



The Impact of Insurance Reform on Health Resource Utilization and Persistence for Chinese Patients with Cohrn’s Disease, Taking Ustekinumab As an Example: Evidence from a Natural Experiment Study

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Objective

To study the influence of insurance reform on biologic drug persistence for Crohn’s disease (CD) treatment and CD-related health resource use (HRU) and the mediating effect of the maintenance treatment setting on that association.

Methodology

Study design

- This was a cohort study based on inflammatory bowel disease (IBD) registry in Hangzhou city, China.
- Participants were CD patients who started Ustekinumab (UST) and receiving maintenance treatment during 2022.
- The exposure was the type of insurance, namely, **the reformed medical insurance type** with comparable inpatient and outpatient reimbursement policy for CD-related treatment; while the **non-reformed insurance type** getting reimbursed only under inpatient setting and have no outpatient reimbursement for CD treatment.

Statistical analysis

- Cox regression models generated hazard ratios (HR).
- Mediation analysis further accounted for the maintenance treatment setting (**Figure 1**).

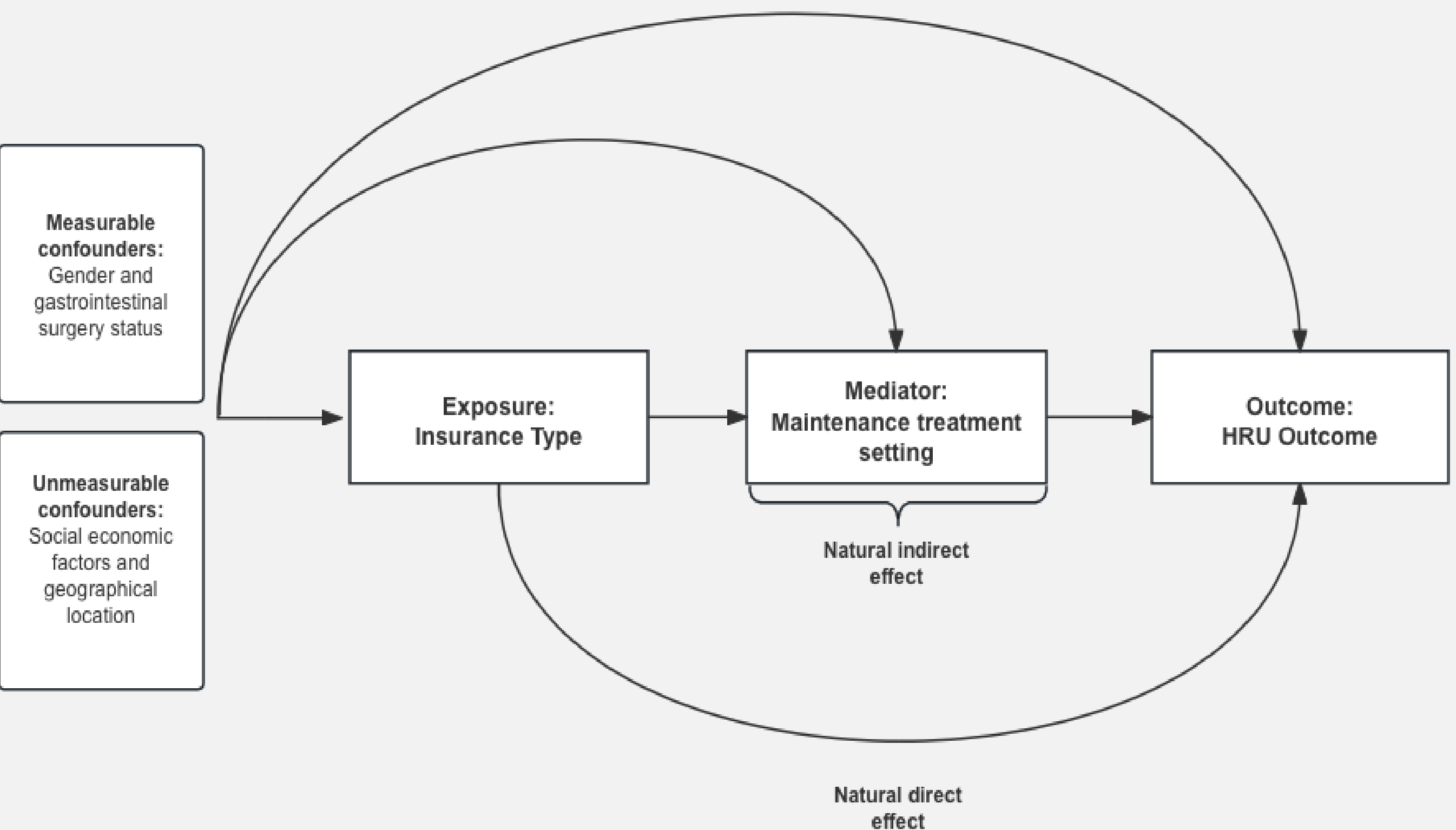


Figure 1. Causal Mediation Analysis of the Relation Between Insurance Type and Health Resource Use (HRU) Outcome

Results

A total of 133 patients were included: 65 (48.9%) from reformed insurance group and 68 (51.1%) from control group. (**Table 1**).

Table 1. Baseline Characteristics of Included CD Patients By Insurance Type

Baseline characteristic	Participants, No. (%)	
	Reformed insurance group (n=65)	Non-reformed insurance group (n=68)
Age of patients, mean (SD), y	35.61 (1.68)	34.63 (1.54)
Age at first diagnosis of CD		
≤16	6 (9.23)	5 (7.35)
17–40	45 (69.23)	48 (70.59)
>40	14 (21.54)	15 (22.06)
Sex		
Female	14 (21.54)	24 (35.29)
Male	51 (78.46)	44 (64.71)
Follow-up, mean (SD), days	247.95 (79.51)	250.60 (83.54)

➤ HRU& Discontinuation

Patients from the reformed insurance group incurred significantly less overall CD-related treatment cost: ¥10,640.53 vs. ¥16,430.7 with cost difference being ¥-5,790.17 (95%CI, -¥10,959.22, -¥621.11) (**Table 2**) and achieved improved persistence with a 72.75% lower risk of UST discontinuation (discontinuation risk, 7.69% vs. 25%; adjusted HR, 0.27; 95%CI, 0.10-0.74) (**Figure 2**).

Table 2. CD-Related Healthcare Expenditure and Resource Use for Patients Included for Analysis by Insurance Type

	Cost and health resource use (HRU), mean (95% CI)				
	Total included patients	Reformed insurance group	Non-reformed insurance group	Cost/HRU difference ^a	Adjusted cost/HRU difference ^b
Healthcare expenditure outcome, CNY					
CD-related treatment cost	13,600.92 (10,979.24, 16,222.60)	10,640.53 (7,366.32, 13,914.74)	16,430.70 (12,403.20, 20,458.20)	-5,790.17 (-10,959.22, -621.11) ^c	-6,362.20 (-11,657.77, -1,066.61) ^c
CD-related hospitalization cost	13,190.10 (10,562.06, 15,818.15)	10,114.74 (6,813.54, 13,415.94)	16,129.78 (12,115.69, 20,143.88)	-6,015.04 (-11,189.46, -840.62) ^c	-6,601.77 (-11,902.64, -1,300.90) ^c
CD-related outpatient cost	348.35 (257.11, 439.59)	460.91 (322.76, 599.06)	240.75 (123.03, 358.47)	220.16 (40.92, 399.40) ^c	226.64 (42.29, 411.00) ^c
CD-related emergency room cost	62.47 (24.60, 100.34)	64.89 (18.28, 111.49)	60.17 (-22, 120.55)	4.72 (-71.33, 80.77)	12.94 (-65.19, 91.06)
Healthcare resource use outcome					
CD-related hospitalization number	3.44 (3.17, 3.70)	2.57 (2.34, 2.80)	4.26 (3.89, 4.64)	-1.70 (-2.14, -1.25) ^c	-1.64 (-2.10, 1.18) ^c
CD-related outpatient visit number	5.36 (4.61, 6.11)	8.58 (7.65, 9.52)	2.28 (1.80, 2.76)	6.31 (5.25, 7.36) ^c	6.53 (5.48, 7.57) ^c
CD-related emergency room visit number	0.22 (0.11, 0.33)	0.23 (0.08, 0.38)	0.21 (0.04, 0.37)	0.02 (-0.20, 0.25)	0.04 (-0.19, 0.28)
CD-related inpatient length of stay	6.43 (5.66, 7.20)	5.28 (4.22, 6.34)	7.53 (6.46, 8.60)	-2.25 (-3.74, -0.76) ^c	-2.02 (-3.56, -0.50) ^c

CNY: Chinese Yuan

a: The expenditure and resource use of reformed insurance group is compared with non-reformed group (reference group).

b. Adjusted for baseline history of gender and baseline gastrointestinal surgery history

c. Statistically significant natural indirect effect at a P value of less than 0.05

➤ Mediation analysis

Shifting UST maintenance therapy from inpatient to outpatient setting mediated a sizeable proportion of the aforementioned association between the insurance type and HRU outcomes, with full mediation on CD-related treatment expenditure, i.e. the natural indirect effect being ¥-10,125.09 (95% CI, -¥15,920.24, -¥4,329.94), and the natural direct effect being ¥4,334.92 (95% CI, -¥3,062.95, ¥11,732.80) and the proportion mediated on CD-related hospitalization number being 49.99% (95% CI, 18.76%, 81.21%).

Results (Cont’d)

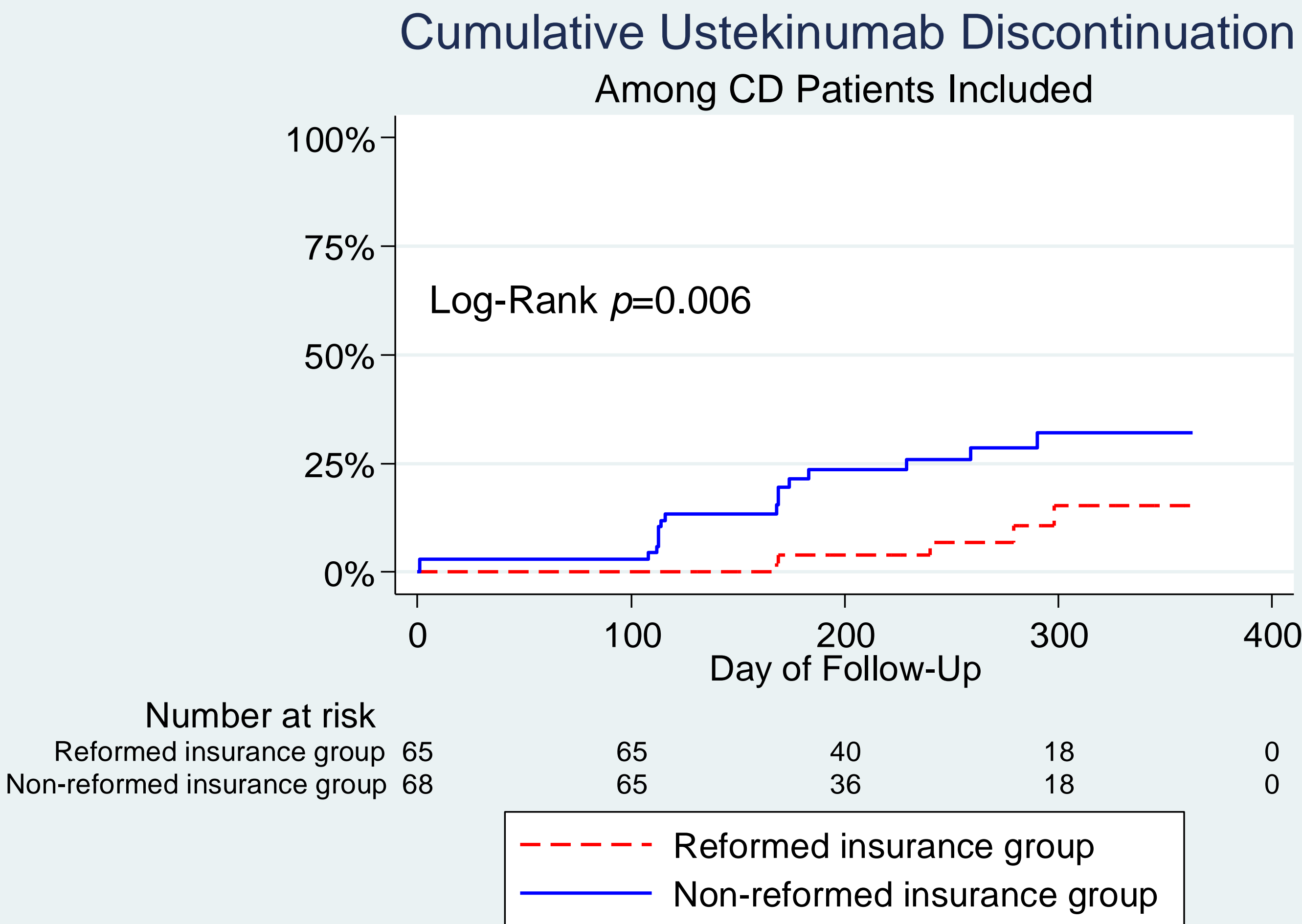


Figure 2. Cumulative Ustekinumab Discontinuation Among CD Patients Included

Conclusion

Insurance reform by increasing the outpatient copayment rate for CD was found associated with reduction in overall CD-related treatment cost, which was fully mediated by maintenance treatment setting shift from inpatient to outpatient.

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