

5.26 Laparoscopic Cholecystectomy Rate (IQI 23)

Surgical removal of the gall bladder (cholecystectomy) performed with a laparoscope has been identified as an underused procedure. Laparoscopic cholecystectomy is associated with less morbidity in less severe cases.

Relationship to Quality	Laparoscopic cholecystectomy is a new technology with lower risks than open cholecystectomy (removal of the gall bladder). Higher rates represent better quality.
Benchmark	State, regional, or peer-group average.
Definition	Number of laparoscopic cholecystectomies per 100 cholecystectomies.
Numerator	Number of laparoscopic cholecystectomies (any procedure field).
Denominator	All discharges with any procedure code of cholecystectomy in any procedure field. Age 18 years and older. Include only discharges with uncomplicated cases: cholecystitis or cholelithiasis in any diagnosis field. Exclude cases: <ul style="list-style-type: none"> • MDC 14 (pregnancy, childbirth, and puerperium) • MDC 15 (newborns and other neonates)
Type of Indicator	Provider Level, Procedure Utilization Indicator
Empirical Performance	Population Rate (2003): 75.55 per 100 discharges at risk
Empirical Rating	20

Summary of Evidence

Cholecystectomy—surgical removal of the gall bladder—is now performed with a laparoscope in about 75% of uncomplicated cases.¹⁸⁴ This indicator has a high percentage of variation attributable to providers. According to the literature, laparoscopic cholecystectomy may need to be adjusted for clinical severity, age, and other factors, because the procedure may be contraindicated for some patients, and others may not be clinically severe enough to qualify for cholecystectomy at all. Too many procedures in patients without appropriate clinical indications may artificially inflate the laparoscopic cholecystectomy rate without improving quality.

Limitations on Use

Up to one-half or more of all cholecystectomies are performed on an outpatient basis, and

providers should incorporate outpatient data if possible when interpreting this indicator. Additional bias may result from clinical differences not identifiable in administrative data, so supplemental risk adjustment using other clinical data may be desirable. As a utilization indicator, the construct validity relies on the actual appropriate use of procedures in hospitals with high rates, which should be investigated further.

Details

Face validity: Does the indicator capture an aspect of quality that is widely regarded as important and subject to provider or public health system control?

Laparoscopic cholecystectomy is associated with less postoperative pain, lower patient-controlled morphine consumption, better postoperative pulmonary function and oxygen saturation, and quicker return to limited activity.^{185 186}

¹⁸⁴Southern Surgeons Club. A prospective analysis of 1518 laparoscopic cholecystectomies. *NEJM* 1991;324:1073-1078.

¹⁸⁵McMahon AJ, Russell IT, Baxter JN, et al. Laparoscopic and minilaparotomy cholecystectomy: a randomised trial [see comment]. *Lancet* 1994;343(8890):135-8.

Laparoscopic cholecystectomy requires more technical skill than the open approach. Therefore, a higher rate for this procedure (as a proportion of all cholecystectomies) suggests that a hospital can rapidly achieve proficiency in up-to-date treatment methods.

Precision: Is there a substantial amount of provider or community level variation that is not attributable to random variation?

According to the literature, cholecystectomies are relatively common, so moderately precise estimates of differences in laparoscopic use can be obtained. Based on empirical evidence, this indicator is very precise, with a raw provider level mean of 66.2% and a substantial standard deviation of 19.2%.¹⁸⁷

Relative to other indicators, a higher percentage of the variation occurs at the provider level, rather than the discharge level. The signal ratio (i.e., the proportion of the total variation across providers that is truly related to systematic differences in provider performance rather than random variation) is high, at 89.1%, indicating that the observed differences in provider performance likely represent true differences.

Minimal bias: Is there either little effect on the indicator of variations in patient disease severity and comorbidities, or is it possible to apply risk adjustment and statistical methods to remove most or all bias?

As surgeons become more experienced in laparoscopic cholecystectomies, they are likely to perform the procedure on more difficult patients. In addition, higher risks of complications are associated with older age and the presence of common bile duct stones.¹⁸⁸ Patient referral patterns and other selection factors may lead to substantial differences in laparoscopy rates (as a proportion of all cholecystectomies) across hospitals. Empirical

results show that age and sex adjustment does seem to disproportionately impact hospitals in the low extreme relative to those in the high extreme.

Use of inpatient data could be substantially biasing, in that it eliminates those cholecystectomies performed on an outpatient basis, most of which are likely to be laparoscopic.

Construct validity: Does the indicator perform well in identifying true (or actual) quality of care problems?

According to the literature, there is no evidence that hospitals that use the laparoscopic approach more frequently provide better quality of care, based on other measures.

Fosters true quality improvement: Is the indicator insulated from perverse incentives for providers to improve their reported performance by avoiding difficult or complex cases, or by other responses that do not improve quality of care?

One concern with this indicator is that the advent of laparoscopic surgery has led to a substantial increase in the overall cholecystectomy rate, especially involving uncomplicated and elective patients.¹⁸⁹ Another concern is that the “optimal” rate for this procedure has not been defined, and incentives to increase use may have negative consequences if local physicians lack appropriate training and expertise.

Prior use: Has the measure been used effectively in practice? Does it have potential for working well with other indicators?

Laparoscopic cholecystectomy was included in the original HCUP QI indicator set.

¹⁸⁶McMahon AF, Russell IT, Ramsay G, et al. Laparoscopic and minilaparotomy cholecystectomy: a randomized trial comparing postoperative pain and pulmonary function. *Surgery* 1994;115(5):533-9.

¹⁸⁷Nationwide Inpatient Sample and State Inpatient Databases. Healthcare Cost and Utilization Project. Agency for Healthcare Research and Quality, Rockville, MD. <http://www.ahrq.gov/data/hcup>

¹⁸⁸Jatzko GR, Lisborg PH, Pertl AM, et al. Multivariate comparison of complications after laparoscopic cholecystectomy and open cholecystectomy. *Ann Surg* 1995;221(4):381-6.

¹⁸⁹Escarce JJ, Chen W, Schwartz JS. Falling cholecystectomy thresholds since the introduction of laparoscopic cholecystectomy. *JAMA* 1995;273(20):1581-5.