

# Costs and Outcomes of ED Patients with Uncomplicated Biliary Colic

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## Introduction

Biliary colic, or acute abdominal pain due to cholelithiasis, is a common presentation in the Emergency Department (ED), representing approximately 335,000 ED visits in the US annually.<sup>1</sup> In addition to pain, complications of biliary colic include acute cholecystitis, cholangitis, and pancreatitis. For uncomplicated biliary colic, there is wide variability in rates of hospital admission and surgical intervention.<sup>2,3</sup> It is also unknown how many patients do not require surgery.<sup>3</sup>

While hospital admission is a known driver of medical costs, it is possible that admission at the initial visit may lead to cumulative savings due to a reduced risk of future costs such as ED revisits and complications. A better understanding of the outcomes associated with initial management of biliary colic is crucial to making informed decisions regarding this common condition.

## Objectives / Research Questions

- How do admission and surgery impact patient costs?
- Does immediate surgery pay for itself by reducing repeat ED visits and subsequent hospitalizations?
- What happens to patients when they leave the ED?

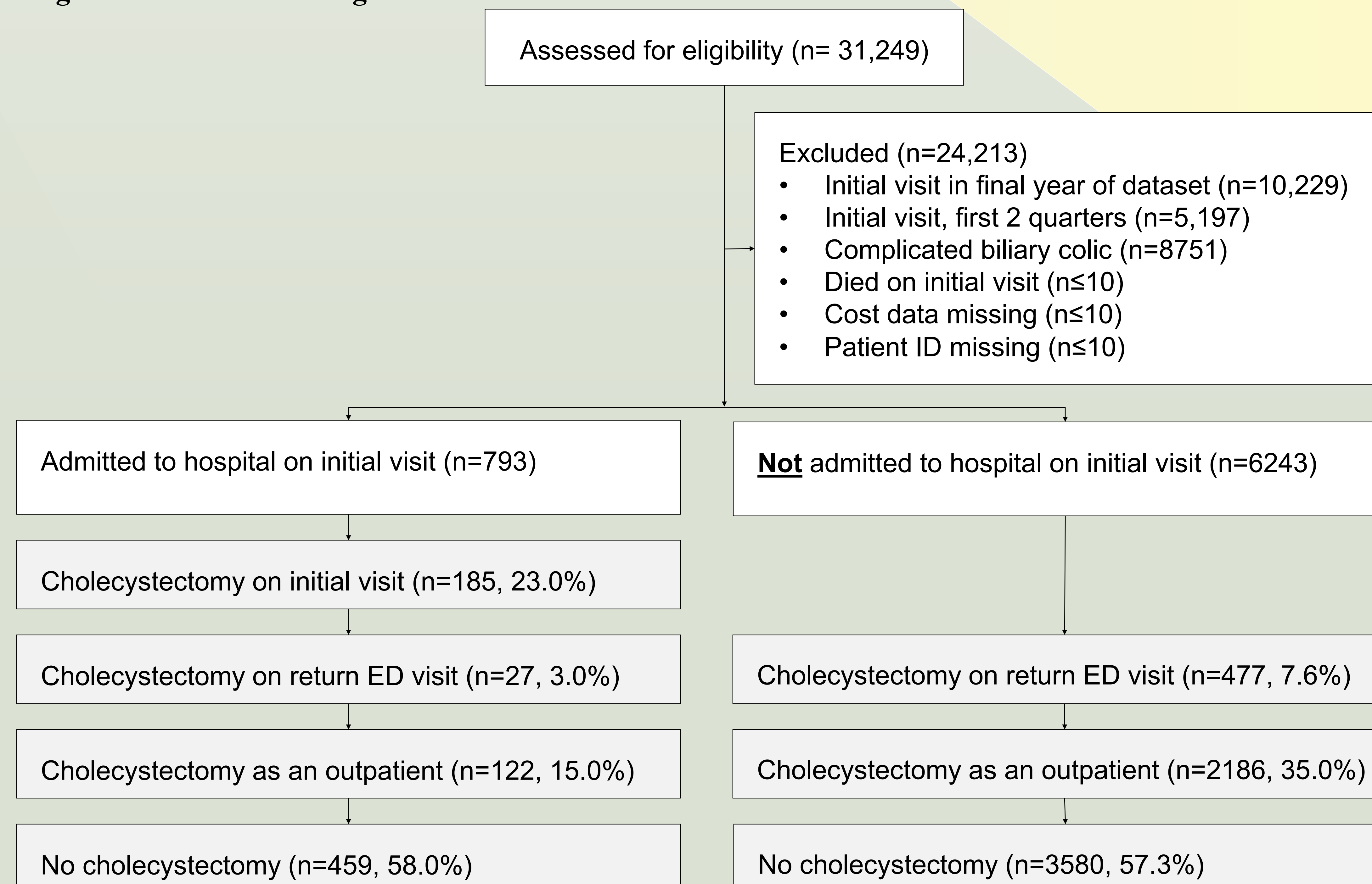
## Methods

- Obtained records from AHRQ's Health Costs and Utilization Projects (HCUP) inpatient, ED, and ambulatory surgery databases from Maryland in 2016-18.
- The first 6 months of records were censored from review in case they represented repeat visits.
- Records of patients presenting to the ED with uncomplicated biliary colic were identified via ICD-10 codes K80.2, K80.5, K80.7, and K80.8.
- Records were linked via unique patient IDs and grouped by clinical pathways determined by initial admission vs discharge and timing of cholecystectomy.
- Charts for each patient were followed for 1 year from initial visit, and outcome variables (repeat hospitalizations, costs, complications, etc) were aggregated across the year.
- Logistic regression was used to identify factors associated with clinical pathway (ie admission and surgery allocation), with significance cutoffs of  $p < 0.001$

	Admitted (N=793) (%, 95% CI, N)	Not Admitted (N=6243) (%, 95% CI, N)	Difference (95% CI)
New Complications	18.0% (15.0, 20.0), 141.0	41.0% (39.0, 42.0), 2530.0	-22.7% (-25.7%, -19.8%)
ED Revisits (# / 1000 patients)	95.8 (70.7, 120.9)	198.0 (185.6, 210.4)	-102.1 (-130.1, -74.2)
Repeat Hospitalizations (# / 1000 patients)	97.1 (74.2, 120.0)	80.9 (73.5, 88.3)	16.2 (-7.9, 40.3)
Cost (USD)	9880.0 (9317.4, 10442.6)	1832.0 (1741.2, 1922.9)	8048.0 (7478.1, 8617.8)
Deaths	3.4% (2.1, 4.7), 27.0	0.6% (0.4, 0.8), 37.0	2.8% (1.5%, 4.1%)

Formatted as: Cost (95% CI), N	Admitted	Not Admitted
Obtained Immediate Cholecystectomy	<b>\$10071.9</b> (\$9025.4, \$11118.4), 183	
Obtained Delayed Cholecystectomy	<b>\$10368.2</b> (\$8906.6, \$11829.8), 121	<b>\$3236.0</b> (\$3046.2, \$3425.8), 2625
Did Not Obtain Cholecystectomy	<b>\$8777.3</b> (\$8220.3, \$9334.3), 452	<b>\$794.7</b> (\$740.0, \$849.4), 3523

Figure 1. CONSORT Diagram



## Results

- Discharged patients had higher rates of new cholecystitis within one year than admitted patients (41% versus 18%) and were more likely to return to the ED than admitted patients (19.8% versus 9.6%).
- The cost was significantly higher if patients were admitted on the initial visit rather than discharged (\$9879.98 versus \$1823.03).
- Deaths were slightly lower in the discharged group (0.6% vs 3.4%), and repeat hospitalizations did not differ significantly between the two groups.
- Initial admission to the hospital seemed to increase costs more than a decision for surgery.
- There was no significant difference between 1-year costs of immediate surgery and delayed surgery.
- Admission was associated with obesity (OR = 1.38, 95% CI 1.32-1.44), increased age (OR = 1.43, 95% CI 1.35-1.53), ischemic heart disease (OR = 1.39, 95% CI 1.30-1.48), mood disorders (OR = 1.18, 95% CI 1.13-1.24), Charleston comorbidity index score (OR = 1.17, 95% CI 1.11-1.23), alcohol-related disorders (OR = 1.20, 95% CI 1.12-1.27), hyperlipidemia (OR = 1.16, 95% CI 1.09-1.23), systemic hypertension (OR = 1.15, 95% CI 1.08-1.21), and nicotine dependence (OR = 1.09, 95% CI 1.04-1.15)

## Conclusions

- Hospital admission seems to impact cost more than surgical management decisions.
- More than half of patients do not obtain cholecystectomy within 1 year of initial visit.
- ED revisit and hospitalization rates are lower than expected (< 200 revisits / 1000 patients), resulting in a lack of cost offset with definitive admission and surgical management.
- Future studies should explore the risk factors for complications of biliary colic to create a decision framework for ED physicians.

## References

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