



# Healthcare Resource Utilization and Costs Associated with Systemic Inflammation in Patients with Coronary Heart Disease and Chronic Kidney Disease: A Retrospective Cohort Study

EE216

Danqing Qian, Min Hu\*  
Fudan University, Shanghai, China;

## BACKGROUND

- Patients with concomitant CAD and stage 3-4 CKD present a paradox of high clinical complexity and heightened physiological vulnerability, necessitating intensive resource allocation.
- While the prognostic value of systemic inflammation is well-established, its impact on resource utilization and incremental medical expenditures remains poorly characterized.

## OBJECTIVE

- To evaluate the impact of systemic inflammation (SI) on healthcare utilization and direct medical costs among patients with CAD and stage 3-4 CKD.

## METHODS

- **Study Design**
  - A retrospective cohort study was conducted among 200 patients with CAD and stage 3–4 CKD who were admitted to a tertiary hospital in 2023.
- **Stratification**
  - Patients were stratified according to baseline high-sensitivity C-reactive protein levels: SI group (hs-CRP  $\geq 2$  mg/L) and non-SI group (hs-CRP  $< 2$  mg/L).
- **Statistical Modeling (Adjusting for confounders)**
  - **Negative Binomial Regression:** Evaluated the intensity of healthcare utilization.
  - **Gamma GLM (log-link):** Analyzed all-cause direct medical costs.
  - **Two-part Model:** Conducted robustness analyses on the likelihood and conditional costs of cardiovascular-specific events.

## RESULTS

### • Patient Characteristics

- A total of 200 CAD patients with stage 3-4 CKD were enrolled, including 112 in the SI group and 88 in the NSI group.
- Baseline demographics and the Charlson Comorbidity Index (CCI) were comparable between the two groups.

### • Comparison of Healthcare Utilization and Costs

- The SI group exhibited a significantly prolonged length of stay (LOS) (Median: 7.0 vs. 6.0 days;  $p < 0.001$ ) and more than doubled per-admission inpatient costs (Median: ¥35,187 vs. ¥16,577;  $p < 0.001$ ) (**Fig. 1**).
- Medical consumables constituted the largest cost component, accounting for 45.1% of total expenditures (**Fig. 2**).

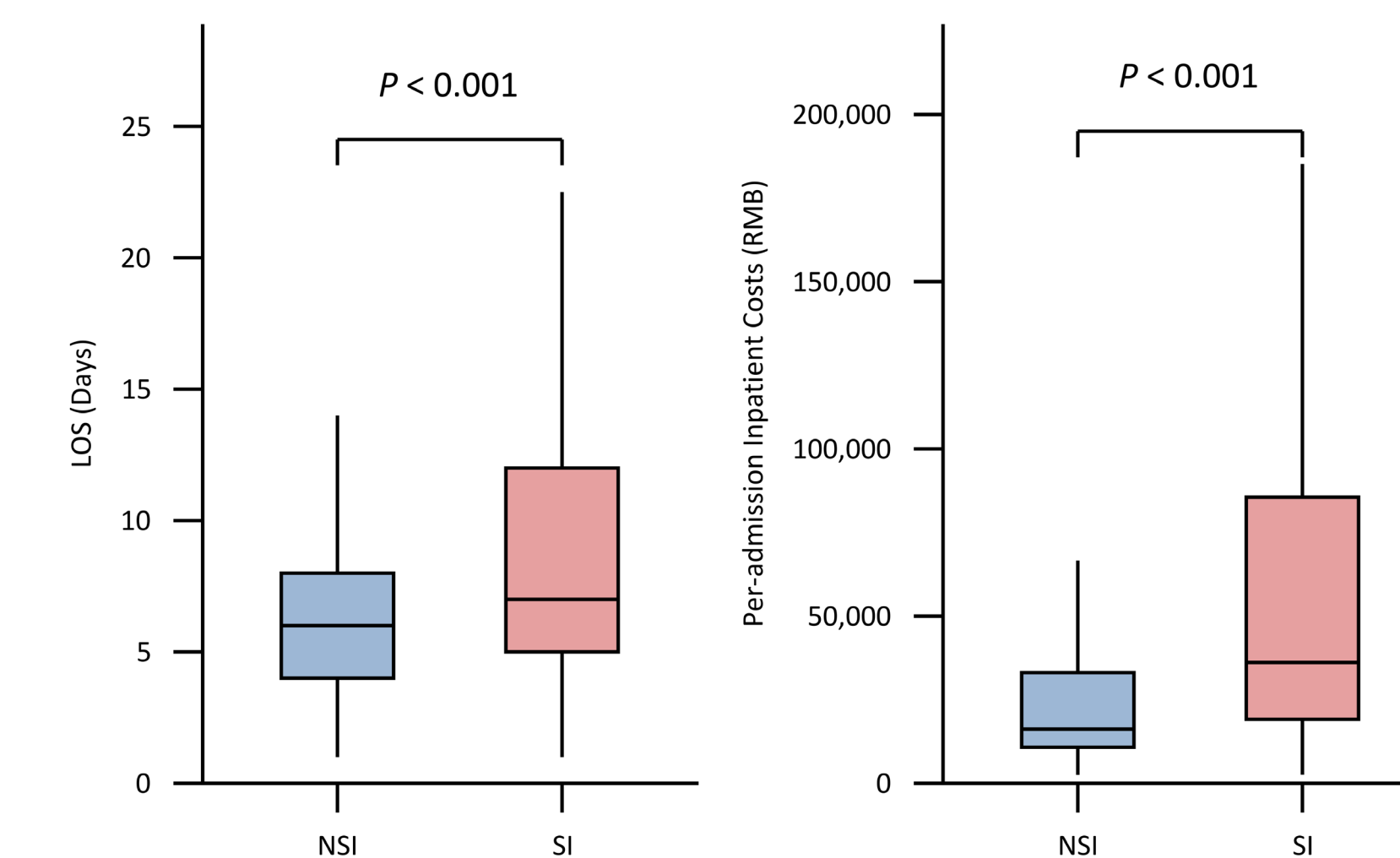


Figure 1. Comparison of Length of Stay and Per-Admission Inpatient Costs Between Groups

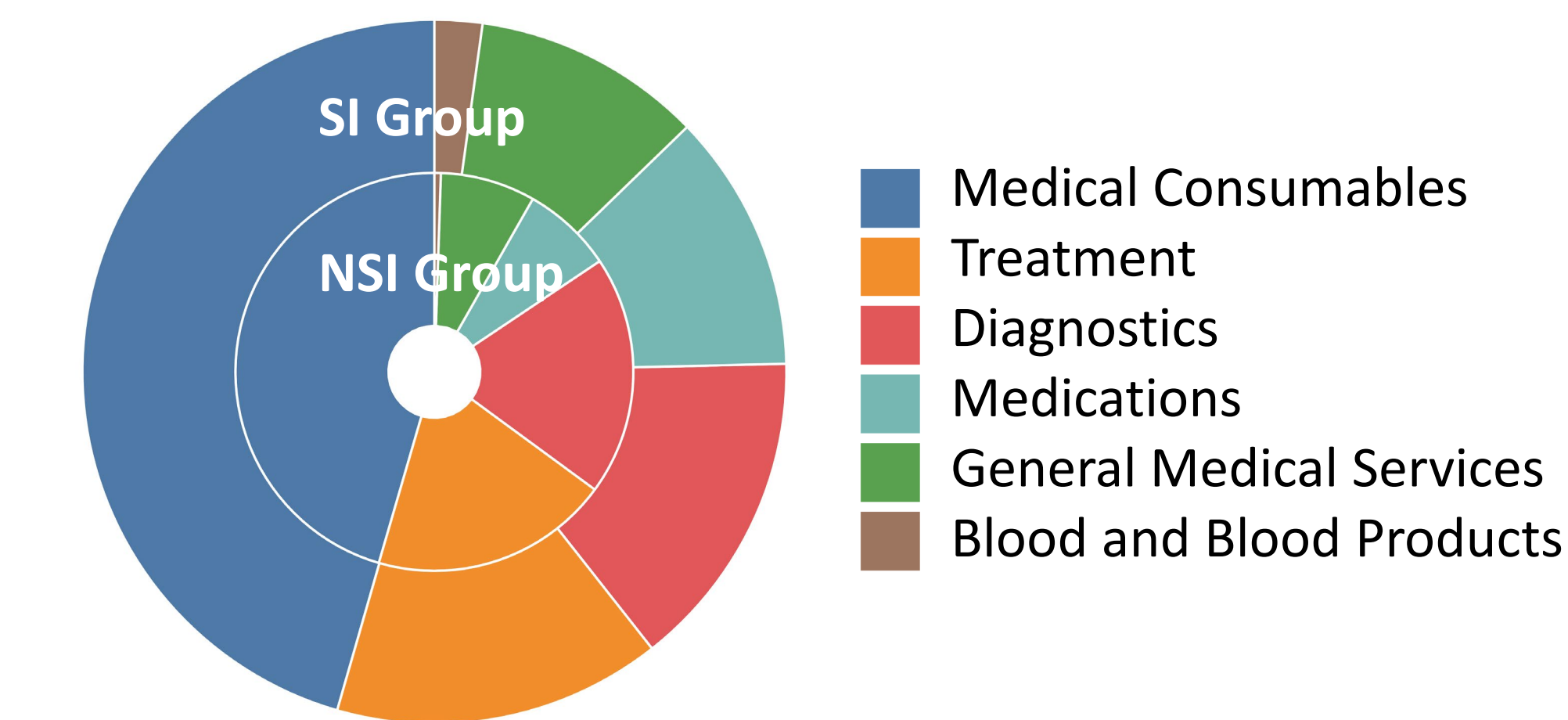


Figure 2. Distribution of Inpatient Cost Components

### • Regression Analysis: Healthcare Utilization

- **General:** SI was associated with a 62% increase in LOS (IRR = 1.62,  $P < 0.001$ ; **Fig. 3**) after covariate adjustment.
- **Cardiovascular-related:** SI was associated with a higher likelihood of cardiovascular-related hospitalization and an 81% increase in conditional LOS among patients with such events (IRR = 1.81,  $p < 0.001$ ; **Fig. 4**).

### • Regression Analysis: Healthcare Costs

- **General:** SI was associated with 119% higher per-admission inpatient costs and 116% higher annual total costs (both  $p < 0.001$ ; **Fig. 3**).
- **Cardiovascular-related:** Two-part models showed that SI was associated with a 2.63-fold increase in conditional mean inpatient costs ( $p < 0.001$ ; **Fig. 4**).

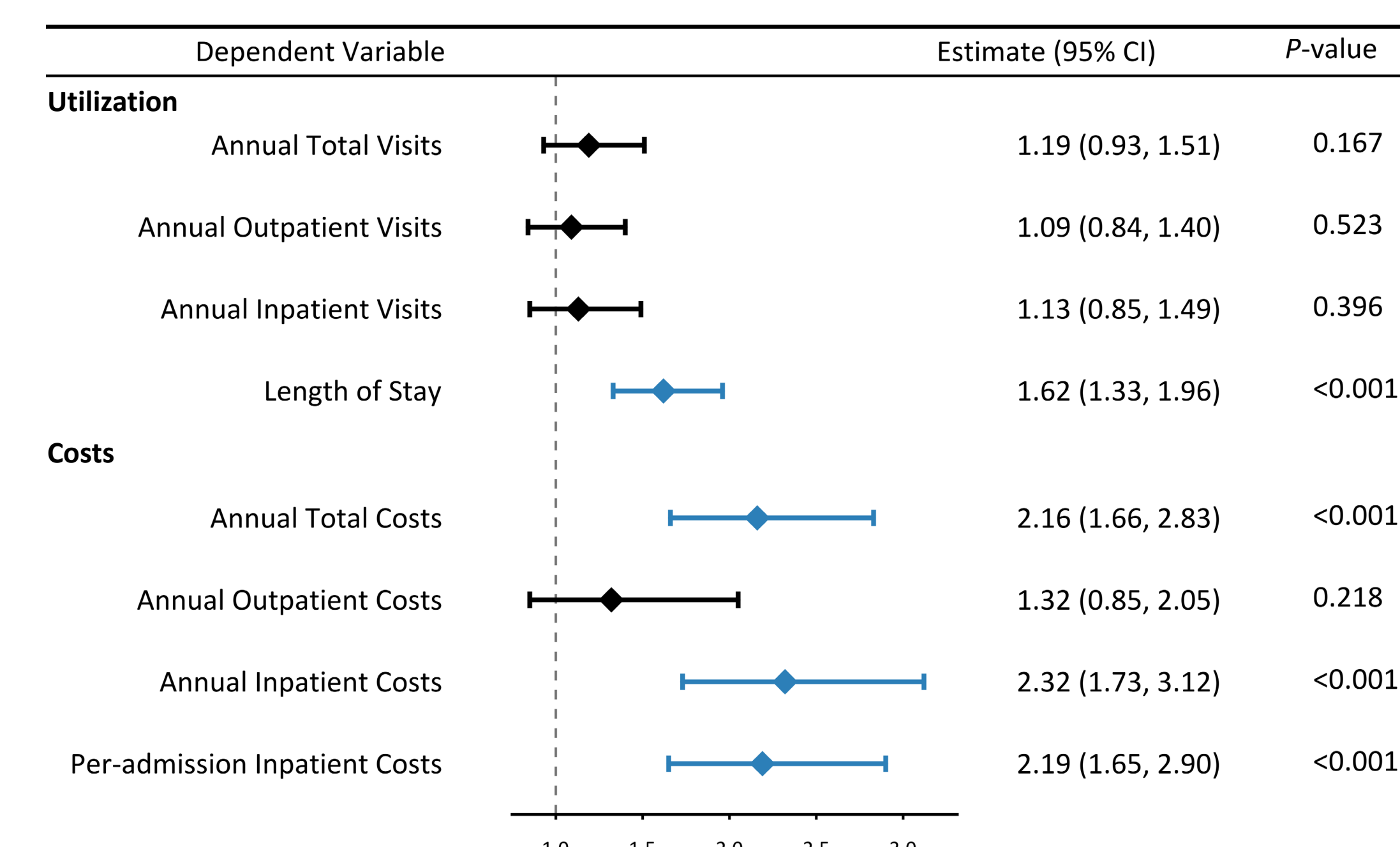


Figure 3. Regression Results for All-Cause Healthcare Utilization and Costs

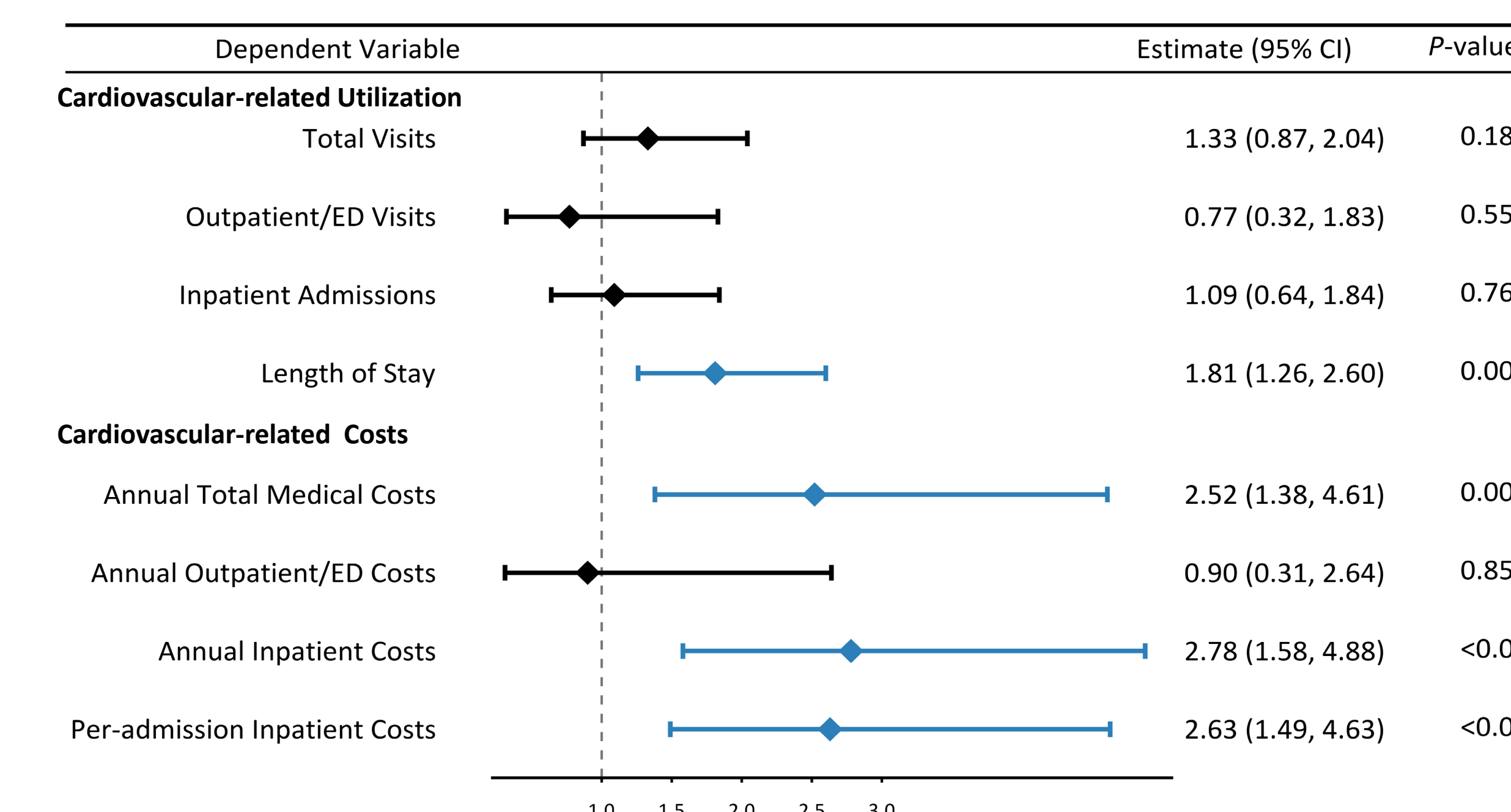


Figure 4. Regression Results for Cardiovascular-Related Healthcare Utilization and Costs

## CONCLUSIONS

- **Core Finding:** Among patients with CAD and moderate-to-severe CKD, systemic inflammation was associated with longer LOS and substantially higher direct medical costs, beyond its established prognostic role.
- **Clinical-Economic Mechanism:** By bridging underlying pathological mechanisms with real-world economic outcomes, this study underscores the clinical utility of inflammatory biomarkers in characterizing resource-intensive phenotypes.
- **Policy Implications:** Incorporating inflammatory biomarkers into early risk stratification and reimbursement risk-adjustment models may support more precise resource allocation and more refined value-based payment design.

## CONTACT INFORMATION

- Correspondence: Min Hu, PhD, Professor; E-mail: [humin@fudan.edu.cn](mailto:humin@fudan.edu.cn)
- Project supported by the National Natural Science Foundation of China (No. 72474053)

Presented at ISPOR 2026 | Philadelphia, PA, USA | May 17–20, 2026