

# **Michigan Acute Care Surgery Collaborative**

**Lansing, MI  
April 18, 2024**

**M·ACS**

## **Disclosures - Mark Hemmila Grants**

- Blue Cross Blue Shield of Michigan
  - MTQIP
- Michigan Department of Health and Human Services
  - MTQIP, MOPEN
- Toyota North America, Insurance Institute for Highway Safety
  - VIPA - Vulnerable Road Users Injury Prevention Alliance
- General Motors Corp.
  - ICAM Fellowship
- Henry Jackson Foundation, DOD
  - Combat Wound Infection Study



**No Photos Please**



## **Agenda**

- ◆ Welcome/Updates
- ◆ Mark Hemmila
  - Data
  - Surgeon Gender
- ◆ Lena Napolitano
  - Alternative Approaches to Acute Cholecystitis
- ◆ Lunch

# Agenda

- ◆ Mark Hemmila
  - SBO and Gastrografin
  - Outcomes for Acute Appendicitis
- ◆ Jill Jakubus
  - MACS Performance Index
- ◆ Mark Hemmila
  - Wrap up

## **Future Meetings**

- ◆ Wednesday September 5, 2024, Ypsilanti
- ◆ Wednesday December 4, 2024, TBD
- ◆ April 2025 TBD
  
- ◆ Let us know if you see problems with dates
- ◆ In-person if possible
  - Virtual – Weather, COVID

# **Data and Reports**

**Mark Hemmila, MD**

## Cases

- ◆ Overall
  - All = 31,836
  - Index = 27,330
  - Readmit = 4,506
- ◆ Acute Appendicitis = 7,806
- ◆ Acute Gallbladder = 12,772
- ◆ SBO = 6,772
- ◆ Emergent Exploratory Laparotomy = 3,938

**Total = 27,330 Index**

**2,685**  
**37**

**6,718**  
**21**

**4,291**  
**7**

**4,737**  
**27**

**765**  
**1**

**2,987**  
**19**

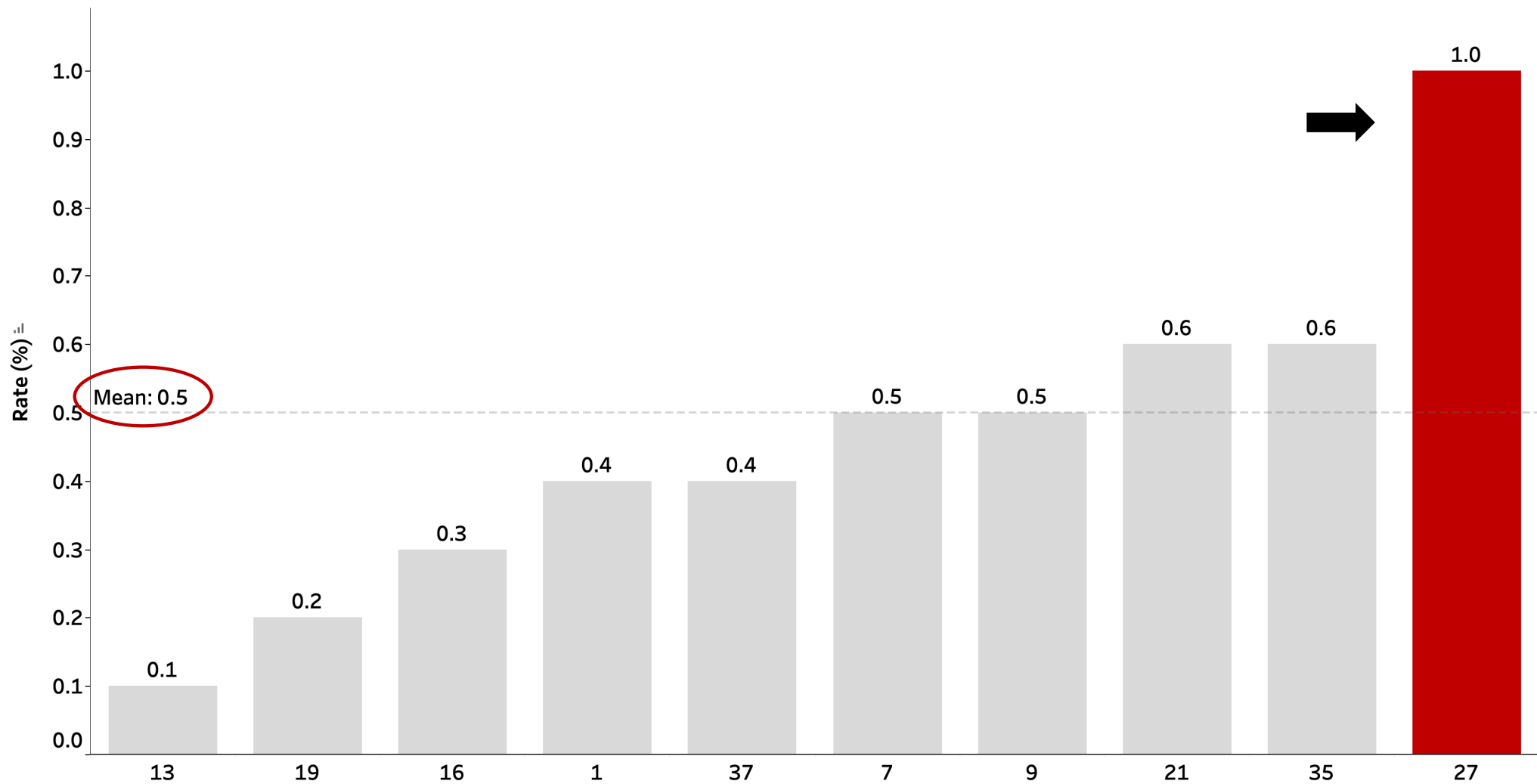
**1,315**  
**9**

**1,402**  
**35**

**1,158**  
**13**

**1,254**  
**16**

Anastomotic Leak Operation  
Summary

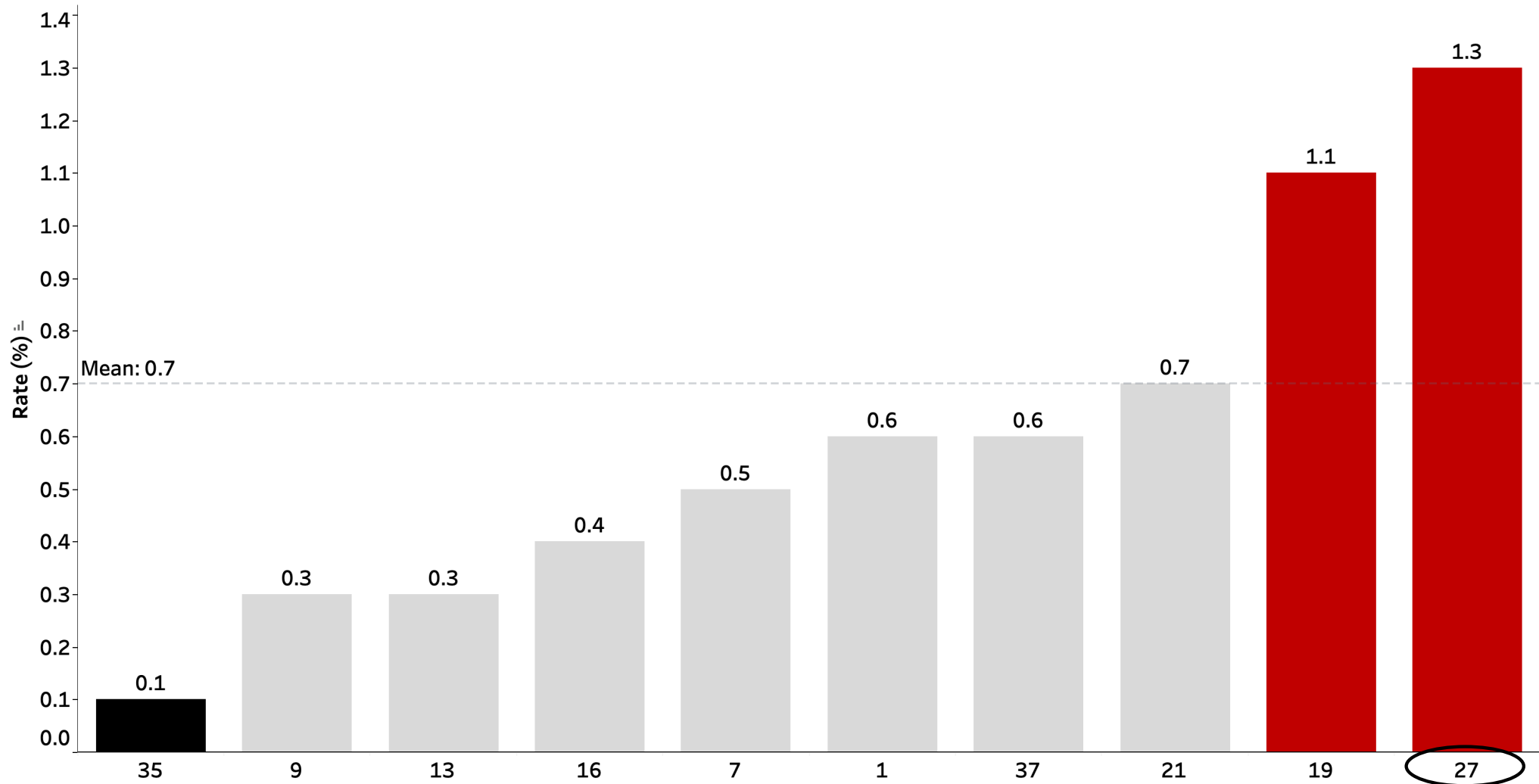




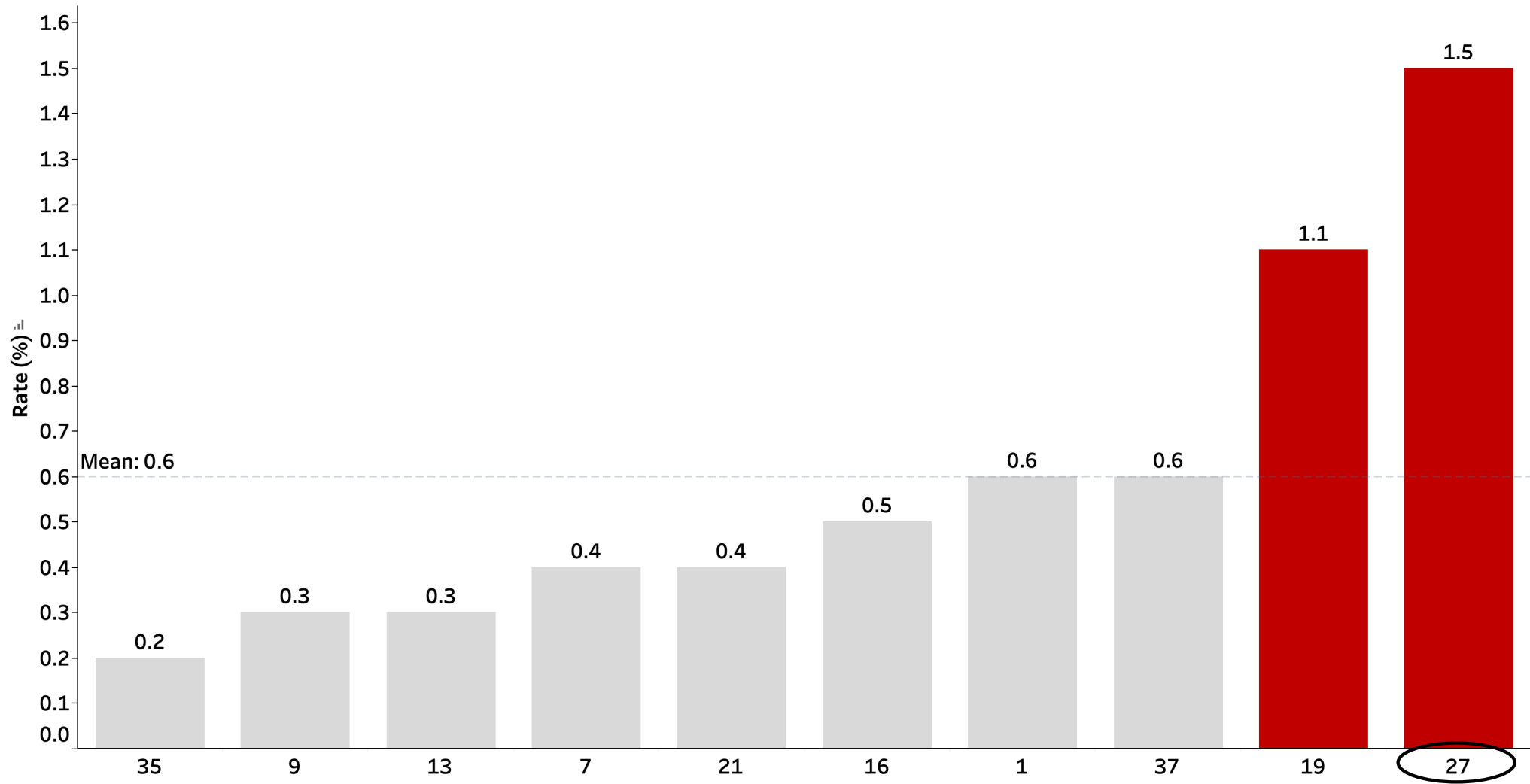
## UM Drill Down

- ◆ 22 Patients
  - 1.2% at center 27 vs. 0.5% Collaborative
  - No anastomosis at center 27 or elective = 5 cases
  - Multiple operations
- ◆ Ischemia
- ◆ Decision making and tough clinical problems
  - Need for Peritoneal Dialysis
  - SB resection after compartment syndrome
- ◆ Clinical review, while painful is revealing

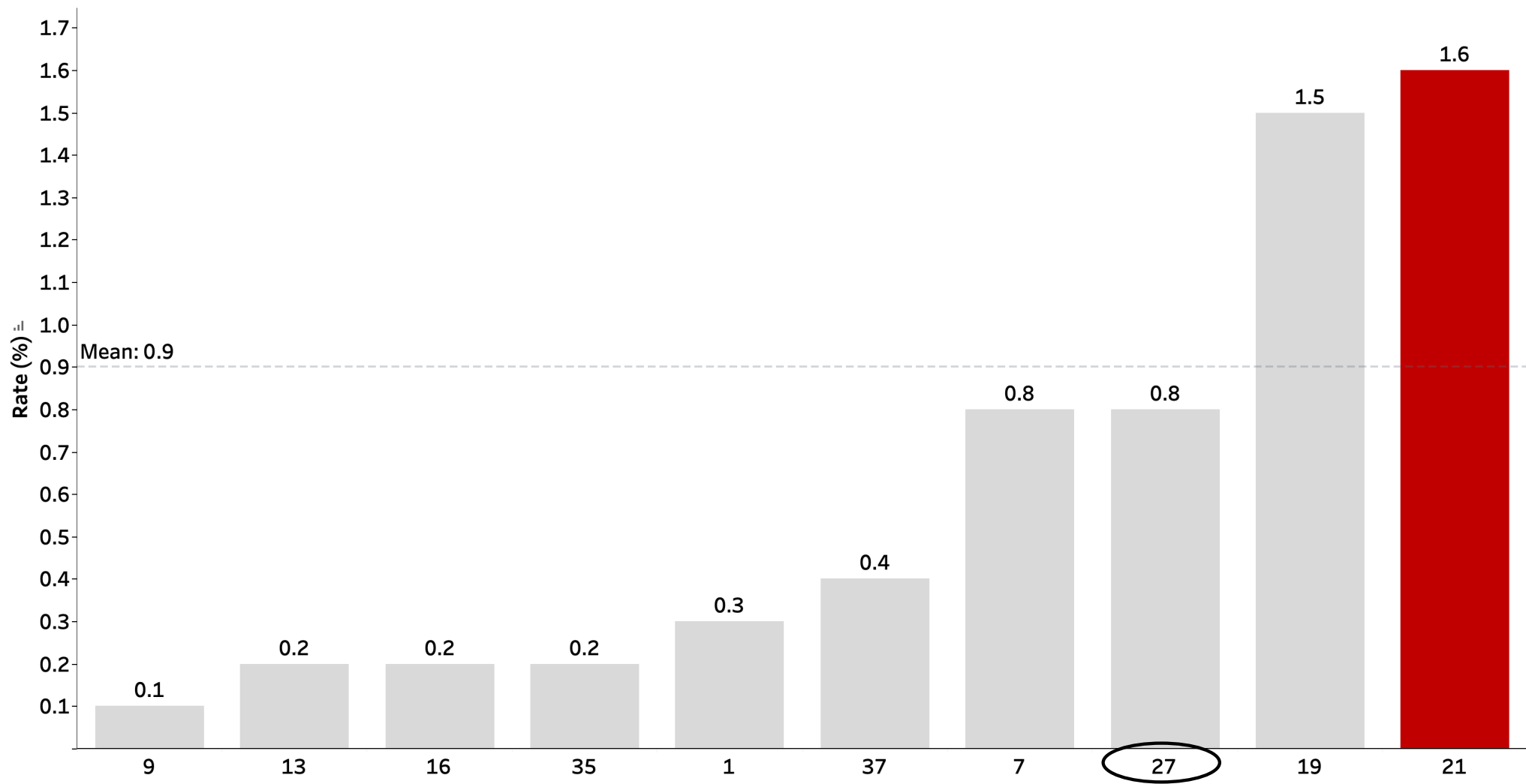
C. difficile  
Summary



C. difficile Operative  
Summary



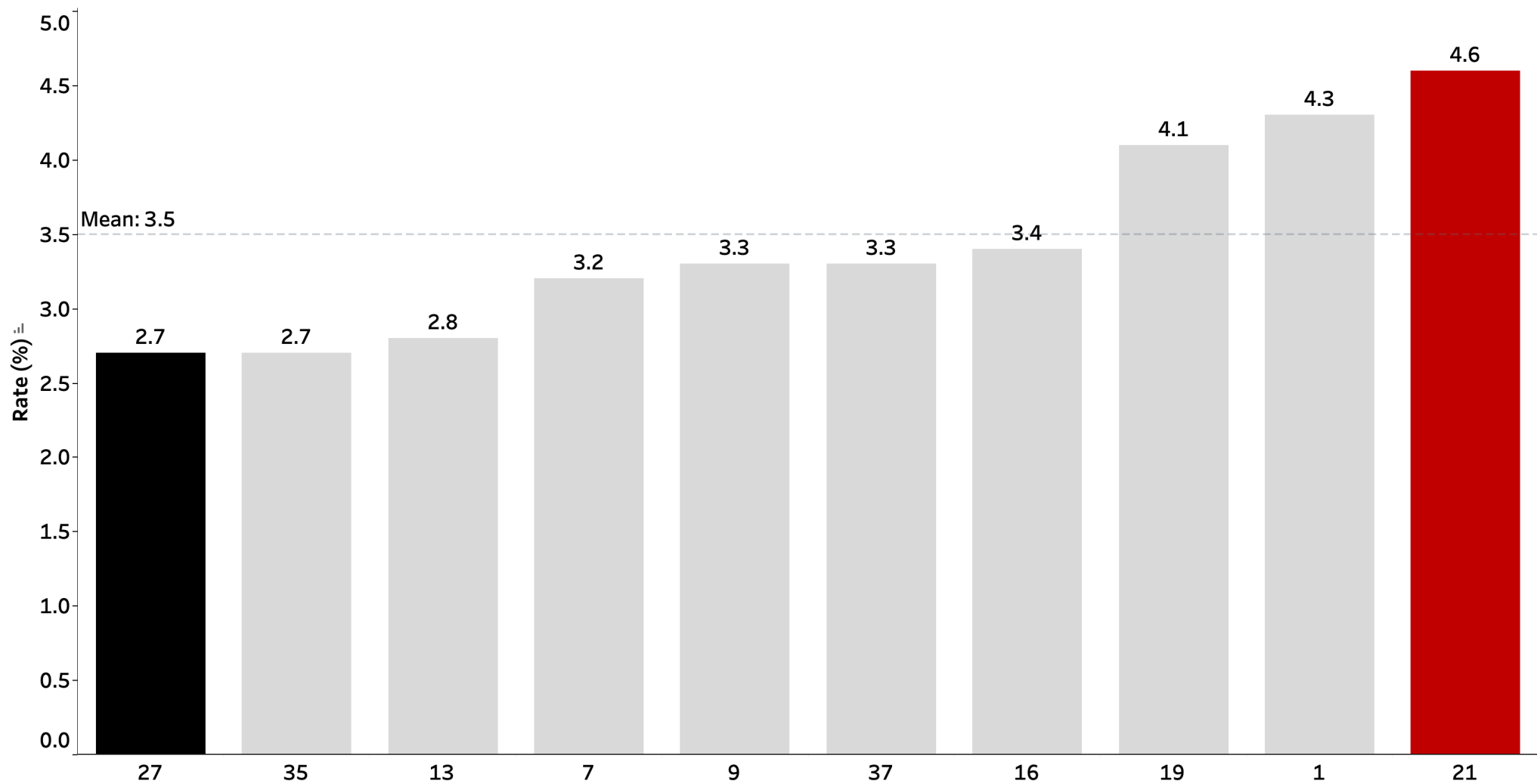
C. difficile Non-operative  
Summary



## **What is the answer for C. Diff ?**

- ◆ Perioperative antibiotics
  - Too broad ?
  - Too long ?
- ◆ Hand washing
- ◆ Other

Mortality  
Summary

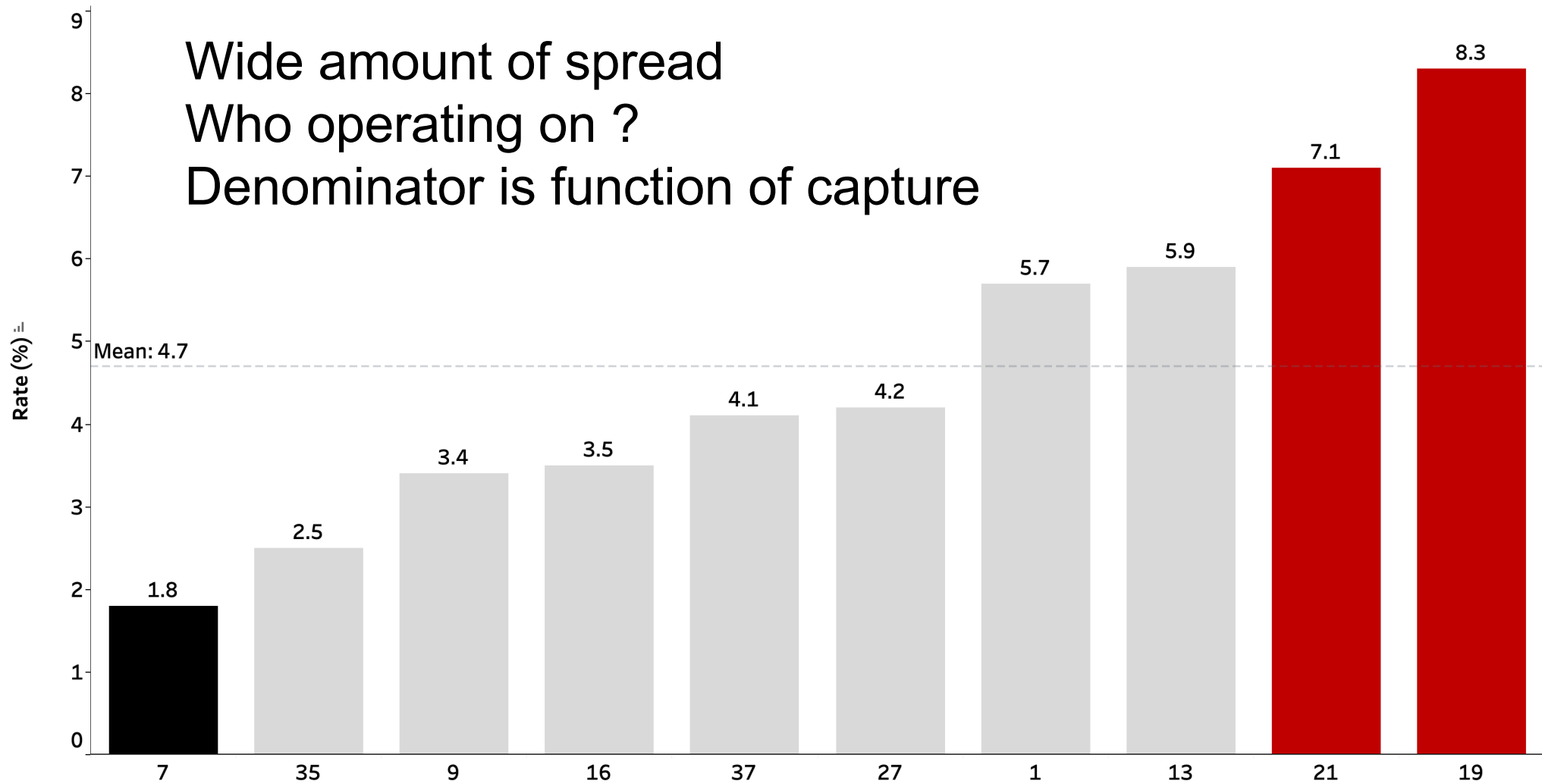


Mortality Operation  
Summary



Mortality Non-operative  
Summary

Wide amount of spread  
Who operating on ?  
Denominator is function of capture

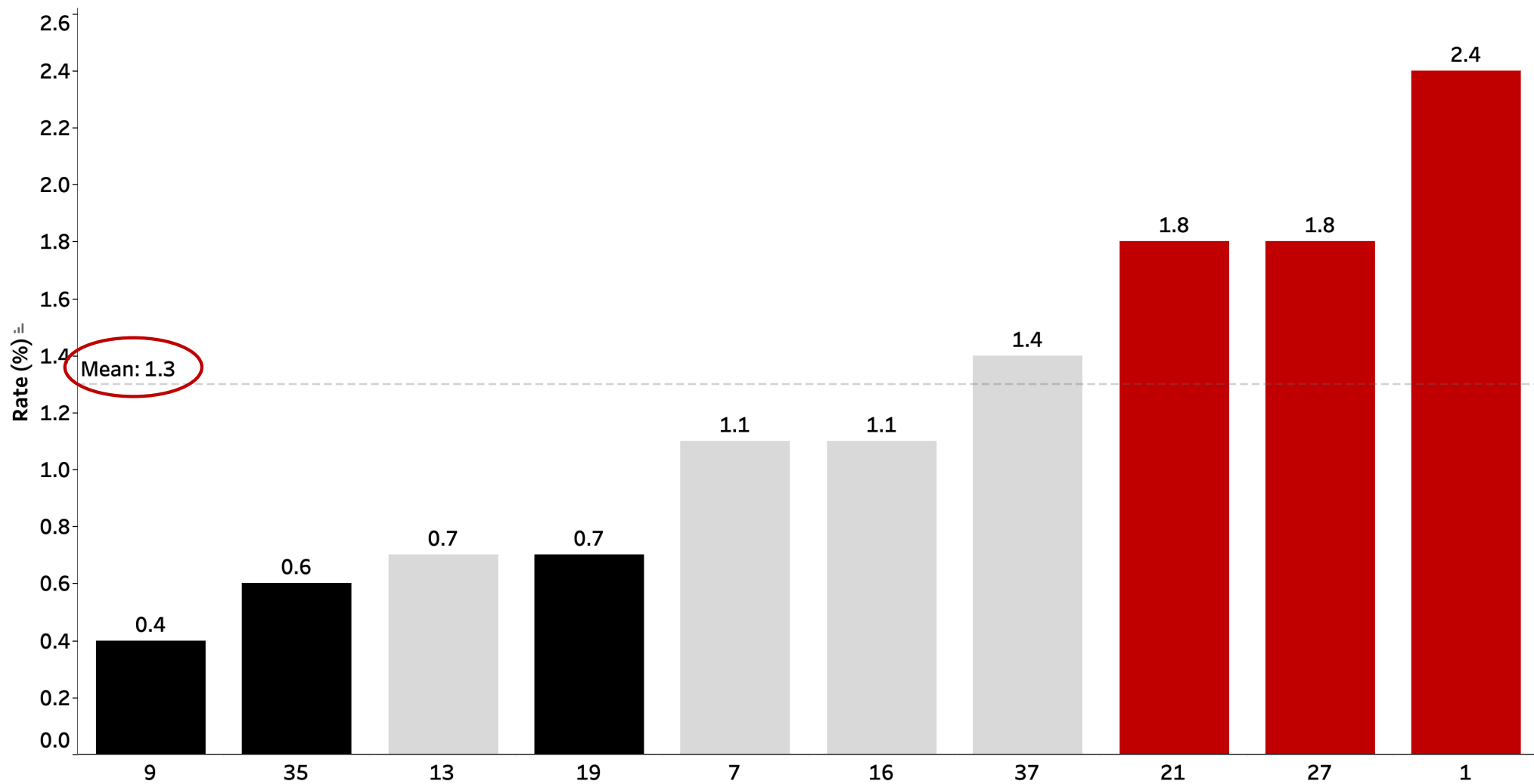




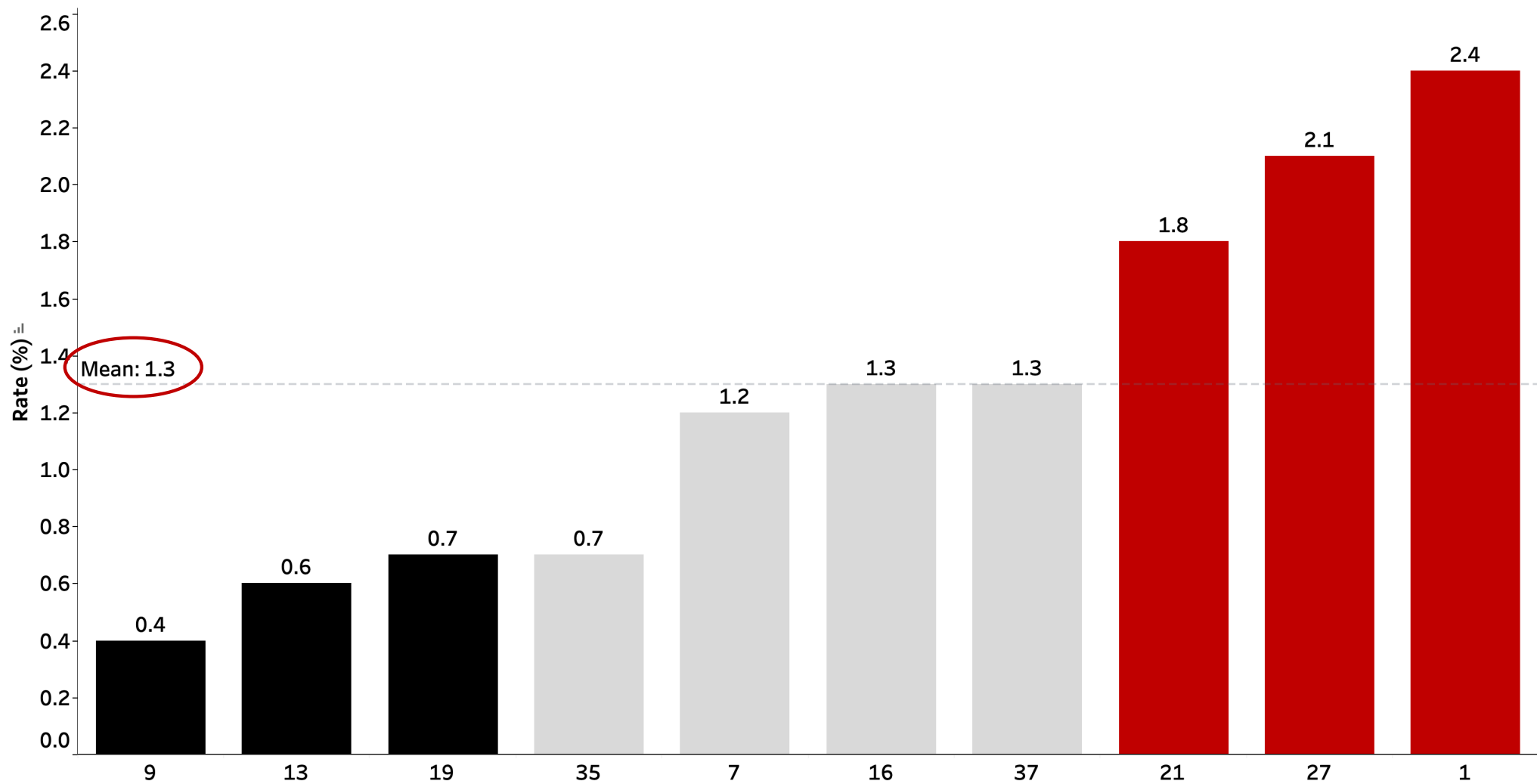
## Death Review ?

- ◆ Time consuming
  - We do it in trauma
  - Would there be actionable information ?
- ◆ Complications

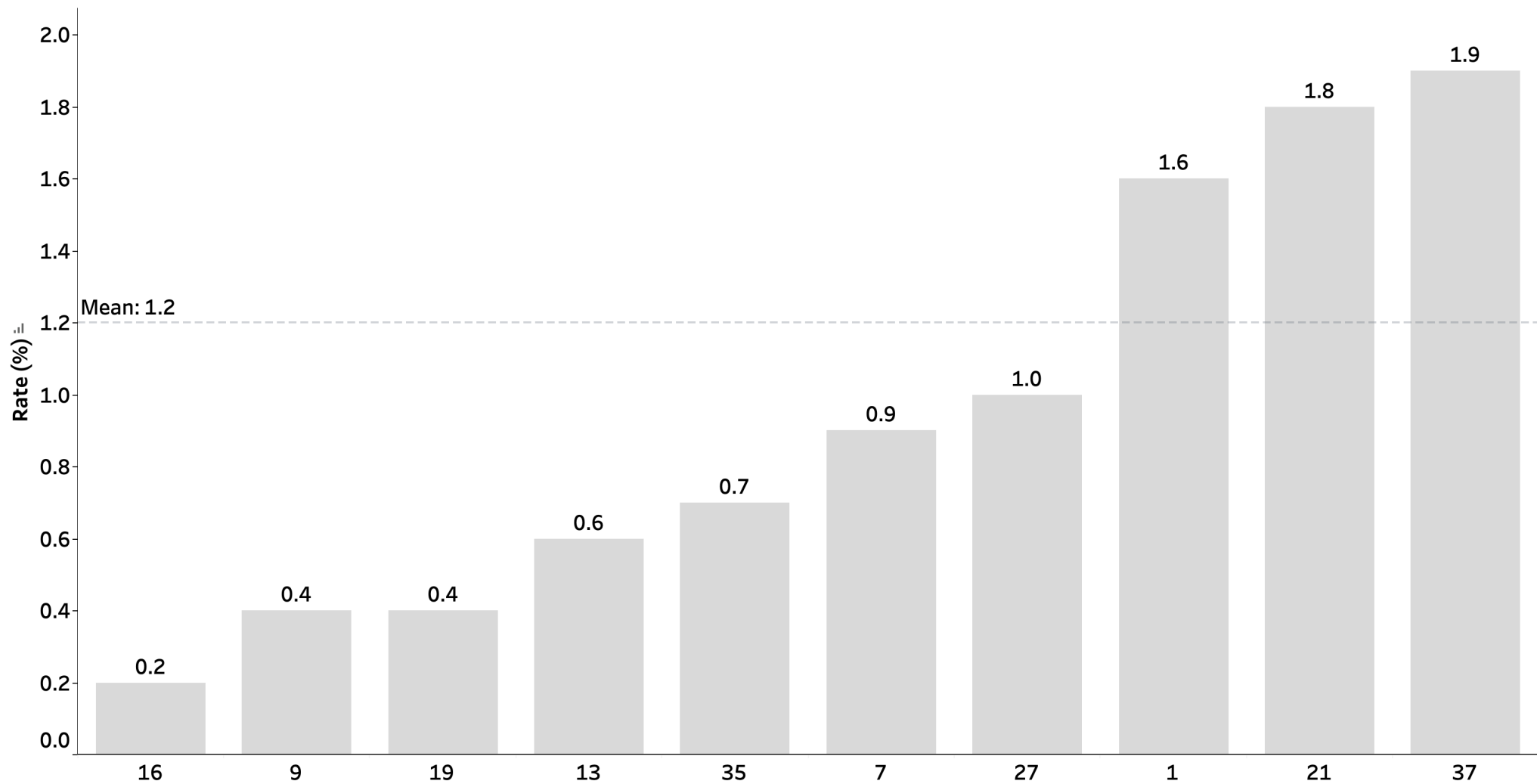
VTE  
Summary



VTE Operation  
Summary



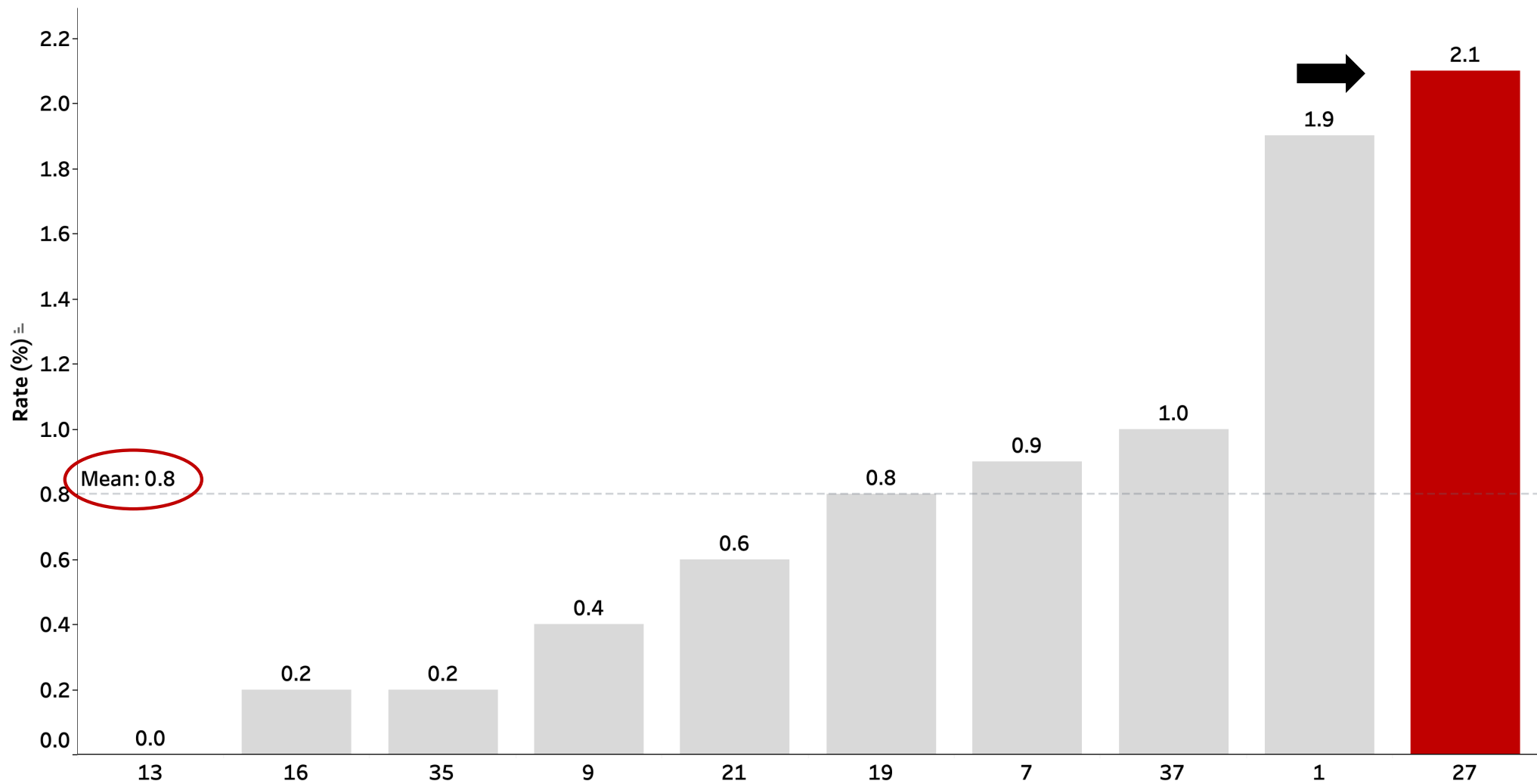
VTE Non-operative  
Summary



## VTE Prophylaxis

- ◆ VTE rates are similar to trauma
- ◆ Diseases
  - Appy > No
  - Acute Gallbladder
    - ◆ With Cancer ?
  - SBO = 1.7%, 2.9% op, 1.0% non-op
  - Ex lap = 4.5%
- ◆ Timing
- ◆ Agent

Incisional SSI Operation  
Appendicitis



# Appendectomy

## ◆ Operation

- Lap = 8
- Lap to Open = 2
- Open = 1

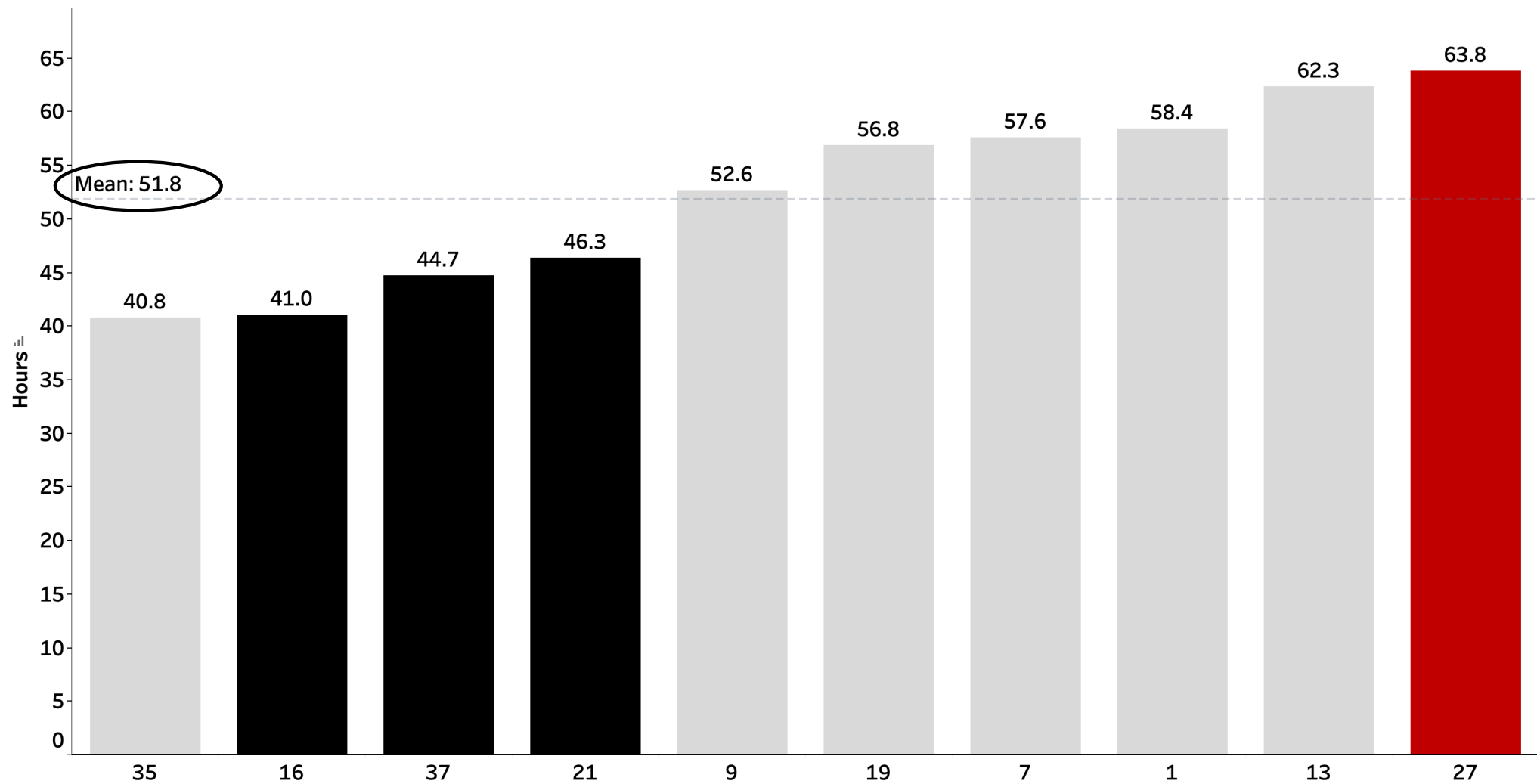
## ◆ Grade

- Grade 1 = 9
- Grade 3 = 1
- Grade 4 = 1

## ◆ Surgeon

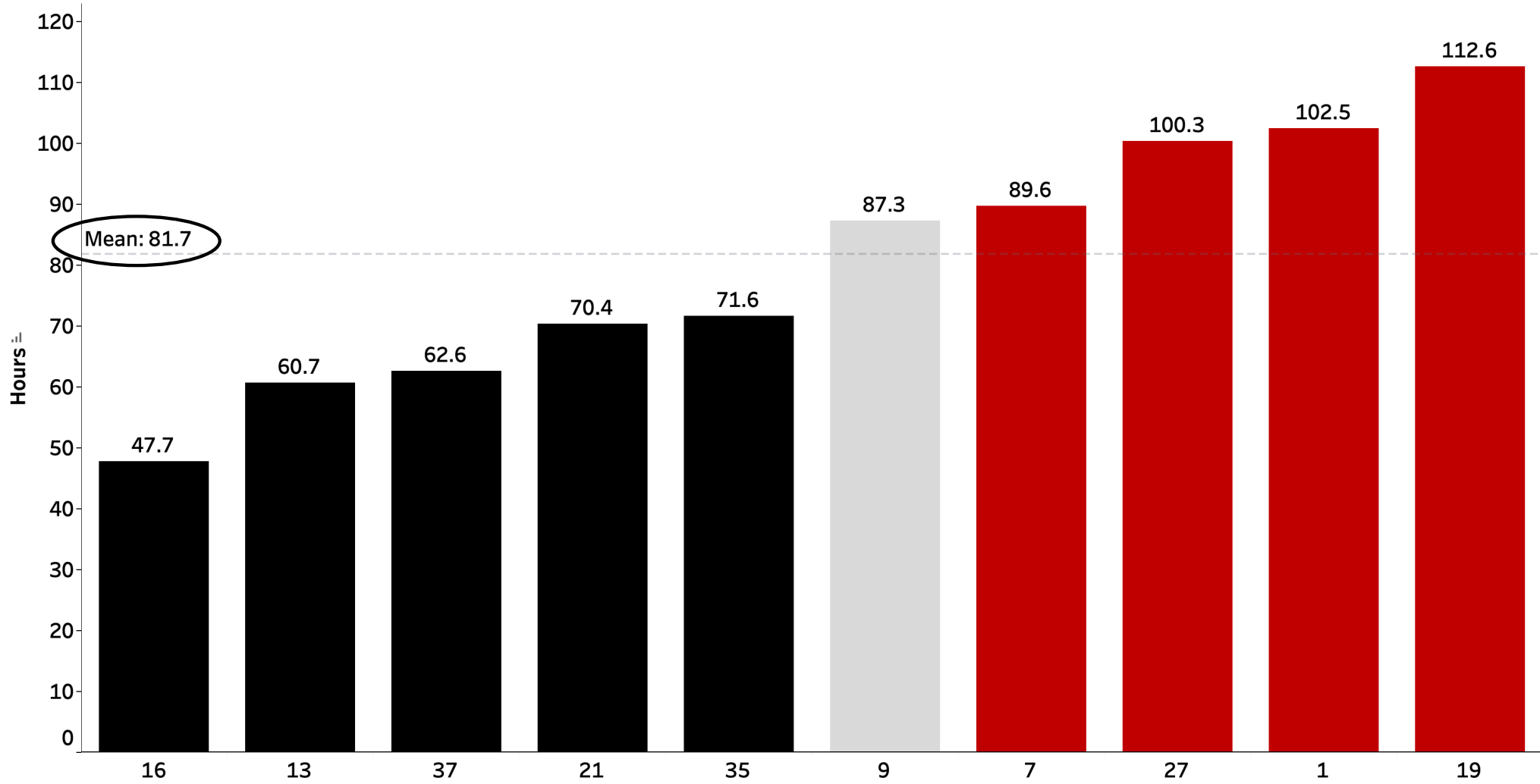
- One with 4
- One with 2

Length of Stay  
Appendicitis





## Length of Stay Non-operative Appendicitis



## Acute Appendicitis

- ◆ Who should get an operation?
  - Uncomplicated
  - Complicated
  - Sweet spot
- ◆ ACS Bulletin - Are antibiotics the answer to treating acute appendicitis?
  - 3 APPAC Trials, CODA Trial
  - Uncomplicated, safe > yes
  - APPAC Trial > 39% recurrence within 5 years
  - CODA Trial > 49% had an appendectomy by year 3-4
  - Recurrence tends to happen fairly early: days to 1.5 years

# Acute Appendicitis

## ◆ APPAC IV

- No antibiotics ? Symptomatic treatment
- IV antibiotics in the outpatient setting
- Discharge from ER
- Finns pushing the envelope

# **Surgeon Gender and Outcomes**

**Mark Hemmila, MD**



JAMA Surgery | **Original Investigation**

## Surgeon Sex and Long-Term Postoperative Outcomes Among Patients Undergoing Common Surgeries

Christopher J. D. Wallis, MD, PhD; Angela Jerath, MD, MSc; Khatereh Aminoltejari, MD, MSc; Kirusanthi Kaneshwaran, MD, MSc; Arghavan Salles, MD, PhD; Natalie Coburn, MD, MPH; Frances C. Wright, MD, MEd; Lesley Gotlib Conn, PhD; Zachary Klaassen, MD, MSc; Amy N. Luckenbaugh, MD; Sanjana Ranganathan, BSc; Carlos Riveros, MD; Colin McCartney, MB, ChB, PhD; Kathleen Armstrong, MD, MSc; Barbara Bass, MD; Allan S. Detsky, MD, PhD, CM; Raj Satkunasivam, MD, MS

JAMA Surgery | **Original Investigation**

## Differences in Cholecystectomy Outcomes and Operating Time Between Male and Female Surgeons in Sweden

My Blohm, MD; Gabriel Sandblom, MD, PhD; Lars Enochsson, MD, PhD; Johanna Österberg, MD, PhD

# Comparison of postoperative outcomes among patients treated by male and female surgeons: a population based matched cohort study



Christopher JD Wallis *resident*<sup>1 2</sup>, Bheeshma Ravi *surgeon and assistant professor*<sup>3</sup>, Natalie Coburn *surgeon and*<sup>4</sup> *associate professor*<sup>4</sup>, Robert K Nam *surgeon and professor*<sup>1</sup>, Allan S Detsky *internist and professor*<sup>2 5</sup>, Raj Satkunasivam *surgeon and assistant professor*<sup>1 6</sup>

<sup>1</sup>Division of Urology, Sunnybrook Health Sciences Centre, University of Toronto, ON M4N 3M5, Canada; <sup>2</sup>Institute of Health Policy, Management, and Evaluation, University of Toronto; <sup>3</sup>Division of Orthopedic Surgery, Sunnybrook Health Sciences Centre; <sup>4</sup>Division of General Surgery, Sunnybrook Health Sciences Centre; <sup>5</sup>Department of Medicine, Mount Sinai Hospital, University Health Network, University of Toronto; <sup>6</sup>Department of Urology and Center for Outcomes Research, Houston Methodist Hospital, Houston, TX, USA.

We selected coronary artery bypass grafting, femoral-popliteal bypass, abdominal aortic aneurysm repair, appendectomy, cholecystectomy, gastric bypass, colon resection, liver resection, hysterectomy, anterior or posterior spinal decompression, anterior or posterior spinal arthrodesis, craniotomy for brain tumour, total knee replacement, total hip replacement, open repair of femoral neck or shaft fracture, total thyroidectomy, neck dissection, lung resection, radical cystectomy, radical prostatectomy, transurethral resection of prostate, carpal tunnel release, and breast reduction.

# Short Term

**Table 2| Outcomes in the matched study cohort, n (%; 95% CI) unless otherwise stated**

Outcome	Patients treated by female surgeon (n=52 315)	Patients treated by male surgeon (n=52 315)	Absolute difference	Adjusted odds ratio (95%CI; P value)
Primary outcome (death, readmission, or complication within 30 days)	5819 (11.1, 10.9 to 11.4)	6046 (11.6, 11.3 to 11.8)	0.43%	0.96 (0.92 to 0.99; 0.02)
Death within 30 days	480 (0.9, 0.8 to 1.0)	543 (1.0, 1.0 to 1.1)	0.12%	0.88 (0.78 to 0.99; 0.04)
Readmission within 30 days	2433 (4.7, 4.5 to 4.8)	2518 (4.8, 4.6 to 5.0)	0.16%	0.96 (0.91 to 1.02; 0.20)
Complication within 30 days	3543 (6.8, 6.6 to 7.0)	3674 (7.0, 6.8 to 7.2)	0.25%	0.96 (0.92 to 1.01; 0.10)
Hospital length of stay, median (IQR)	2 (0 to 4)	2 (0 to 4)	0	0.97 (0.94 to 0.99; 0.01)*

\*Adjusted relative rate rather than adjusted odds ratio.



# Long Term

Table 2. Multivariable Adjusted Event Rates and Outcomes<sup>a</sup>

Outcome	Outcome within 90 d			Outcome within 1 y		
	Adjusted event rate (95% CI) <sup>b</sup>		Adjusted odds ratio (95% CI) <sup>c</sup>	Adjusted event rate (95% CI) <sup>b</sup>		Adjusted odds ratio (95% CI) <sup>c</sup>
	Male surgeon	Female surgeon		Male surgeon	Female surgeon	
Composite end point	13.9 (11.3-17.2)	12.5 (9.9-15.6)	1.08 (1.03-1.13)	25.0 (22.4-27.9)	20.7 (17.2-24.8)	1.06 (1.01-1.12)
Death	0.8 (0.4-1.6)	0.5 (0.3-1.1)	1.25 (1.12-1.39)	2.4 (1.2-4.8)	1.6 (0.8-3.1)	1.24 (1.13-1.36)
Readmission	8.4 (7.0-10.2)	7.1 (6.0-8.4)	1.05 (1.01-1.10)	19.6 (16.7-23.1)	15.5 (12.6-19.1)	1.04 (0.98-1.10)
Complications	6.1 (4.2-8.9)	6.0 (4.0-9.0)	1.09 (1.03-1.16)	7.4 (5.4-10.1)	7.0 (4.9-10.0)	1.09 (1.03-1.14)

<sup>a</sup> Adjusted odds ratio greater than 1 indicates a higher likelihood of the event among patients treated by male surgeons.

hospital status (using academic).

<sup>c</sup> Using GEE modeling dealing with clustering based on procedure fee code

# Cholecystectomies

- ◆ Sweden
- ◆ 2006 to 2019
- ◆ 150,000 patients, 65% elective, 35% acute
- ◆ 33% Female surgeons
  - Fewer per year
  - University and private (Regional, county)

JAMA Surgery | **Original Investigation**

## Differences in Cholecystectomy Outcomes and Operating Time Between Male and Female Surgeons in Sweden

My Blohm, MD; Gabriel Sandblom, MD, PhD; Lars Enochsson, MD, PhD; Johanna Österberg, MD, PhD

# Cholecystectomies

## ◆ Male Surgeon

- ↑ Surgical complications (OR 1.29, 95% CI 1.19-1.40)
- ↑ Total complications (OR 1.12, 95% CI 1.06-1.19)
- ↑ Bile duct injury, elective (OR 1.69, 95% CI 1.22-2.34)
- No difference bile duct injury, acute
- ↑ Conversion to open, acute (OR 1.22, 95% CI 1.04-1.43)
- Longer hospital stay

## ◆ Female Surgeon

- ↑ OR time

## ◆ No difference in mortality

**What about us?**

## What about us?

- ◆ Existing risk-adjust models
  - Surgeon gender
  - Add to model

**What about us? > Gallbladder (6,707 patients, 74% Male, 26% Female surgeon)**

<b>Outcome</b>	<b>Male Surgeon Odds Ratio (CI)</b>	<b>P Value</b>
<b>Any Complication - Operative</b>	<b>0.88 (0.76-1.01)</b>	<b>0.07</b>
<b>Incisional SSI</b>	<b>0.80 (0.42-1.50)</b>	<b>0.48</b>
<b>Organ SSI</b>	<b>1.18 (0.68-2.04)</b>	<b>0.56</b>
<b>Cystic Duct Leak</b>	<b>1.25 (0.75-2.08)</b>	<b>0.39</b>
<b>Retained Stone</b>	<b>0.73 (0.52-1.03)</b>	<b>0.07</b>
<b>CBD Injury</b>	<b>0.71 (0.18-2.86)</b>	<b>0.63</b>
<b>Sepsis - Operative</b>	<b>1.06 (0.70-1.59)</b>	<b>0.8</b>
<b>ED Visit - Operative</b>	<b>0.88 (0.73-1.07)</b>	<b>0.21</b>
<b>Readmission - Operative</b>	<b>0.90 (0.73-1.10)</b>	<b>0.22</b>
<b>Mortality - Operative</b>	<b>0.88 (0.37-2.12)</b>	<b>0.78</b>

## What about us? > Gallbladder

Continuous Outcome	Male Surgeon Coefficient (CI)	P Value
Length of Stay (Hours) - Operative	0.02 (-0.02-0.05)	0.4
Length of Stay (Hours) - Acute Chole	0.009 (-0.03-0.05)	0.67
Length of Stay (Hours) - Cholangitis	0.04 (-0.17,0.24)	0.73
Length of Stay (Hours) - Choledocho	0.06 (-0.01-0.14	0.09
Length of Stay (Hours) - GS Panc	0.06 (-0.02-0.14)	0.17

**What about us? > Emergent Ex. Laparotomy (2,399 patients, 72% Male, 28% Female surgeon)**

<b>Outcome</b>	<b>Male Surgeon Odds Ratio (CI)</b>	<b>P Value</b>
<b>Any Complication - Operative</b>	<b>0.98 (0.79-1.21)</b>	<b>0.83</b>
<b>Incisional SSI</b>	<b>0.94 (0.61-1.44)</b>	<b>0.77</b>
<b>Organ SSI</b>	<b>1.11 (0.83-1.48)</b>	<b>0.5</b>
<b>Anastomotic Leak</b>	<b>0.979 (0.57-1.72)</b>	<b>0.96</b>
<b>Wound Disruption</b>	<b>1.09 (0.53-2.27)</b>	<b>0.81</b>
<b>EC Fistula</b>	<b>2.81 (0.84-9.44)</b>	<b>0.09</b>
<b>Ileus</b>	<b>1.00 (0.78-1.30)</b>	<b>0.95</b>
<b>C Difficile</b>	<b>1.83 (0.88-3.81)</b>	<b>0.11</b>
<b>VTE</b>	<b>0.73 (0.48-1.1)</b>	<b>0.13</b>
<b>Pneumonia</b>	<b>1.01 (0.70-1.45)</b>	<b>0.96</b>



## What about us? > Emergent Ex. Laparotomy

Outcome	Male Surgeon Odds Ratio (CI)	P Value
Cardiac Arrest	0.77 (0.46-1.29)	0.32
Sepsis - Operative	1.08 (0.85-1.37)	0.54
ED Visit - Operative	0.94 (0.72-1.24)	0.68
Readmission - Operative	1.08 (0.86-1.35)	0.53
Mortality - Operative	1.03 (0.77-1.38)	0.86

## What about us? > Emergent Ex. Laparotomy

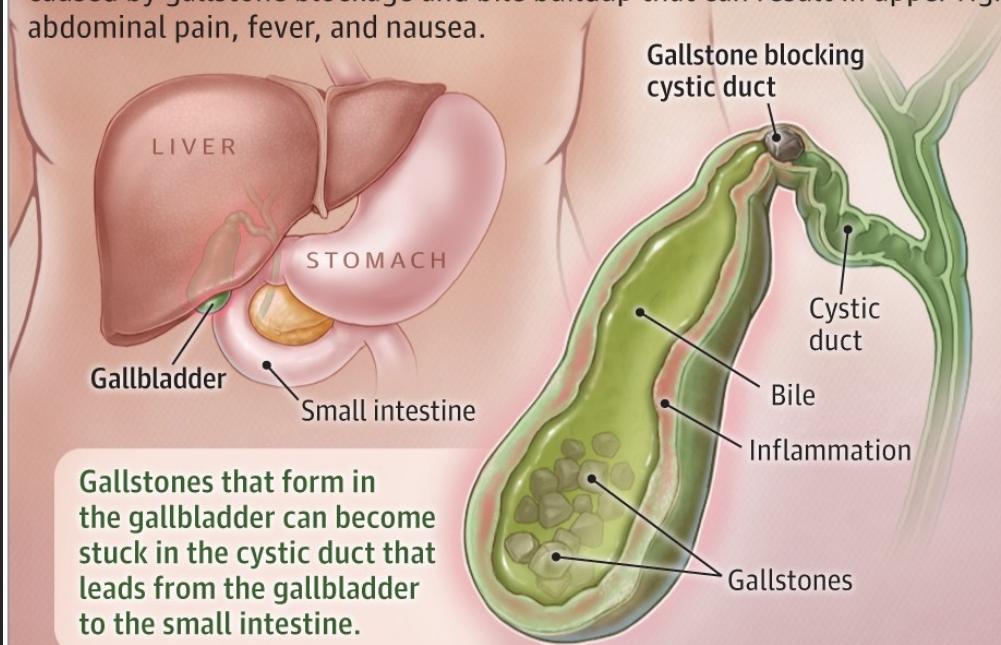
Continuous Outcome	Male Surgeon Coefficient (CI)	P Value
Length of Stay (Hours)	0.01 (-0.06-0.07)	0.84
ICU Length of Stay (Hours)	-0.05 (-0.19-0.09)	0.48

**Acute Cholecystitis**  
**High Operative Risk**  
**Difficult Cholecystectomy**

**Lena Napolitano, MD**

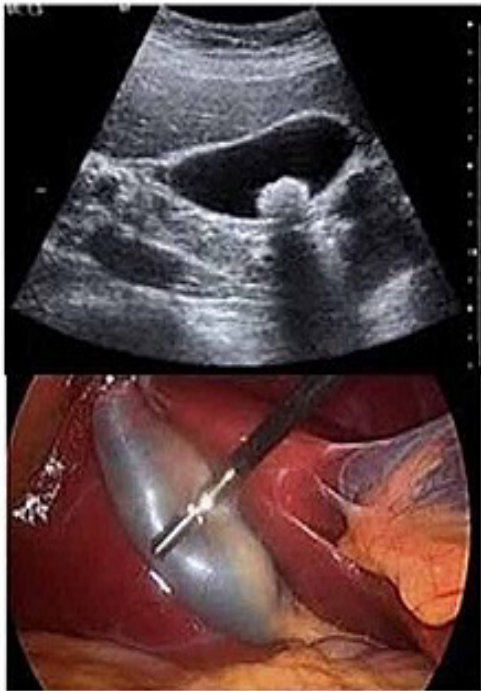
# Challenging Issues in Acute Care Surgery: *Acute Cholecystitis*

**Acute cholecystitis** is inflammation of the gallbladder most commonly caused by gallstone blockage and bile buildup that can result in upper right abdominal pain, fever, and nausea.

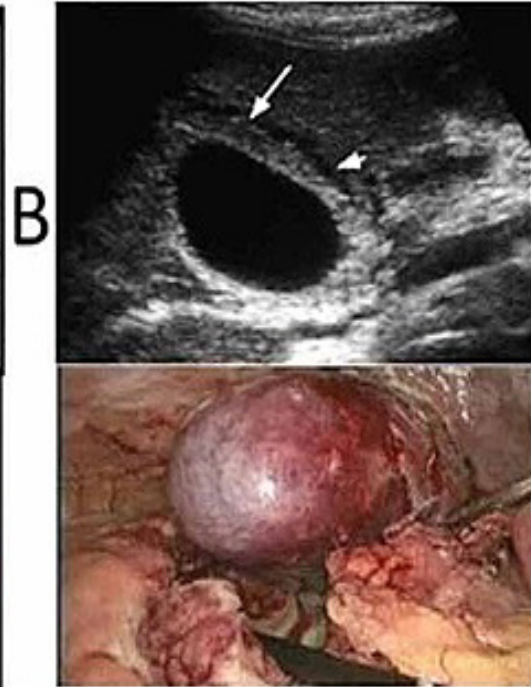


MACS 4/2024 Lansing

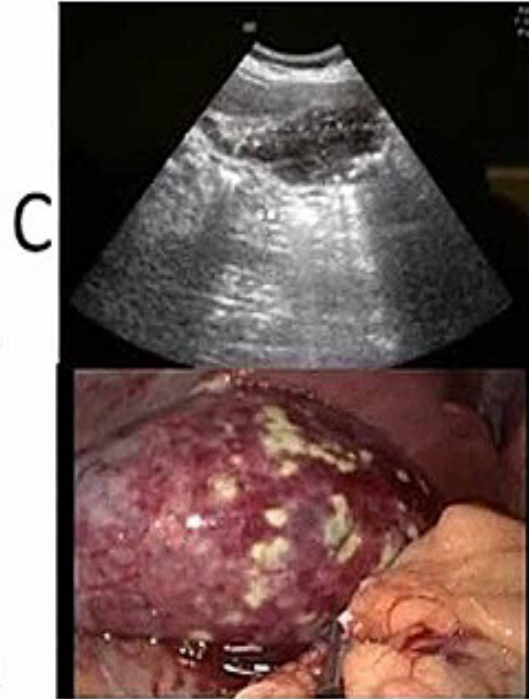
# Acute Cholecystitis – Wide Spectrum of Disease



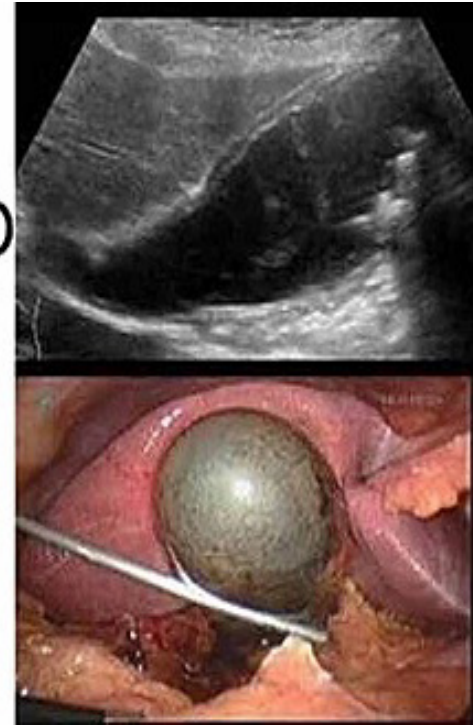
Normal



Acute  
Cholecystitis



Empyema of GB



Gangrenous  
Cholecystitis



# AAST Grades of Acute Cholecystitis -2016

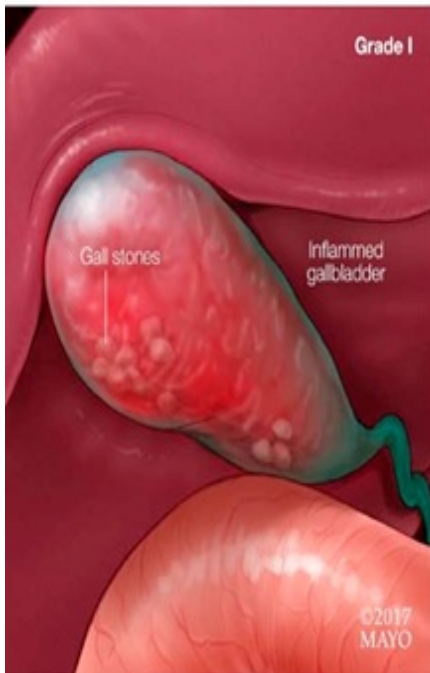
**AAST I**

**AAST II**

**AAST III**

**AAST IV**

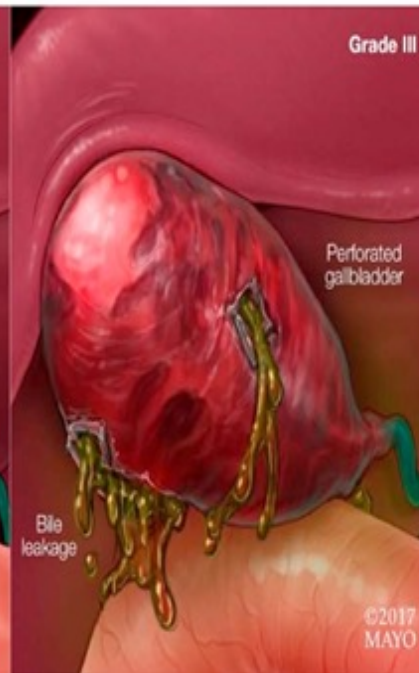
**AAST V**



Acute cholecystitis



Emphysematous or  
gangrenous  
cholecystitis



Gallbladder  
perforation with local  
contamination



Gallbladder  
perforation with  
abscess or fistula

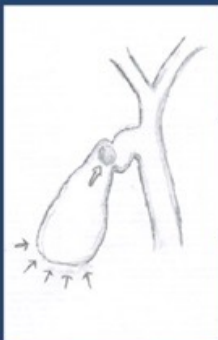


Gallbladder  
perforation with  
peritonitis

## A Revised AAST Grading System for Acute Cholecystitis Results in Significantly Improved Outcome Predictions

## AAST Update 2022

### Acute Cholecystitis



Apply Optimized  
AAST Scoring  
System

Grade	Description	Clinical Criteria*	Imaging Criteria (CT/US/HIDA findings)	Operative Criteria	Pathologic Criteria
<b>I</b>	Acute cholecystitis	Right upper quadrant or epigastric pain/tenderness	Gallbladder distention; gallstones or sludge; pericholecystic fluid; non-visualization of gallbladder (GB) on hepatobiliary iminodiacetic acid (HIDA) scan	Gallbladder with hyperemia or edema	Acute inflammatory changes in the GB wall without necrosis or pus
<b>II</b>	Severe but uncomplicated acute cholecystitis	Murphy's Sign	Gallbladder distention; gallstones or sludge; pericholecystic fluid; non-visualization of gallbladder (GB) on hepatobiliary iminodiacetic acid (HIDA) scan	Any anatomic anomaly (large liver, intrahepatic gallbladder, BMI > 50); severe wall thickening, omental adhesions to body or fundus of gallbladder	Above, plus severely thickened gallbladder wall
<b>III</b>	GB empyema or gangrenous cholecystitis or emphysematous cholecystitis	Localized peritonitis in RUQ	Above, plus ultrasound findings of gallbladder wall thickening 4mm or greater or CBD diameter 8mm or greater. Inflammatory changes on CT or MRI	Gallbladder wall with necrotic areas or purulent fluid in gallbladder.	Above plus purulent fluid in the GB lumen or necrosis of GB wall (<50%) or intramural abscess
<b>IV</b>	Complete GB necrosis or perforation with perichole-cystic abscess	Localized peritonitis in RUQ	Abscess in RUQ outside GB	Complete or near complete necrosis of the gallbladder wall, or contained perforation.	Necrosis of the GB wall (>= 50%)
<b>V</b>	GB perforation with generalized peritonitis or bilio-enteric fistula	Above, with generalized peritonitis	Free gallbladder perforation or bilio-enteric fistula	Perforated gallbladder; bilio-enteric fistula	Necrosis of the GB with non-iatrogenic perforation

Schuster K et al. Revision of the AAST grading scale for acute cholecystitis with comparison to physiologic measures of severity. J Trauma Acute Care Surgery 2022;92(4):p 664-674. DOI: 10.1097/TA.000000000000035

\*For patients with prior surgery, prior cholecystitis admission, more than 3 days of pain increase the clinical grade by one point. For patients with WBC  $\geq$  18,000, or total bilirubin > 1.3 increase the clinical grade by two points.



# Acute Cholecystitis – Wide Spectrum of Patients

## • Low-Risk vs. High-Risk for Surgery

### Charlson Comorbidity Index (CCI)



1 point	MI, CHF, PVD, CVA, Dementia, COPD, PUD, Mild liver disease
2 points	Mod-severe CKD, CA without metastasis, DM with end-organ damage
3 points	Mod-severe liver disease
6 points	Metastatic solid CA, AIDS
1 point	Each decade in age > 40 years

Female 75 years old with underlying disease

- DM with diabetic nephropathy
- Chronic kidney disease
- History of CVA



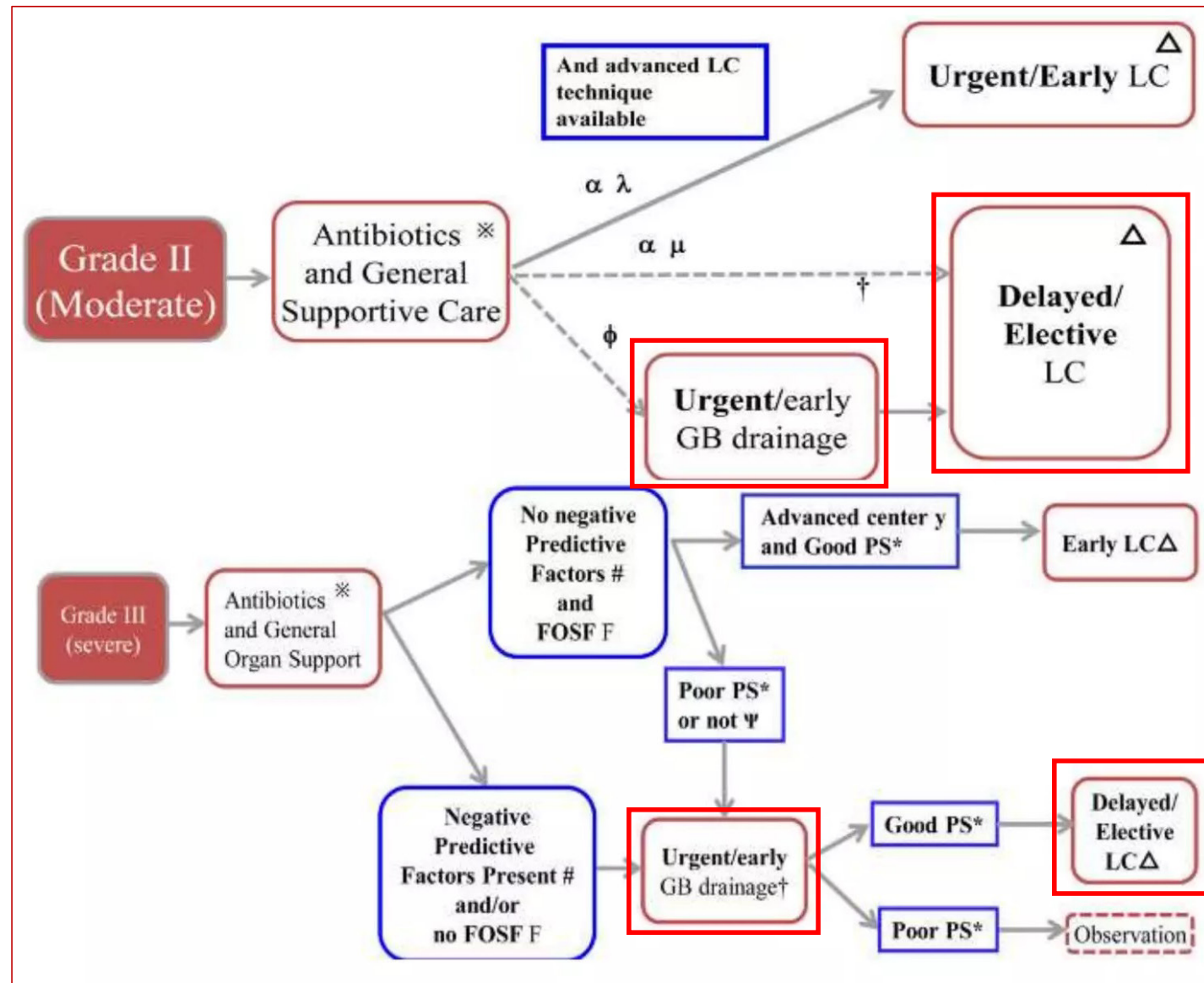
Age – 3 points  
DM – 2 points  
CKD – 2 points  
CVA – 1 point  
  
CCI – 8 points

ASA Classification	Definition	Examples
ASA I	A normal healthy patient	Healthy, non-smoking, no or minimal alcohol use
ASA II	A patient with mild systemic disease	Mild diseases only without substantive functional limitations. Current smoker, social alcohol drinker, pregnancy, obesity (30<BMI<40), well-controlled DM/HTN, mild lung disease
ASA III	A patient with severe systemic disease	Substantive functional limitations; One or more moderate to severe diseases. Poorly controlled DM or HTN, COPD, morbid obesity (BMI ≥40), active hepatitis, alcohol dependence or abuse, implanted pacemaker, moderate reduction of ejection fraction, ESRD undergoing regularly scheduled dialysis, history (>3 months) of MI, CVA, TIA, or CAD/stents.
ASA IV	A patient with severe systemic disease that is a constant threat to life	Recent (<3 months) MI, CVA, TIA or CAD/stents, ongoing cardiac ischemia or severe valve dysfunction, severe reduction of ejection fraction, shock, sepsis, DIC, ARD or ESRD not undergoing regularly scheduled dialysis
ASA V	A moribund patient who is not expected to survive without the operation	Ruptured abdominal/thoracic aneurysm, massive trauma, intracranial bleed with mass effect, ischemic bowel in the face of significant cardiac pathology or multiple organ/system dysfunction
ASA VI	A declared brain-dead patient whose organs are being removed for donor purposes	



## Tokyo-18 Guidelines

- **Grade I (mild):** Early LC if CCI  $\leq 5$  and ASA  $\leq 2$
- **Grade II (moderate):** Early LC if CCI  $\leq 5$  and ASA  $\leq 2$  by experienced surgeons; and if not, after medical treatment and/or gallbladder drainage, LC would be indicated.
- **Grade III (severe):** Early LC if CCI  $\leq 3$  and ASA  $\leq 2$  treated at an advanced center with experienced surgeons. If not considered suitable for early LC, recommend early/urgent biliary drainage followed by delayed LC once the patient's overall condition has improved.



# Percutaneous cholecystostomy versus emergency cholecystectomy for the treatment of acute calculous cholecystitis in high-risk surgical patients: a meta-analysis and systematic review

Hejing Huang<sup>1</sup> · Hang Zhang<sup>1</sup> · Dejun Yang<sup>2</sup> · Weijun Wang<sup>2</sup> · Xin Zhang<sup>2</sup> 

Vizient Database 2013-15  
Severity of Illness Score  
PC 1682; LC 6456; OC 658  
CONVERSION 765

Loozen = CHOCLATE RCT

- Perc chole (PC) vs. Emergency Lap chole (LC)
- 8960 pts
- 6 studies
- PC associated with increased mortality (RR = 2.87; CI = 1.33–6.18;  $p = 0.007$ ) and readmission rate (RR = 4.70; CI = 3.30–6.70;  $p < 0.00001$ )
- No significant difference in morbidity, severe complication rate or LOS

Updates in Surgery (2022) 74:55–64

<https://doi.org/10.1007/s13304-021-01081-9>

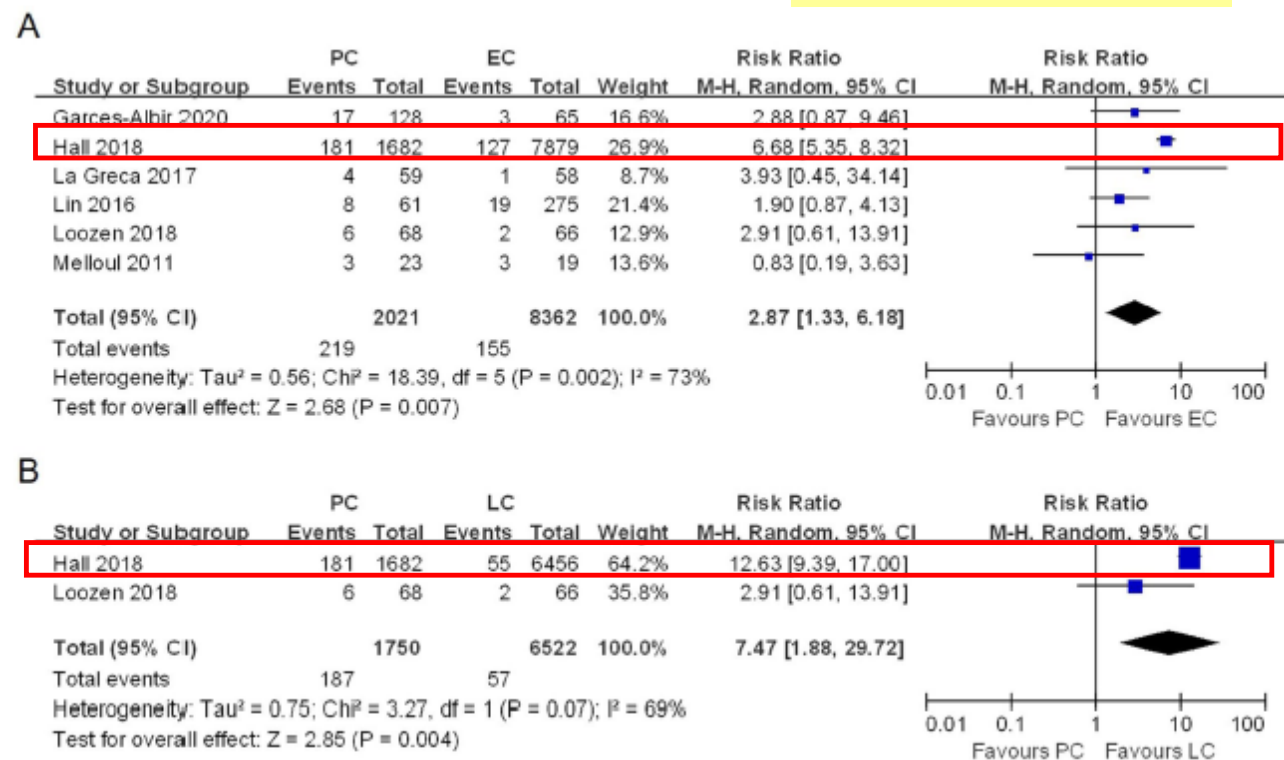


Fig. 2 Forest plot to show the pooled effects of mortality. **a** PC vs. EC, **b** PC vs. LC

# Challenging Issues in General Surgery

1. Acute cholecystitis – High Operative Risk

2. Acute cholecystitis – Difficult Cholecystectomy

# Challenging Issues in General Surgery



1. Acute cholecystitis – High Operative Risk

2. Acute cholecystitis – Difficult Cholecystectomy



## Non-Operative Options: Acute Cholecystitis







**Figure 1** Acute cholecystitis (AC) with distended gallbladder, stones, mucosal hyper-enhancement and pericholecystic fluid noted on computed tomography

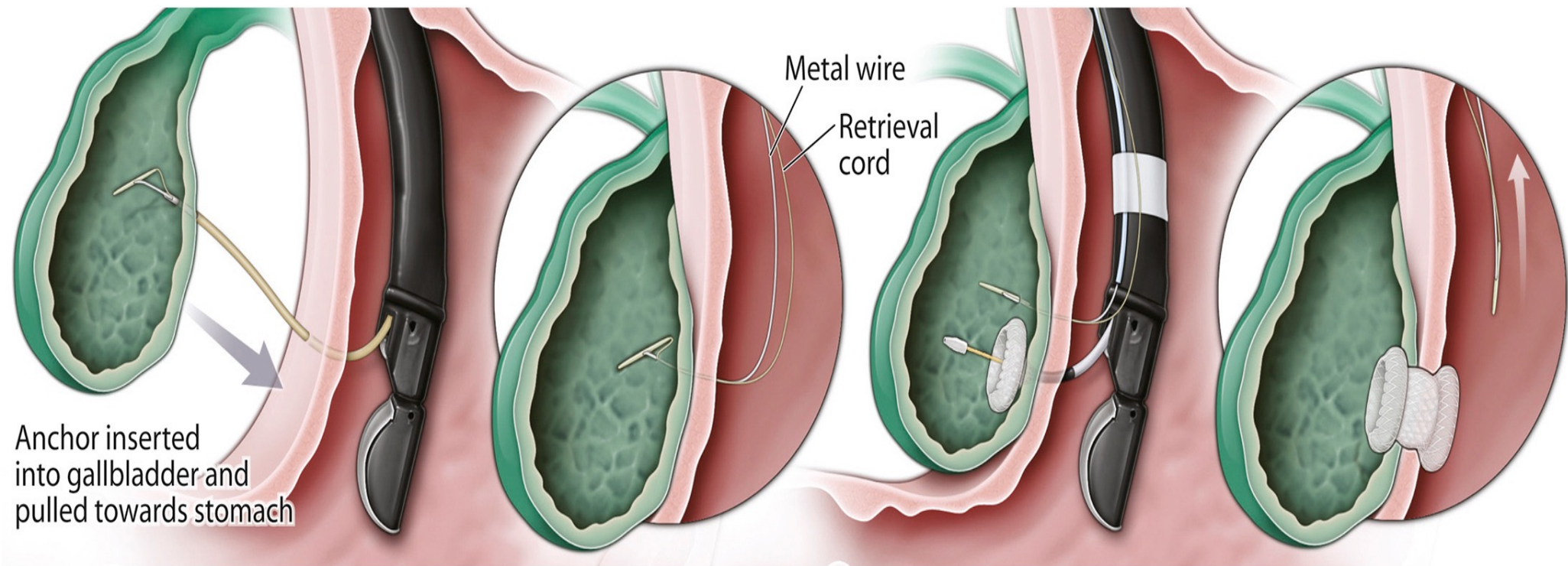
## EUS-GBD



- Endoscopic Ultrasound-guided Gallbladder Drainage (EUS-GBD) is now considered a well-established alternative treatment to surgery in case of AC.
- First described in 2007

Kwan V, Eisendrath P, Antaki F, et al. EUS-guided cholecystenterostomy: a new technique (with videos). *Gastrointest Endosc.* 2007;66 (3):582–586. doi:10.1016/j.gie.2007.02.065

# Retrievable puncture Anchor Traction Method for EUS-guided Gallbladder Drainage (EUS-GBD)



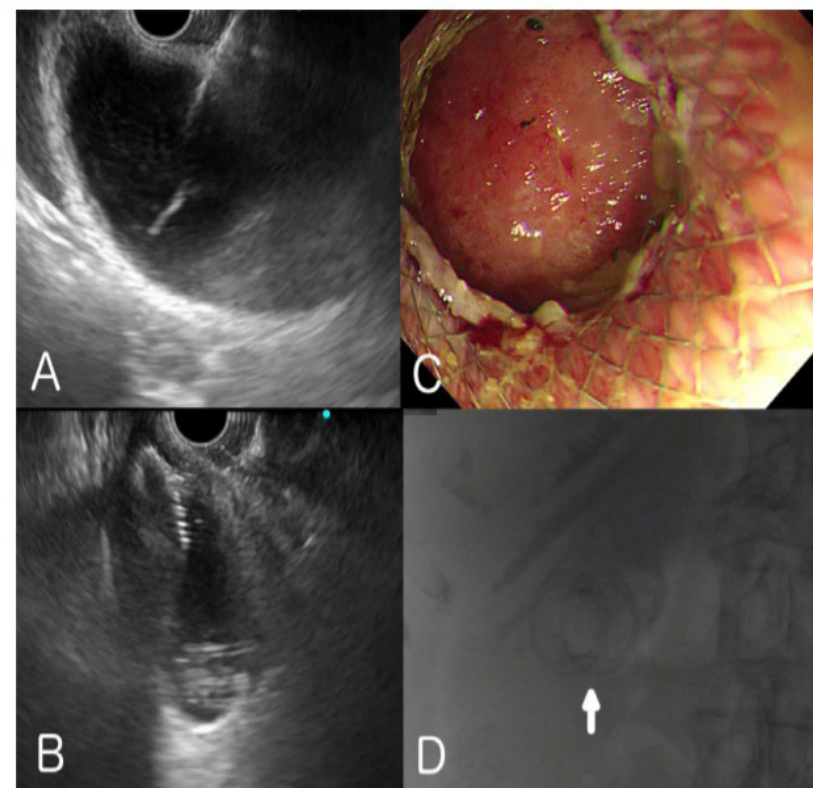
ORIGINAL RESEARCH

# Endosonography-guided gallbladder drainage versus percutaneous cholecystostomy in very high-risk surgical patients with acute cholecystitis: an international randomised multicentre controlled superiority trial (DRAC 1)

## What are the new findings?

- In this randomised trial of 80 patients, EUS-GBD significantly reduced 1-year adverse events (25.6% vs 77.5%,  $p<0.001$ ), 30-day adverse events (12.8% vs 47.5%,  $p=0.001$ ), re-interventions after 30 days (2.6% vs 30%,  $p=0.001$ ), number of unplanned readmissions (6% vs 50%,  $p=0.002$ ) and recurrent cholecystitis (2.6% vs 20%,  $p=0.029$ ).

Teoh AYB, et al. Gut 2020;69:1085–1091. doi:10.1136/gutjnl-2019-319996



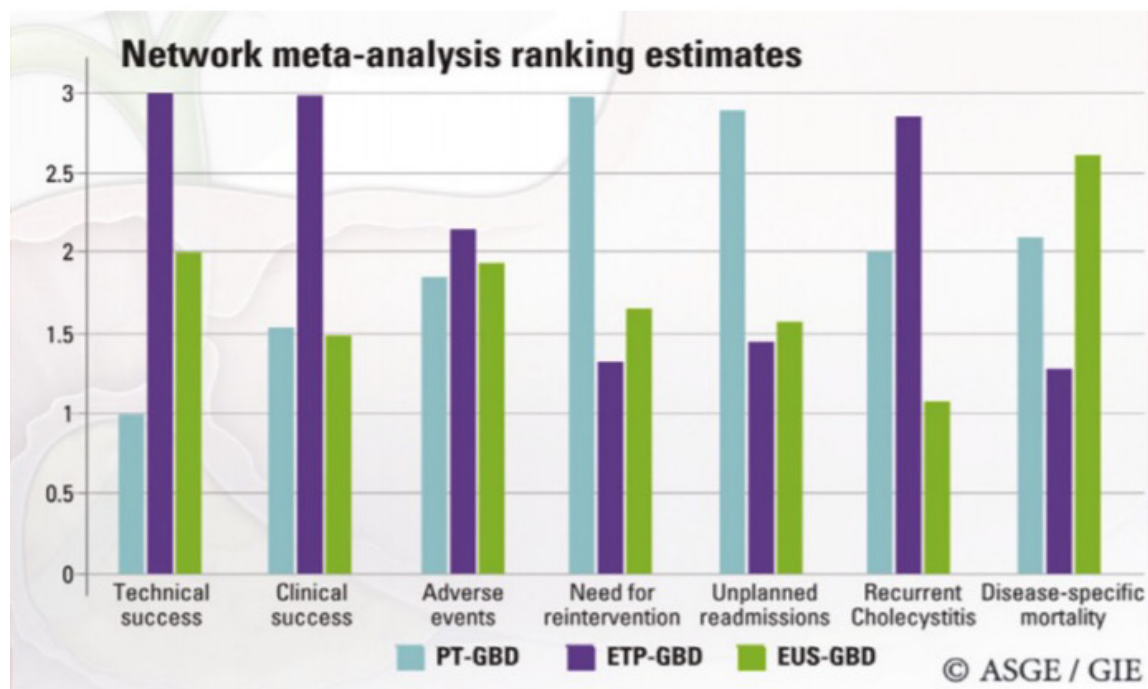
**Figure 1** The EUS-GBD procedure. (A) Direct puncture of the cauterly tipped delivery device. (B) opening of the distal flange. (C) Endoscopic appearance after opening of the proximal flange. (D) The LAMS as seen on X-ray after complete deployment indicated by the white arrow. GBD, gallbladder drainage; LAMS, lumen apposing metal stent.



## Comparison of EUS-guided endoscopic transpapillary and percutaneous gallbladder drainage for acute cholecystitis: a systematic review with network meta-analysis CME

Alexander Podboy, MD,<sup>1</sup> Jacky Yuan, PhD,<sup>2</sup> Christopher Donald Stave, MLS,<sup>3</sup>  
Shannon Melissa Chan, FRCSEd (Gen),<sup>4</sup> Joo Ha Hwang, MD, PhD,<sup>1</sup> Anthony Yuen Bun Teoh, FRCSEd (Gen)

- 10 studies, 1267 pts
- **EUS-GBD lowest risk of recurrent cholecystitis:**
  - EUS-GBD vs PT-GBD vs ETP-GBD:
    - 1.089 vs 2.02 vs 2.891
- **PT-GBD (perc chole) had highest risk of reintervention and unplanned readmissions**
- In centers with expertise, EUS-GBD is preferred over PT-GBD with improved outcomes.



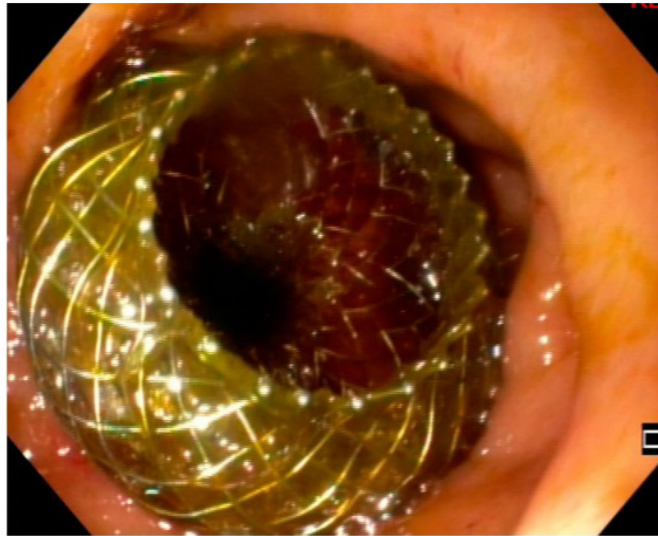
*Gastrointest Endosc* 2021 Apr;93(4):797-804.e1.

doi: 10.1016/j.gie.2020.09.040

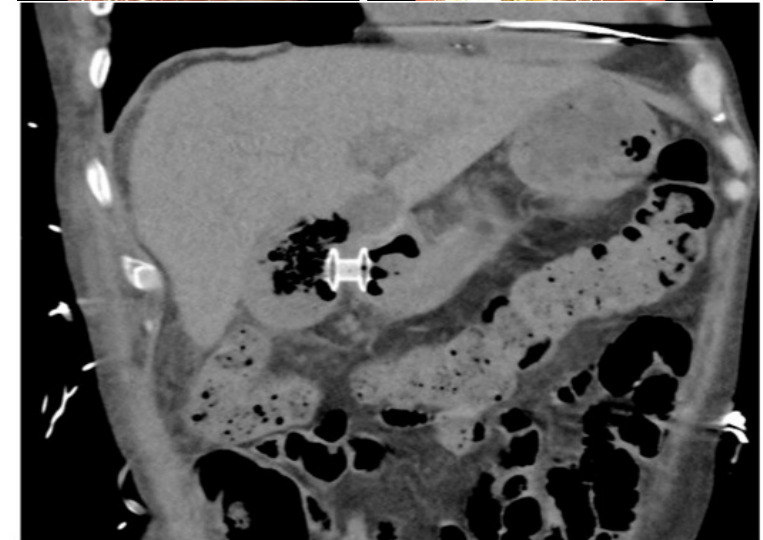
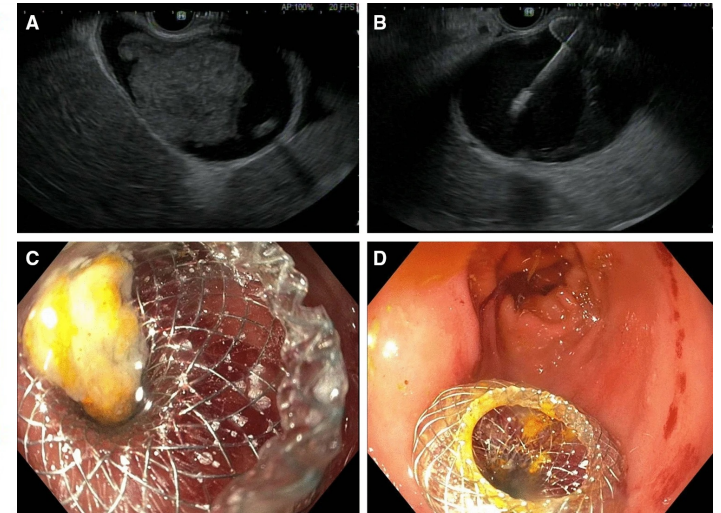
# EUS-GBD

## Long-term Outcomes

- Delayed AE 7.1%
- Cumulative stent patency rate 86% 3 yrs
- Stent occlusion can be managed endoscopically
- Cholecystectomy can be performed after EUS-GBD. Compared with Perc Chole, no difference in lap vs. open cholecystectomy



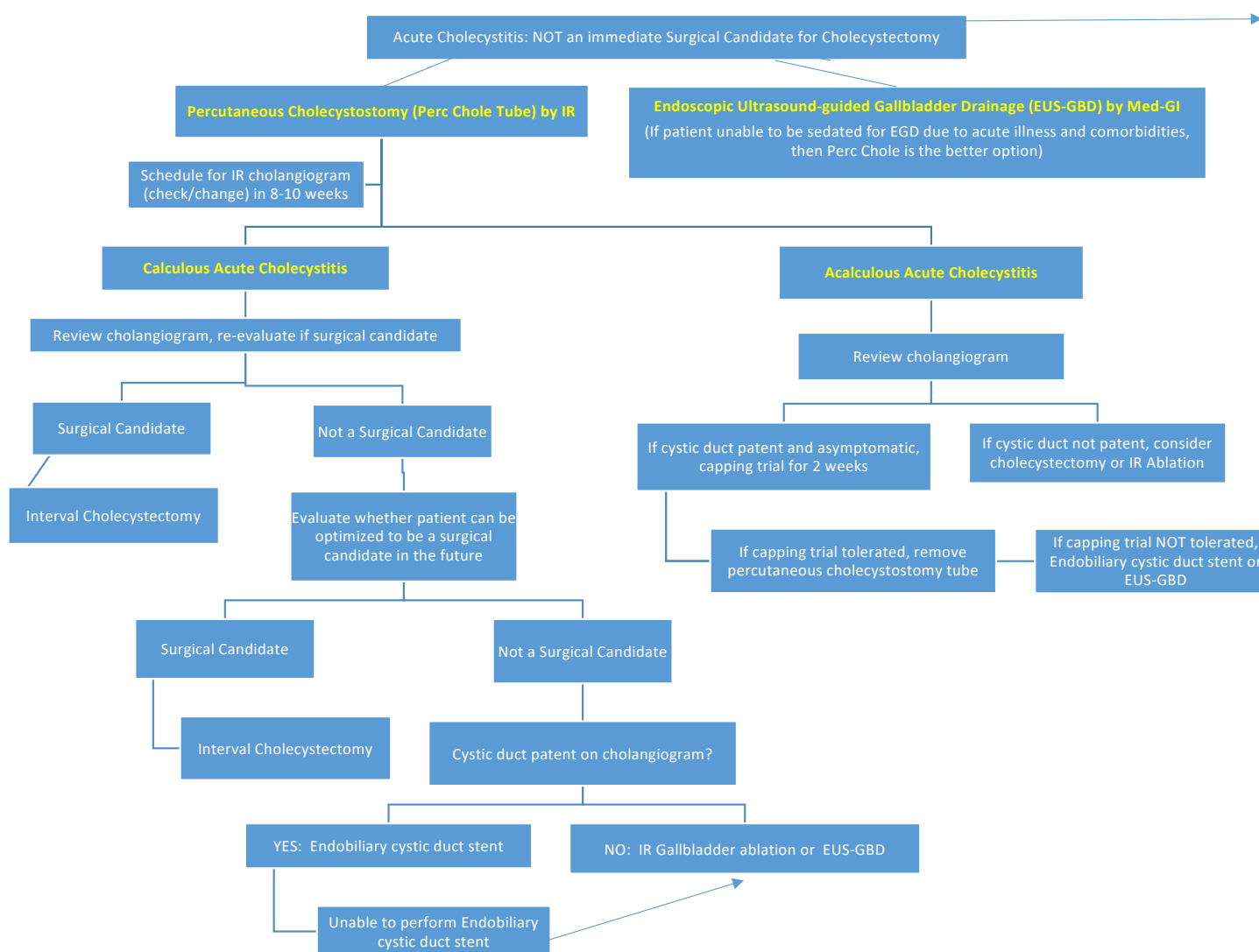
**Figure 4** Endoscopic image obtained after electrocautery lumen-apposing metal stent (EC-LAMS) deployment in the gastric lumen.



**Figure 6** Computed tomography (CT) scan after 2 months of follow-up showing a cholecystoduodenostomy using electrocautery lumen-apposing metal stent.

# Acute cholecystitis

Modality	Description	Patient selection	Advantages	Disadvantages
Percutaneous	Ultrasound/CT-guided drain	Conventional	Widely available	<ul style="list-style-type: none"> <li>• ↑ reintervention</li> <li>• ↑ cholecystitis</li> <li>• External drain</li> </ul>
Cystic duct stent	ERCP with selective cannulation of cystic duct	<ul style="list-style-type: none"> <li>• Undergoing ERCP</li> <li>• Large volume ascites</li> <li>• Future surgical candidates</li> <li>• Coagulopathy</li> </ul>	<ul style="list-style-type: none"> <li>• Simultaneous w choledocholithias &amp; cholangitis</li> <li>• Better in ascites</li> </ul>	<ul style="list-style-type: none"> <li>• Risk of pancreatitis</li> <li>• Migration leads to repeat ERCP</li> <li>• ↓ technical success</li> <li>• ↓ clinical success</li> </ul>
EUS-guided	EUS-guided stent from duodenum / stomach into GB	<ul style="list-style-type: none"> <li>• Uncovered metal biliary stent</li> <li>• Malignant cystic duct involvement</li> <li>• Large volume cholelithiasis</li> </ul>	<ul style="list-style-type: none"> <li>• ↓ need for reintervention</li> </ul>	<ul style="list-style-type: none"> <li>• Fistula closure if surgery offered</li> <li>• May occlude w food</li> <li>• Expertise</li> <li>• Contraindicated if perforation</li> </ul>



DRAC-1 Trial criteria defining high risk for cholecystectomy (one of the following):

- Age  $\geq$  80 years old
- ASA Grade 3 or higher
- Age-adjusted Charlson Comorbidity Index  $>$  5
- Karnofsky score  $<$  50



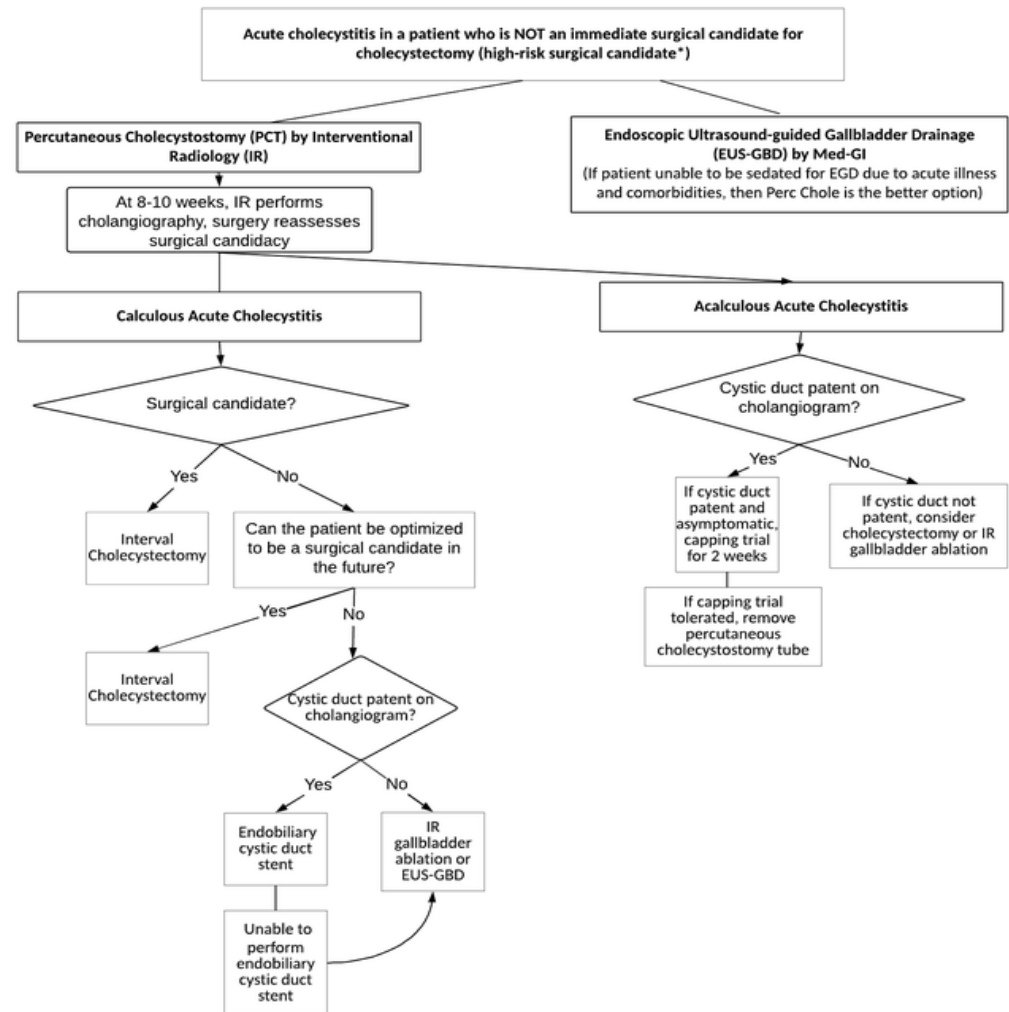
## Evaluation and Management of Gallstone-Related Diseases in Non-Pregnant Adults

- In the DRAC-1 Trial (Teoh AYB, 2020), patients were considered high-risk for cholecystectomy if they met one of the following criteria:
- Age  $\geq 80$  years old
- ASA Grade 3 or higher
- Age-adjusted Charlson Comorbidity Index  $> 5$
- Karnofsky score  $< 50$

Teoh AYB, Kitano M, Itoi T, Pérez-Miranda M, Ogura T, Chan SM, Serna-Higuera C, Omoto S, Torres-Yuste R, Tsuchiya T, Wong KT, Leung CH, Chiu PWY, Ng EKW, Lau JYW. Endosonography-guided gallbladder drainage versus percutaneous cholecystostomy in very high-risk surgical patients with acute cholecystitis: an international randomised multicentre controlled superiority trial (DRAC 1). Gut. 2020

Napolitano LM, et al. Evaluation and Management of Gallstone-Related Diseases in Non-Pregnant Adults [Internet]. Ann Arbor (MI): Michigan Medicine University of Michigan; 2021. Available from <https://www.ncbi.nlm.nih.gov/books/NBK569245/>  
PubMed PMID: 33793166 and from UMHS at <http://www.uofmhealth.org/provider/clinical-care-guidelines>

Figure 2: Nonsurgical Management of Acute Cholecystitis



# Options for High-Risk Surgical Patients

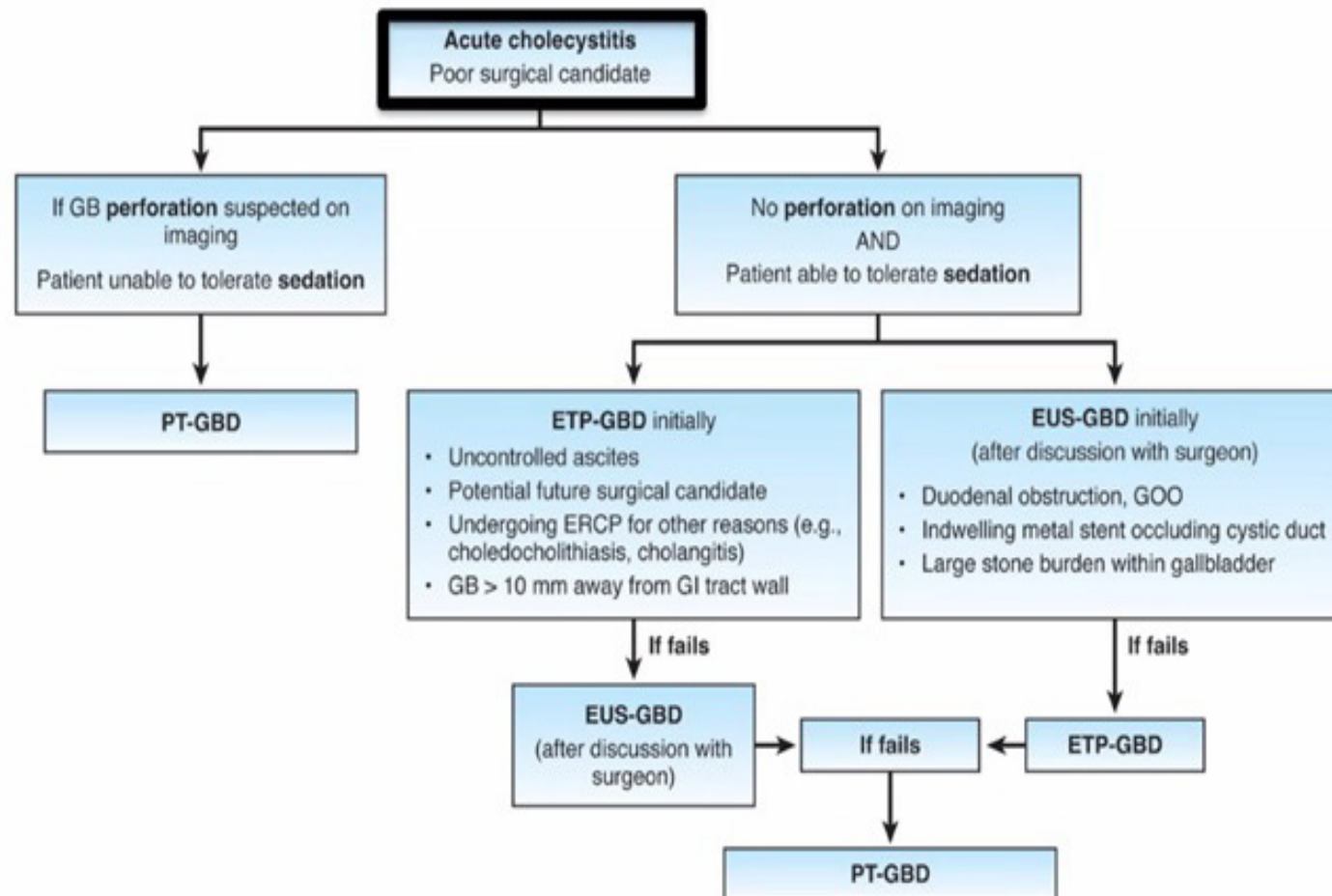
## **IR Gallbladder Ablation**

- Perc chole tube present for 8 weeks and sepsis resolution
- Schedule check/change in 8-10 weeks
- Gallstone removal prior to GB ablation
- Upsize perc chole tube for gallstone removal – will require multiple IR visits for adequate upsizing of the perc chole tract, dependent on size of the gallstones
- Wait 2 weeks after gallstone removal for GB cryo-ablation procedure
- Perc chole tube left in place for 2 weeks after GB ablation, then removed
- HIDA scan and LFTs at 1 month after GB ablation

## **EUS-GBD**

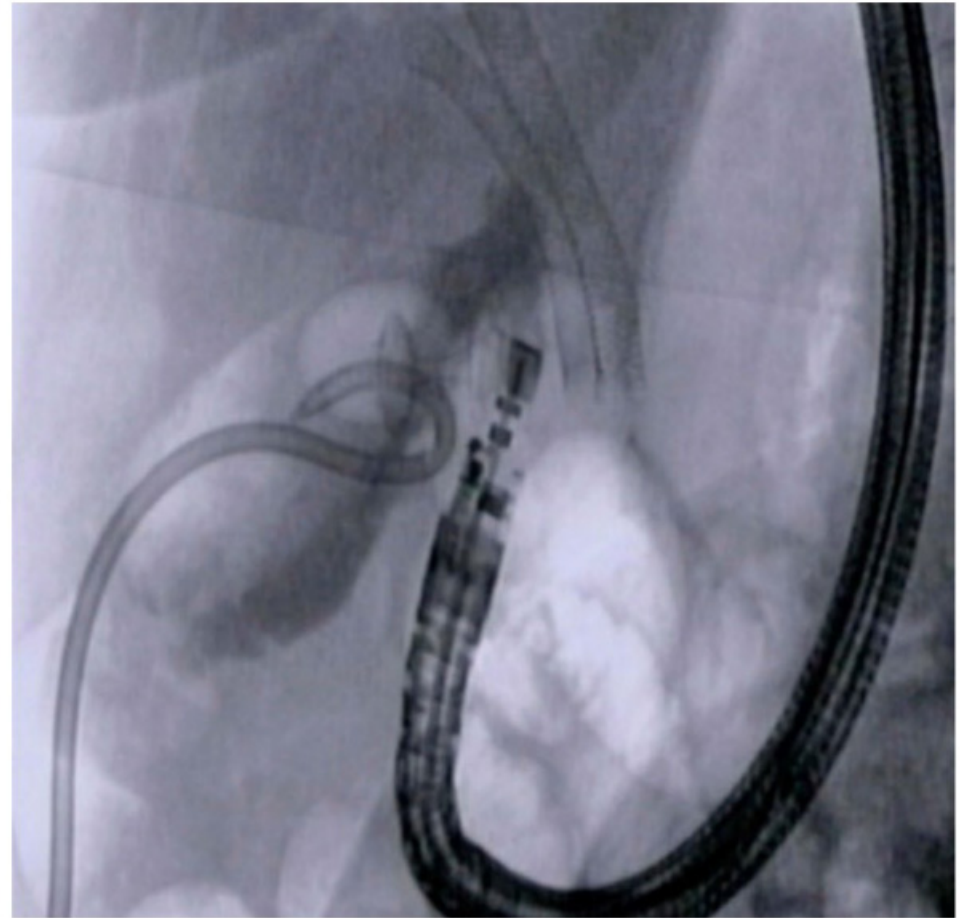
- EUS-guided gallbladder drainage (EUS-GBD) provides internal drainage of the gallbladder
- Requires EGD with sedation/anesthesia
- Done via gastric or duodenal lumen with LAMS (DRAC1 Trial)
- EGD for cholecystoscopy 1 month later, possibly clear gallstones, removal LAMS if patient doing well or replace with pigtails.
- If life expectancy short, LAMS stays in indefinitely.
- If gallstones not cleared, EGD for cholecystoscopy 1 month later
- If too frail for additional endoscopic procedures, stent is permanent

# Acute cholecystitis



# Conversion of Perc Chole Tube to EUS-GBD

- Since Perc Chole is most commonly performed in pts with Acute Cholecystitis and high operative risk....IR available!
- Conversion to EUS-GBD can be offered
- Gallbladder must be distended for conversion to EUS-GBD
- Fill gallbladder with saline via Perc Chole tube
- Use smaller size LAMS (6-8-10mm)



**Figure 7** Fluoroscopic view of a conversion procedure, from percutaneous trans-hepatic gallbladder drainage (PTGBD) to endoscopic ultrasound-guided gallbladder drainage (EUS-GBD) with the positioned electrocautery lumen apposing metal stent (EC-LAMS) into the gallbladder lumen.

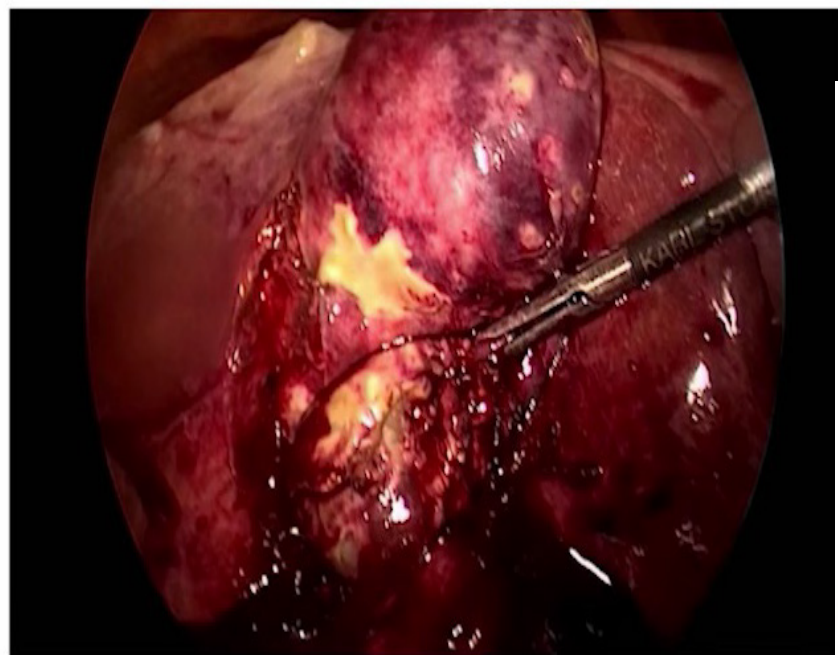
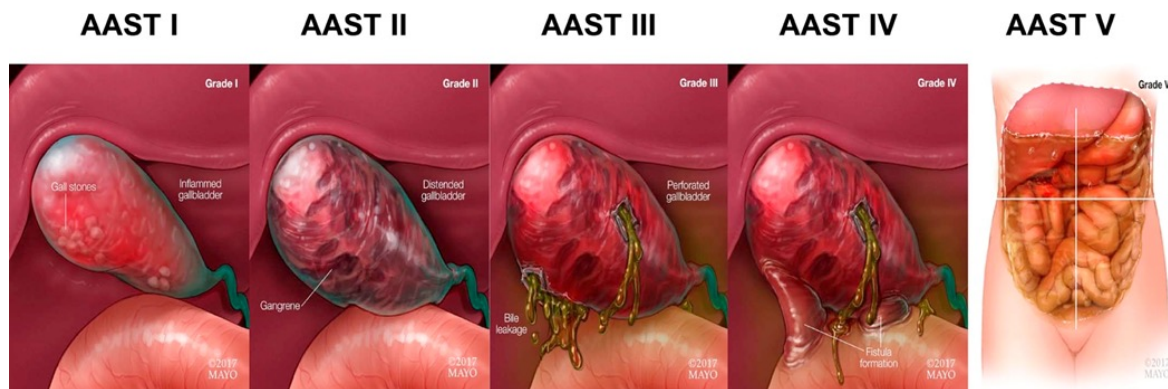


# Challenging Issues in General Surgery

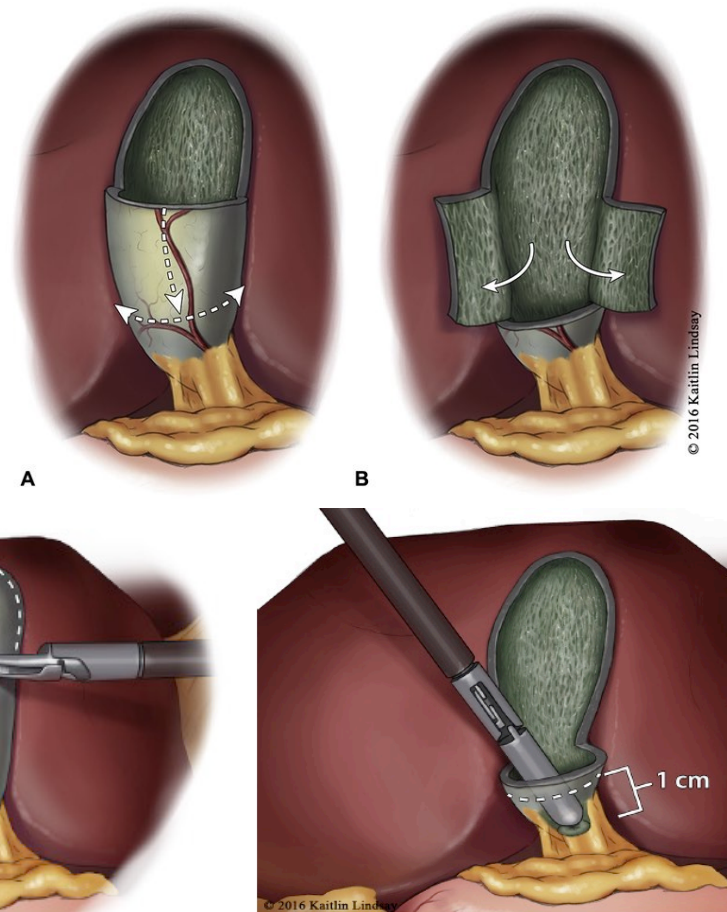


1. Acute cholecystitis – High Operative Risk

2. Acute cholecystitis – Difficult Cholecystectomy



**Figure 1.** Initial incision into the gallbladder wall is made using a hemostatic device near the dome of the gallbladder, in order to minimize potential injury to vital structure. (© 2016 Kaitlin Lindsay,

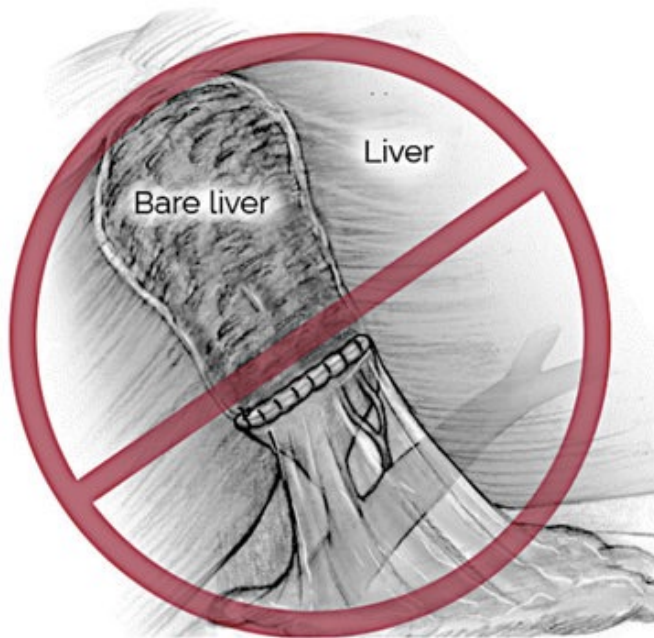


**Figure 3.** The remaining infundibulum is then assessed for depth, and trimmed to 1 cm above the cystic duct orifice. The posterior wall of the gallbladder is left undisturbed throughout the procedure, to prevent iatrogenic right hepatic duct, common bile duct, or hepatic artery injury caused by dense fibrotic adhesions between these structures and the gallbladder wall, which can occur with inferior retraction of the gallbladder in severe inflammation. (© 2016 Kaitlin Lindsay, printed with permission.)

<http://dx.doi.org/10.1016/j.jamcollsurg.2016.05.006>

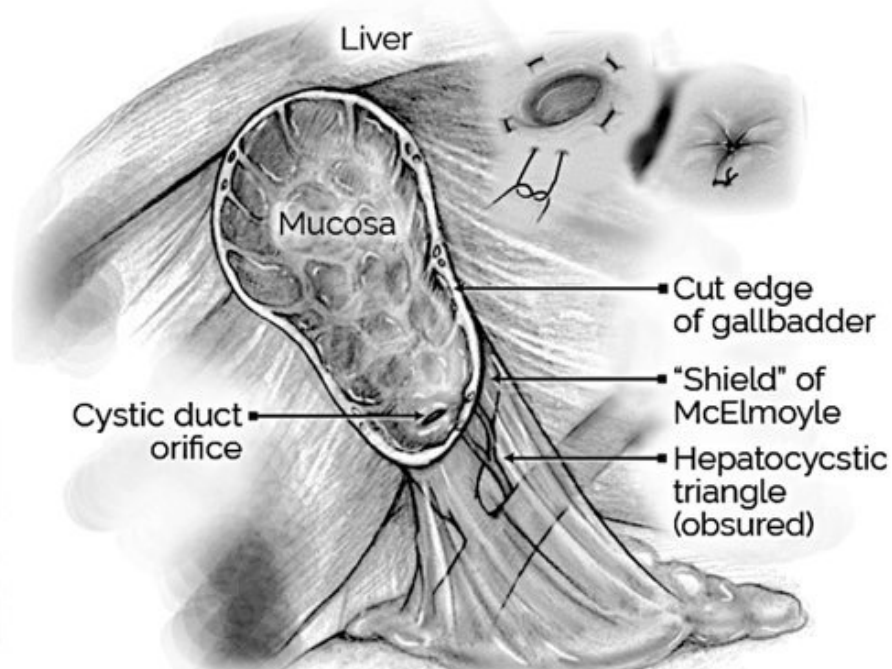
# Fenestrating vs. Reconstituting Subtotal Chole

Reconstituting Subtotal Cholecystectomy



**Closed Infundibulum**  
**Recurrent symptomatic**  
**cholecystitis more common**

Fenestrating Type Cholecystectomy



**Open Infundibulum**  
**Bile leak more common**



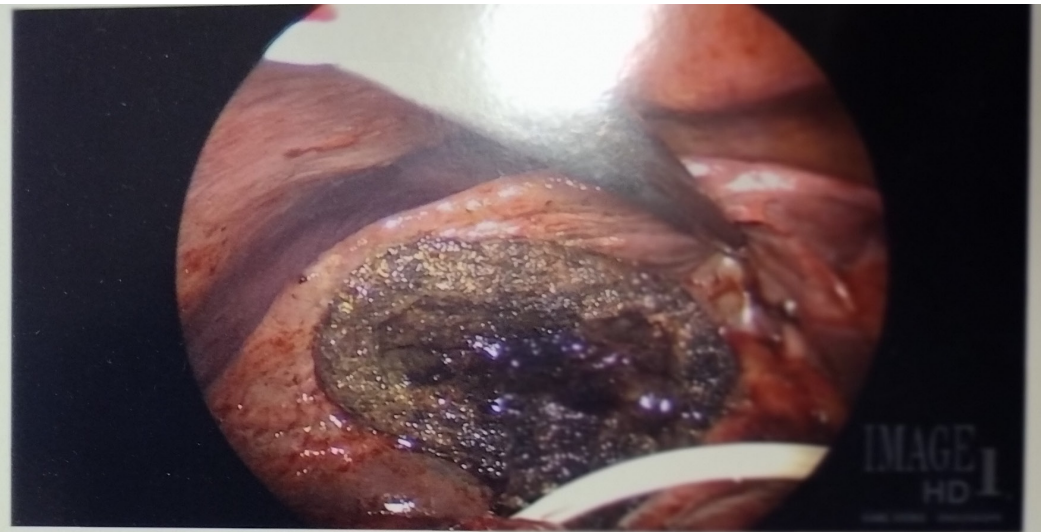
Dr. Steven M.  
Strasberg

J Am Coll Surg 2016  
Jan;222(1):89-96.

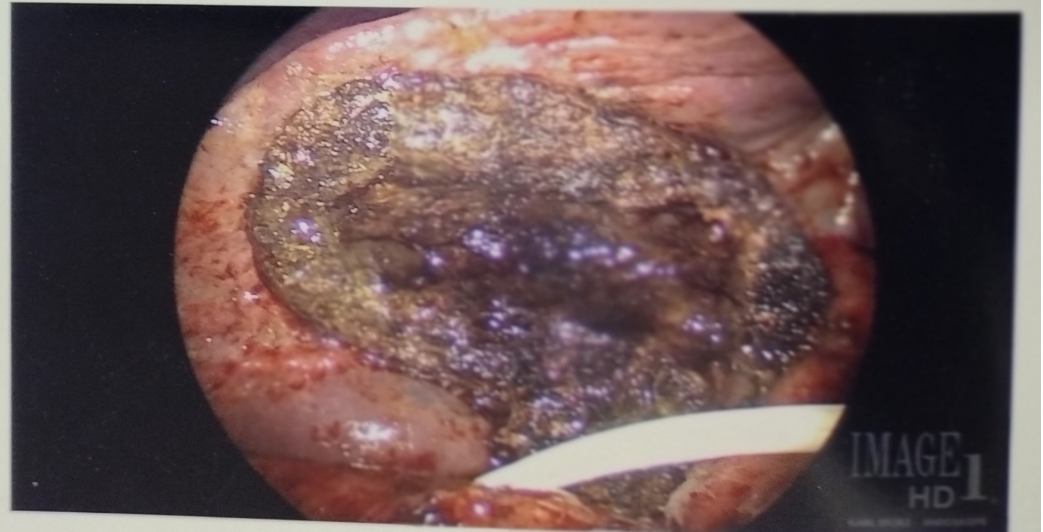




**FIGURE 35.15.** Laparoscopic subtotal cholecystectomy, demonstrating the anterior wall excised and a small strip of the posterior wall left attached to the liver. The remnant mucosa can then be either removed or coagulated with cautery or argon laser.



IMG002



IMG004

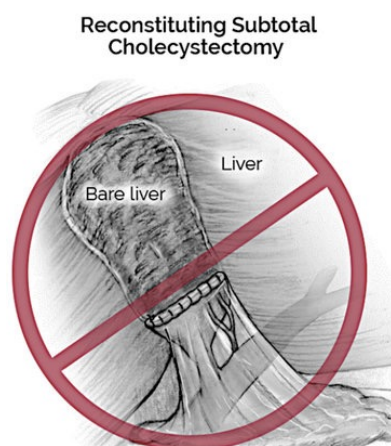
TABLE 2 Summary of reconstituting vs. fenestrating subtotal cholecystectomy results.

Complications	Koo et al. (26)			Nzenwa et al. (27)		
	Reconstituting	Fenestrating	OR (CI95%)	Reconstituting	Fenestrating	RR (CI95%)
Bile leak	16.0% (150/935)	18.8% (107/570)	0.83 (0.63–1.09)	10.7% (291/2,719)	26.3% (214/815)	<b>0.41 (0.34–0.49)</b>
Retained stones	4.1% (38/935)	6.7% (38/570)	<b>0.59 (0.37–0.94)</b>	2.5% (68/2,719)	4.8% (39/815)	<b>0.52 (0.33–0.81)</b>
Subhepatic or subphrenic collections	1.4% (13/935)	5.8% (33/570)	<b>0.23 (0.12–0.44)</b>	1.9% (52/2,719)	3.6% (30/815)	<b>0.52 (0.28–0.96)</b>
Wound infection	1.5% (14/935)	3.2% (18/570)	<b>0.47 (0.23–0.94)</b>	2.6% (71/2,719)	5.5% (45/815)	<b>0.47 (0.29–0.74)</b>
Need for reoperation	1.3% (12/935)	3.5% (20/570)	<b>0.36 (0.17–0.74)</b>	NS	NS	NS
Need for ERCP	6.6% (62/935)	14.4% (82/570)	<b>0.42 (0.30–0.60)</b>	3.7% (101/2,719)	15.2% (124/815)	<b>0.25 (0.18–0.33)</b>
30-day mortality	0% (0/935)	0.7% (4/570)	0.07 (0.00–1.25)	NS	NS	NS

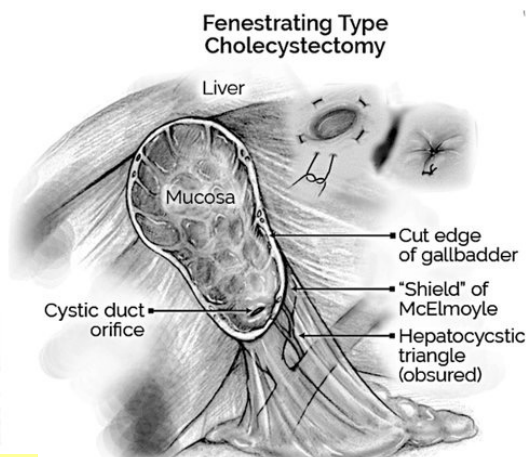
NS, not significant; bold values indicate statistically significant; (absolute values).

## CONCLUSION:

- During long-term f/u (median 6 years) recurrent biliary disease was less frequent with fenestrating type vs. reconstituting type:
- **9% vs. 18%**



**Closed Infundibulum**  
Recurrent symptomatic  
cholecystitis more



**Open Infundibulum**  
Bile leak more common

Koo JGA et al. Surg Endosc. (2021) 35(3):1014–24.  
Nzenwa IC et al. Surgery. (2021) 170 (4):1014–23.  
Van Dijk AH et al. J Am Coll Surg. (2017) 225(3):371–9.  
Toro A et al. World J Emerg Surg. (2021) 16(1):15



## SAFE CHOLECYSTECTOMY MULTI-SOCIETY PRACTICE GUIDELINE AND STATE OF THE ART CONSENSUS CONFERENCE ON PREVENTION OF BILE DUCT INJURY DURING CHOLECYSTECTOMY

**Bile duct injury (BDI):  
devastating for patients;  
incidence remains constant**



**Goal: Identify strategies  
for BDI prevention**

### 18 Key Questions defined

- ✓ Systematic review 
- ✓ Guidelines development
- ✓ Expert consensus (n=25) 



15 guidelines provided  
with >80% consensus  
22 research recommendations

### Strong recommendations:



Uncertain  
anatomy or  
suspected BDI  
→ Imaging

BDI transfer to experienced  
facility/team



L. Michael Brunt, et al.  
Surgical Endoscopy 2020  
Visual Abstract by Athanasiadis DI



# Use of a piece of free omentum to prevent bile leakage after subtotal cholecystectomy<sup>☆</sup>

Yoichi Matsui, MD\*, Satoshi Hirooka, MD, Masaya Kotsuka, MD, So Yamaki, MD, Tomohisa Yamamoto, MD, Hisashi Kosaka, MD, Sohei Satoi, MD, FACS

Department of Surgery, Kansai Medical University, Osaka, Japan

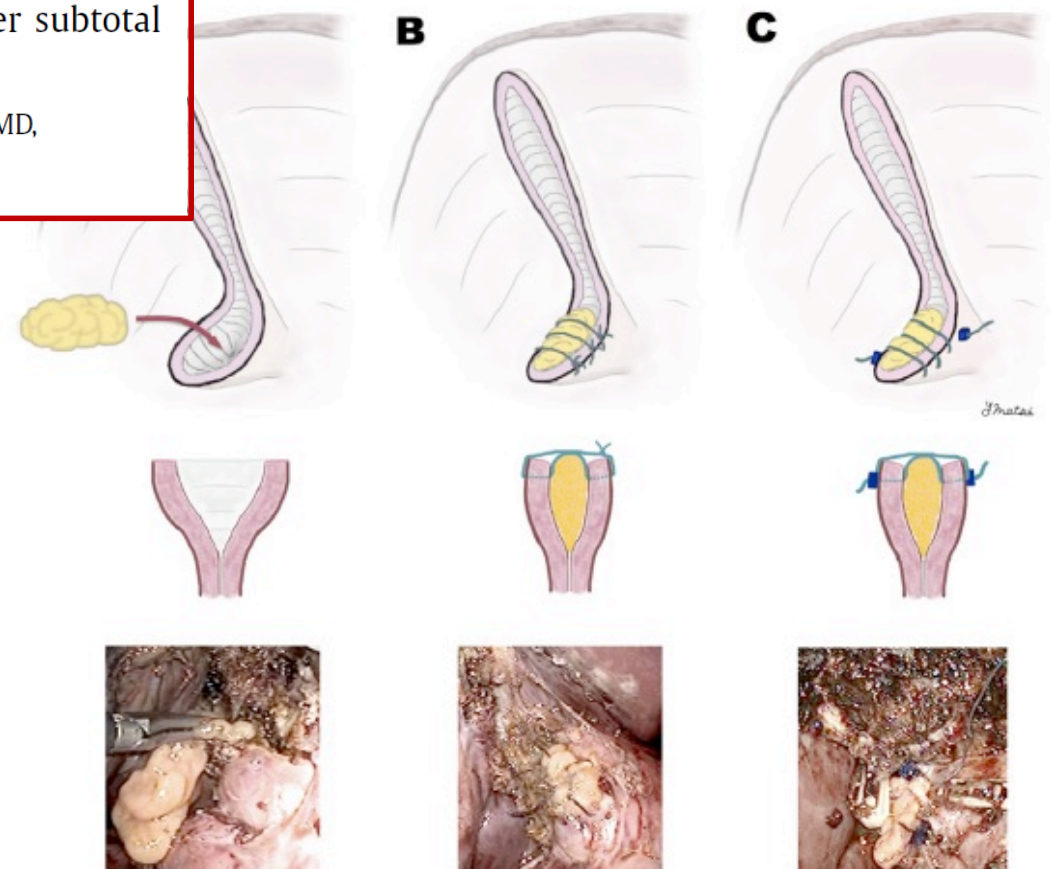
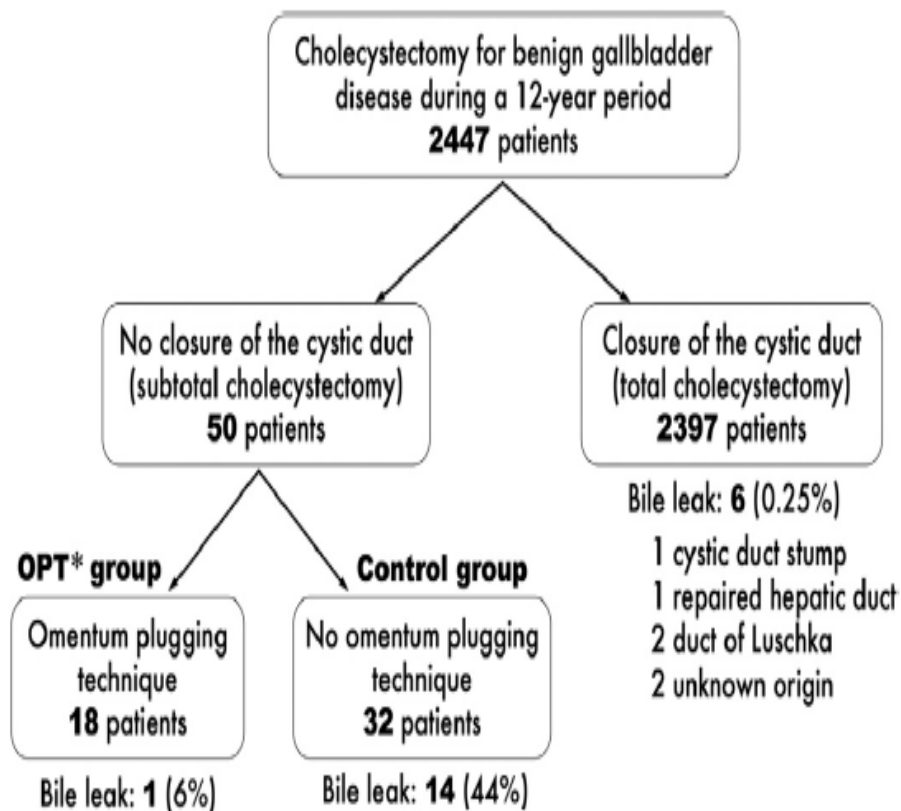


Fig. 1. Omentum plugging technique. A, A piece of omentum is plugged into the gallbladder stump after subtotal cholecystectomy. B, Both sides of the stump edges are closed near each other by suturing. C, The stump edges are closed using absorbable suture clips (LAPRATY). Each illustration in the middle panels depicts a cross section at each of the stages of the procedure shown in the upper panels. The bottom panels are photographs of actual operative fields.

# Challenging Issues in General Surgery

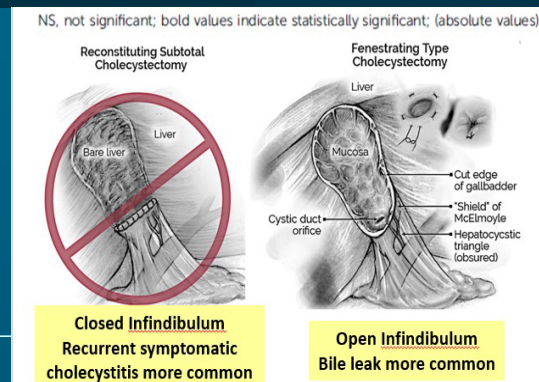
## 1. Acute cholecystitis – High Operative Risk

- Multiple non-op options for AC
- EUS-GBD and ET-GBD better
- PC with many reinterventions
- IR Gallbladder ablation after PC



## 2. Acute cholecystitis – Difficult Cholecystectomy

- Subtotal Chole option
- Fenestrating type
- Less risk for recurrent biliary disease



### CONCLUSION:

- During long-term f/u (median 6 years) recurrent biliary disease was less frequent with **fenestrating** type vs. reconstituting type:
- **9% vs. 18%**

Koo JGA et al. *Surg Endosc.* (2021) 35(3):1014–24.  
Nzenwa IC et al. *Surgery.* (2021) 170 (4):1014–23.  
Van Dijk AH et al. *J Am Coll Surg.* (2017) 225(3):371–9.  
Toro A et al. *World J Emerg Surg.* (2021) 16(1):45.



## Acute Cholecystitis - Index

- ◆ Patients = 6,984
- ◆ 87.7% Operation
  - 83.5% Laparoscopic
  - 11.8% Robotic
  - 3.7% Lap to Open
  - 1.0% Open
- ◆ 97% Total excision
- ◆ 3% Sub-total
  - 47% Fenestrated
  - 23% Reconstituted
  - 30% Not specified

AAST Grade	operation	Total
	1	
1	4,520	4,520
2	1,302	1,302
3	147	147
4	29	29
5	19	19
6	107	107
Total	6,124	6,124

## **Acute Cholecystitis - Index, Non-op**

- ◆ Patients = 858
- ◆ ERCP 14% (123)
  - CBD stent = 32
  - Cystic duct stent = 17 (16 at UM)
  - Pancreatic stent = 10
  - Stones/Sludge = 63
  - Sphincterotomy = 68
- ◆ IR Procedure 56% (484)
  - Drain = 21
  - PTC = 5
  - Chole tube = 449 (52% of non-op patients)

## **Acute Cholecystitis – Cholecystostomy Tube**

- ◆ Patients = 449
- ◆ Operation = 98 (21.8%)
  - 57% Laparoscopic
  - 10% Robotic
  - 16% Lap to Open
  - 16% Open

## Acute Cholecystitis – Cholecystostomy Tube

- ◆ Patients = 449
- ◆ Operation = 98 (21.8%)
  - Total 78
  - Fenestrated 6
  - Reconstituted 0
  - Subtotal/Not specified 1
  - Unknown 13
- ◆ Days to Operation
  - Median = 80 days
  - Mean = 117 days

**Lunch**

**Return 1:15 pm**

# **SBO SCOAP Gastrografin**

**Mark Hemmila, MD**

## **Gastrografin**

- ◆ SCOAP – Surgical Care Outcomes Assessment Program
  - Foundation for Healthcare Quality
  - SBO
  - Periodic meetings to share program information
- ◆ Gastrografin data
  - Adhesive SBO
  - Algorithm analytics

## **Gastrografin Challenge**

Admit



Candidate for GG after 24 hrs   or   Immediate Operation < 24 hrs



Received contrast   or   Did not get GGC



Did not clear   or   Cleared contrast



## SBO Clean (Adhesive SBO)

	N	Deaths	%	Median LOS
Total	4,958	177	3.6	
Index	4,018 (81%)	155	3.9	3.37 days
Readmit	940 (19%)	21	2.2	3.38 days
Medical Manage	3,402 (69%)			
Surgery	1,556 (31%)			
OR<24hrs	827 (53%)			
OR>=24hrs	729 (47%)			

## Immediate Operation <24 hrs

	N	Deaths	%	Median LOS
Total	827	15	1.8	3.9 days
Index	719 (87%)			
Readmit	108 (13%)			
Lysis of Adhesions	428 (55%)			
SBR w Anas	187 (24%)			
SBR w Stoma	10 (1.3%)			
Bypass	3 (0.4%)			
Hernia Repair Prim	231 (30%)			
Hernia Repair Mesh	203 (26%)			

SCOAP Mortality = 3.1%

## Candidate for GGC

	N	Deaths	%	Median LOS
Total	4,131	162	3.9	3.2 days
Index	3,299 (80%)			
Readmit	832 (20%)			
Medical Manage	3,402 (82%)	110	3.2	2.8 days
Surgery	729 (18%)	50	6.9	9.1 days
No GGC	1,878 (45%)	90	4.8	3.3 days
Yes GGC	2,223 (54%)	70	3.1	3.2 days
Unknown	30 (0.7%)	2	6.7	

## Received GGC

	N	Deaths	%	Median LOS
Negative to Colon	380 (17%)	39	10.3	7.0 days
Positive to Colon	1,771 (80%)	28	1.6	2.8 days
Other	72 (3.2%)	3	4.2	5.4 days
				Median hrs
Time to GG, hr				29.6
Operation				38.4
No operation				28.6

## Negative to Colon

	N	Deaths	%	Median LOS
Total	380	39	10.3	7.0
Index	336 (88%)			
Readmit	44 (12%)			
Medical Manage	169 (44%)	25	14.8	4.7
Surgery	211 (56%)	14	6.6	9.0
Lysis of Adhesions	188 (89%)			
Bypass	1 (0.5%)			
SBR w Anas	66 (31%)			
SBR w Stoma	6 (2.8%)			
Hernia Repair Prim	15 (7.1%)			
Hernia Repair Mesh	6 (2.8%)			
				Median hrs
Time to GG, hr				36.3
Operation				38.3
No operation				35.2
Time GG to OR, hr				21.0

## Positive to Colon

	N	Deaths	%	Median LOS
Total	1,771	28	1.6	2.7
Index	1,422 (80%)			
Readmit	349 (20%)			
Medical Manage	1,653 (93%)	19	1.1	2.7
Surgery	118 (7%)	9	7.6	11.3
Lysis of Adhesions	102 (86%)			
SBR w Anas	41 (35%)			
SBR w Stoma	3 (2.5%)			
Hernia Repair Prim	12 (10%)			
Hernia Repair Mesh	8 (6.8%)			
				Median hrs
Time to GG, hr				28.3
Operation				37.1
No operation				28.0
Time GG to OR, hr				38.0

## Did not get GGC

	N	Deaths	%	Median LOS
Total	1,878	91	4.8	3.3
Index	1,479 (79%)			
Readmit	399 (21%)			
Medical Manage	1,519 (81%)	66	4.3	2.8
Surgery	359 (19%)	24	6.7	8.9
Lysis of Adhesions	222 (62%)			
SBR w Anas	101 (28%)			
SBR w Stoma	13 (3.6%)			
Bypass	4 (1.1%)			
Hernia Repair Prim	69 (19%)			
Hernia Repair Mesh	78 (22%)			

# **Acute Appendicitis Outcomes**

**Mark Hemmila, MD**



## INDEPENDENT SUBMISSIONS

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# A core outcome set for appendicitis: A consensus approach utilizing modified Delphi methodology

**Christopher A. Butts, PhD, DO, FACOS, FACS, Saskya Byerly, MD, Jeffry Nahmias, MD, MHPE, FACS, Rondi Gelbard, MD, FACS, Markus Ziesmann, MD, FRCSC, Brandon Bruns, MD, MBA, FACS, Giana H. Davidson, MD, MPH, FACS, Salomone Di Saverio, MD, Thomas J. Esposito, MD, MPH, Katherine Fischkoff, MD, MPA, FACS, Bellal Joseph, MD, FACS, Haytham Kaafarani, MD, MPH, FACS, Panu Mentula, MD, Mauro Podda, MD, FACS, Joseph V. Sakran, MD, MPH, MPA, FACS, Paulina Salminen, MD, PhD, FACS (Hon), Henna Sammalkorpi, MD, Robert G. Sawyer, MD, Dionne Skeete, MD, FACS, Ronald Tesoriero, MD, and Daniel Dante Yeh, MD, MHPE, FACS, *West Reading, Pennsylvania***

## **Acute Appendicitis - Proposed Core Outcome Measures**

- ◆ Treatment selection factors
- ◆ Failure rate of nonoperative management on index admission
- ◆ Interval or recurrence related appendectomy
- ◆ Disease factors
- ◆ Occult neoplasm
- ◆ Perforation/peritonitis
- ◆ Surgical Complications
- ◆ Superficial SSI/deep SSI including abscess

## **Acute Appendicitis - Proposed Core Outcome Measures**

- ◆ Wound disruption including hernia
- ◆ Negative appendectomy rate
- ◆ Initial presentation outcomes
- ◆ Failure of nonoperative management
- ◆ Need for additional procedures (IR/repeat OR)
- ◆ Reoperation
- ◆ Mortality
- ◆ Length of hospital stay

## **Acute Appendicitis - Proposed Core Outcome Measures**

- ◆ Relapse
- ◆ 30-d ED presentation
- ◆ Readmission, any
- ◆ Recurrent appendicitis
- ◆ Patient experience
- ◆ Quality of life measures
- ◆ Time to return to daily activities (work/school/full function)

## **Acute Appendicitis - Proposed Core Outcome Measures**

- ◆ Failure rate of nonoperative management on index admission
  - ◆ Interval or recurrence related appendectomy
  - ◆ Relapse
  - ◆ Recurrent appendicitis
- 
- ◆ Failure initial (days)
  - ◆ Failure 30-days
  - ◆ Failure 31-days to x
  - ◆ Interval appendectomy

## **Acute Appendicitis - Proposed Core Outcome Measures**

- ◆ Occult neoplasm

M·ACS

# **ANALYTIC UPDATES**

**Jill Jakubus**



# Objectives

## **ArborMetrix MACS**

**Contract status**  
**Analytic plan**

## **MACS bonus points**

**Plan review**  
**Draft index metrics**  
**Supporting literature**  
**Center baseline status**  
**Progress monitoring**







# ArborMetrix

## **Situation**

**MACS contract expires 11/22/24**  
**MTQIP and MACS fees increasing**

## **Background**

**BCBS CC budgets flat**

## **Assessment**

**4 users logged in 2024**

## **Recommendation**

**User feedback**

# Bonus Points

## Background

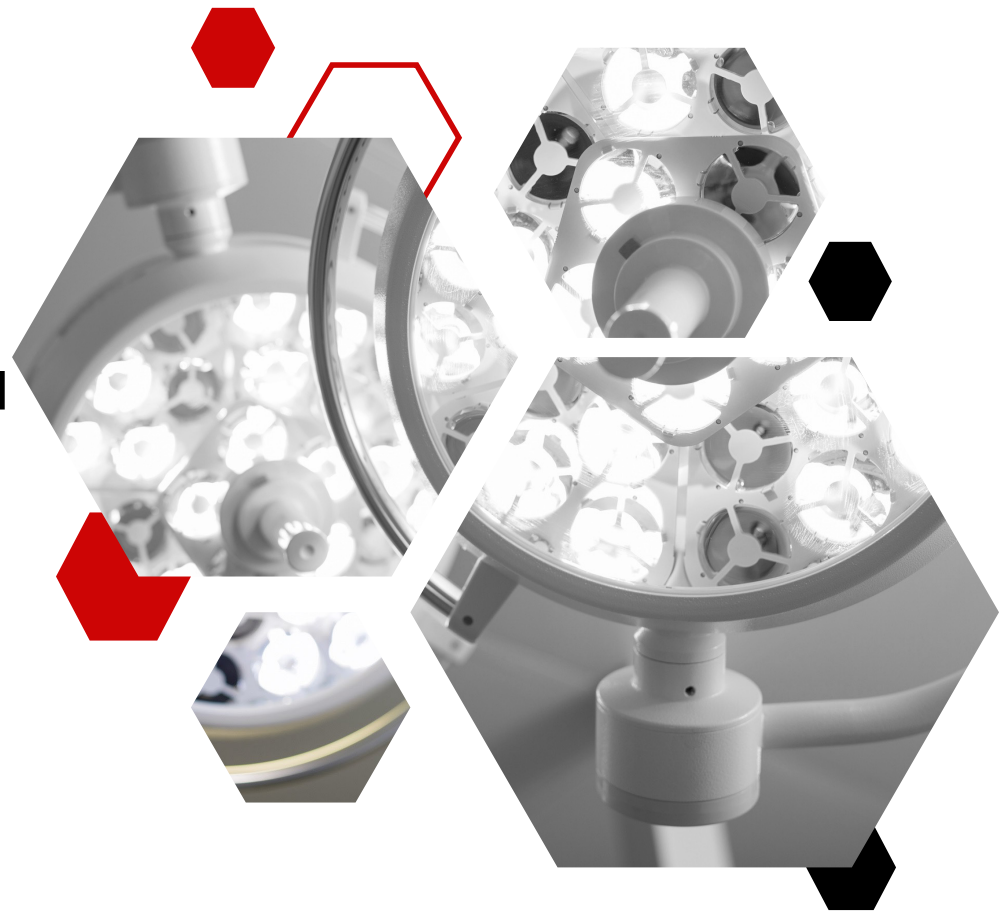
BCBS recommended alignment

## Assessment

Portfolio of CQIs indexes reviewed  
Similar CQIs offer bonus points  
Points added to MTQIP index

## Recommendation

Created draft bonus points  
Next steps BCBS approval





# General Info

## Total Points

**Total possible points with the addition of bonus points cannot exceed 100.**

## Non-MTQIP MACS Participants

**For MACS Participants from an enterprise that are not MTQIP Members, total bonus points are averaged then added to the MTQIP Performance Index.**

# Metric

2025 Optional Bonus for MACS Participants				
Optional	1	<b>MACS Data Submission</b>		
		On time and complete 3 of 3 times	1.0	
		On time and complete 2 of 3 times	0.5	
		On time and complete 1 of 3 times	0.0	

## MACS Data Submission

Partial/incomplete submissions receive no points. Complete data submission is defined as all cases submitted for the requested interval for the required data submissions.

# Metric

Optional	1	<b>MACS Meeting Participation</b>		<b>PARTICIPATION</b>
		Surgeon attends 3 of 3 meetings	1.0	
		Surgeon attends 2 of 3 meetings	0.5	
		Surgeon attends 0-1 of 3 meetings	0.0	
Optional	1	<b>MACS Meeting Participation</b>		<b>PARTICIPATION</b>
		Quality Administrator/Manager or Data Abstractor attend 3 of 3 meetings	1.0	
		Quality Administrator/Manager or Data Abstractor attend 2 of 3 meetings	0.5	
		Quality Administrator/Manager or Data Abstractor attend 0-1 of 3 meetings	0.0	

## MACS Meeting Participation

A surgeon may represent one center only. Alternate surgeons are allowed but must be consistent (not rotating). The alternate surgeon must be an attending-level equivalent from the call panel.

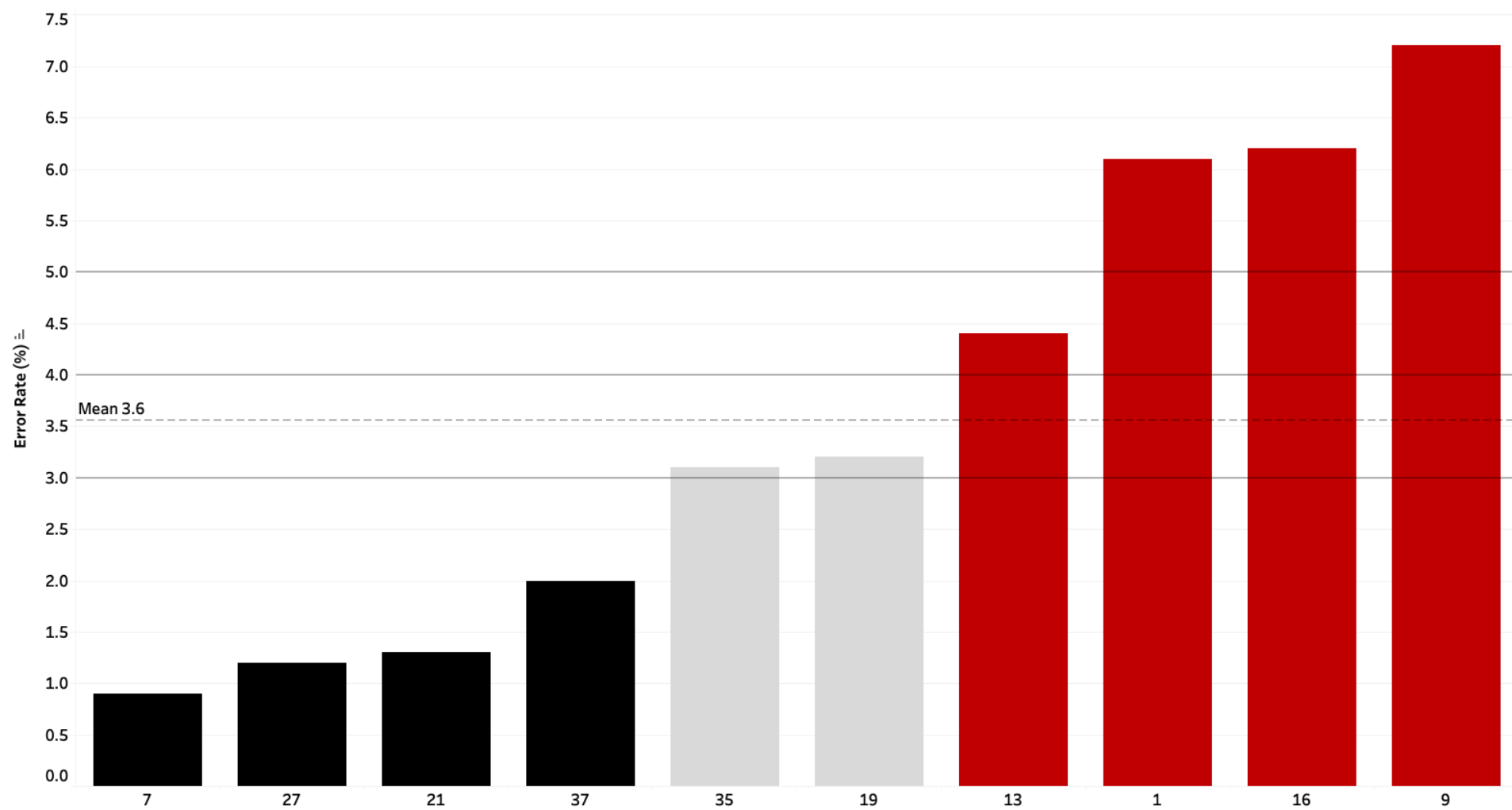
# Metric

Optional	2.5	<b>MACS Data Validation Error Rate</b>		
		0.0-3.0%	2.5	
		3.1-4.0%	1.5	
		4.1-5.0%	0.5	
		> 5.0%	0.0	

## MACS Data Validation Error Rate

Centers not selected for validation this year will receive full points. Centers that are selected but do not schedule a visit will receive 0 points for the validation measure.

Metric | Data Validation



# Progress Monitoring

## MACS INTER-RATER RELIABILITY AUDIT/SITE VISIT REPORT

---

Purpose: To perform external data validation on selected cases to verify data validity and reliability for the MACS CQI.

Date Performed: 01/15/2024

Auditors:

---

### Chart Selection

Cases for inter-rater reliability (IRR) chart review were selected from your data using an algorithm. These cases included deaths in the hospital, or patients admitted to your ACS services or consulted upon by your ACS services from 9/1/22 to 8/31/23. Two cases from each category were selected: appendix, gallbladder, small bowel, and exploratory laparotomy.

1) Any mortality



# Metric

Optional	1	<b>MACS Evidence-Based Opioid Prescribing in Appendectomy</b> (12 mo:8/1/24-7/31/25) ≥ 80% patients (≤ 52.5 discharge OME, oxycodone 5 mg = 7 pills) ≥ 70% patients (≤ 52.5 discharge OME) < 70% patients (≤ 52.5 discharge OME)	1.0 0.5 0.0	
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## MACS Evidence-Based Opioid Prescribing Appendectomy

Include appendicitis index encounter, operation, and Discharge Disposition = Home or Home Care.

Exclude Prior Opioid Use = Yes.

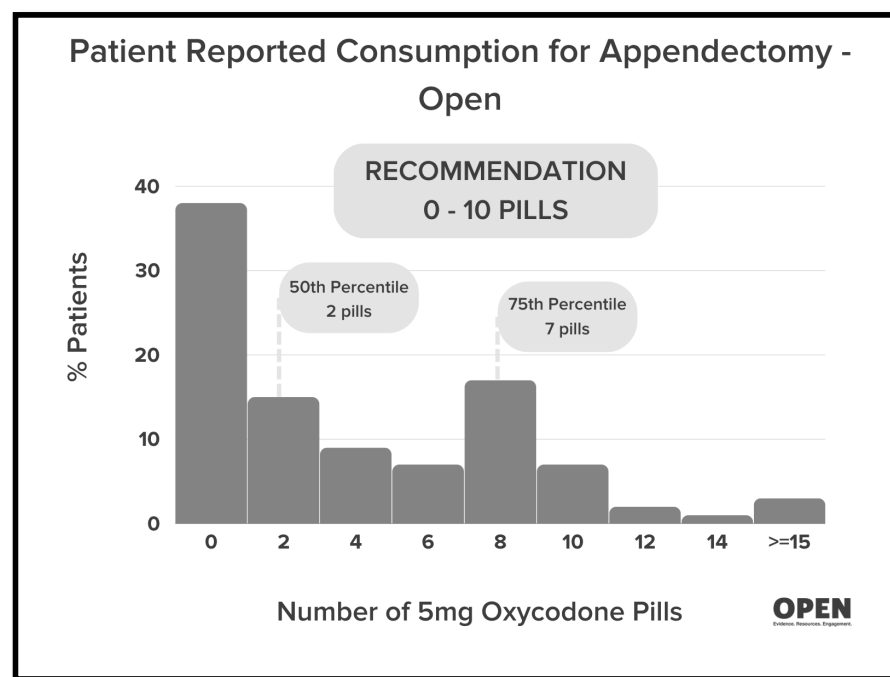
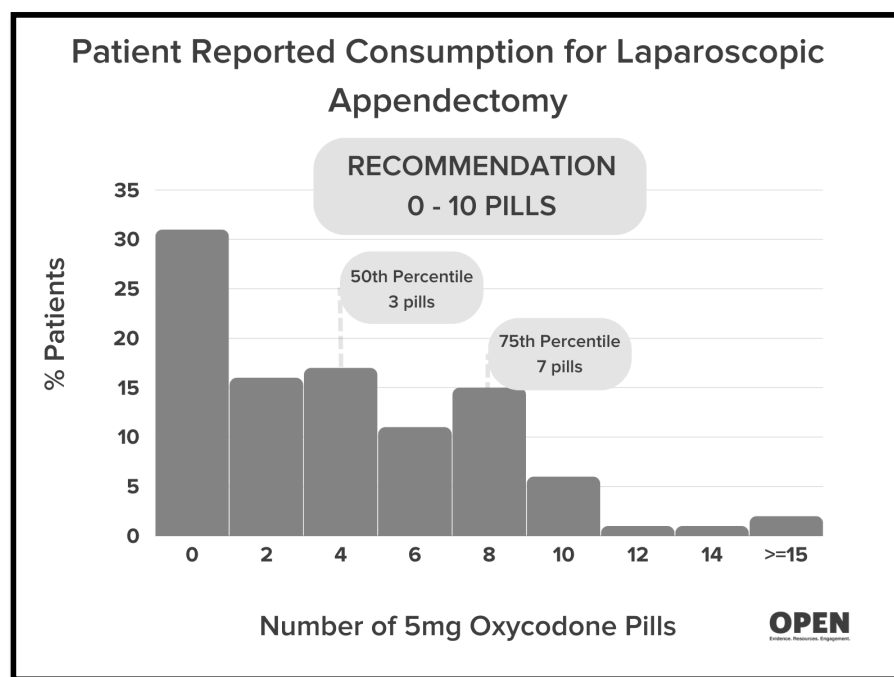
### OME Calculation

*Rx: oxycodone 5 mg 1 tab PO Q 6 hours prn pain #7 tabs*

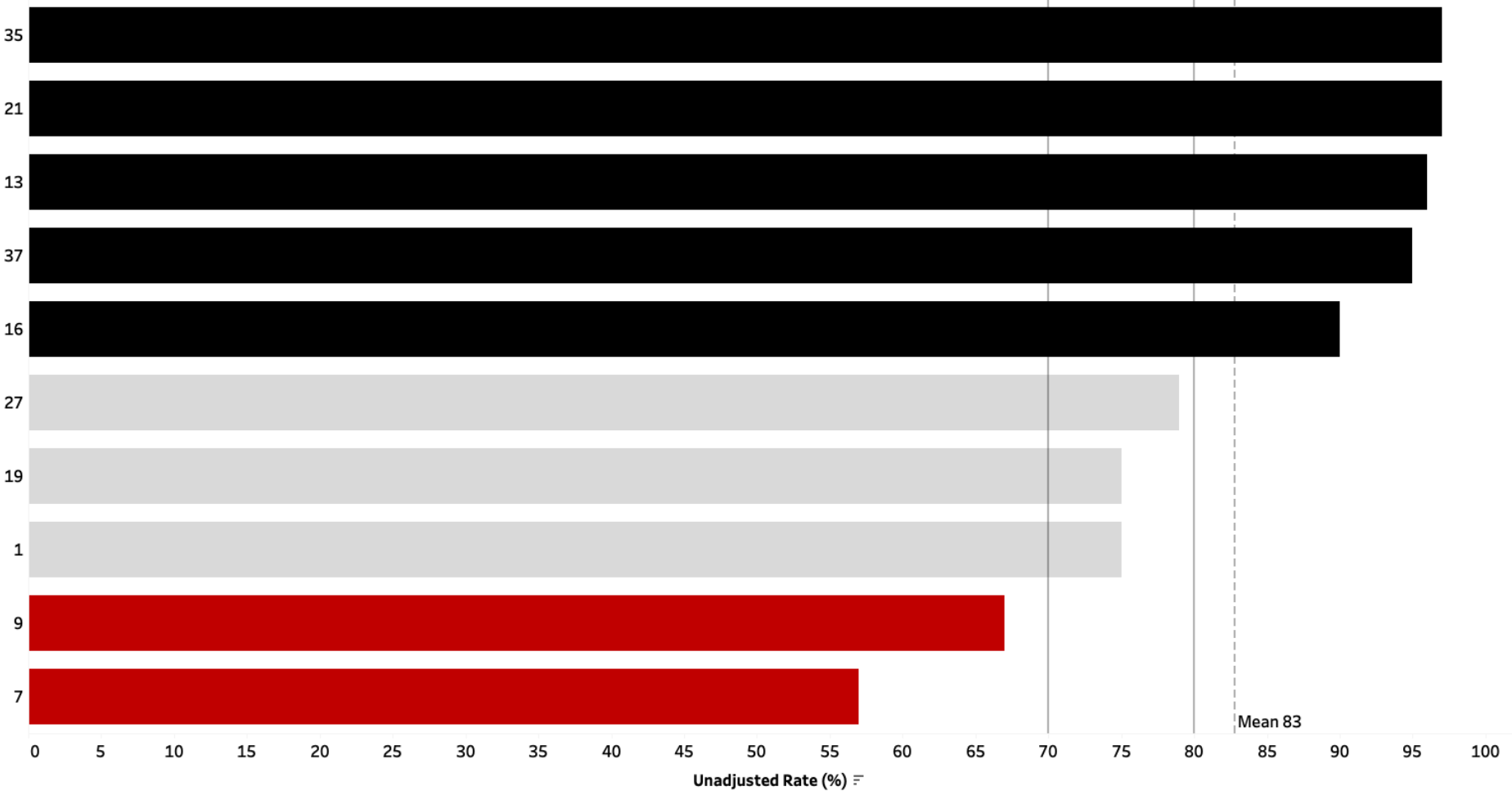
Opioid Strength x Opioid Quantity x Conversion Factor

5 x 7 x 1.5 = 52.5 OME

# Literature



Metric | Opioid Prescribing Appendectomy



# Progress Monitoring

MACS Opioid Drill Down

Interval 8/1/23 - 7/31/24

Target Appendectomy >= 80% patients (<= 52.2 discharge OME)

Cholecystectomy >= 80% patients (<= 45 discharge OME)

M·ACS

Center	Case #	MRN	Arrival Date	Organ System	Conversion	Surgeon	Tab 1 Type	Tab 1 OME	Tab 2 Type	Tab 2 OME	Solution Type	Solution OME	Other Type	Other OME	Total OME	OME Alert
--------	--------	-----	--------------	--------------	------------	---------	------------	-----------	------------	-----------	---------------	--------------	------------	-----------	-----------	-----------

# Metric

Optional	1	<b>MACS Evidence-Based Opioid Prescribing in Cholecystectomy (Laparoscopic or Robotic)</b> (12 mo:8/1/24-7/31/25) ≥ 80% patients (≤ 45 discharge OME, oxycodone 5 mg = 6 pills) ≥ 70% patients (≤ 45 discharge OME) < 70% patients (≤ 45 discharge OME)	1.0 0.5 0.0	PERFORMANCE
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## MACS Evidence-Based Opioid Prescribing in Laparoscopic Cholecystectomy

Include gallbladder index encounter, Conversion = Laparoscopic or Robotic, and Discharge Disposition = Home or Home Care.

Exclude Prior Opioid Use = Yes.

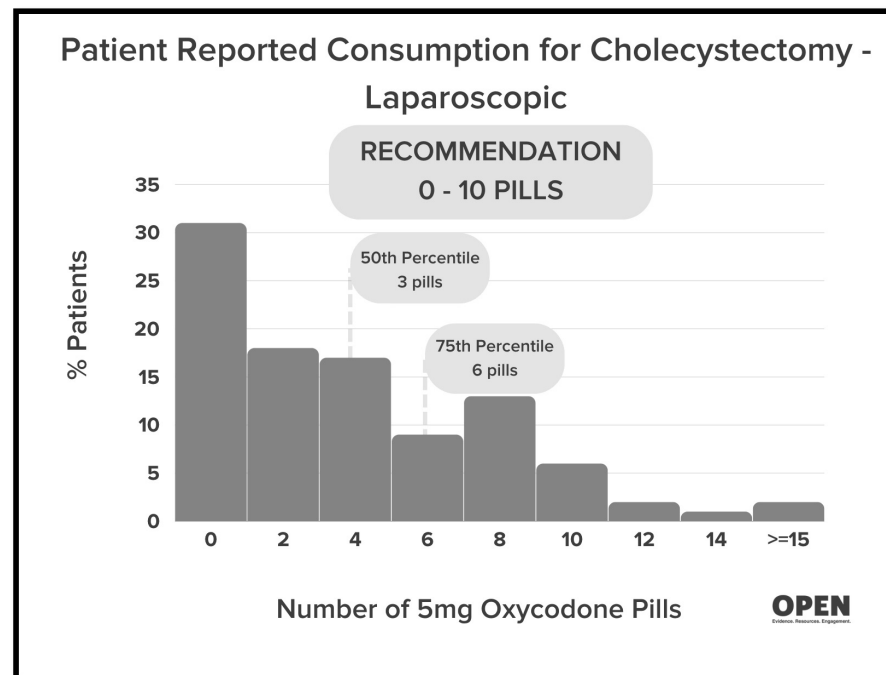
### OME Calculation

*Rx: oxycodone 5 mg 1 tab PO Q 6 hours prn pain #6 tabs*

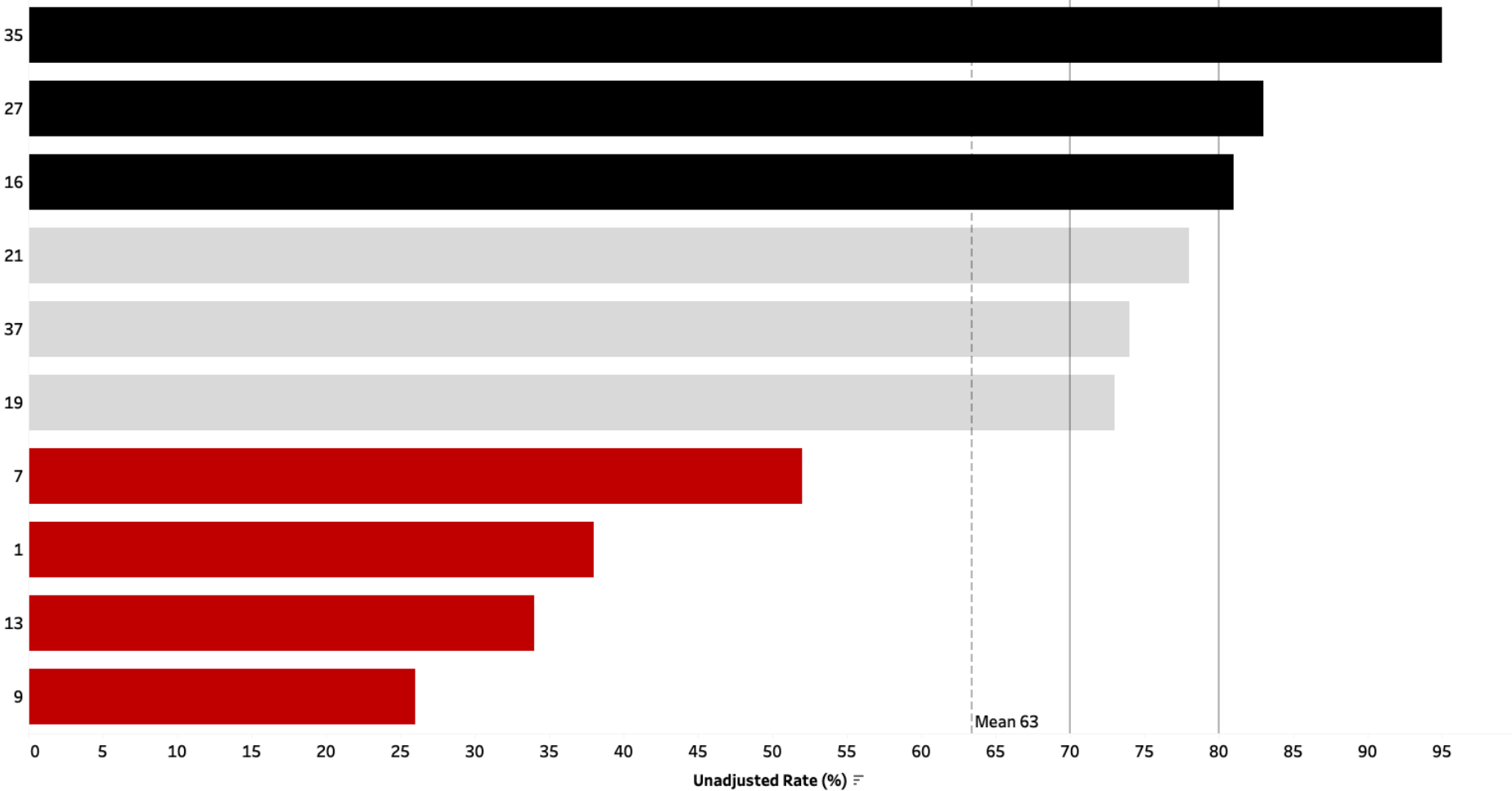
Opioid Strength x Opioid Quantity x Conversion Factor

5 x 6 x 1.5 = 45 OME

# Literature



Metric | Opioid Prescribing Cholecystectomy



# Progress Monitoring

MACS Opioid Drill Down

Interval

8/1/23 - 7/31/24

Target

Appendectomy >= 80% patients (<= 52.2 discharge OME)

Cholecystectomy >= 80% patients (<= 45 discharge OME)

M·ACS

Center	Case #	MRN	Arrival Date	Organ System	Conversion	Surgeon	Tab 1 Type	Tab 1 OME	Tab 2 Type	Tab 2 OME	Solution Type	Solution OME	Other Type	Other OME	Total OME	OME Alert
--------	--------	-----	--------------	--------------	------------	---------	------------	-----------	------------	-----------	---------------	--------------	------------	-----------	-----------	-----------



# Metric

Optional	1	<b>Appendectomy Performed in Uncomplicated Appendicitis with Appendicolith on CT</b> (12 mo:8/1/24-7/31/25) ≥ 95% patients ≥ 90% patients < 90% patients	1.0 0.5 0.0	PERFOR
----------	---	--	-------------------	--------

## **Appendectomy Performed in Uncomplicated Appendicitis with Appendicolith on CT**

Include appendicitis index encounter and CT Findings = Fecalith.

Exclude for presence of CT Findings = Abscess, Cecum or Terminal Ileum Inflammation, Free Air, Free Fluid, or Phlegmon.

# Literature

The presence of an appendicolith in patients with acute appendicitis is associated with an increased risk of complications such as perforation.<sup>[1]</sup> The literature suggests that an appendicolith is a significant risk factor for perforation, with patients presenting with an appendicolith being more likely to develop complicated appendicitis within the first 12 hours of admission.<sup>[1]</sup> Additionally, the presence of an appendicolith has been identified as an independent predictor for the failure of nonoperative treatment for complicated appendicitis in adults.<sup>[2]</sup>

In the context of uncomplicated appendicitis, the presence of an appendicolith has been associated with a higher risk of treatment failure when managed conservatively with antibiotics.<sup>[3]</sup> Specifically, patients with an appendicolith who were treated with antibiotics had a higher rate of complications and were more likely to require an appendectomy within 90 days compared to those without an appendicolith.<sup>[3]</sup>

Given these findings, it is reasonable to consider early appendectomy in adult patients with uncomplicated appendicitis when an appendicolith is present, as this may reduce the risk of progression to complicated appendicitis and the potential for treatment failure with conservative management.<sup>[1-3]</sup> However, the decision should be individualized based on the overall clinical picture, patient preferences, and the presence of other risk factors.

1. [Appendicolith Appendicitis: Should We Be Operating Sooner? A Retrospective Cohort Study.](#)

Show Details ▾

Taib AG, Kler A, Prayle M, et al.

Annals of the Royal College of Surgeons of England. 2024;106(3):237-244.

doi:10.1308/rcsann.2023.0055.

📅 New Research

2. [Fecalith in the Proximal Area of the Appendix Is a Predictor of Failure of Nonoperative Treatment for Complicated Appendicitis in Adults.](#)

Show Details ▾

Ando T, Oka T, Oshima G, et al.

The Journal of Surgical Research. 2021;267:477-484. doi:10.1016/j.jss.2021.06.015.

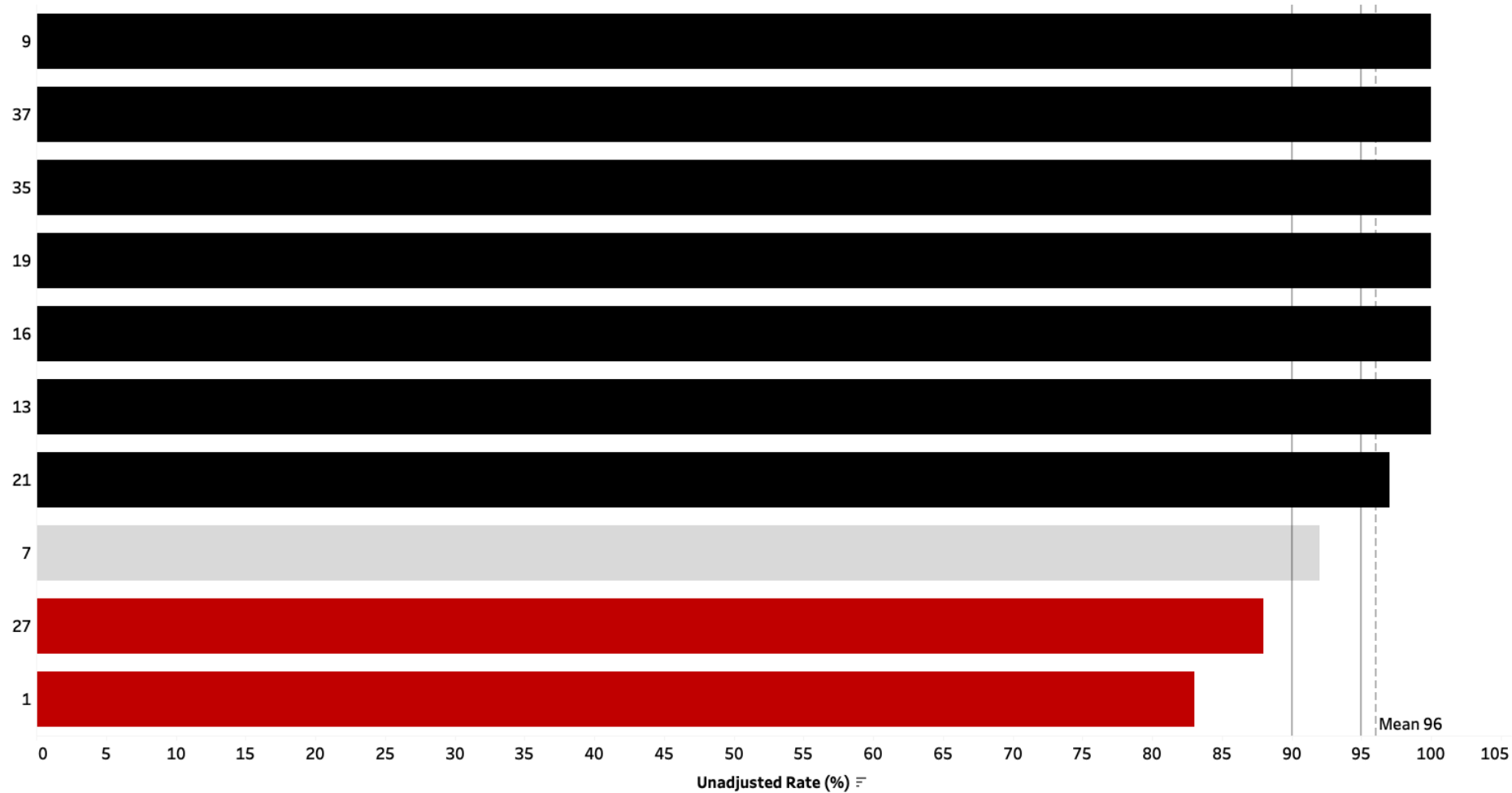
3. [A Randomized Trial Comparing Antibiotics With Appendectomy for Appendicitis.](#)

Show Details ▾

Flum DR, Davidson GH, Monsell SE, et al.

The New England Journal of Medicine. 2020;383(20):1907-1919. doi:10.1056/NEJMoa2014320.

Metric | Appendectomy in Uncomplicated Appendicitis with Appendicolith



# Progress Monitoring

MACS Appendicolith Drill Down

Interval8/1/23 - 7/31/24

Target>= 95% patients

M·ACS

Center	Case #	MRN	Arrival Date	CT Fecalith	CT Abscess	CT Free Air	CT Free Fluid	CT Phlegmon	CT Cecum/TI Inflammation	Consult Surgeon	OR Date	Operative Surgeon	Non-operative Alert
				Yes	No	No	No	No					

# Metric

Optional	1.5	<b>ED Visits Z-Score Trend in Appendicitis</b> (3 yr: 8/1/22-7/31/25) < -1 (major improvement) -1 to 1 or serious complications low outlier (average or better rate) > 1 (rates of serious complications increased)	1.5 0.7 0.5	
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# Definition

## 244) Return to ED/UC Date (mm/dd/yyyy) 1-3

Intent: To track unscheduled returns for care.

Definition: The date the patient returned to an emergency department or urgent care within 30 days of discharge from their last hospitalization.

Variable Options: Date in mm/dd/yyyy format

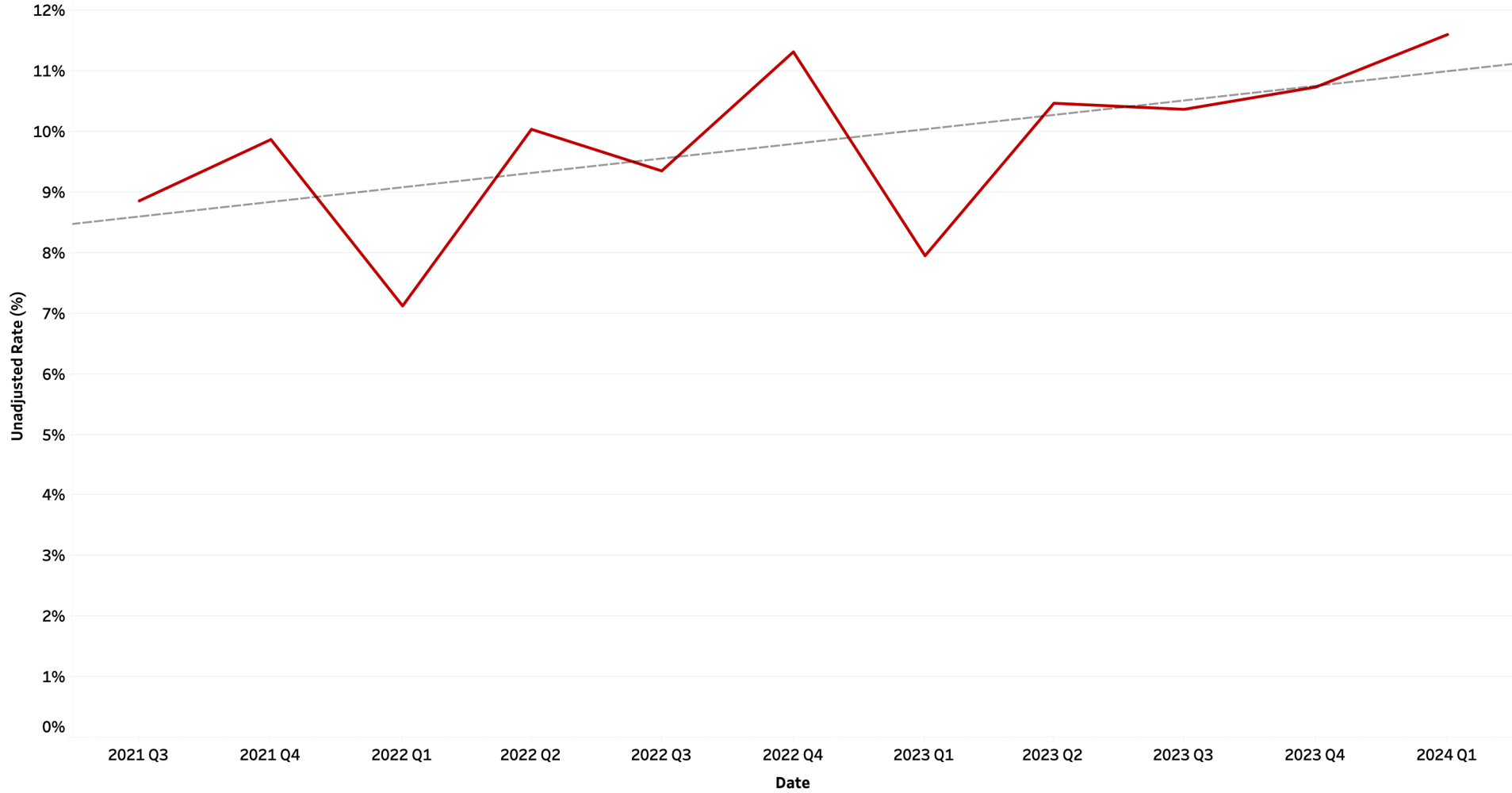
Include: All

Exclude: None

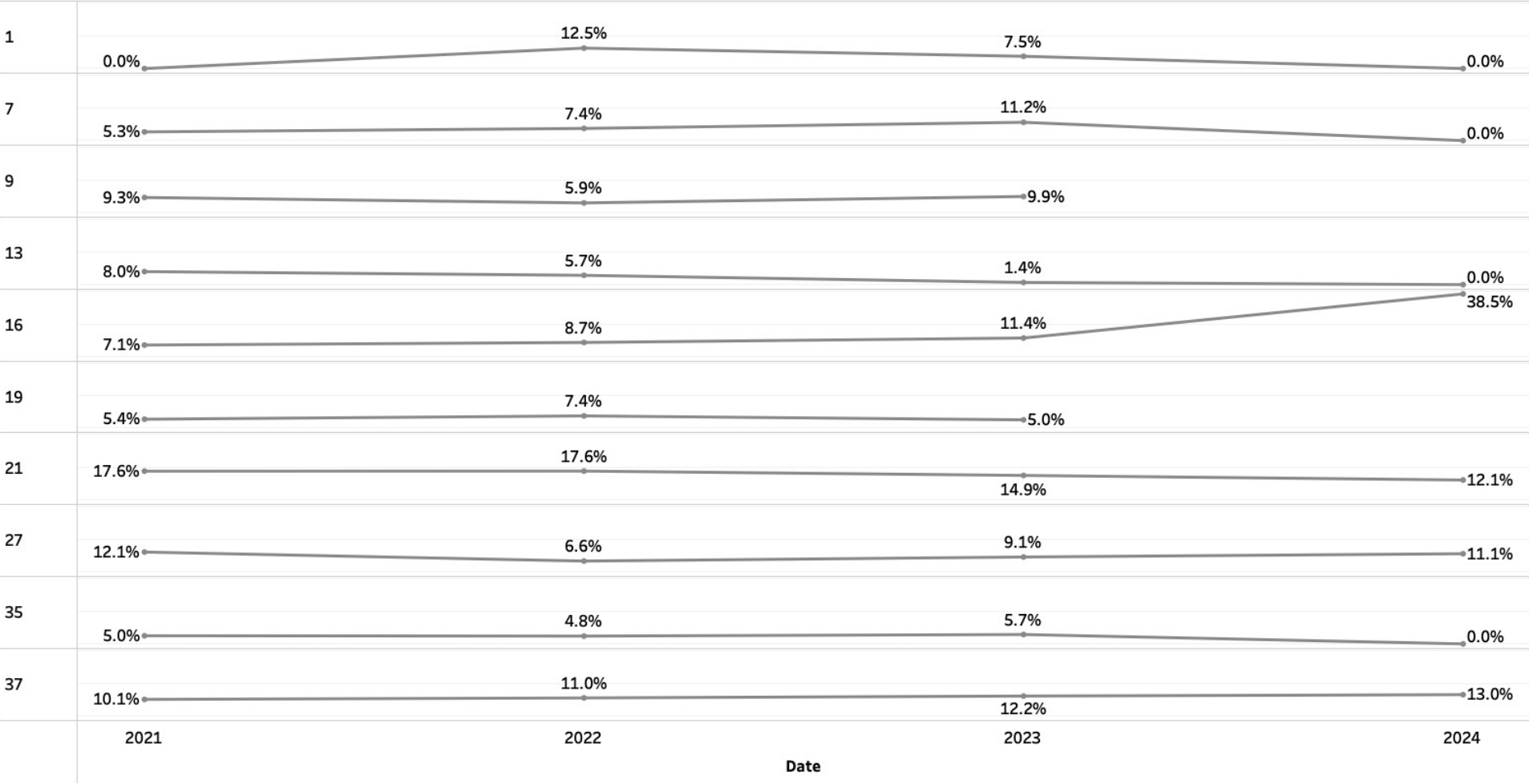
Notes:

- Leave blank if the patient does not return.
- Leave blank if the patient returns to the ED and is readmitted (readmissions will have a new MACS case).
- If there are greater than three ED visits following hospital discharge, enter the first three ED visits.

Metric | ED Visits Z Score Appendicitis



Metric | ED Visits Z Score Appendicitis





# Progress Monitoring

MACS Appendicitis ED Visit Drill Down												M·ACS			
Interval 8/1/21 - 7/31/24															
Center	Case #	MRN	Arrival Date	Consult Surgeon	Operative Surgeon	OR Date	Approach	ASA Score	AAST Grade	ED Visit 1	ED Visit 2	ED Visit 3	ED Visit Alert		
Laparoscopic												2	1	7/2022	

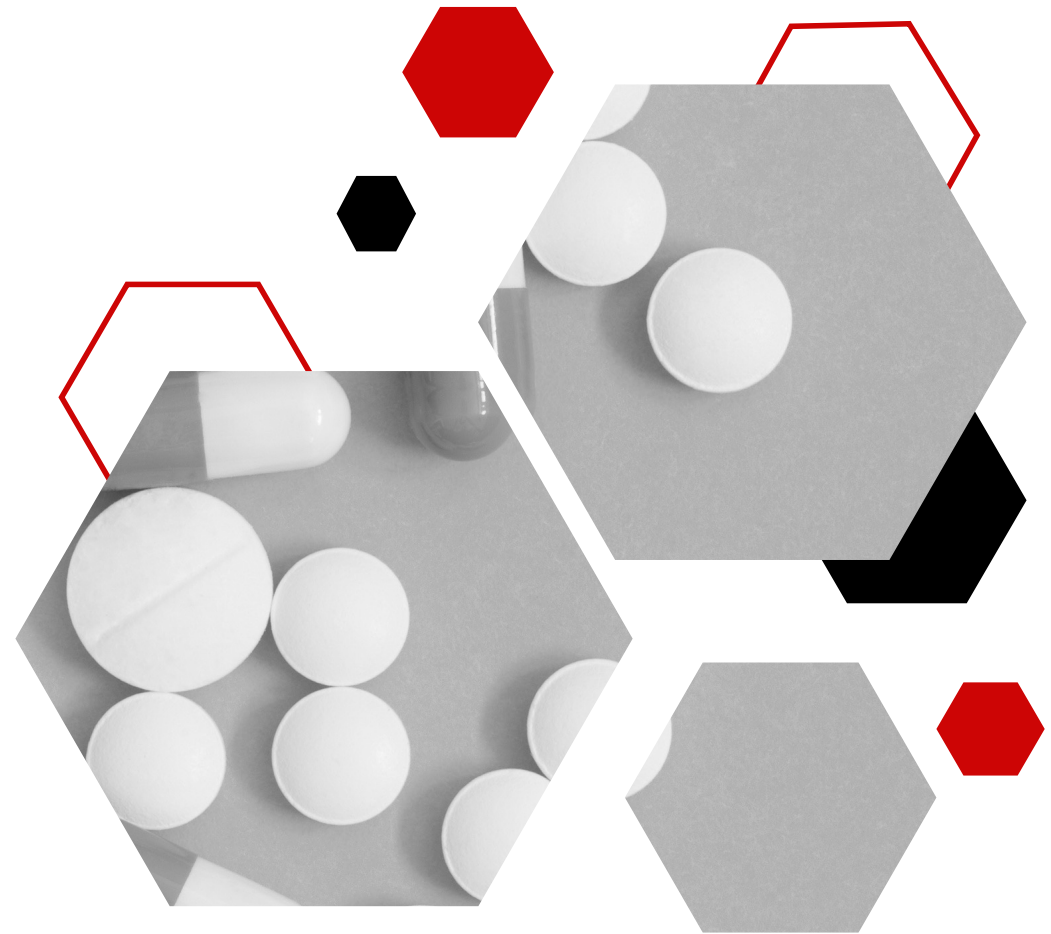
Add-ins           Michigan Trauma Quality Improvement Program (MTQIP) Optional Bonus for MACS Participants (Baseline DRAFT) January 1 to December 31, 2024						
Measure	Weight	Measure Description	Result	Points	Possible	
Optional	1	<b>MACS Data Submission</b> On time and complete 3 of 3 times On time and complete 2 of 3 times On time and complete 1 of 3 times	1	0.0	1.0 0.5 0.0	PARTICIPATION
Optional	1	<b>MACS Meeting Participation</b> Surgeon attends 3 of 3 meetings Surgeon attends 2 of 3 meetings Surgeon attends 0-1 of 3 meetings	0	0.0	1.0 0.5 0.0	
Optional	1	<b>MACS Meeting Participation</b> Quality Administrator/Manager or Data Abstractor attend 3 of 3 meetings Quality Administrator/Manager or Data Abstractor attend 2 of 3 meetings Quality Administrator/Manager or Data Abstractor attend 0-1 of 3 meetings	0	0.0	1.0 0.5 0.0	
Optional	1	<b>MACS Data Validation Error Rate</b> 0.0-3.0% 3.1-4.0% 4.1-5.0% > 5.0%	1.2	2.5	2.5 1.5 0.5 0.0	
Optional	1	<b>MACS Evidence-Based Opioid Prescribing in Appendectomy</b> (12 mo:8/1/23-7/31/24) ≥80% patients (< 52.5 discharge OME, oxycodone 5 mg = 7 pills) ≥70% patients (< 52.5 discharge OME) <70% patients (< 52.5 discharge OME)	79	0.5	1.0 0.5 0.0	PERFORMANCE
Optional	1	<b>MACS Evidence-Based Opioid Prescribing in Cholecystectomy (Laparoscopic or Robotic)</b> (12 mo:8/1/23-7/31/24) ≥80% patients (< 45 discharge OME, oxycodone 5 mg = 6 pills) ≥70% patients (< 45 discharge OME) <70% patients (< 45 discharge OME)	83	1.0	1.0 0.5 0.0	
Optional	1	<b>Appendectomy Performed in Uncomplicated Appendicitis with Appendicolith on CT</b> (12 mo:8/1/23-7/31/24) ≥95% patients ≥90% patients <90% patients	88	0.0	1.0 0.5 0.0	
Optional	1.5	<b>ED Visits Z-Score Trend in Appendicitis</b> (3 yr: 8/1/21-7/31/24) <-1 (major improvement) -1 to 1 or serious complications low outlier (average or better rate) >1 (rates of serious complications increased)	coming soon		1.5 0.7 0.5	
Total Points				4.0	10	

[Additional Information](#)

# Scorecard

Points earned to date  
 Dropbox upload for baseline  
 Current draft pending BCBS  
 Target go live 2025 (8/1/24)

# Feedback



# M·ACS

# Thank you



Blue Cross  
Blue Shield  
Blue Care Network  
of Michigan

Nonprofit corporations and independent licensees  
of the Blue Cross and Blue Shield Association

