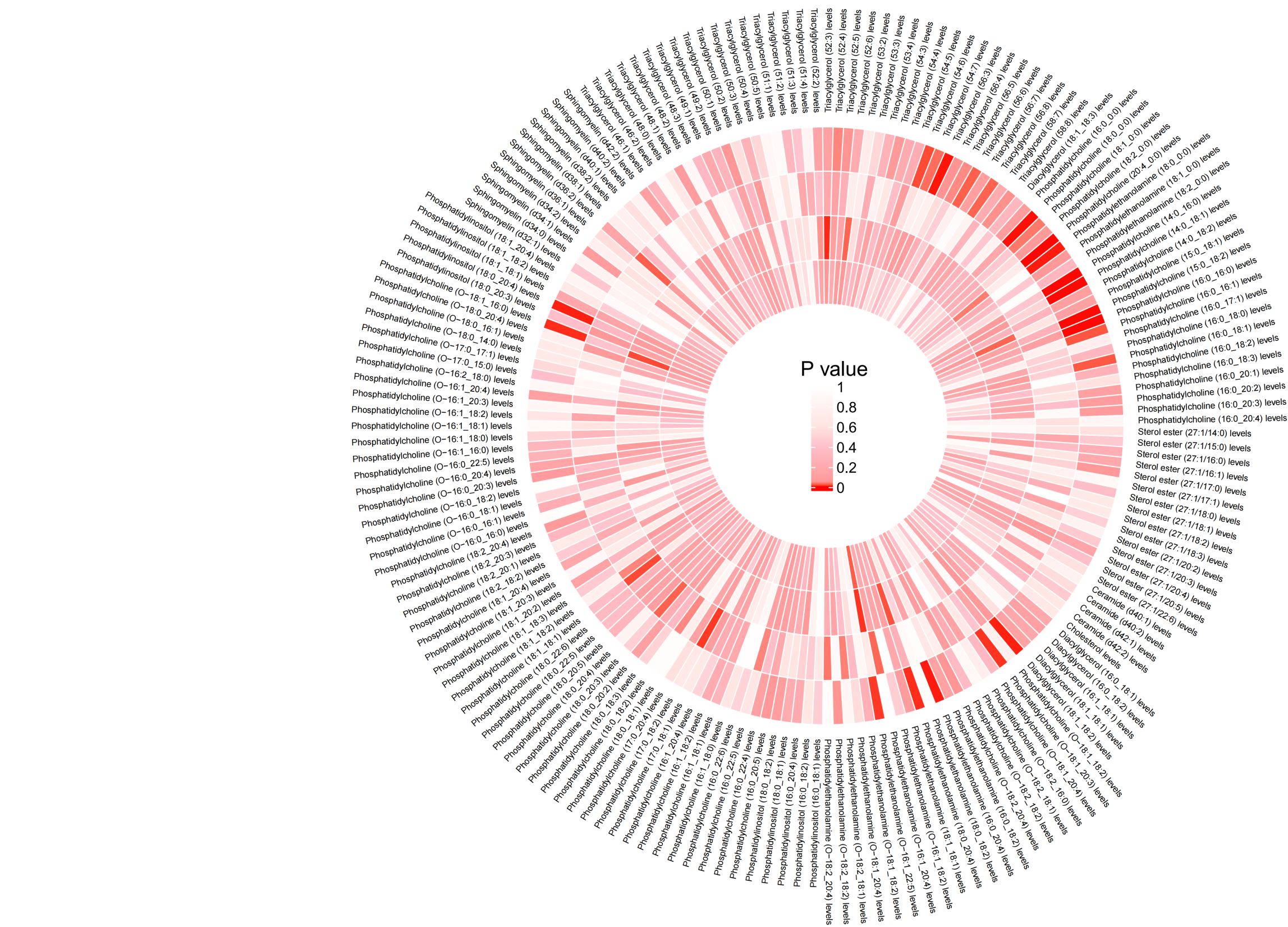
(N)



(O)

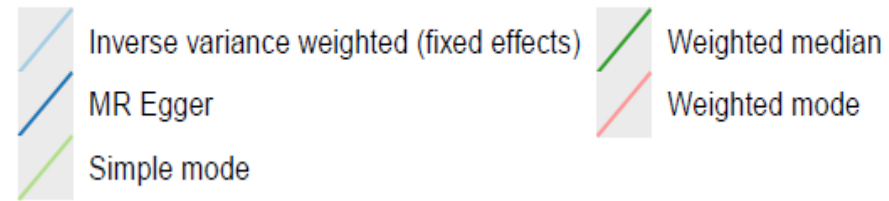


Supplementary Fig. 13. Leave-one-out analysis of MR analyses of (A) DAG(18:1_18:2), (B)PEO (O-16:1_22:5), (C) PC(O-18:1_16:0), (D) PI(18:0_20:4), (E) TAG(52:3), (F) TAG(52:5), (G) TAG(54:6), (H) TAG(54:7), (I) PC(18:0_0:0),(J) PE(18:0_0:0), (K) PC(14:0_16:0), (L) PC(14:0_18:1), (M) PC(15:0_18:2), (N) PC(16:0_16:0) and (O) PC(16:0_20:1) on migraine

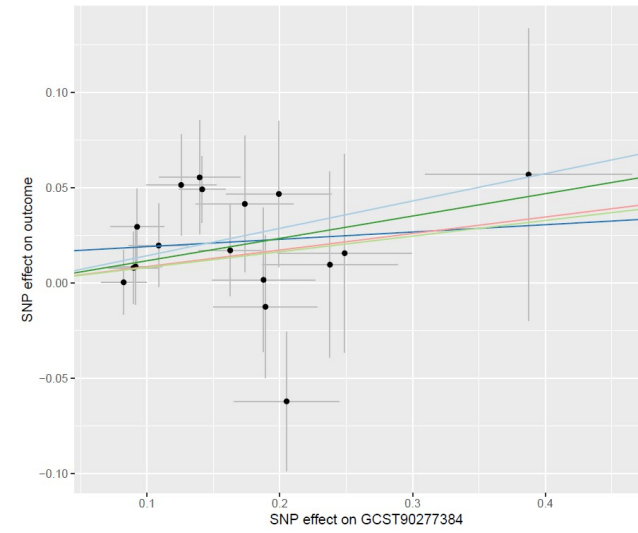


Supplementary Fig. 14. Circular heatmap of the causal effect of 179 lipid species components on migraine without aura. The circular heat map represents the four MR methods, including IVW, Weighted Median, MR-Egger, Weighted mode, in order from the outer ring to the inner ring.

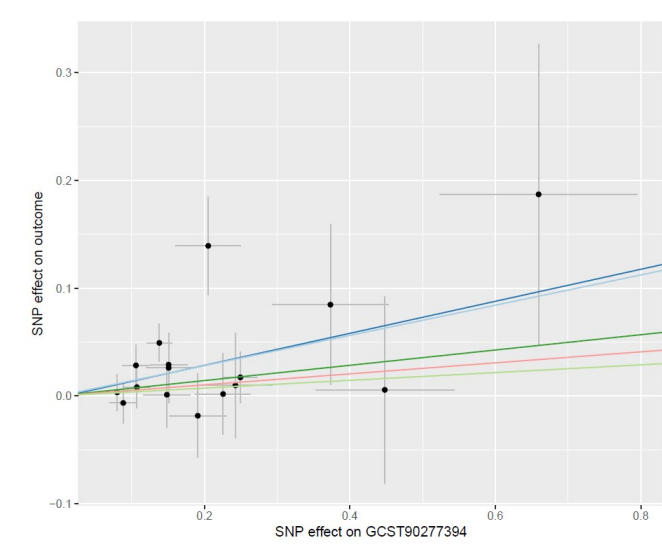
MR Test



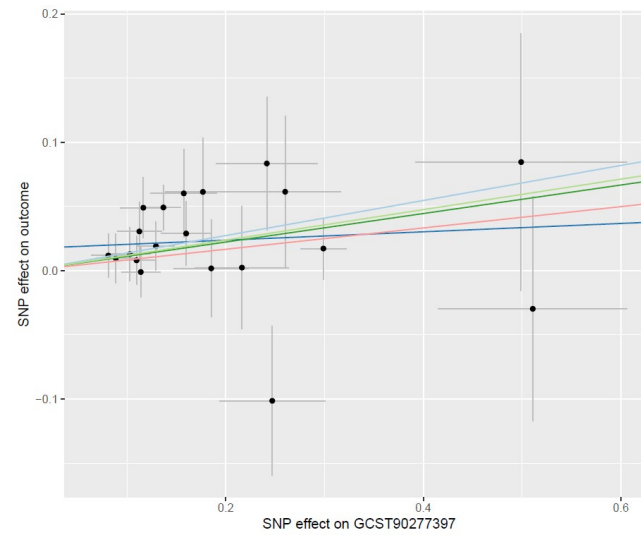
(A)



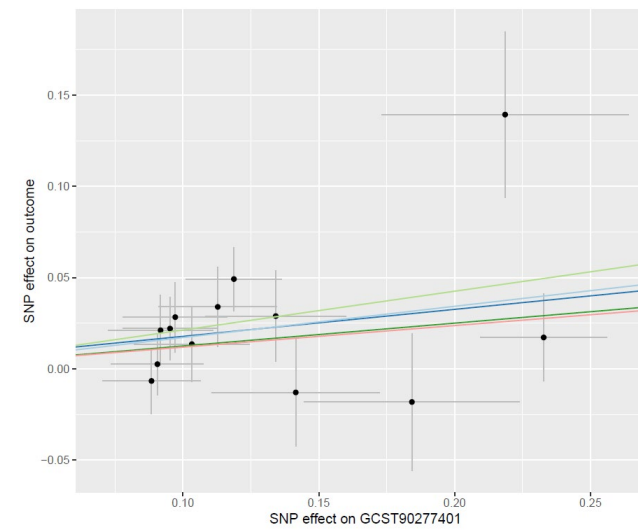
(B)



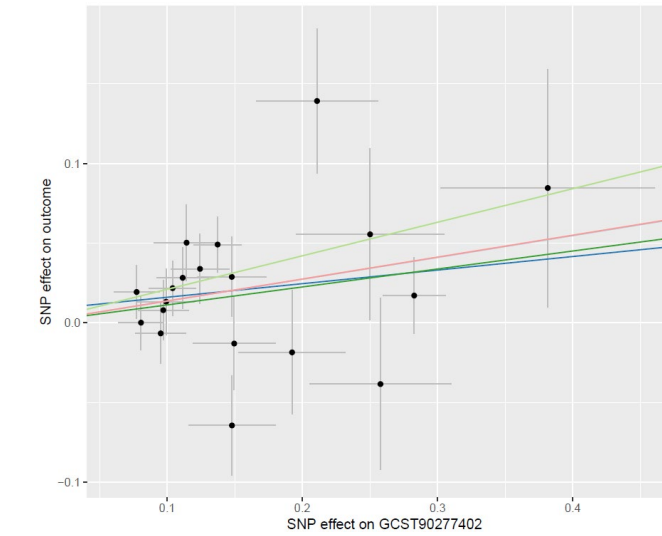
(C)



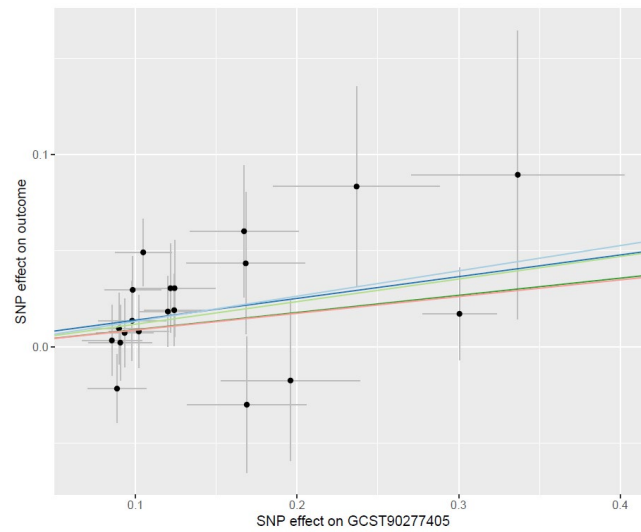
(D)



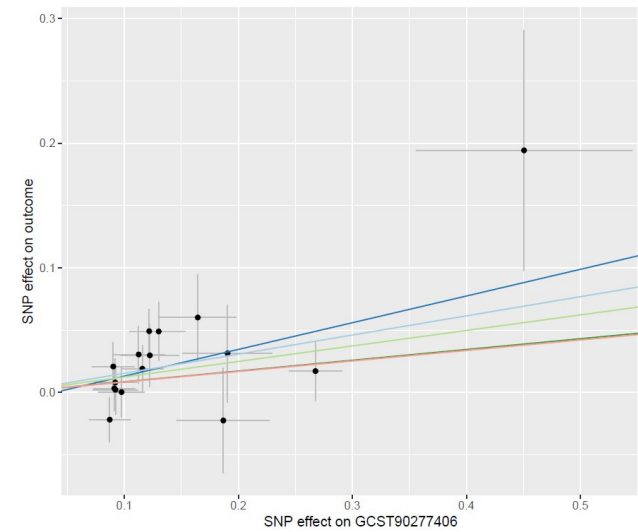
(E)



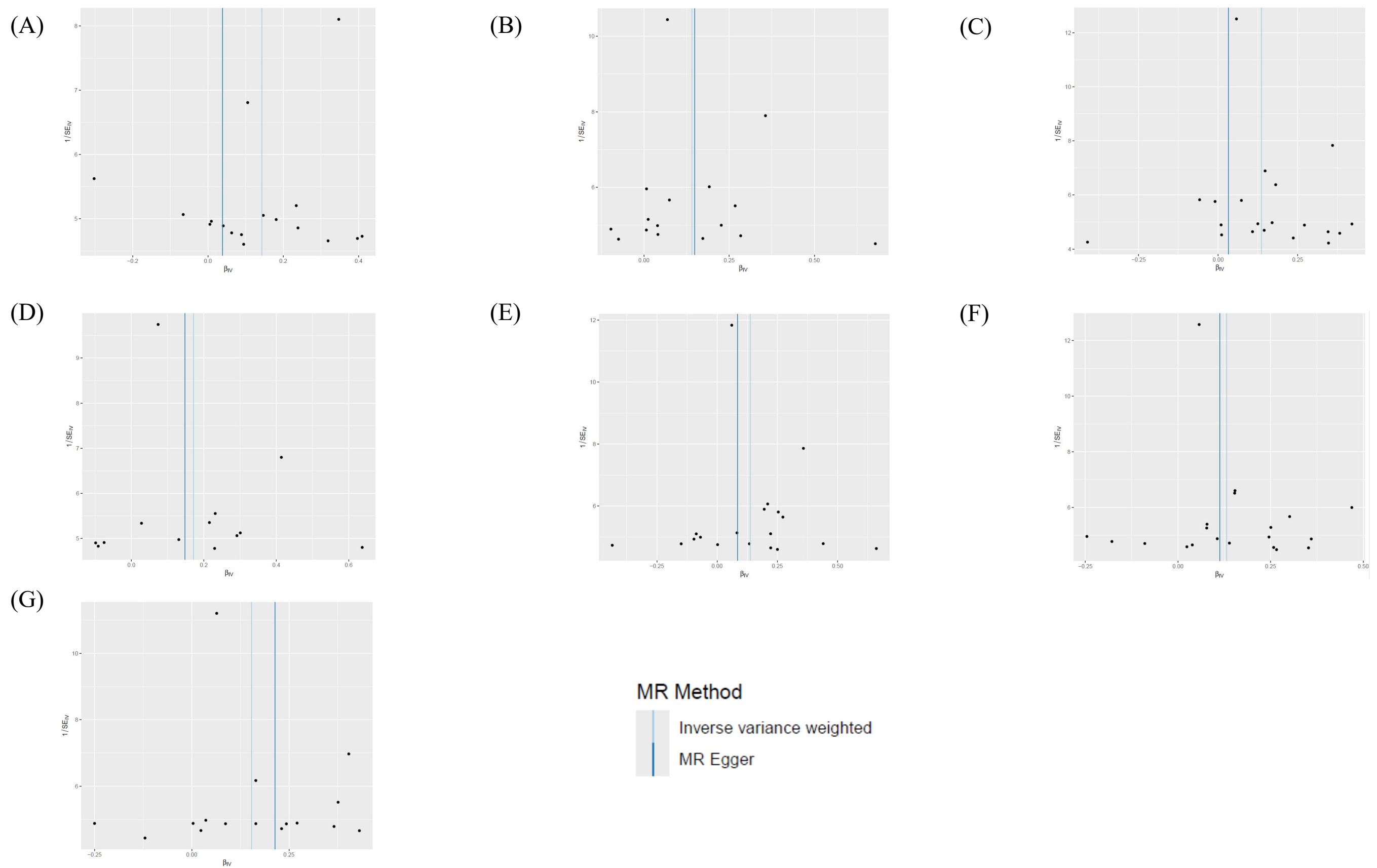
(F)



(G)

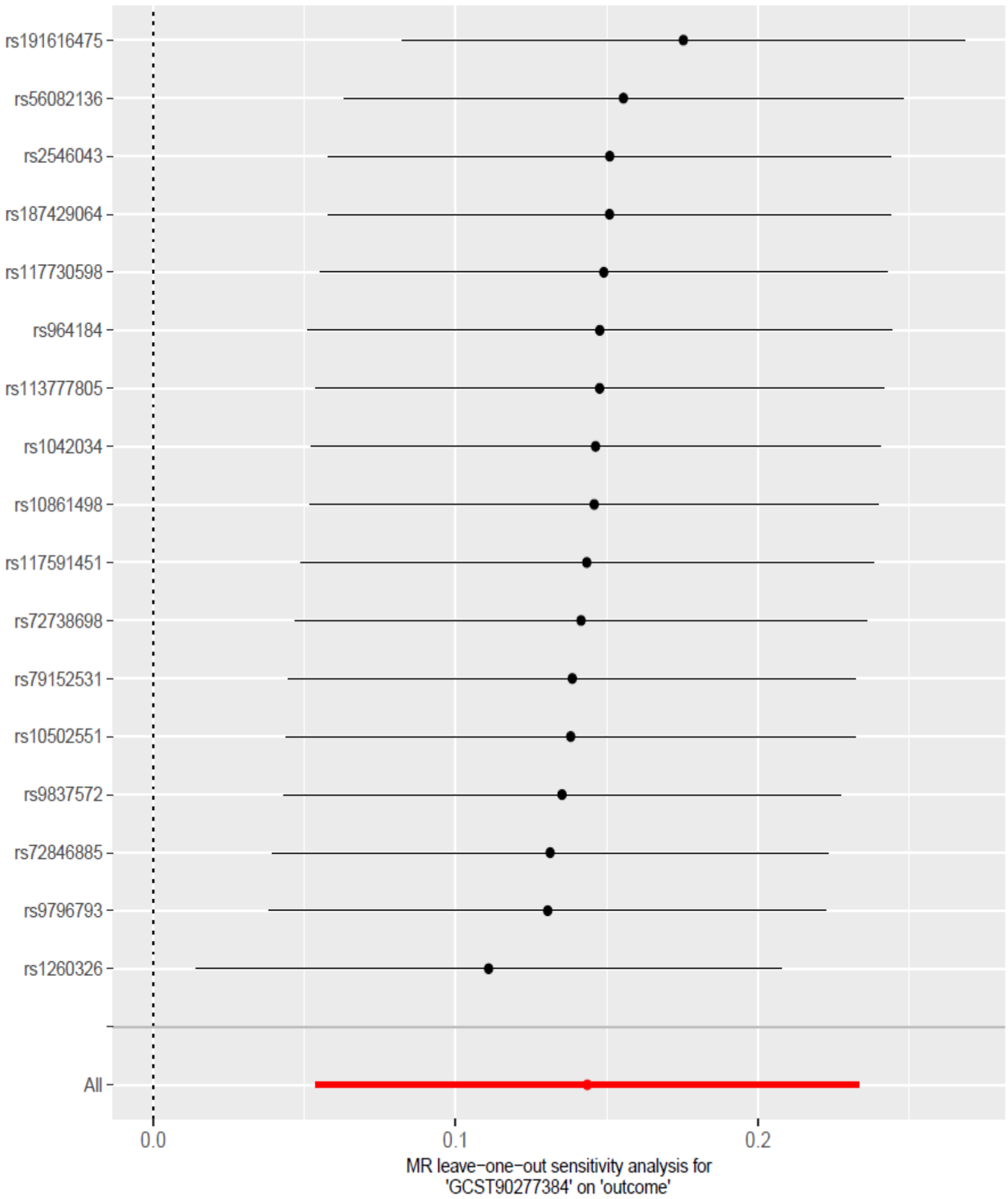


Supplementary Fig. 15. Scatter plots to show MR estimates of (A) TAG(56:3), (B) PC(18:0_0:0), (C) PC(20:4_0:0), (D) PC(14:0_16:0), (E) PC(14:0_18:1), (F) PC(15:0_18:2) and (G) PC(16:0_16:0) on migraine without aura (MO).

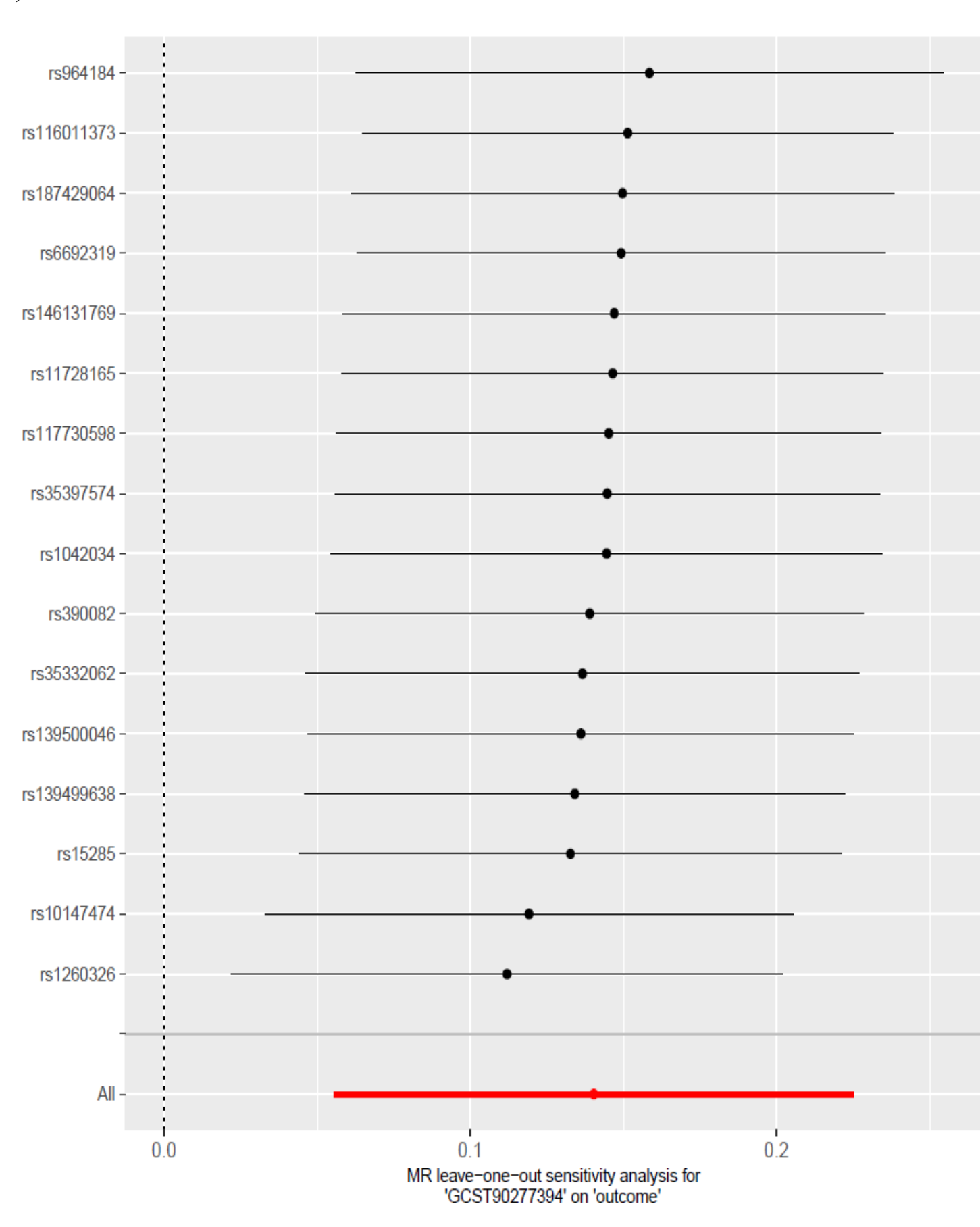


Supplementary Fig. 16. Funnel plots of MR analyses of (A) TAG(56:3), (B) PC(18:0_0:0), (C) PC(20:4_0:0), (D) PC(14:0_16:0), (E) PC(14:0_18:1), (F) PC(15:0_18:2) and (G) PC(16:0_16:0) on migraine without aura (MO).

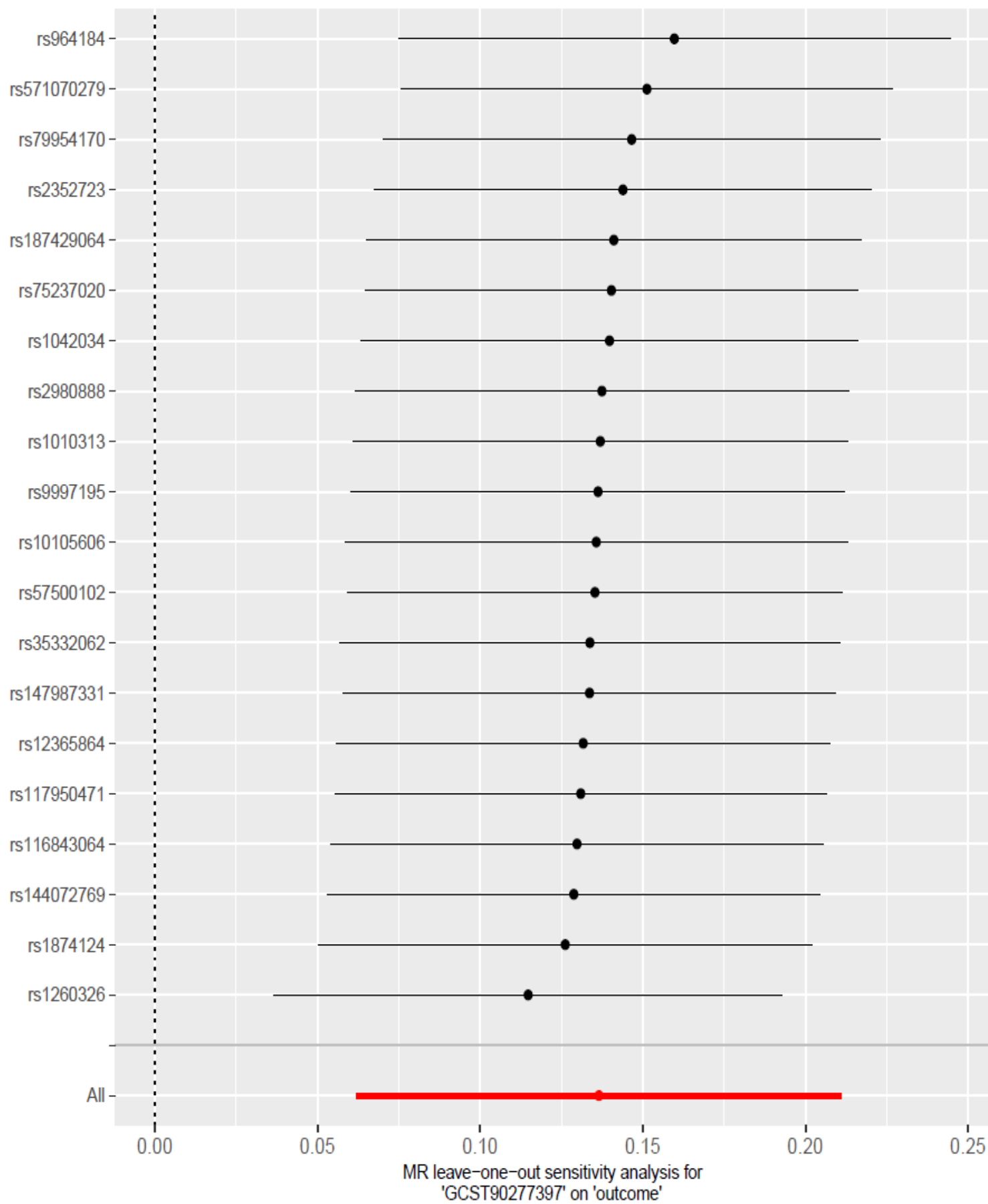
(A)



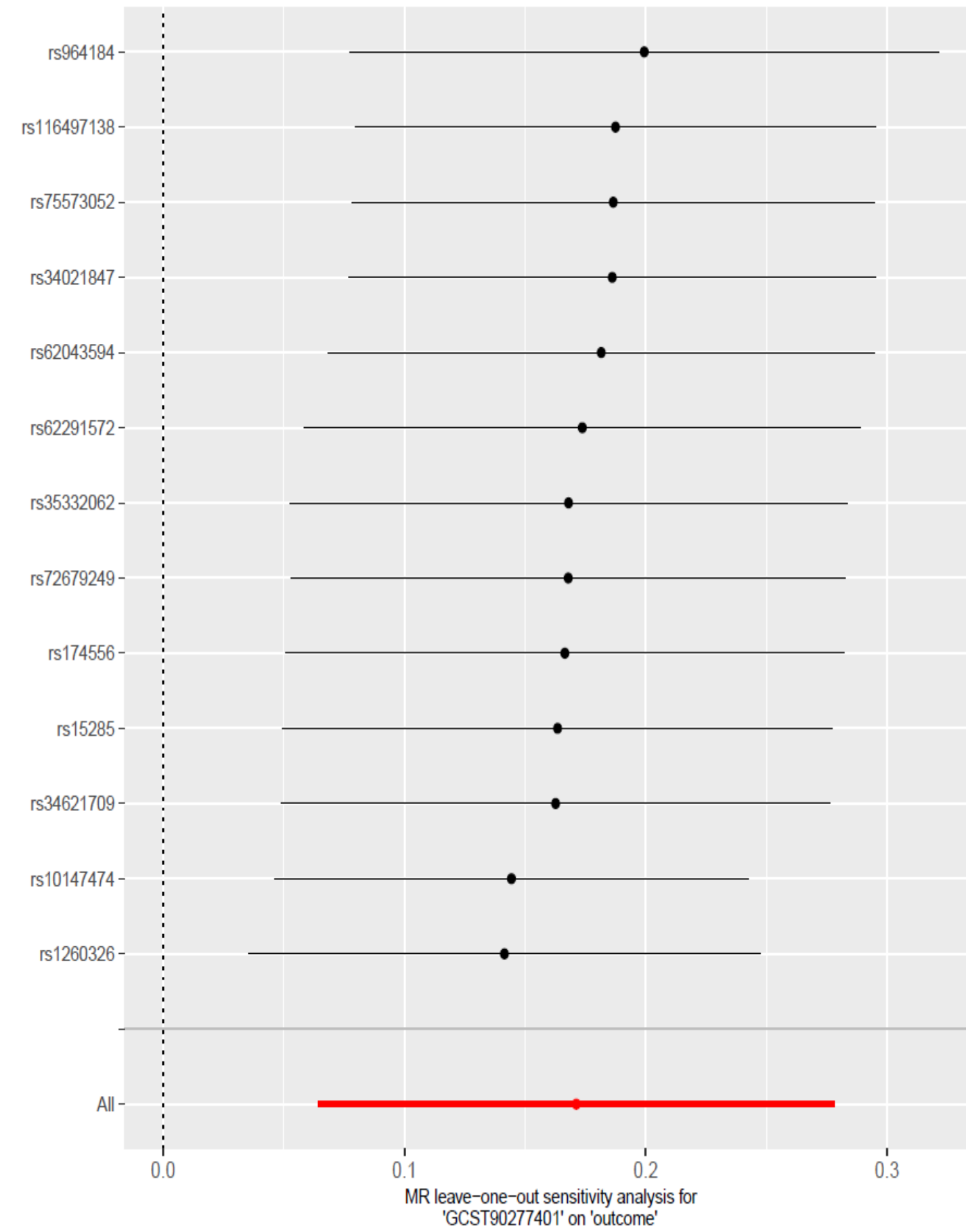
(B)



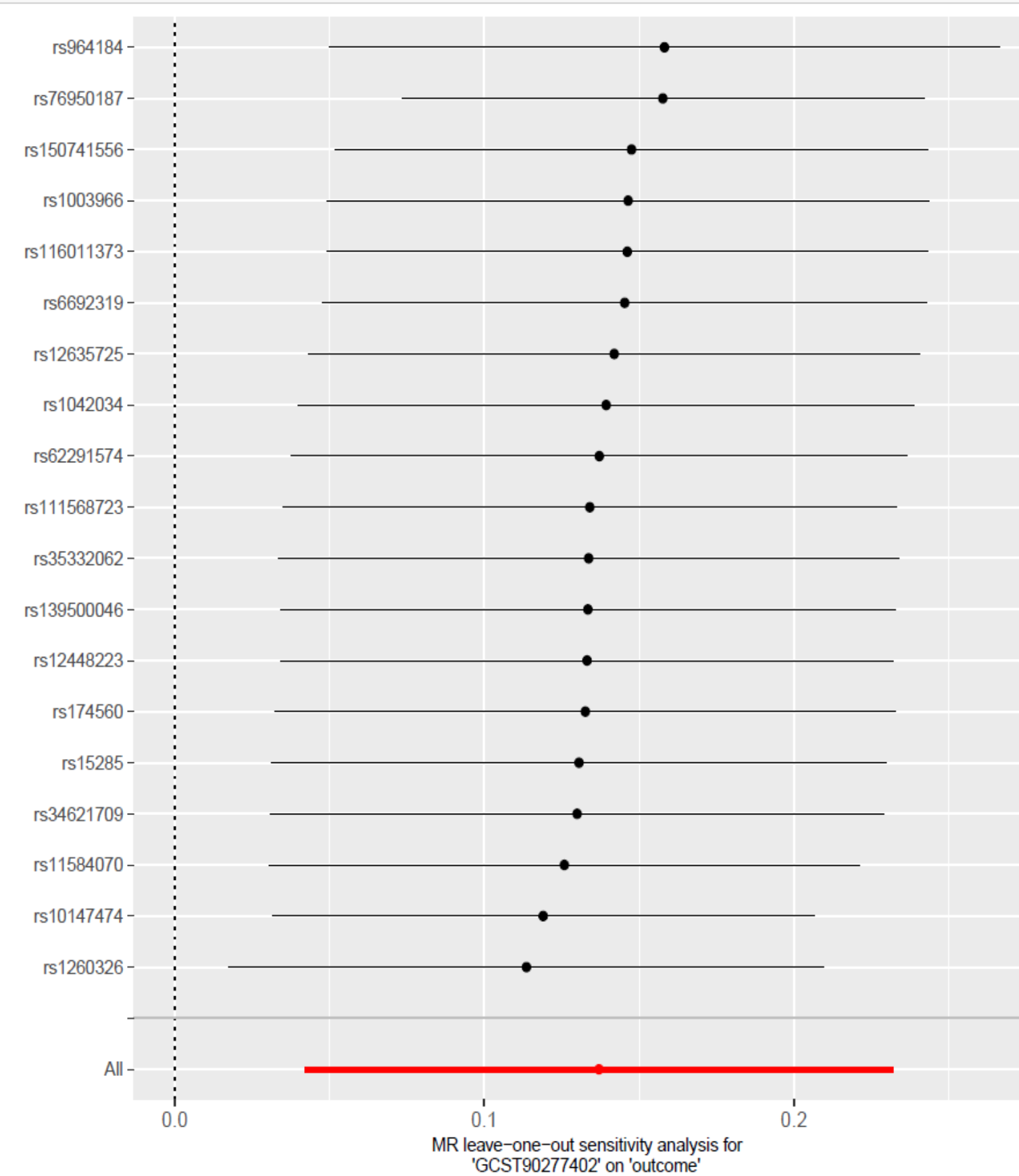
(C)



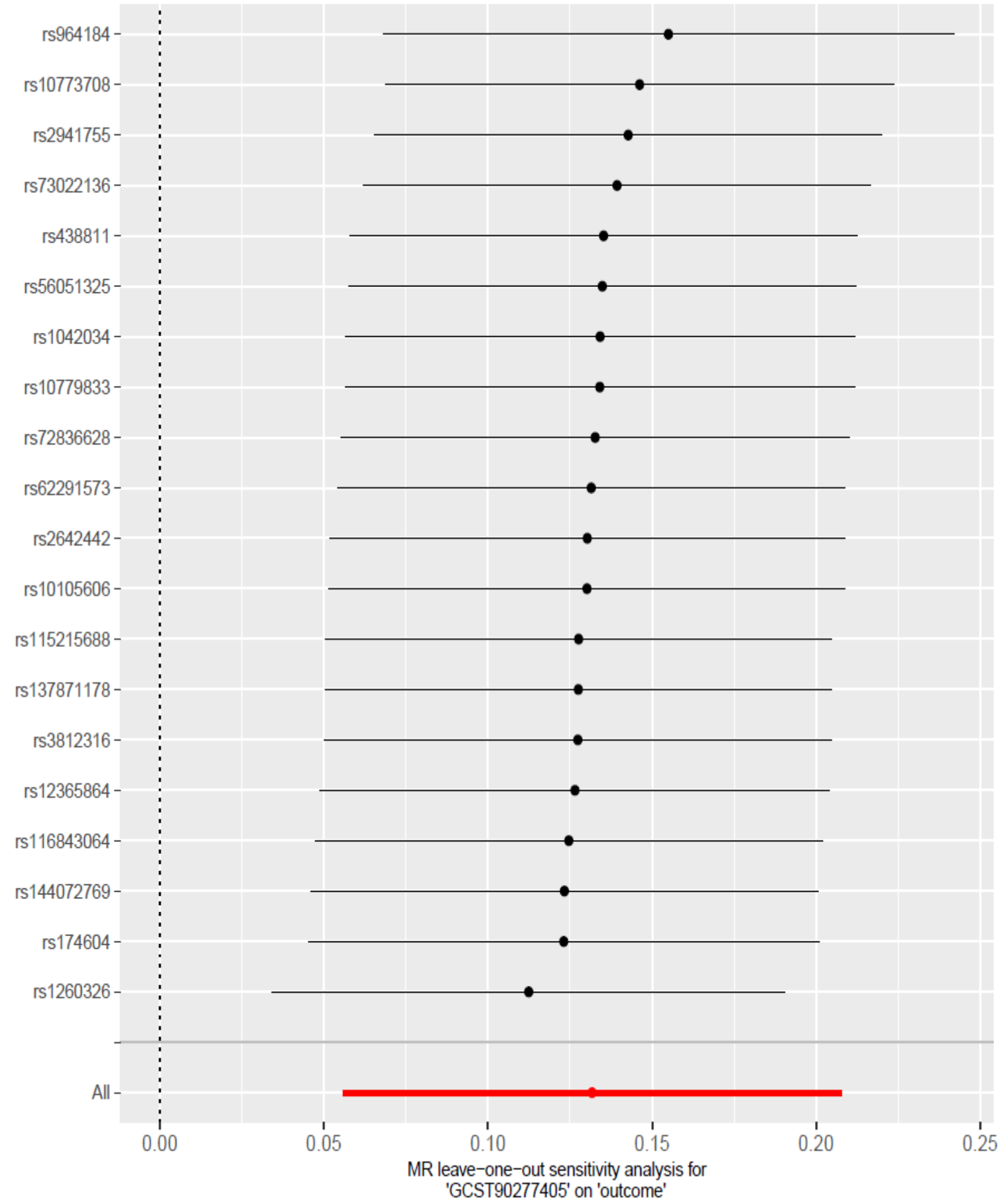
(D)



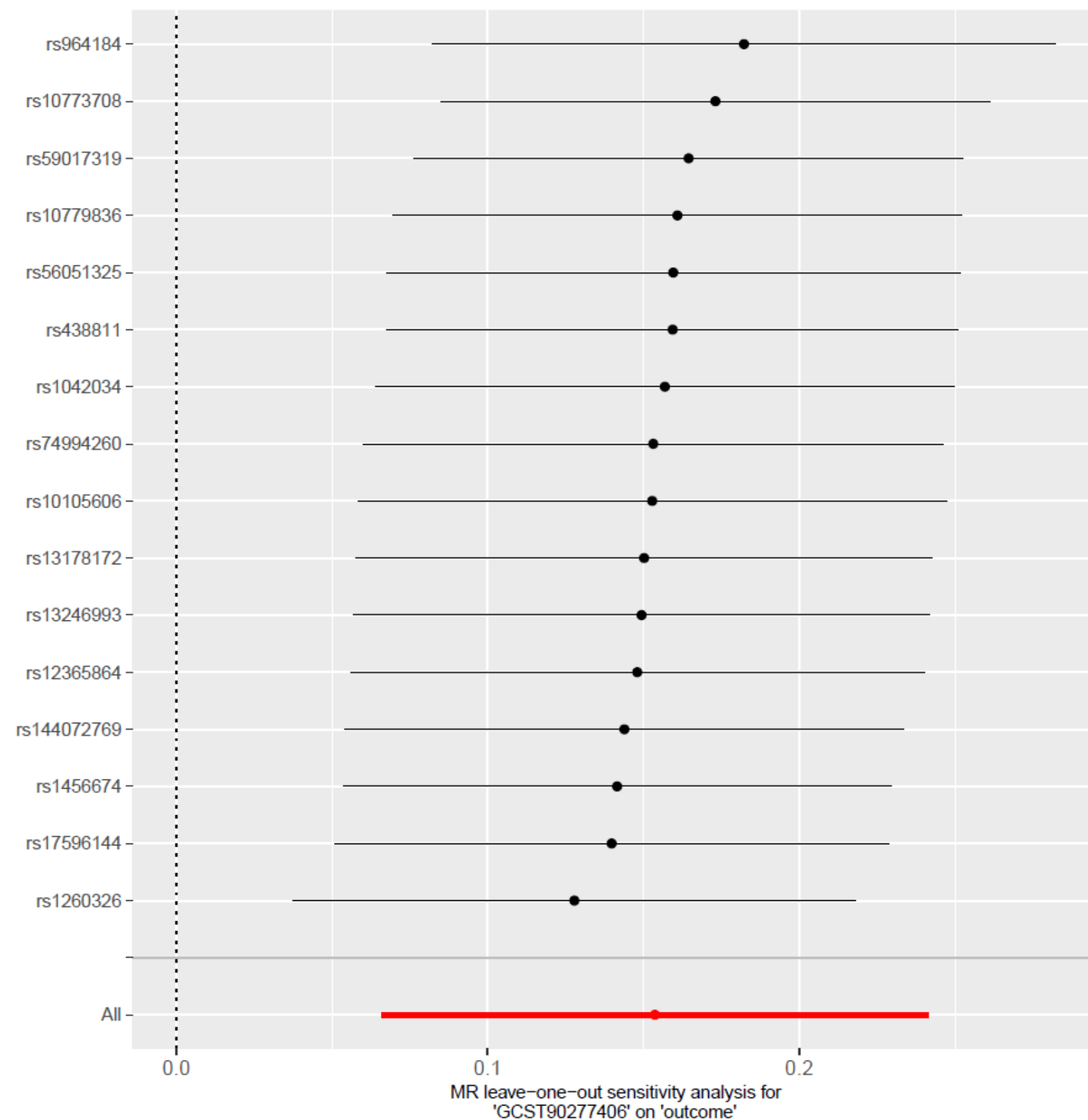
(E)



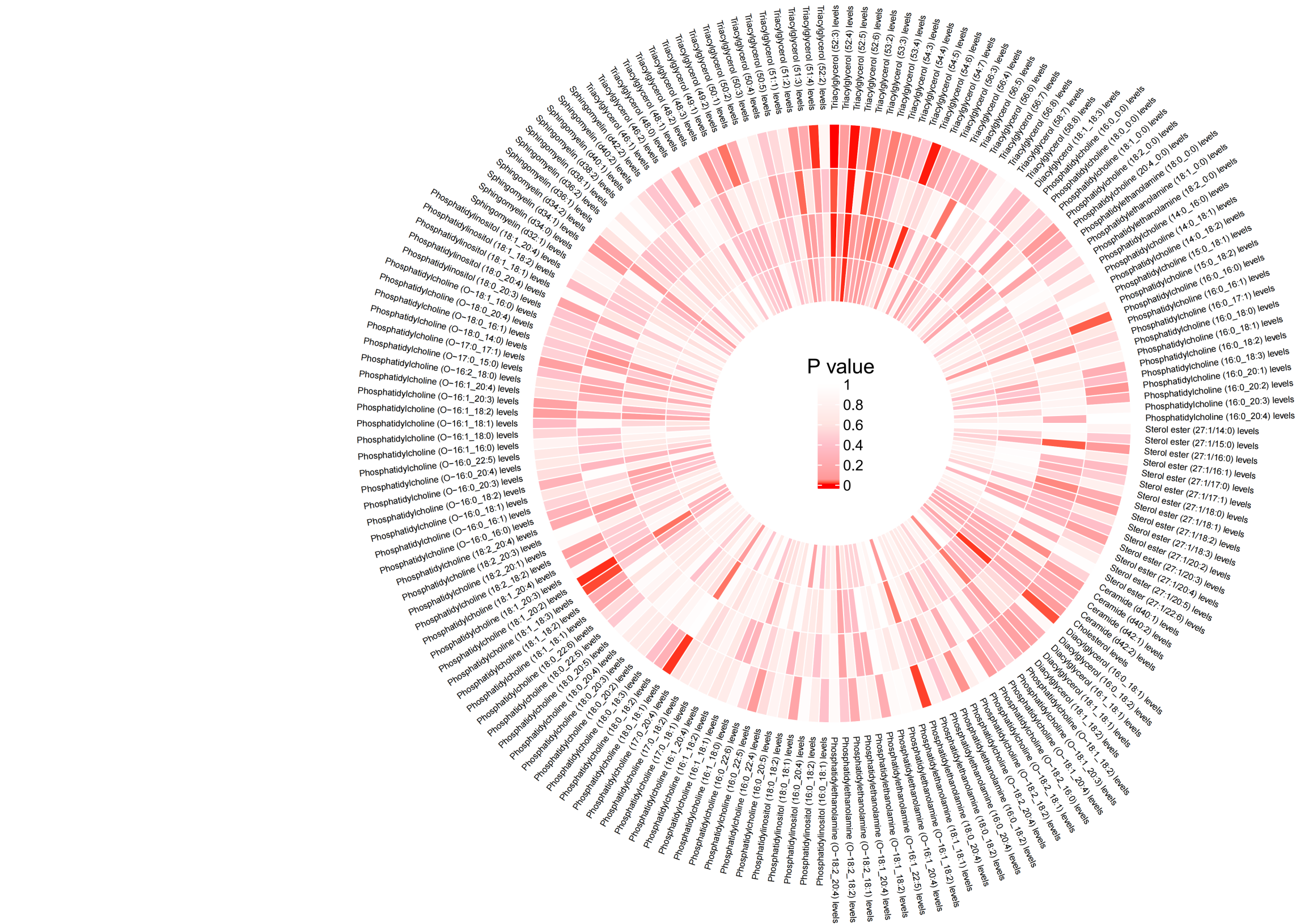
(F)



(G)

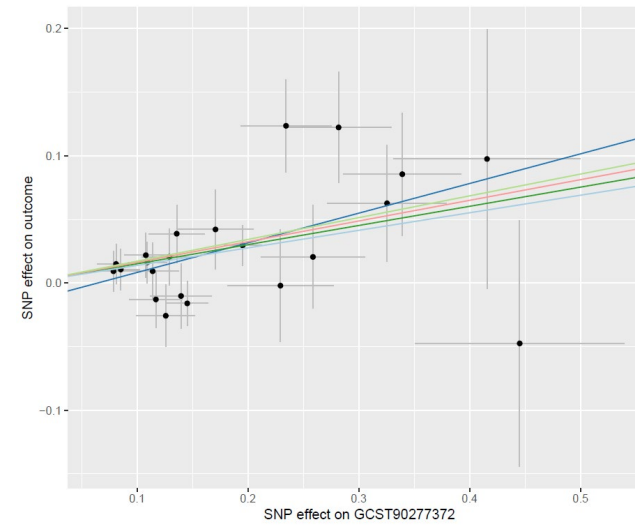
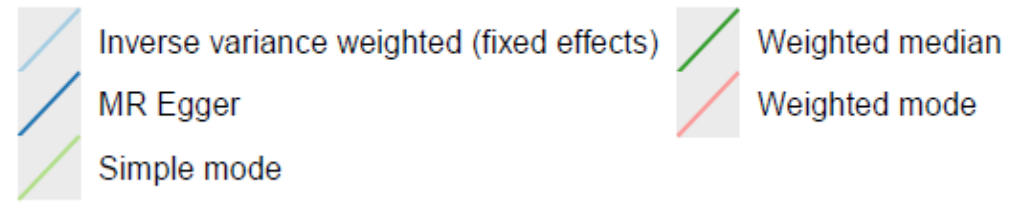


Supplementary Fig. 17. Leave-one-out analysis of MR analyses of (A) TAG(56:3), (B) PC(18:0_0:0), (C) PC(20:4_0:0), (D) PC(14:0_16:0), (E) PC(14:0_18:1), (F) PC(15:0_18:2) and (G) PC(16:0_16:0) on migraine without aura (MO).

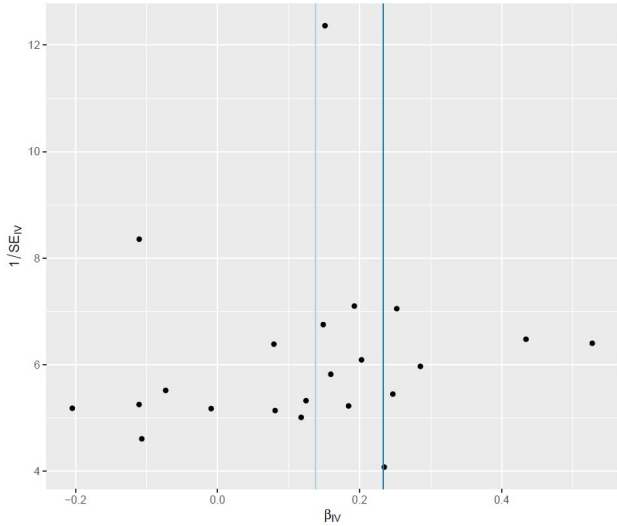
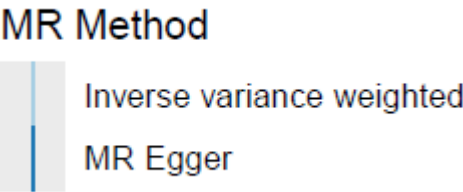


Supplementary Fig. 18. Circular heatmap of the causal effect of 179 lipid species components on migraine with aura. The circular heat map represents the four MR methods, including IVW, Weighted Median, MR-Egger, Weighted mode, in order from the outer ring to the inner ring.

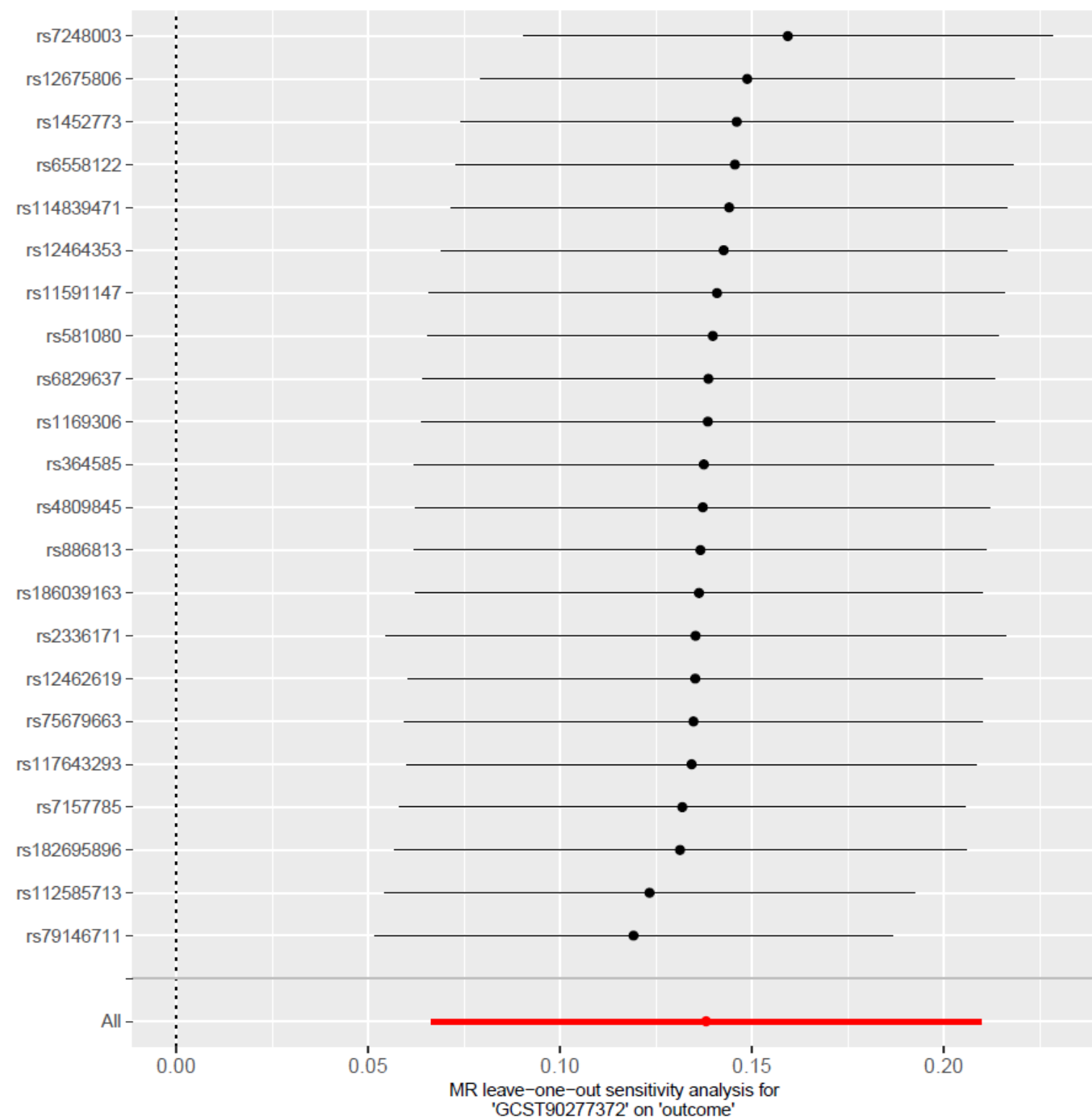
MR Test



Supplementary Fig. 19. Scatter plots to show MR estimates of TAG(52:3) on migraine with aura (MA).



Supplementary Fig. 20. Funnel plots of MR analyses of TAG(52:3) on migraine with aura (MA).



Supplementary Fig. 21. Leave-one-out analysis of MR analyses of TAG(52:3) on migraine with aura (MA).