

CLINICAL AND ECONOMIC OUTCOMES OF ULTRASONIC ENERGY DEVICES USED IN PATIENTS TREATED WITH SLEEVE GASTRECTOMY

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INTRODUCTION

To date, not many studies have focused on evaluating the performance of energy devices used in sleeve gastrectomy since surgical stapling played a key role in anastomosis. However, energy devices provide coagulation, cutting, dissecting, and grasping in one system, further assisting gastric sleeve procedures. The objective of the study is to evaluate clinical and economic outcomes of the use of two ultrasonic energy devices in patients undergoing sleeve gastrectomy (SG).

METHODS

Data Sources PINC AI™ Healthcare Data 2019 and 2023

Study population: Patients who underwent elective primary gastric sleeve (ICD 10 procedure code “0DB64Z3”) used either corded (CD, Ethicon™ Harmonic™) or cordless (CL, Medtronic™ Sonicision™) ultrasonic devices (UD), with no use of other energy devices. The main analysis included total eligible SG patients regardless of the use of staplers. The subgroup analysis included cases that used the same-brand stapler or no stapler use.

Outcomes measurement Clinical outcomes included incidence rates of blood transfusion, bleeding, and 30-day readmission; economic outcomes included hospitalization cost (all costs were converted to 2023 USD), operating room time (minutes), and length of stay (days)

Patient/provider characteristics, and others

Gender, race and ethnicity, payer, diagnosis (obesity ICD 10 E66.01), Charlson comorbidity index (CCI), census region, urban/rural, bed size, teaching status, hospital/surgeon annual thoracic procedure volume, stapler use, robotic platform use, and concurrent hiatal hernia repair performed.

Statistical Analyses

A 1:1 nearest neighbor propensity score matching (PSM) method without replacement with a caliper of 0.2 for patients who used SU and MU was performed. We used patient and provider characteristics to calculate PS. Post PSM outcomes were estimated with bias correction regression adjustment.

Sensitivity analysis was done using multivariable general linear model analysis methods.

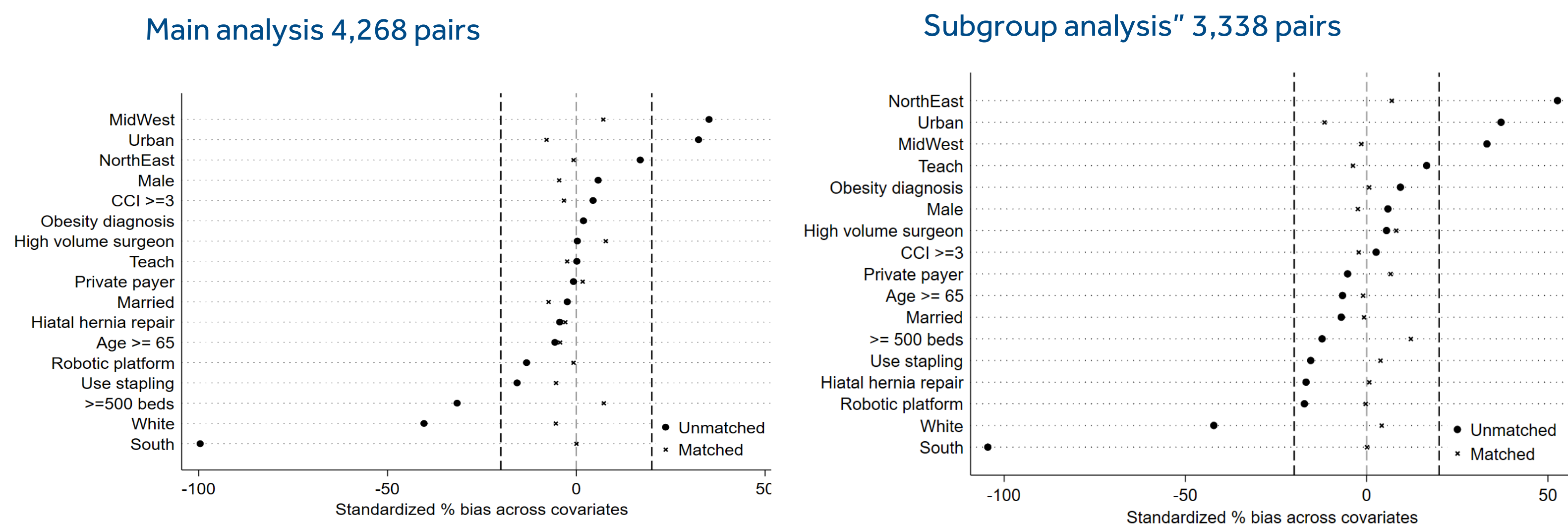
Statistical software All analyses were conducted using SAS 9.4 and Stata 18.5 using 2-sided statistical tests. Significance level is 0.05.

RESULTS

Figure 1: Cohort selection



Figure 2: Baseline standard difference before and after PSM



Baseline descriptions

4268 (17.7%) of 24160 cases and 3464 (18.3%) of 18906 cases used CLUD in the main and subgroup. Overall, 78% cases used stapling, 2% cases utilized robotic platform, 20% cases had concurrent hiatal hernia repair.

Clinical outcomes

Patients who used CLUD were **less** likely to have an ICU visit (Figure 3) than CDUD. There is no difference in blood transfusion and bleeding rates, as well as 30-day readmission, between patients who used two ultrasonic devices.

Healthcare resources utilization

Patients who used CLUD had **21 to 24 minutes shorter** operating room time than patients who used CDUD in performing gastric sleeve procedures. (Figure 4) There is no difference in total inpatient costs and length of stay between patients who used two ultrasonic devices. (Figure 5 and Figure 6)

CONCLUSIONS

The study shows that the latest developed cordless ultrasonic devices were more efficient in patients treated with sleeve gastrectomy and had similar clinical and economic outcomes to the corded ultrasonic devices.

Figure 3: Clinical outcomes comparison between corded ultrasonic device (CDUD) and cordless ultrasonic device (CLUD)

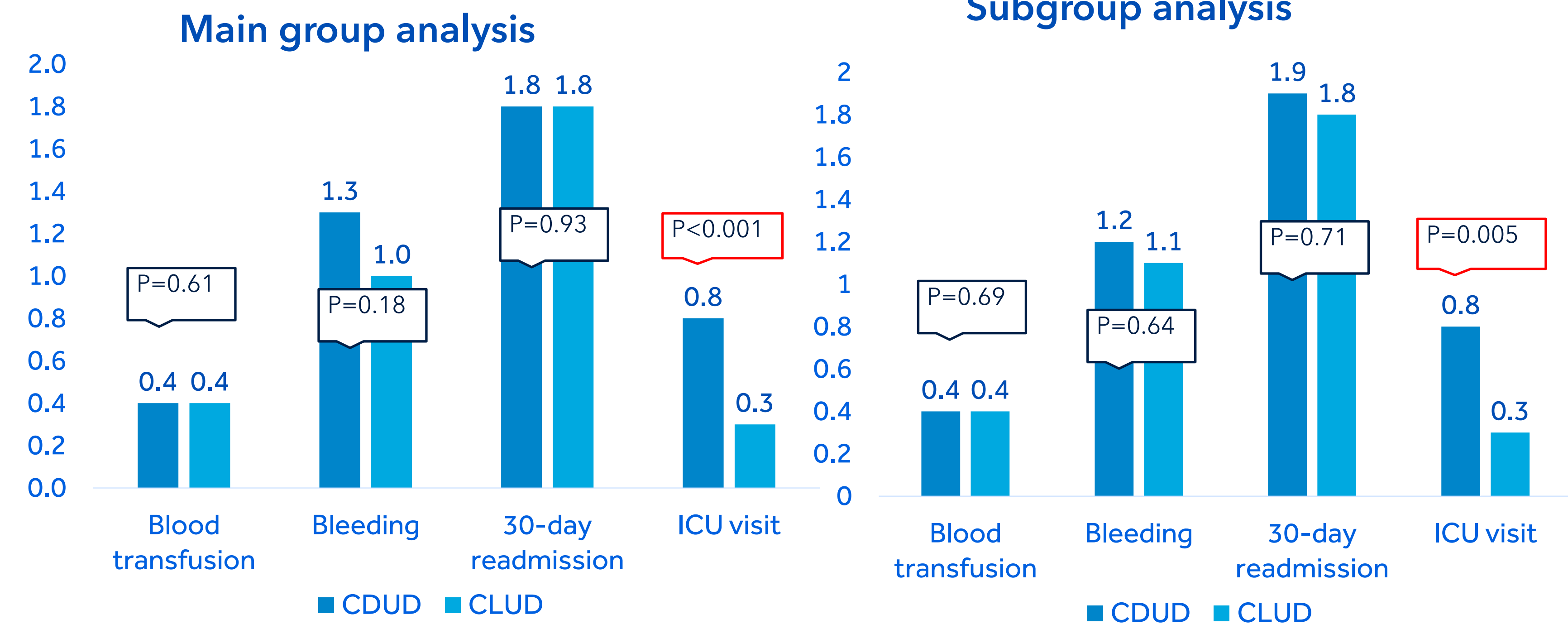


Figure 4: Operating room time (minutes) by CDUD and CLUD

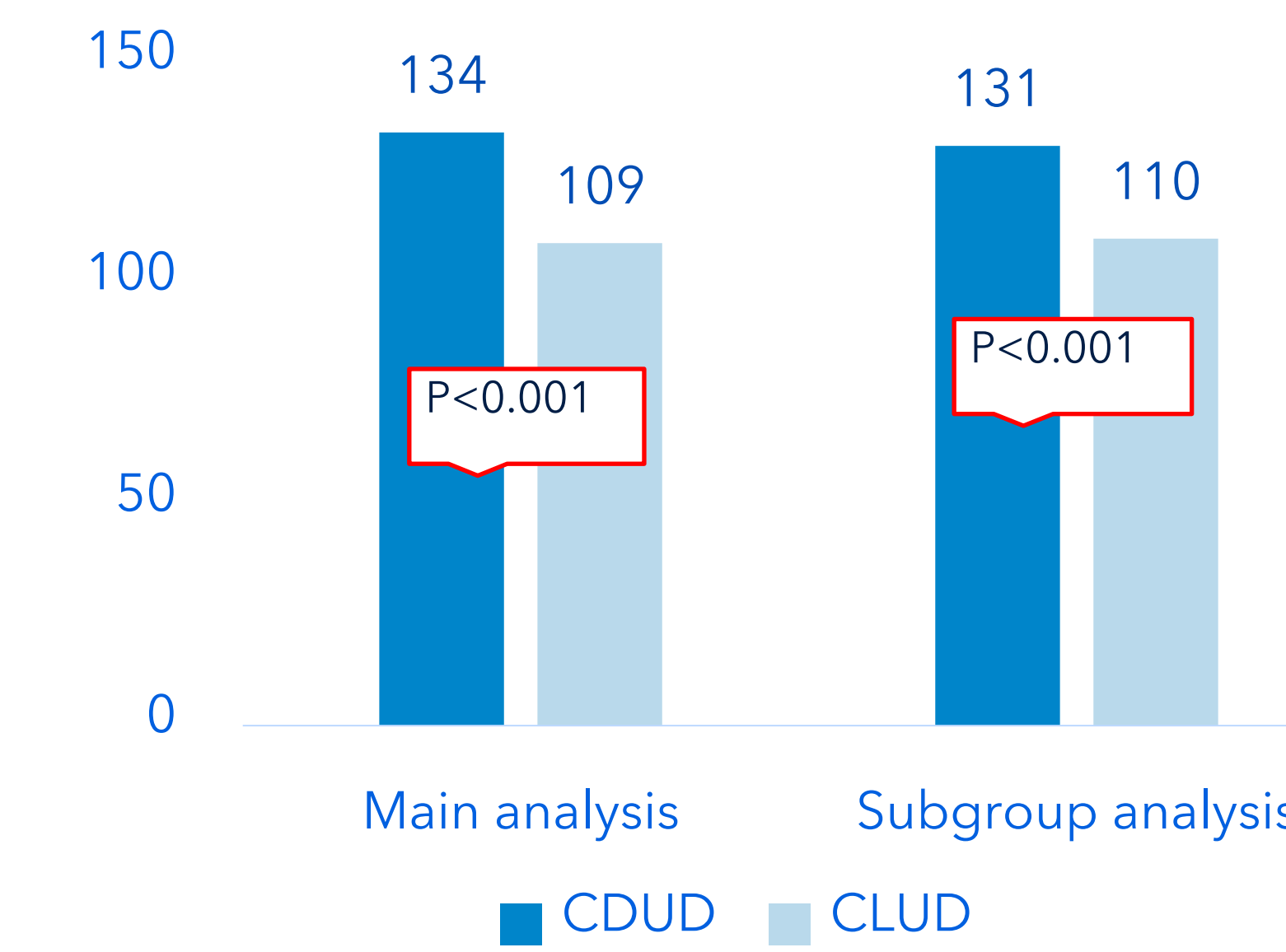


Figure 5: Total inpatient costs by CDUD and CLUD

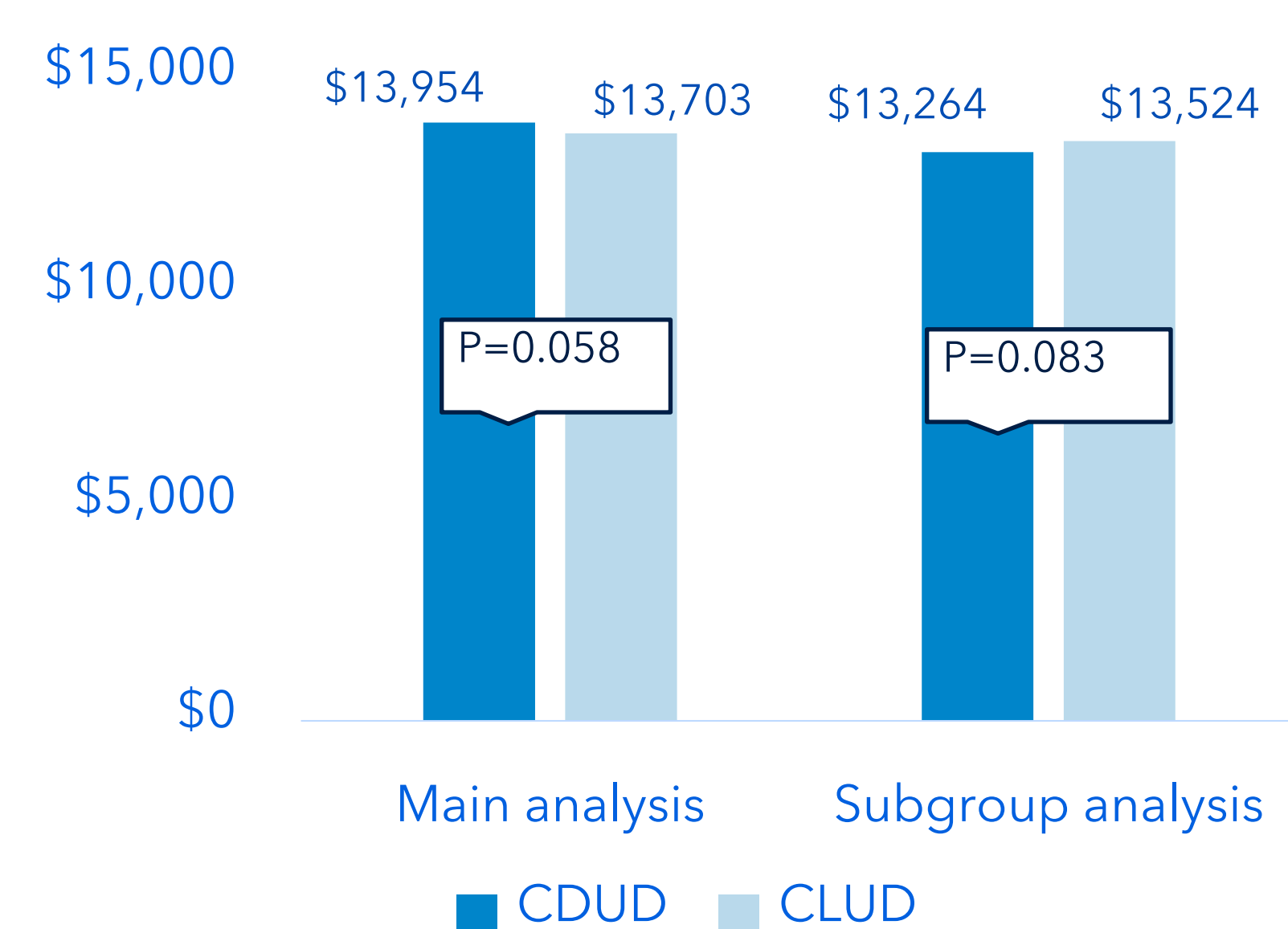
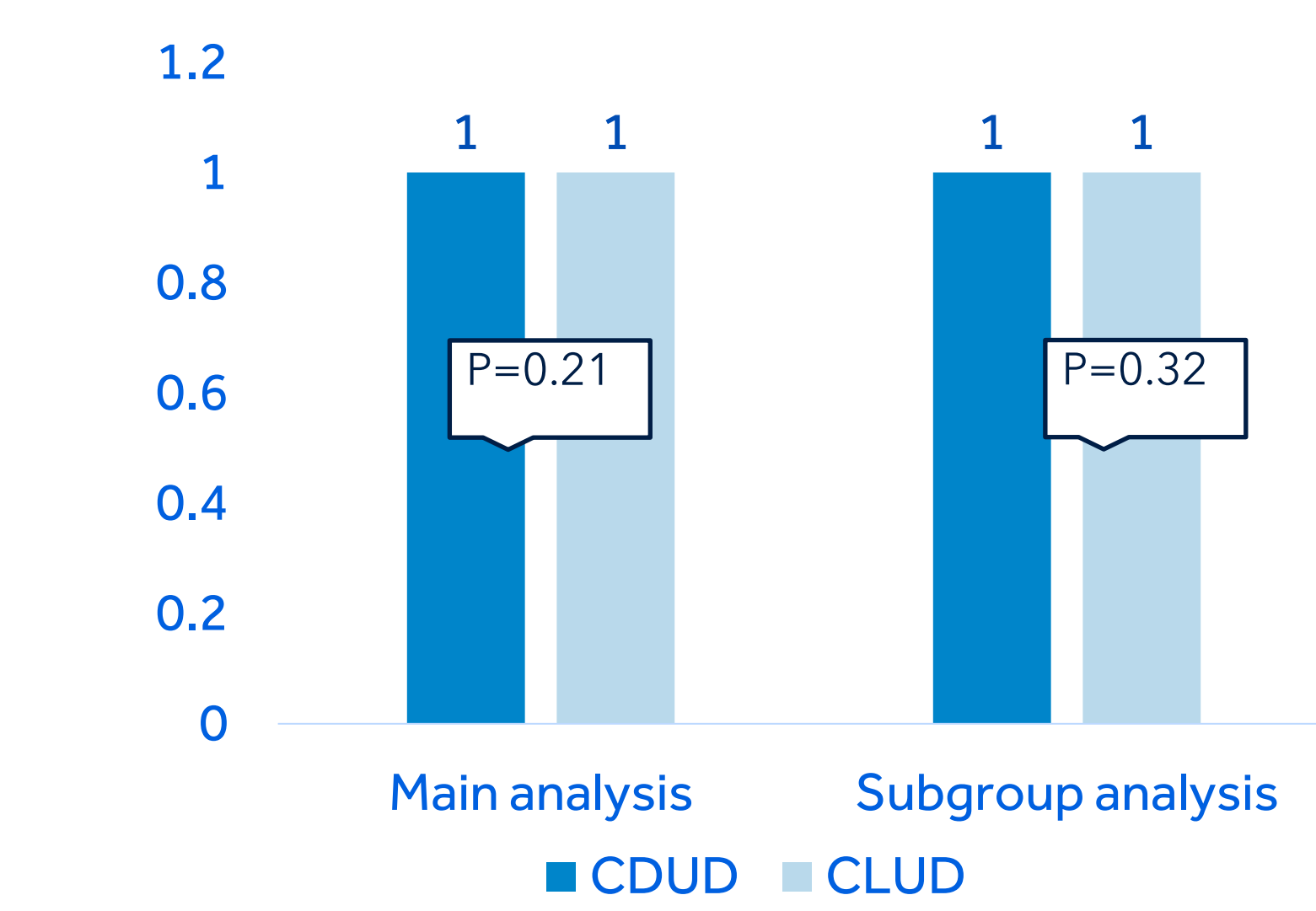


Figure 6: Length of stay (days) by CDUD and CLUD



See supplemental material for references and study codes to identify complications.

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