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Disease Burden of Moderate to Severe Ulcerative Colitis in Chinese Patients Under Current Care: A Model Simulation Study

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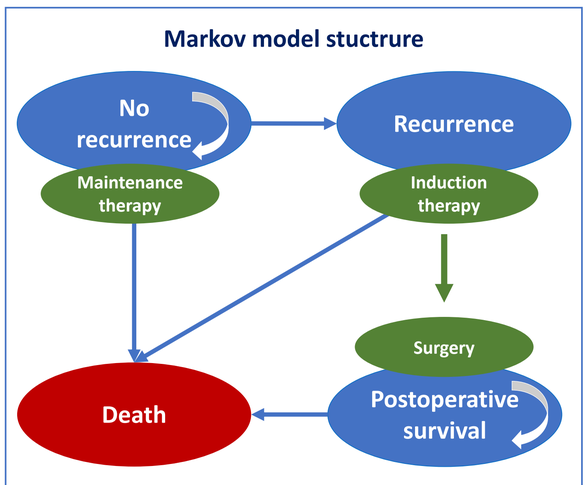
Background & Objectives

- Ulcerative colitis (UC) is a chronic inflammatory bowel disease affecting the sigmoid colon and rectum. Symptoms of UC include abdominal pain, diarrhea, bloody stool, and colonic spasms. The age-standardized prevalence rate of UC in China is 17.24/100,000. UC has a relatively minor effect on a patient's overall survival prognosis. However, UC is linked to a notably high recurrence rate, with around 70% to 80% of patients experiencing repeated episodes. The recurrent nature of UC substantially impairs patients' quality of life and places a significant financial burden on patients.
- The objective of this study is to assess the impact of moderate to severe UC (msUC) on long-term health outcomes and medical costs in Chinese patients under current care.

Methods: disease burden model design

Markov model stuctrure



Model design

Model cohort	Chinese msUC patients vs. Age and gender matched Chinese general population
Health status	Recurrence, No recurrence, Postoperative survival, and Death
Cycle length	3 months
Time horizon	Lifetime
Model outputs	Quality-adjusted life years (QALY), direct medical costs, and indirect costs

Methods: literature search and evidence synthesis

Bibliographic databases

- English: MEDLINE, EMBASE, Web of Science
- Chinese: WANFANG, CNKI, and VIP

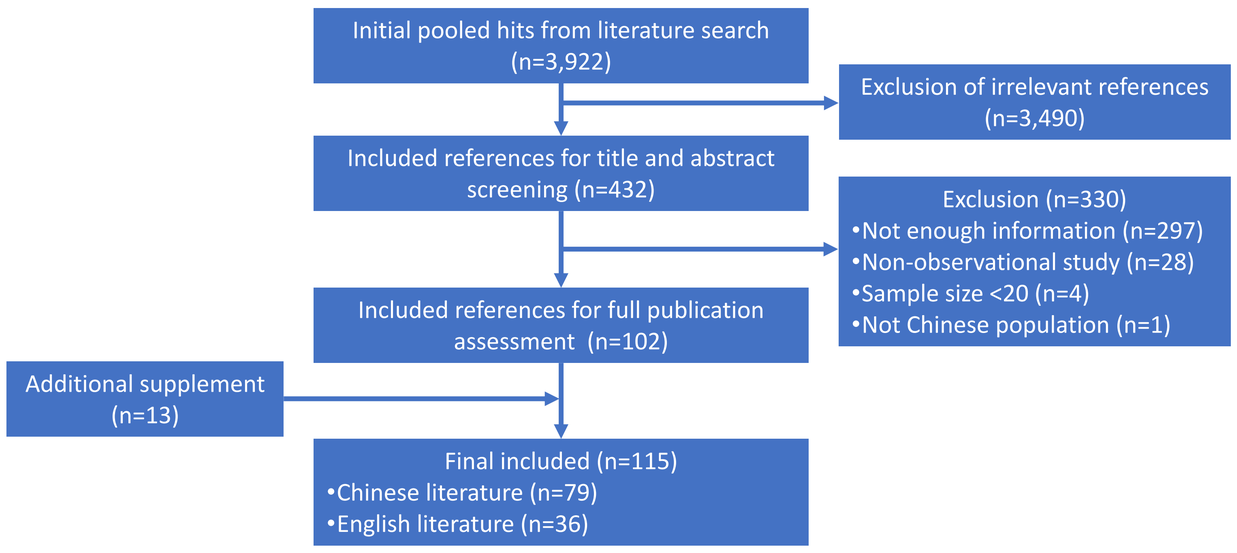
Literature search strategies

- **Publication date range:** 2018-2023
- **Keywords:**
  - Disease: ulcerative colitis
  - Region : China
  - Study design: observational study
  - Intervention: glucocorticoid, aminosalicylic acid, immunosuppressant, biologics and novel small molecule drugs
  - Outcome: Clinical efficacy results, quality of life, cost

Evidence synthesis

- Meta-analysis
- Heterogeneity analysis using I^2 method
- Indirect comparison (network meta-analysis)

Results: literature search flowchart



Methods: model inputs summary

Model inputs	Baseline
Demographics	
Age (years)	45.2
Male (%)	52.5%
Body weight (kg)	57.9
Treatment efficacy	
Remission rate-induction (moderate UC)	
Glucocorticoid	40.2%
Aminosalicylic acid	48.8%
Immunosuppressant	72.0%
Biologics/novel small molecule drugs	69.5%
Remission rate-induction (severe UC)	
Glucocorticoid	79.1%
Quarterly discontinuation risk-maintenance	
Aminosalicylic acid	0.083
Immunosuppressant	0.083
Biologics/novel small molecule drugs	0.143
Quality of life (utility)	
Moderate UC	
Active	0.584
Remission	0.893
Severe UC	
Active	0.496
Remission	0.893
Postoperative	0.723

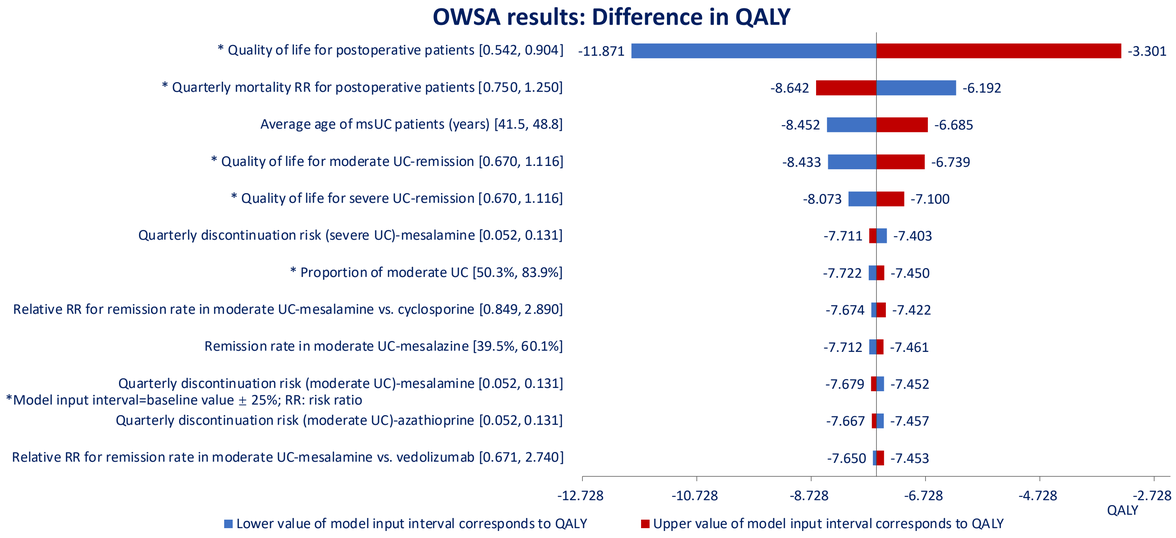
Model inputs	Baseline
Costs	
Quarterly drug costs-induction (moderate UC)	
Glucocorticoid	¥18
Aminosalicylic acid	¥647
Immunosuppressant	¥176
Biologics/novel small molecule drugs	¥12,265
Quarterly drug costs-maintenance (moderate UC)	
Aminosalicylic acid	¥737
Immunosuppressant	¥650
Biologics/novel small molecule drugs	¥6,662
Quarterly drug costs-induction (severe UC)	
Glucocorticoid	¥2,449
Quarterly drug costs-maintenance (severe UC)	
Aminosalicylic acid	¥737
Surgery costs	¥68,774
Postoperative complication treatment costs	¥9,429
Quarterly disease management costs (moderate UC)	
Induction therapy	¥2,787
Maintenance therapy	¥146
Quarterly disease management costs (severe UC)	
Induction therapy	¥7,311
Maintenance therapy	¥146
Postoperative	¥359

Results: base case analysis

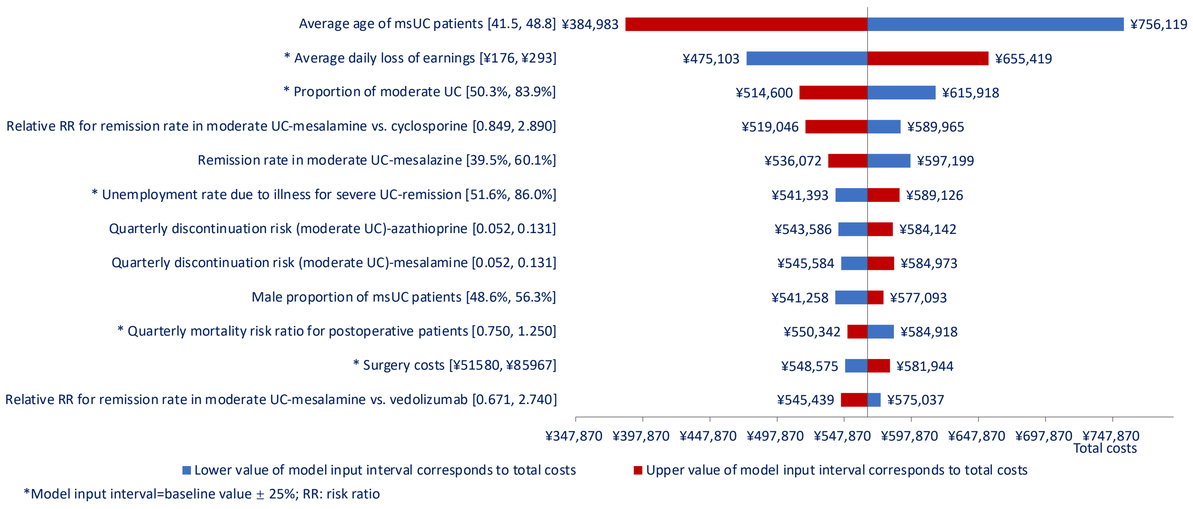
	msUC patients	General population	Difference
Quality-adjusted life years (QALY)	**22.961**	**30.547**	**-7.586**
Moderate UC-active	0.370		
Moderate UC-remission	3.388		
Severe UC-active	0.116		
Severe UC-remission	1.946		
Severe UC-postoperative	17.141		
Total costs	**¥745,911**	**¥180,651**	**¥565,259**
Direct medical costs	¥361,211	¥180,651	¥180,560
Indirect costs	¥384,700		¥384,700

Results: one-way sensitivity analysis (OWSA)

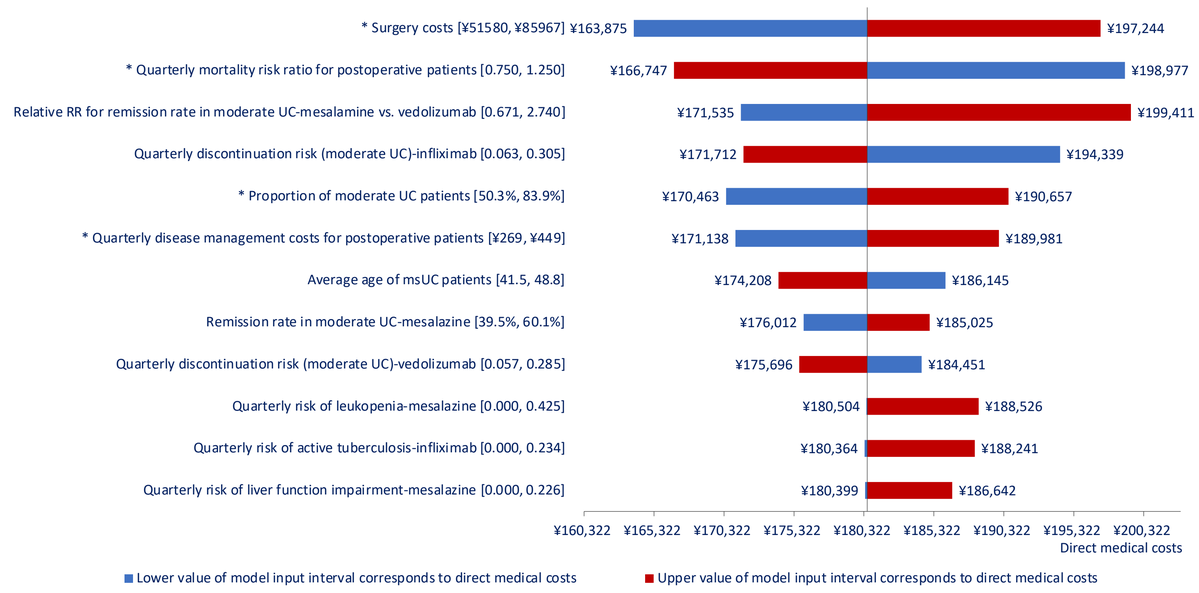
OWSA results: Difference in QALY



OWSA results: Difference in lifetime total costs



OWSA results: Difference in lifetime direct medical costs



Results: probabilistic sensitivity analysis

Model outputs	Median	95% credible interval	
		Lower	Upper
Difference in QALY	-7.523	-8.462	-6.544
Difference in lifetime total costs	¥559,357	¥380,353	¥764,447
Difference in lifetime direct medical costs	¥180,401	¥165,672	¥215,259

Conclusions

- The disease burden of UC in Chinese patients is primarily evident in substantially reduced QALY and doubled costs of msUC relative to the matched general population.
- Preventing disease progression from moderate disease to severe disease is likely to be the primary strategy to control the burden of UC in China.

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