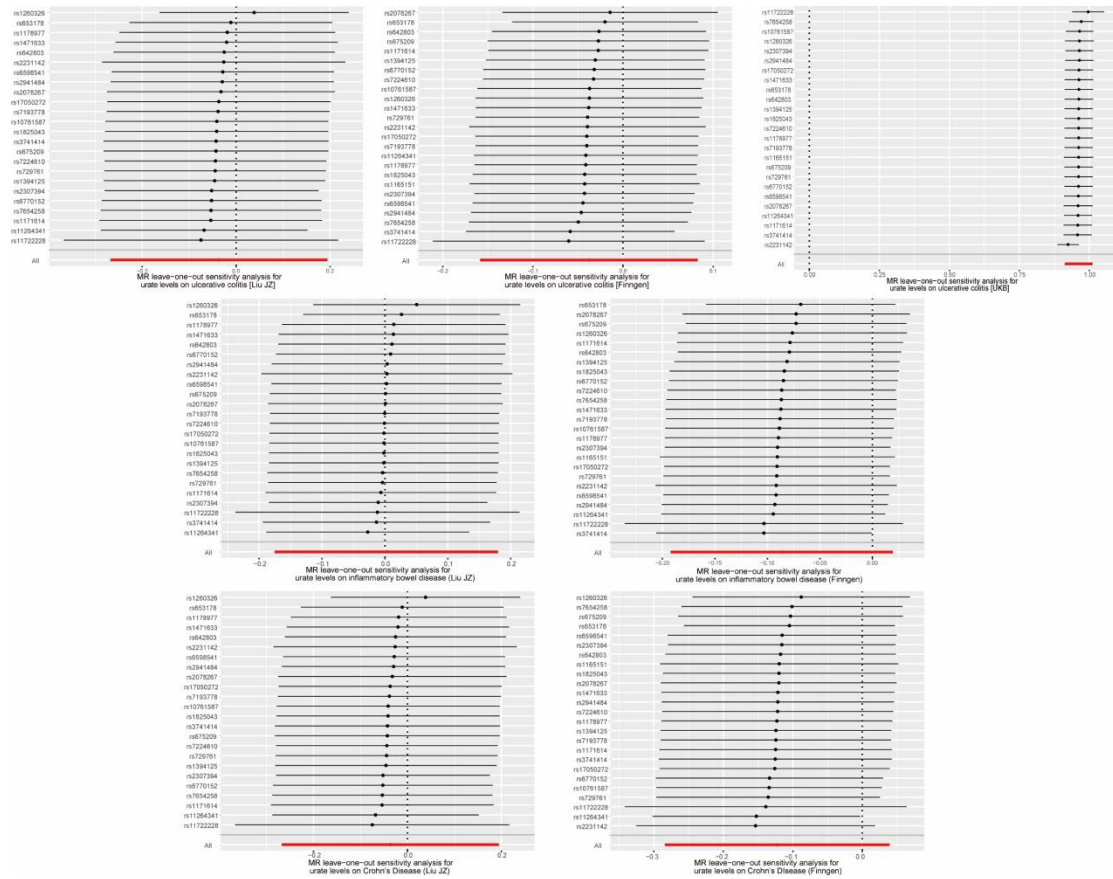
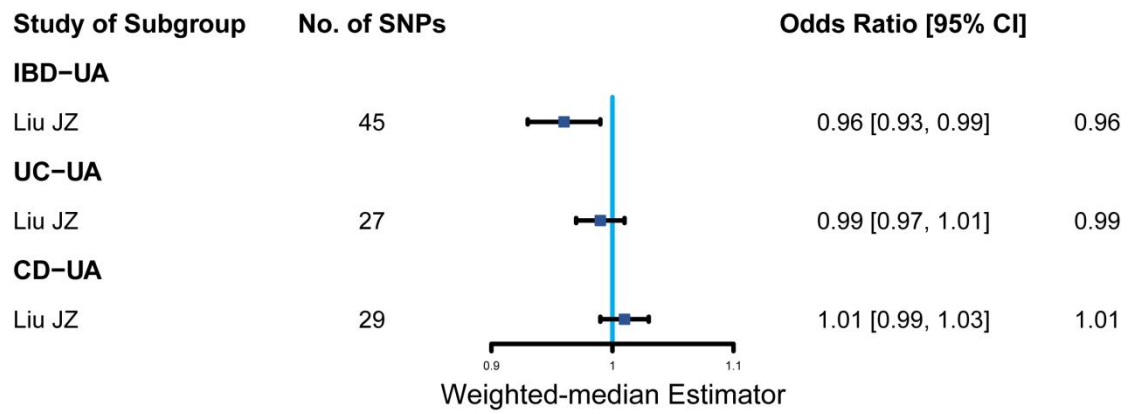


**Supplementary Figure 1** Estimated odds ratios of the effect of per log-odds ratios of urate levels on inflammatory bowel disease, obtained from Weighted-median Estimator per outcome database separately and combined over the three databases for UC and two databases (data are not available in the UKB) for Crohn’s disease and UC using fixed-effect meta-analyses. IBD: Inflammatory bowel disease; CD: Crohn’s disease; UC: Ulcerative colitis; OR: Odds ratio; CI: Confidence interval.

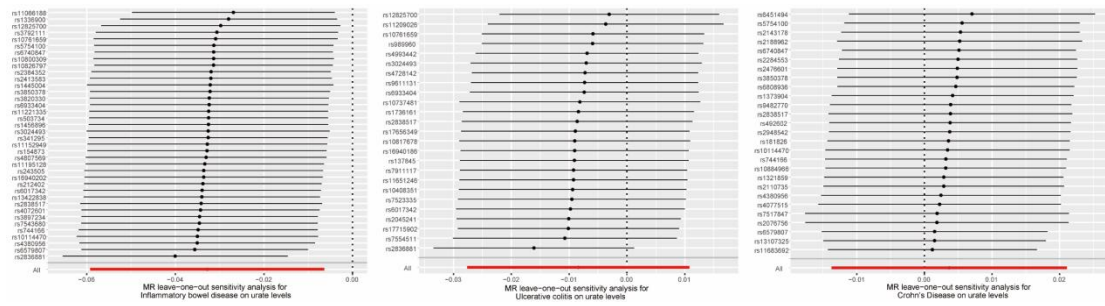


**Supplementary Figure 2** Leave-one-out plot of MR analyses from IBD to urate levels in each database.



**Supplementary Figure 3 Estimated odds ratios of the effect of per log-odds ratio of IBD on urate levels, obtained from Weighted-median Estimator.**

Data for IBD was extracted from Liu *et al*<sup>[19]</sup>. IBD: Inflammatory bowel disease; CD: Crohn's disease; UC: Ulcerative colitis; OR: Odds ratio; CI: Confidence interval.



**Supplementary Figure 4** Leave-one-out plot of MR analyses from IBD to urate levels.

**Supplementary Table 1 Summary statistics of genetics instruments identified for MR analysis**

<b>Exposure</b>	<b>Significant level</b>	<b>No. of SNPs</b>	<b>of F statistics<sup>1</sup></b>
<b>Urate levels</b>	5e-08	27	63.4 (35.4-1406.3)
<b>IBD</b>			
IBD	5e-08	117	47.1 (29.9-500.6)
CD	5e-08	87	55.0 (30.1-489.6)
UC	5e-08	60	57.6 (30.5-408.1)

<sup>1</sup>Data for F statistics was presented as median and range.

IBD: Inflammatory bowel disease; UC: Ulcerative colitis; CD: Crohn's disease; SNP: Single-nucleotide polymorphisms.

**Supplementary Table 2 Instrumental variables for urate levels (significant level of  $P < 5 \times 10^{-8}$ )**

SNP	EA/ non-E A	Beta (SE)	F statistic s	p value	Palin dromi c	IBD [Beta (SE)]		UC [Beta (SE)]			CD [Beta (SE)]	
						Liu JZ	Finngge n	Liu JZ	Finngge n	UKB	Liu JZ	Finngge n
rs1076158 7	T/C	0.062 (0.0091)	46.4	9.58E-1 1	No	0.017 (0.02)	0.003 (0.022)	0.018 (0.026)	-0.005 (0.025)	0.044 (0.006)	0.018 (0.026)	0.036 (0.036)
rs1126434 1	T/C	-0.048 (0.0059)	66.2	1.04E-1 4	No	-0.07 (0.013)	-0.015 (0.016)	-0.072 (0.016)	-0.006 (0.018)	-0.052 (0.004)	-0.072 (0.016)	-0.065 (0.026)
rs1165151	T/G	-0.092 (0.0054)	290.3	4.52E-6 0	No	NA	0.003 (0.016)	NA	-0.002 (0.018)	-0.089 (0.004)	NA	0.015 (0.026)
rs1171614	T/C	-0.074 (0.0071)	108.6	6.48E-2 3	No	-0.02 (0.015)	0.028 (0.021)	-0.035 (0.02)	0.032 (0.024)	-0.078 (0.005)	-0.035 (0.02)	0.002 (0.035)
rs1172222	T/C	0.21	1406.3	1.00E-2	No	0.006	-0.011	0.007	0.001	0.188	0.007	-0.019







rs3741414	T/C	-0.071 (0.007)	102.9	9.79E-2 2	No	-0.034 (0.015)	-0.031 (0.018)	-0.011 (0.019)	-0.043 (0.021)	-0.078 (0.005)	-0.011 (0.019)	0.002 (0.03)
rs642803	T/C	-0.043 (0.0054	63.4	4.51E-1 4	No	0.023 (0.012)	0.024 (0.016)	0.03 (0.016)	0.032 (0.018)	-0.04 (0.004)	0.03 (0.016)	0.018 (0.026)
rs653178	T/C	-0.036 (0.0054	44.4	2.45E-1 0	No	0.075 (0.013)	0.061 (0.016)	0.081 (0.016)	0.058 (0.018)	-0.032 (0.004)	0.081 (0.016)	0.06 (0.026)
rs6598541	A/G	0.044 (0.0057	59.6	5.20E-1 3	No	-0.001 (0.013)	0.011 (0.016)	-0.024 (0.017)	0.017 (0.019)	0.046 (0.004)	-0.024 (0.017)	-0.025 (0.027)
rs675209	T/C	0.063 (0.0062	103.3	1.38E-2 1	No	0.003 (0.014)	-0.033 (0.017)	0.011 (0.018)	-0.023 (0.019)	0.061 (0.004)	0.011 (0.018)	-0.046 (0.027)
rs6770152	T/G	-0.048 (0.0056	73.5	2.66E-1 6	No	0.016 (0.013)	0.008 (0.016)	-0.035 (0.016)	0.016 (0.018)	-0.048 (0.004)	-0.035 (0.016)	-0.021 (0.026)

rs6830367	C/G	0.051 (0.0072 )	50.2	2.35E-1 1	Yes	0.011 (0.017)	-0.027 (0.019)	0.006 (0.021)	-0.04 (0.022)	0.04 (0.005)	0.006 (0.021)	0.006 (0.032)
rs7193778	T/C	-0.047 (0.0079 )	35.4	2.36E-0 8	No	-0.013 (0.018)	-0.004 (0.022)	-0.007 (0.023)	-0.01 (0.026)	-0.046 (0.006)	-0.007 (0.023)	-0.004 (0.037)
rs7224610	A/C	-0.038 (0.0055 )	47.7	4.74E-1 1	No	-0.01 (0.013)	0.003 (0.016)	-0.021 (0.016)	0.017 (0.018)	-0.037 (0.004)	-0.021 (0.016)	0.006 (0.026)
rs729761	T/G	-0.046 (0.0063 )	53.3	3.05E-1 2	No	-0.019 (0.014)	-0.01 (0.017)	-0.023 (0.018)	-0.003 (0.019)	-0.045 (0.004)	-0.023 (0.018)	-0.033 (0.028)
rs7654258	T/C	-0.099 (0.01)	98.0	1.09E-1 9	No	-0.024 (0.024)	0.007 (0.027)	-0.064 (0.031)	-0.038 (0.031)	-0.054 (0.007)	-0.064 (0.031)	0.087 (0.045)

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**Supplementary Table 3 Effect estimates of the genetics instrumental variables for urate levels and risk of IBD**

Urate levels	IVW		Weighted Median	MR-Egger		MR-PRESSO (outlier-corrected)		
	OR (95% CI)	Q (p value)	OR (95% CI)	OR (95% CI)	Intercept (p value)	outlier	OR (95% CI)	P for global test
<b>IBD</b>								
Liu JZ	1.00 (0.88, 1.13)	57.7 (4.5E -5)	1.02 (0.92, 1.14)	1.01 (0.73, 1.40)	-0.001 (0.93)	4	1.03 (0.94, 1.13)	< 0.001
Finngen	0.92 (0.83, 1.02)	33.4 (0.1)	0.95 (0.83, 1.08)	0.96 (0.78, 1.17)	-0.003 (0.63)	0	NA	0.13
<b>Meta-analysis</b>	<b>0.95 (0.88, 1.03)</b>	-	<b>0.99 (0.92, 1.08)</b>	<b>0.97 (0.82, 1.15)</b>	-	-	-	-
<b>UC</b>								
Liu JZ	1.04 (0.92, 1.17)	30.5 (0.05)	1.04 (0.91, 1.19)	1.04 (0.76, 1.42)	-0.001 (0.92)	5	1.04 (0.91, 1.18)	< 0.001
Finngen	0.96 (0.85, 1.09)	33.2 (0.1)	1.00 (0.86, 1.16)	1.06 (0.85, 1.33)	-0.009 (0.32)	0	NA	0.10
UKB	2.70 (2.54, 2.87)	110.8 (1.8E-13)	0.96 (0.76, 1.22)	1.06 (0.70, 1.61)	-0.012 (0.47)	3	2.71 (2.54-2.88)	0.012

<b>Meta-analysis</b>	<b>1.95 (1.86, 2.05)</b>	-	<b>1.01 (0.92, 1.11)</b>	<b>1.06 (0.89, 1.25)</b>	-	-	-	-
<b>CD</b>								
Liu JZ	1.04 (0.92, 1.18)	30.3 (0.05)	1.02 (0.89, 1.17)	0.97 (0.64, 1.49)	-0.001 (0.95)	5	1.04 (0.91, 1.18)	< 0.001
Finngen	0.88 (0.75, 1.04)	28.7 (0.23)	0.90 (0.73, 1.12)	0.93 (0.69, 1.27)	-0.004 (0.70)	0	NA	0.274
<b>Meta-analysis</b>	<b>0.98 (0.89, 1.08)</b>	-	<b>0.98 (0.87, 1.11)</b>	<b>0.95 (0.74, 1.21)</b>	-	-	-	-

Footnote: Results of meta-analyses were from fixed-effect or random-effect model depending on heterogeneity test on outcome datasets. IVW will be re-performed if outliers are detected in MR-PRESSO estimates. IVW: Inverse variance weighted; OR: Odds Ratio; CI: Confidence Interval; Q: Cochran's Q statistics; MR-PRESSO: MR Pleiotropy Residual Sum and Outlier; NA: Not available. IBD: Inflammatory Bowel Disease; UC: Ulcerative Colitis; CD: Crohn's Disease.

**Table S4 Instrumental variables for IBD (significant level of  $P < 5 \times 10^{-8}$ )**

SNP	E A	Non-E A	Beta	SE	F	p value	Palindromic	Urate levels (K)	
								Beta	SE
<b>IBD</b>									
rs101144	T	C	0.14	0.01	115.9	4.10E-2	No	0.00	0.00
70			8	4		7		2	6
rs107616	A	G	0.15	0.01	158.2	2.30E-3	No	-0.0	0.00
59			9	3		6		10	6
rs108003	A	G	-0.1	0.01	85.5	1.94E-2	No	0.00	0.00
09			23	3		0		9	6
rs108267	G	T	-0.0	0.01	53.0	3.99E-1	No	0.01	0.00
97			99	4		3		0	6
rs110661	G	A	0.08	0.01	45.2	1.76E-1	No	-0.0	0.00
88			7	3		1		31	6
rs111529	A	G	0.10	0.01	58.7	1.56E-1	No	-0.0	0.00
49			2	3		4		03	6
rs111951	C	T	0.07	0.01	35.5	2.74E-0	No	0.00	0.00
28			9	3		9		1	6
rs112213	T	C	0.08	0.01	31.2	2.44E-0	No	-0.0	0.00
35			3	5		8		05	6
rs117391	G	C	0.13	0.01	119.4	1.10E-2	Yes	-0.0	0.00
35			7	3		7		08	6
rs126749	G	C	0.10	0.01	43.9	3.39E-1	Yes	-0.0	0.00
6			5	6		1		11	7
rs128257	G	A	0.13	0.01	108.7	1.28E-2	No	-0.0	0.00
00			2	3		5		13	6
rs131995	C	G	-0.0	0.01	33.5	7.50E-0	Yes	0.00	0.00
1			85	5		9		7	7

rs133690	G	A	-0.0	0.01	43.9	2.98E-1	No	0.02	0.00
0			85	3		1		4	5
rs134228	T	C	-0.1	0.02	31.1	2.56E-0	No	-0.0	0.00
38			14	1		8		09	9
rs144500	C	T	0.16	0.01	176.9	3.48E-4	No	-0.0	0.00
4			9	3		0		07	6
rs145689	C	T	0.08	0.01	43.7	4.50E-1	No	-0.0	0.00
6			8	3		1		04	6
rs154873	G	A	-0.0	0.01	37.9	7.38E-1	No	0.00	0.00
			81	3		0		2	6
rs169402	T	C	0.11	0.01	44.7	2.51E-1	No	0.00	0.00
02			3	7		1		3	9
rs212402	G	A	-0.0	0.01	32.7	1.06E-0	No	-0.0	0.00
			74	3		8		03	6
rs238435	A	G	0.09	0.01	52.7	3.12E-1	No	-0.0	0.00
2			5	3		3		07	6
rs241358	C	T	-0.1	0.01	102.6	4.60E-2	No	0.00	0.00
3			73	7		4		9	8
rs243505	A	G	-0.0	0.01	39.6	3.04E-1	No	-0.0	0.00
			81	3		0		01	6
rs248839	G	C	0.09	0.01	43.7	3.63E-1	Yes	-0.0	0.00
8			9	5		1		04	7
rs254837	G	C	0.12	0.02	35.5	2.54E-0	Yes	0.01	0.01
			2	1		9		4	0
rs283688	G	T	-0.1	0.01	126.6	1.96E-2	No	-0.0	0.00
1			64	5		9		17	6
rs283851	T	C	-0.1	0.01	104.9	1.84E-2	No	0.00	0.00
7			28	3		4		0	5
rs285765	G	C	-0.1	0.01	50.5	1.07E-1	Yes	-0.0	0.00

6			00	4		2			05	6
rs302449	C	A	0.19	0.01	134.1	4.04E-3	No		-0.0	0.00
3			1	7		1			07	8
rs341295	C	T	0.07	0.01	32.1	1.45E-0	No		-0.0	0.00
			0	2		8			03	5
rs379211	C	T	0.13	0.01	125.8	5.12E-2	No		-0.0	0.00
1			9	2		9			10	5
rs382033	C	A	-0.0	0.01	40.6	1.72E-1	No		0.00	0.00
0			89	4		0			5	6
rs385037	T	C	0.15	0.02	55.1	1.10E-1	No		-0.0	0.00
8			4	1		3			09	9
rs389723	T	C	0.09	0.01	44.8	1.90E-1	No		0.00	0.00
4			7	5		1			6	6
rs407260	G	A	-0.1	0.01	51.0	8.43E-1	No		-0.0	0.00
1			26	8		3			04	7
rs438095	G	A	0.09	0.01	51.0	1.12E-1	No		0.00	0.00
6			1	3		2			7	6
rs471252	G	C	0.10	0.01	47.1	7.14E-1	Yes		-0.0	0.00
8			4	5		2			06	7
rs480756	A	C	0.12	0.01	71.0	4.24E-1	No		-0.0	0.00
9			8	5		7			03	7
rs503734	A	G	-0.0	0.01	31.1	2.67E-0	No		0.00	0.00
			69	2		8			4	5
rs575410	T	C	0.12	0.01	65.3	7.14E-1	No		-0.0	0.00
0			9	6		6			11	7
rs601734	A	C	0.11	0.01	73.3	1.07E-1	No		0.00	0.00
2			6	4		7			5	8
rs657980	C	T	0.12	0.01	43.7	4.01E-1	No		0.02	0.01
7			5	9		1			5	0

rs674084	A	G	-0.0	0.01	54.6	1.22E-1	No	0.00	0.00
7			92	3		3		9	6
rs693340	T	C	0.08	0.01	33.5	6.64E-0	No	-0.0	0.00
4			6	5		9		06	7
rs744166	A	G	-0.1	0.01	77.5	1.34E-1	No	-0.0	0.00
			11	3		8		03	5
rs754368	G	A	-0.1	0.01	42.8	5.51E-1	No	-0.0	0.00
0			00	5		1		06	7
rs601734	A	C	0.11	0.01	73.3	1.07E-1	No	0.00	0.00
2			6	4		7		5	8
rs657980	C	T	0.12	0.01	43.7	4.01E-1	No	0.02	0.01
7			5	9		1		5	0
rs674084	A	G	-0.0	0.01	54.6	1.22E-1	No	0.00	0.00
7			92	3		3		9	6
rs693340	T	C	0.08	0.01	33.5	6.64E-0	No	-0.0	0.00
4			6	5		9		06	7
rs744166	A	G	-0.1	0.01	77.5	1.34E-1	No	-0.0	0.00
			11	3		8		03	5
rs754368	G	A	-0.1	0.01	42.8	5.51E-1	No	-0.0	0.00
0			00	5		1		06	7
<b>UC</b>									
rs104083	G	A	0.15	0.02	57.6	2.92E-1	No	0.00	0.00
51			5	0		4		5	8
rs107374	T	G	0.21	0.01	186.8	2.56E-4	No	-0.0	0.00
81			7	6		2		02	5
rs107616	A	G	0.12	0.01	63.6	1.33E-1	No	-0.0	0.00
59			8	6		5		10	6
rs108176	G	A	0.13	0.01	61.4	4.42E-1	No	0.00	0.00
78			3	7		5		1	6



rs112090	G	A	-0.4	0.03	182.0	2.00E-4	No	0.01	0.01
26			83	6		1		9	1
rs116512	T	G	0.14	0.02	45.1	2.01E-1	No	0.00	0.00
46			7	2		1		4	8
rs128257	G	A	0.18	0.01	137.7	7.33E-3	No	-0.0	0.00
00			9	6		2		13	6
rs137845	A	G	0.10	0.01	40.9	1.50E-1	No	0.00	0.00
			1	6		0		2	5
rs169401	T	C	0.13	0.02	40.2	2.19E-1	No	0.00	0.00
86			6	1		0		3	8
rs173616	G	A	-0.1	0.01	58.1	2.22E-1	No	0.00	0.00
1			23	6		4		1	6
rs176563	C	T	0.09	0.01	32.0	1.54E-0	No	0.00	0.00
49			0	6		8		2	5
rs177159	G	A	0.09	0.01	34.4	4.62E-0	No	0.00	0.00
02			7	7		9		8	6
rs204524	G	A	-0.1	0.01	39.6	2.83E-1	No	-0.0	0.00
1			06	7		0		06	6
rs281695	T	A	0.13	0.02	36.1	1.80E-0	Yes	0.00	0.00
4			8	3		9		2	8
rs283688	G	T	-0.2	0.01	142.1	1.11E-3	No	-0.0	0.00
1			22	9		2		17	6
rs283851	T	C	-0.1	0.01	54.1	1.78E-1	No	0.00	0.00
7			18	6		3		0	5
rs302449	C	A	0.21	0.02	101.0	7.46E-2	No	-0.0	0.00
3			0	1		4		07	8
rs472814	G	A	0.10	0.01	39.7	3.23E-1	No	-0.0	0.00
2			0	6		0		06	6
rs499344	G	T	-0.0	0.01	30.5	3.54E-0	No	0.00	0.00

2			99	8		8			9	6
rs601734	A	C	0.19	0.01	130.8	3.95E-3	No		0.00	0.00
2			4	7		0			5	8
rs693340	T	C	0.14	0.01	62.5	2.69E-1	No		-0.0	0.00
4			9	9		5			06	7
rs752333	G	A	-0.1	0.02	43.7	3.42E-1	No		-0.0	0.00
5			39	1		1			04	7
rs755451	C	A	-0.1	0.01	66.2	4.27E-1	No		-0.0	0.00
1			45	8		6			08	6
rs791111	T	G	-0.1	0.02	31.5	1.84E-0	No		-0.0	0.00
7			34	4		8			05	8
rs926779	G	C	0.24	0.02	78.8	6.54E-1	Yes		-0.0	0.01
8			9	8		9			05	1
rs961113	T	C	-0.1	0.02	43.3	5.11E-1	No		0.00	0.00
1			49	3		1			8	8
rs989960	C	T	-0.1	0.01	57.6	3.29E-1	No		0.01	0.00
			21	6		4			0	6
<b>CD</b>										
rs101144	T	C	0.16	0.01	90.8	1.76E-2	No		0.00	0.00
70			9	8		1			2	6
rs108849	G	A	0.11	0.01	43.7	4.13E-1	No		0.00	0.00
66			3	7		1			4	6
rs116836	T	C	-0.2	0.03	31.8	1.75E-0	No		-0.0	0.01
92			14	8		8			45	3
rs131073	C	T	0.20	0.02	49.9	1.67E-1	No		0.03	0.01
25			1	8		2			0	1
rs132185	C	T	-0.1	0.01	37.2	1.18E-0	No		-0.0	0.00
9			05	7		9			06	6
rs137390	A	G	0.14	0.01	55.7	9.11E-1	No		-0.0	0.00

4			1	9		4			03	6
rs181826	C	A	0.11	0.01	48.4	3.25E-1	No		0.00	0.00
			6	7		2			1	6
rs207675	A	G	0.38	0.01	489.6	1.80E-1	No		0.00	0.00
6			5	7		08			5	6
rs211073	A	G	-0.1	0.01	55.0	1.20E-1	No		-0.0	0.00
5			37	9		3			06	7
rs214317	T	C	-0.2	0.02	87.6	6.84E-2	No		0.01	0.00
8			09	2		1			0	8
rs218896	C	T	0.20	0.01	156.9	5.59E-3	No		-0.0	0.00
2			0	6		6			04	6
rs228455	A	G	0.12	0.01	59.9	1.14E-1	No		-0.0	0.00
3			8	7		4			07	6
rs247660	A	G	0.23	0.02	65.3	6.44E-1	No		-0.0	0.00
1			1	9		6			09	9
rs258182	C	G	-0.0	0.01	33.7	6.46E-0	Yes		-0.0	0.00
8			94	6		9			18	6
rs283851	T	C	-0.1	0.01	80.8	2.03E-1	No		0.00	0.00
7			46	6		9			0	5
rs285765	G	C	-0.1	0.01	75.0	4.22E-1	Yes		-0.0	0.00
6			58	8		8			05	6
rs294854	A	G	0.10	0.01	38.9	5.15E-1	No		0.00	0.00
2			2	6		0			0	6
rs385037	T	C	0.19	0.02	55.5	8.31E-1	No		-0.0	0.00
8			9	7		4			09	9
rs407751	C	T	0.18	0.01	130.1	3.15E-3	No		0.00	0.00
5			5	6		0			7	6
rs438095	G	A	0.13	0.01	64.0	1.15E-1	No		0.00	0.00
6			2	7		5			7	6

rs492602	A	G	0.10	0.01	44.8	2.33E-1	No	-0.0	0.00
			8	6		1		01	6
rs575410	T	C	0.16	0.02	67.1	3.02E-1	No	-0.0	0.00
0			9	1		6		11	7
rs645149	T	C	0.26	0.01	246.3	8.26E-5	No	-0.0	0.00
4			1	7		6		07	6
rs657980	C	T	0.19	0.02	66.7	3.44E-1	No	0.02	0.01
7			9	4		6		5	0
rs674084	A	G	-0.1	0.01	41.7	9.72E-1	No	0.00	0.00
7			04	6		1		9	6
rs680893	A	G	0.09	0.01	31.5	1.93E-0	No	-0.0	0.00
6			0	6		8		07	5
rs744166	A	G	-0.1	0.01	49.7	1.80E-1	No	-0.0	0.00
			14	6		2		03	5
rs751784	T	G	-0.3	0.01	436.4	5.84E-9	No	-0.0	0.00
7			45	7		7		04	5
rs948277	T	C	0.09	0.01	37.1	1.01E-0	No	-0.0	0.00
0			9	6		9		01	6

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**Supplementary Table 5 Effect estimates of the genetics instrumental variables for IBD and risk of urate levels**

	IVW		Weighted Median	MR-Egger		MR-PRESSO (outlier-corrected)		
	OR (95% CI)	Q ( <i>P</i> value)	OR (95% CI)	OR (95% CI)	Intercept ( <i>p</i> value)	outlier	OR (95% CI)	<i>P</i> for global test
<b>IBD</b>								
Liu	0.97	94.8	0.96 (0.93,	1.01	-0.001	7	0.97	0.02
JZ	(0.94,	(1.4E	0.99)	(0.92,	(0.34)		(0.95,	
	0.99)	-05)		1.12)			1.00)	
<b>UC</b>								
Liu	0.99	33.4	0.99 (0.97,	0.98	0.002	0	NA	0.076
JZ	(0.97,	(0.1)	1.01)	(0.93,	(0.57)			
	1.01)			1.03)				
<b>CD</b>								
Liu	1.01	56.2	1.09 (0.83,	0.97	-0.002	0*	NA	0.006
JZ	(0.99,	(0.001)	1.44)	(0.97,	(0.61)			
	1.02)			1.06)				

<sup>1</sup>There were 2 insignificant outliers for CD and risk of urate levels in MR-PRESSO analysis (*P* value = 0.054 and 0.081), as a result, effect estimate did not be performed by excluding the two insignificant outliers.

Footnote: Results of meta-analyses were from fixed-effect model given no heterogeneity detected between outcome datasets. Otherwise, the random-effect model was performed to provide effect estimates. IVW: Inverse variance weighted; OR: Odds Ratio; CI: Confidence Interval; Q: Cochran's Q statistics; MR-PRESSO: MR Pleiotropy Residual Sum and Outlier; NA: Not available; IBD: Inflammatory Bowel Disease; UC: Ulcerative Colitis; CD: Crohn's Disease.