Contemporary Management of Diverticulitis

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Disclosures

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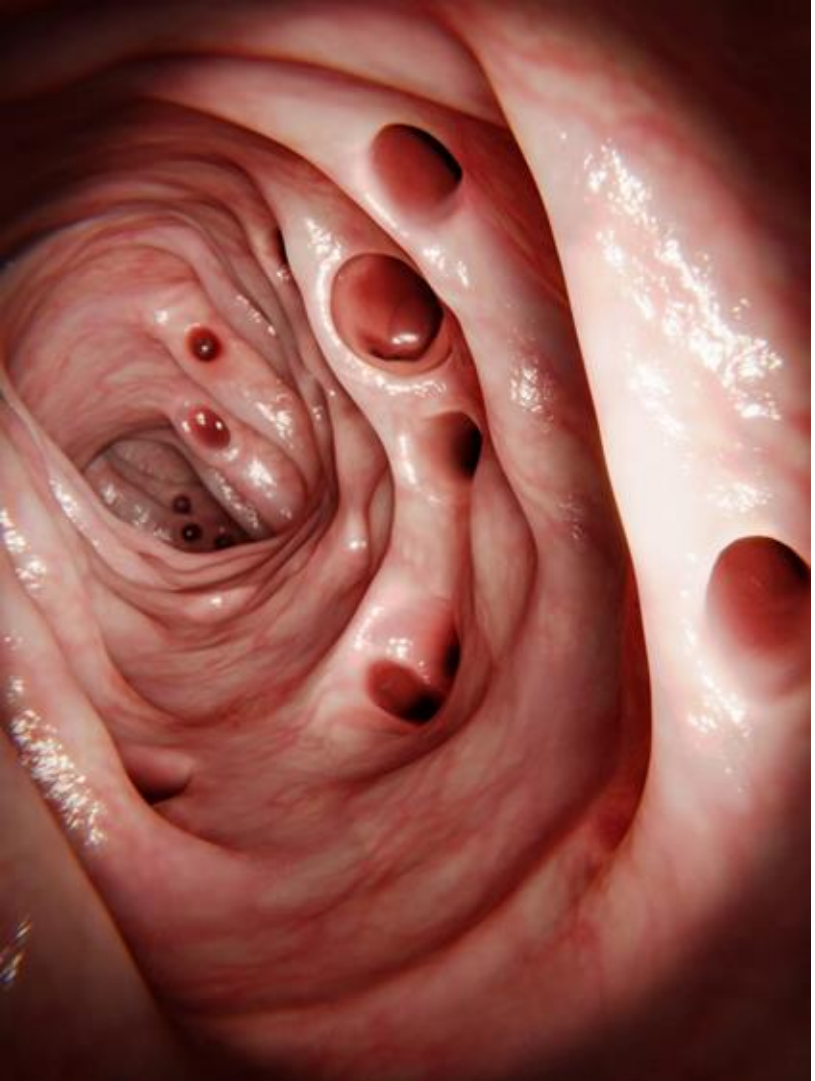
- Education, travel support from Intuitive Surgical, Inc.
- Advisory board for BD Surgical



Diverticulitis is common, costly

Every year in the United States:

- 1.9M outpatient visits
- 340,000 ER encounters
- 200,000 inpatient admissions

Pop Medicine > Celebrity Diagnosis

Pope Francis's Diverticular Disease

— A look at the pontiff's recent medical condition

by Michele R. Berman, MD July 20, 2021

CNN World Africa Americas Asia Australia China Europe India Middle East United Kingdom LIVE TV

Pope Francis has surgery for colon diverticulitis

By Livia Borghese, CNN

Updated 7:17 PM ET, Sun July 4, 2021

More from CNN

Restaurant owne... why he kicked ou... for...

Fashion editor Pa... Buckley, husband... Ford, dies at 72

The New York Times

A Closer Look at the Colon Condition That Hospitalized the Pope

Francis suffered a disorder that is relatively common and treatable, and doctors expect him to make a full recovery.

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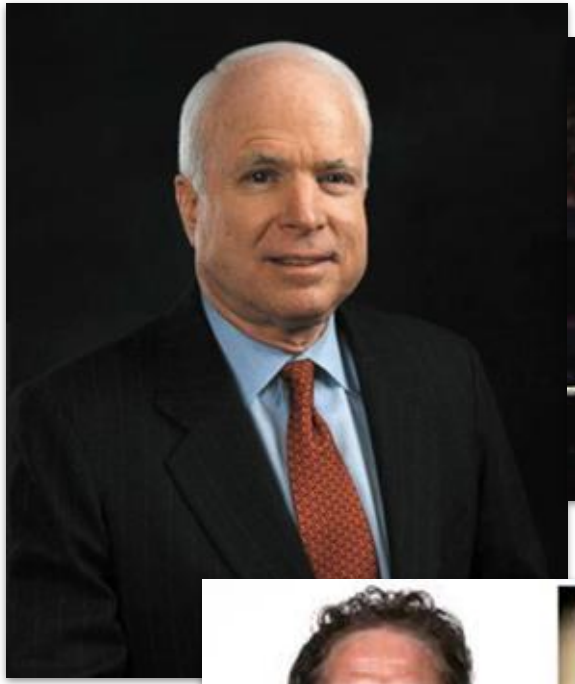

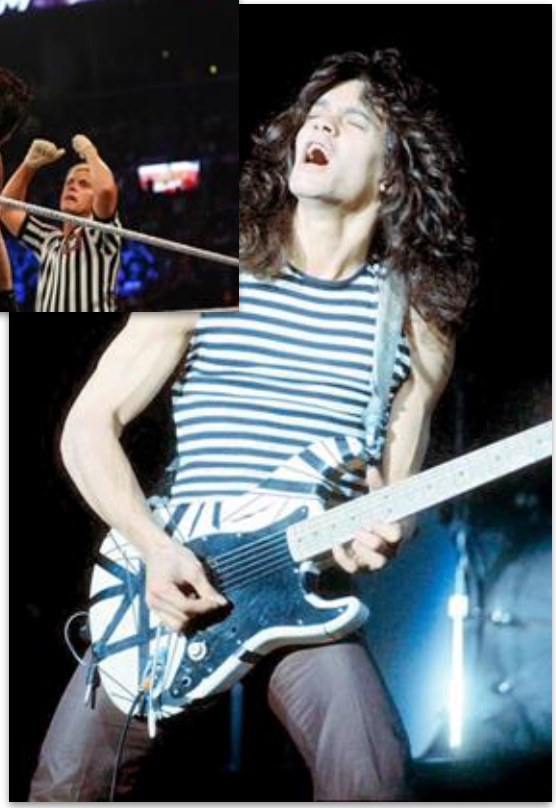

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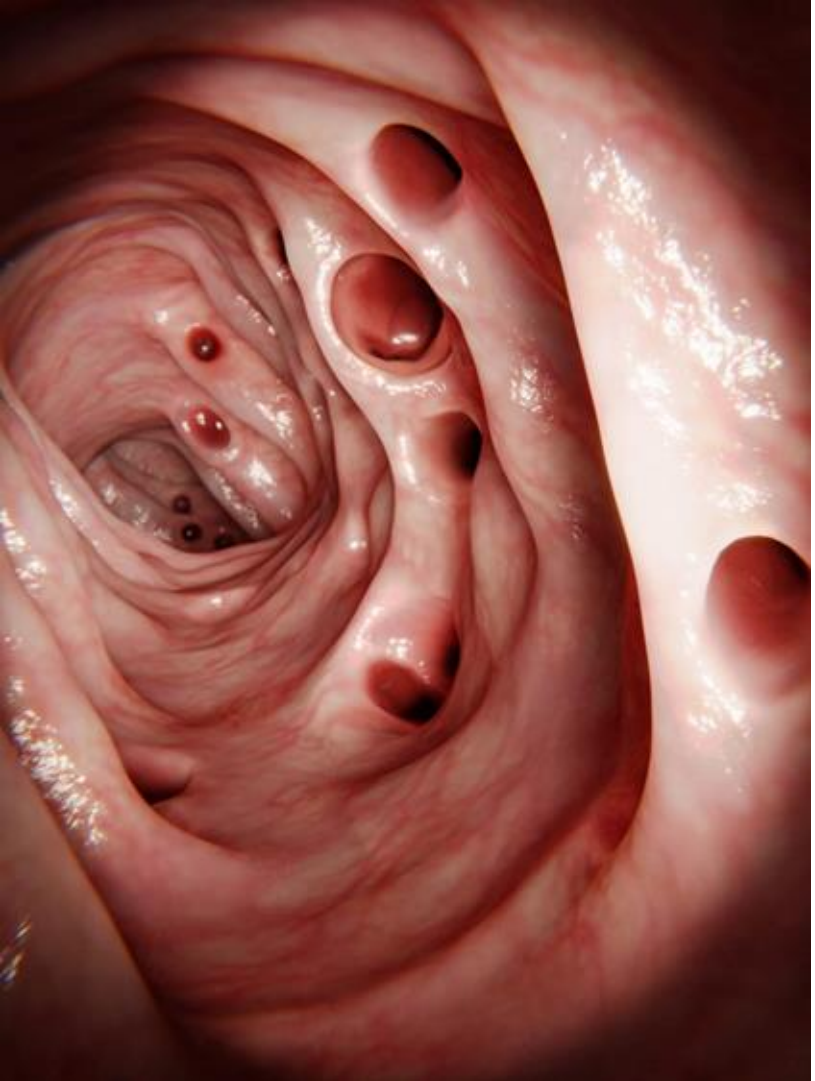

Objectives

Risk stratification of common condition

- Complicated vs uncomplicated

Personalized outpatient management

- Are Antibiotics actually needed?
- Dietary and Lifestyle interventions
- Who needs colonoscopy?

Contemporary Surgical Management

- Shift to minimally-invasive surgery
- ‘Individualizing’ surgery decisions

Future work

- COSMID, IMPEDE studies

How common is common? (Epidemiology)

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- 50% of patients over age 60 have diverticulosis at colonoscopy

- Diverticulitis **209** per **100k** person-years
- Hospitalization **49** per **100k** person-years
  (perforation **2.7** per **100k** person-years)

- Surgery for diverticulitis **8** per **100k** person-years
- Emergent surgery **2** per **100k** person-years
- Death related to diverticulitis **0.9** per **100k** person-years

- Colorectal Cancer in WA **40/100k** person-years (mortality 10/100k person-years)
- IBD in North America **20/100k** person-years

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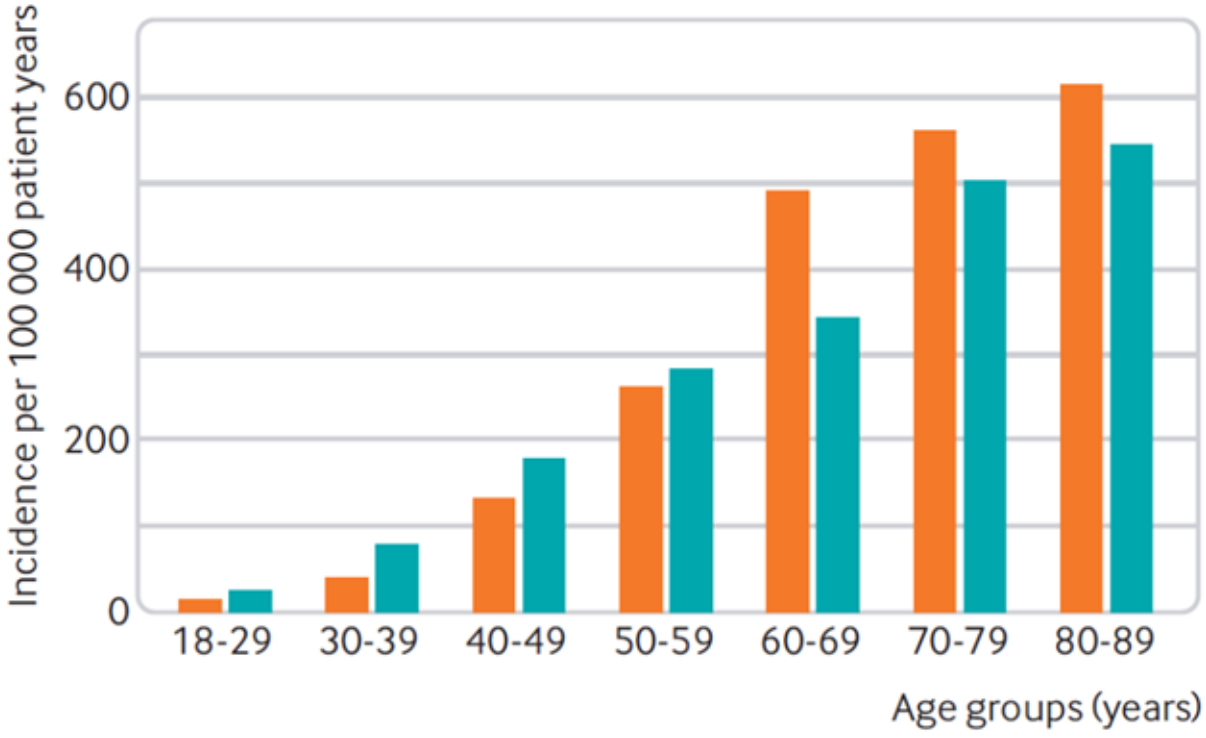
Bharucha AE. Am J Gastroenterol. 2015.
American Cancer Society. 2021.
Molodecky NA. Gastroenterology. 2012.

More **men** when young, more **women** when older



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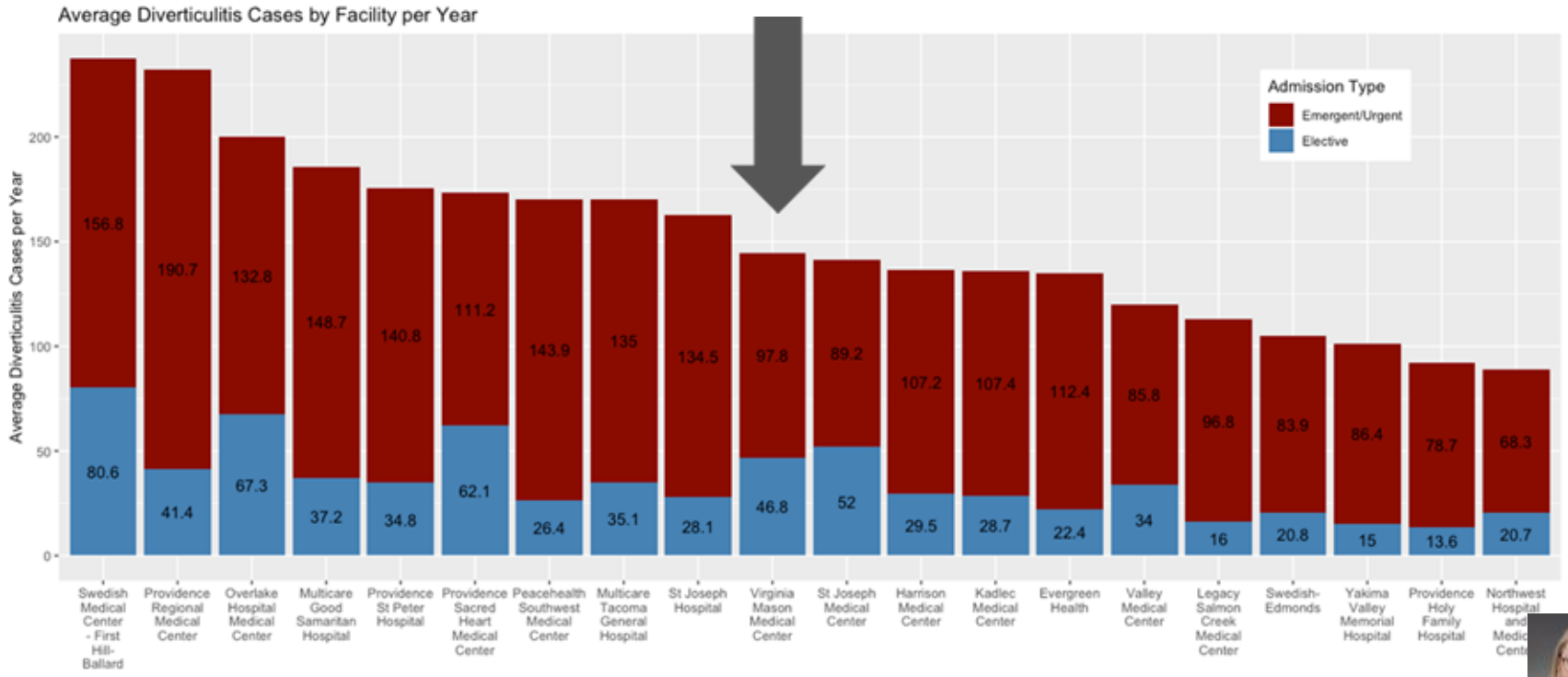
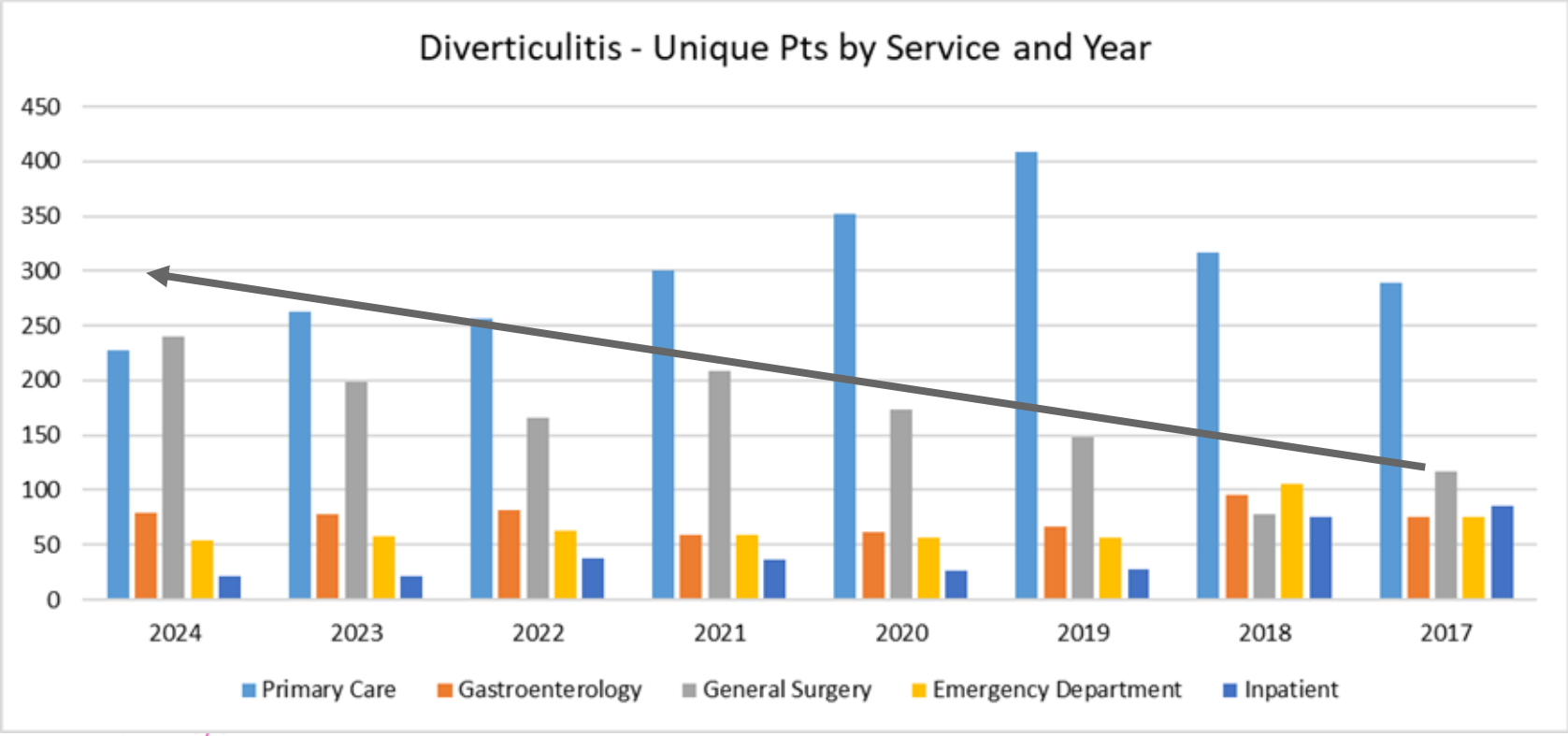
Bharucha AE. Am J Gastroenterol. 2015.

~12 hospitalizations / day in WA

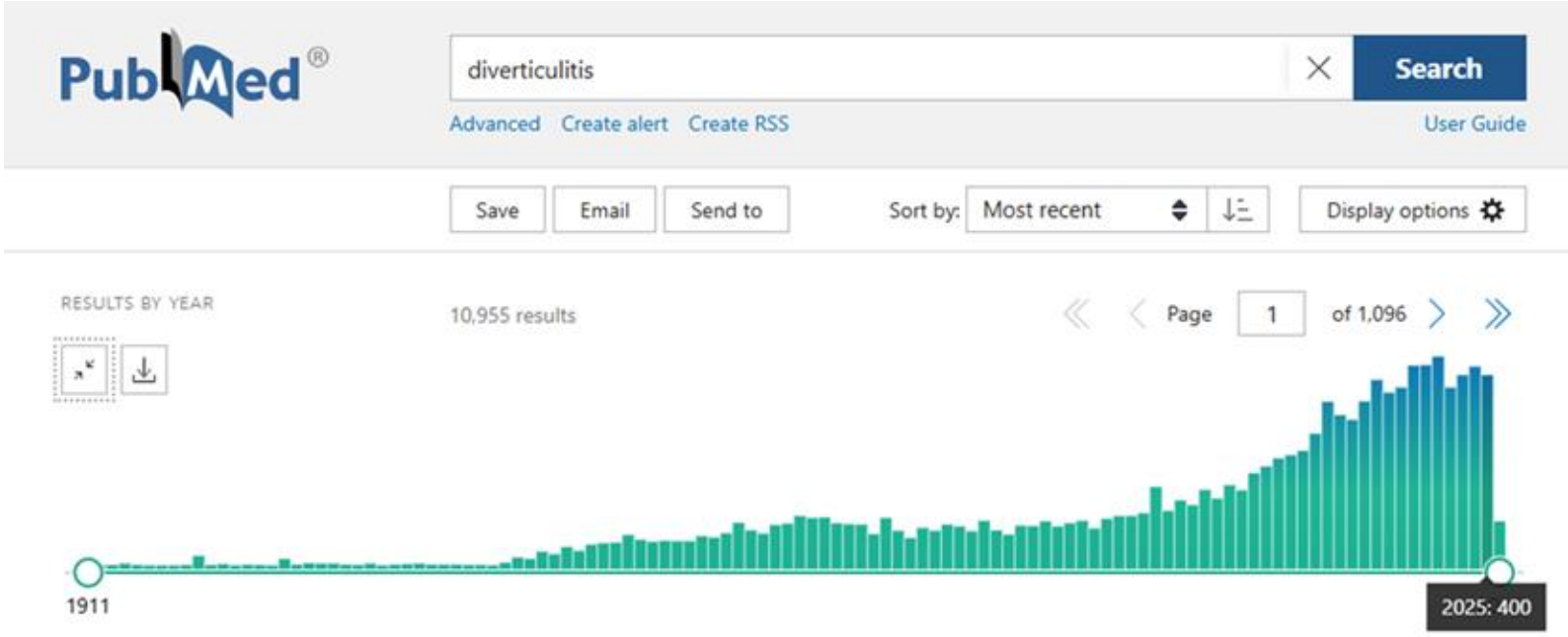


Stovall SL. Am Surg. 2023.

Unique Diverticulitis Patients at Virginia Mason



About 400 new publications per year…



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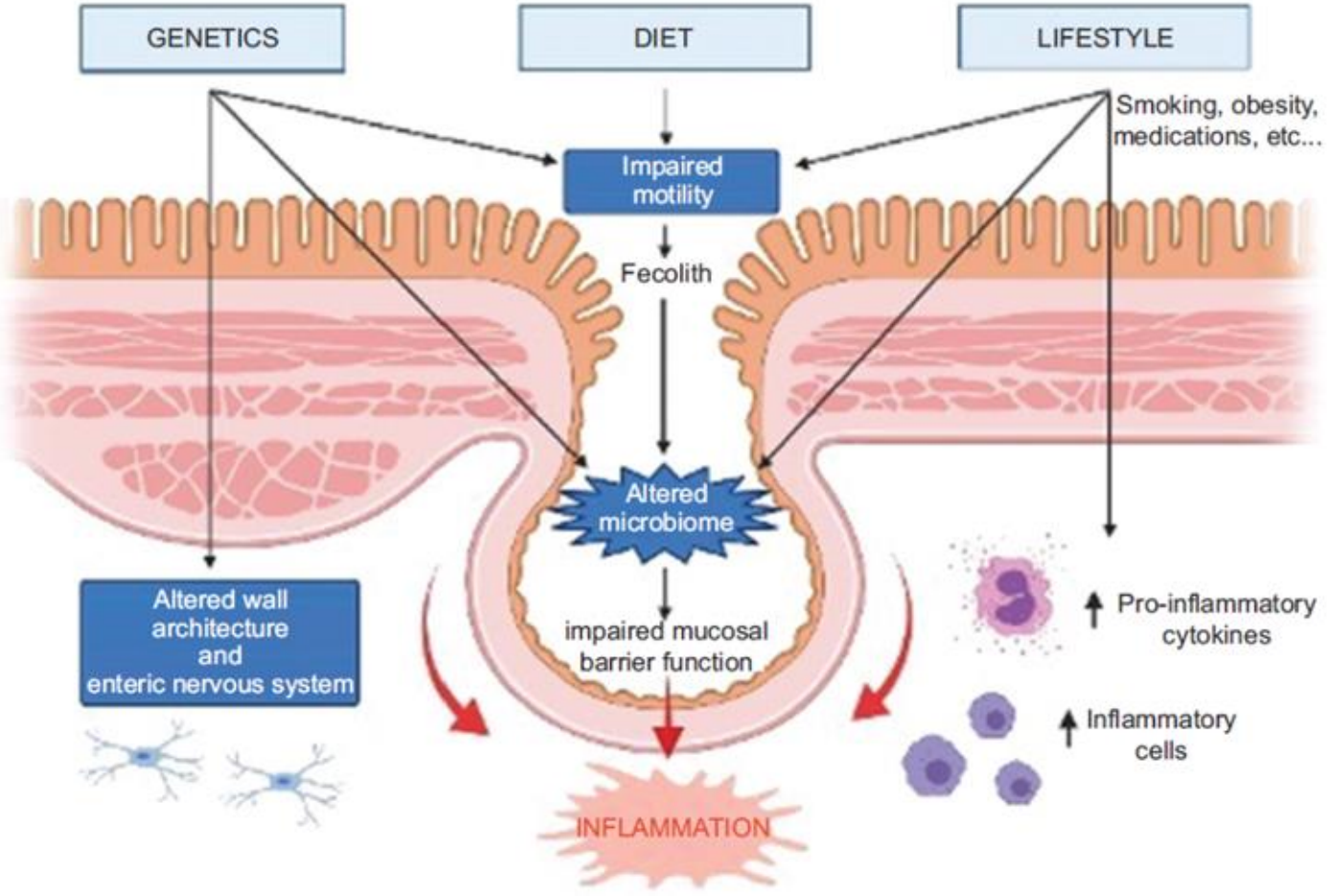
Etiology of diverticulitis is… complex



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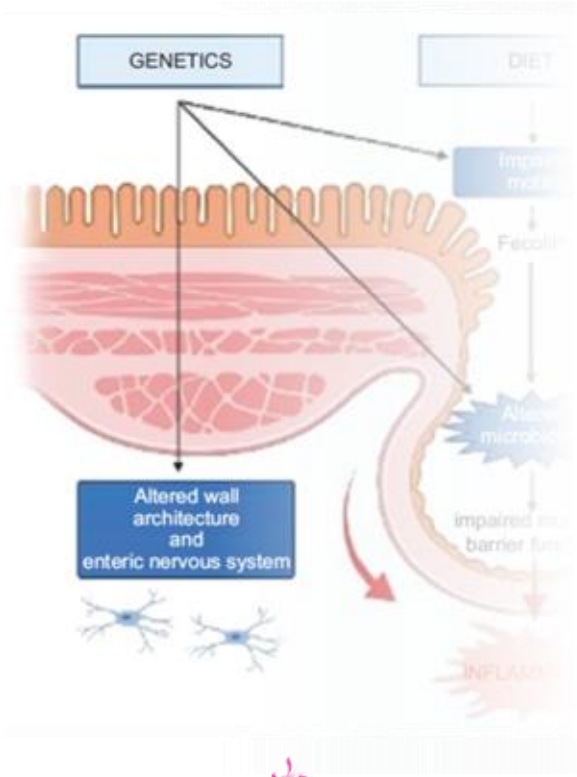
Koprowski MA. Ann Gastroenterol. 2022.

Genetics of Diverticulitis



Associated with:

- Marfan syndrome
- Ehler-Danlos Syndrom
- Polycystic Kidney Disease

Heritability

- Monozygotic twins OR 7-15
- Dizygotic OR 3-5

Genome-wide association studies

- SNPs associated with connective tissue, motility, inflammation, vascular biology

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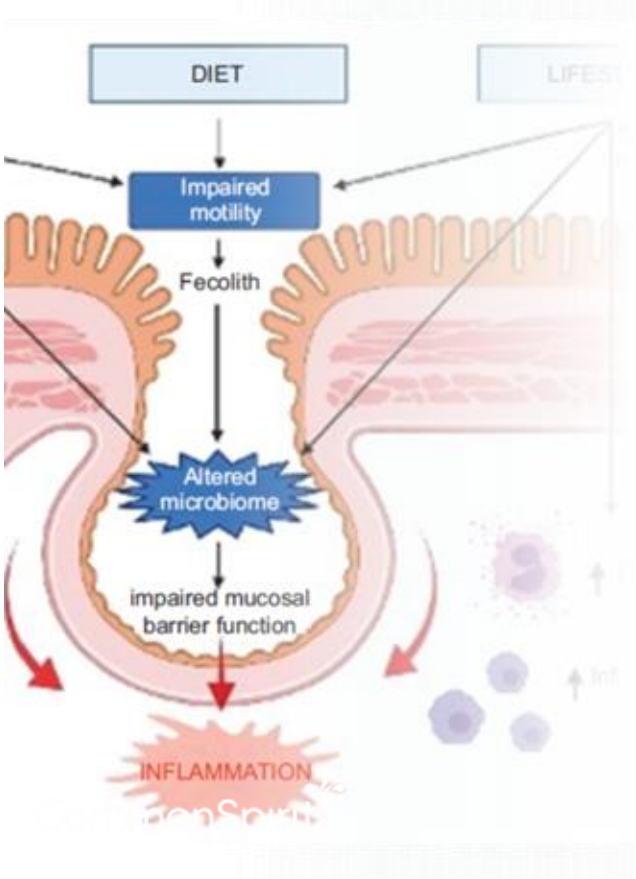
Strate LL. Gastroenterology. 2013.
Maguire LH. Nat Genet. 2018.

The Diverticulitis Diet – is it about the fiber ?



Health Professionals Follow-Up Study (n=46,461 men)

- "Western diet" - red and processed meats, refined grains, sweets, french fries, high fat dairy
  - HR 1.55 for diverticulitis
- "Prudent diet" - fruits, vegetables, whole grains, legumes, poultry and fish
  - HR 0.74 for diverticulitis
- **Increased Fiber** and **Decreased Red Meat** are key components
  - Unprocessed meat worse than processed (up to 6 servings per week)

Nurses' Health Study (n=50,019 women)

- Top quintile dietary fiber, less diverticulitis
- Nuts, corn, popcorn consumption does not increase risk of diverticulosis, complications

Strate LL. Gastroenterology. 2017.
Cao Y. Gut. 2018.
Ma W. Am J Gastroenterol.. 2019.

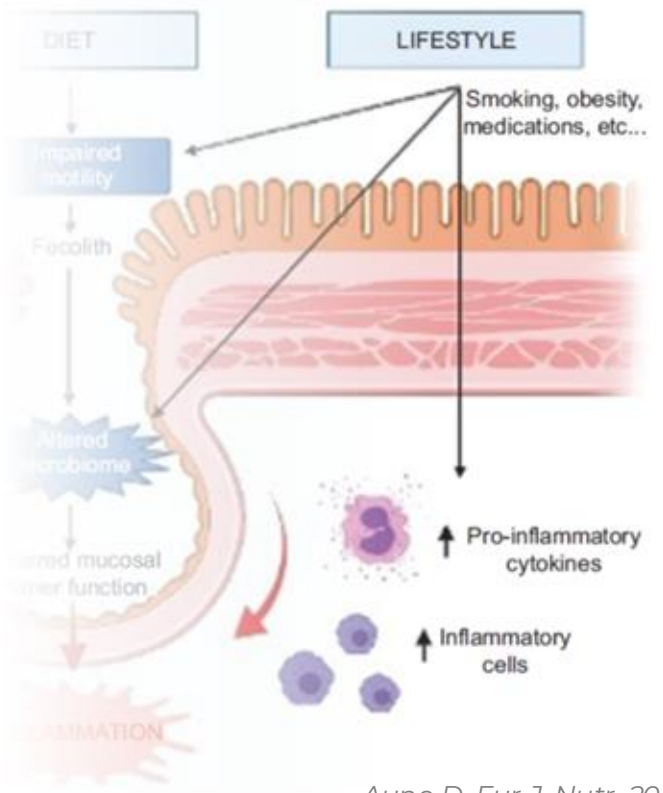
Other ‘Environmental’ Factors

“Healthy lifestyle” = Teachable moment with patients

- Highest vs low physical activity (RR 0.76)
- Every 5 points in HMI (25% increase)
- Smoking (RR 1.36)

NSAID use associated with incident diverticulitis

Peak in summer month (UK, Australia, USA)



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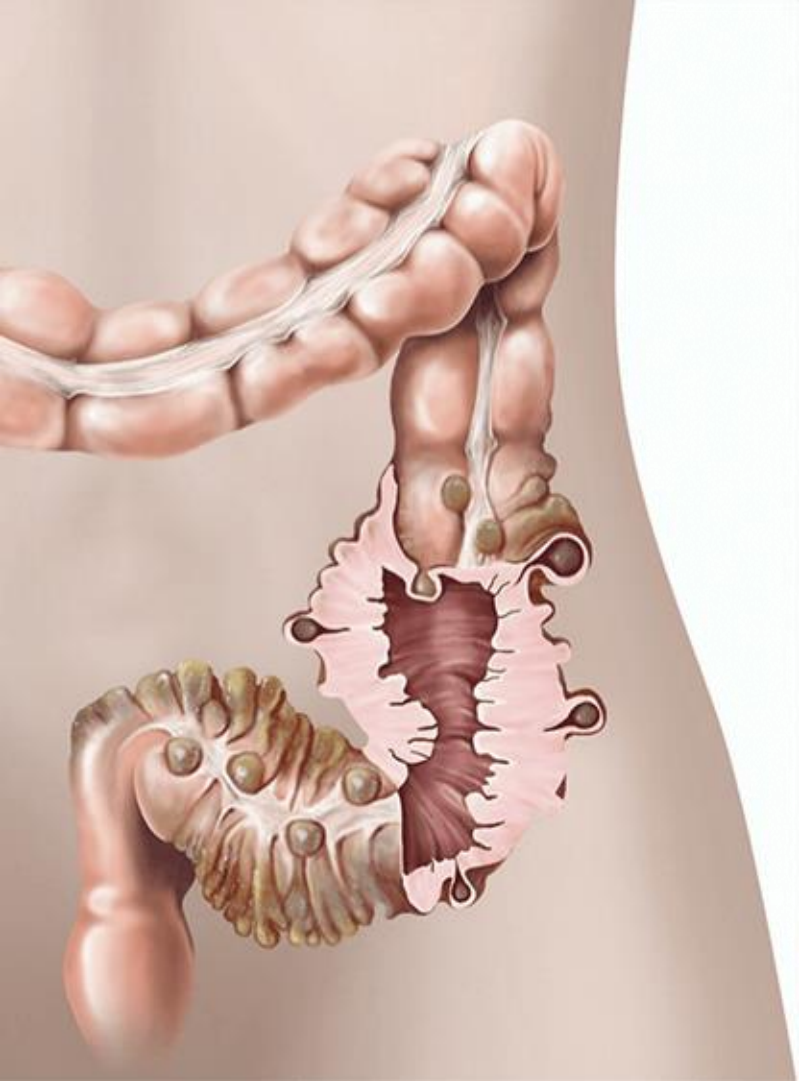
Aune D. Eur J. Nutr. 2020.
Liu PH. Gastroenterology. 2017.
Adler JT. Dis Colon Rectum. 2016.

Managing ACUTE Diverticulitis



ASCRS Guidelines 2020

Acute Diverticulitis:

- CT scan best to confirm diagnosis
- US/MRI can be alternatives

Medical management:

- Resuscitate and manage sepsis
- Select patients can be managed without Abx
- Percuatenous drainage of abscess >4cm

Emergency surgery:

- Peritonitis, or failure of non-op management
  - consider repeating CT if ‘stable-ish’
- Surgeons need to know what to resect, when to anastomose, and when not to

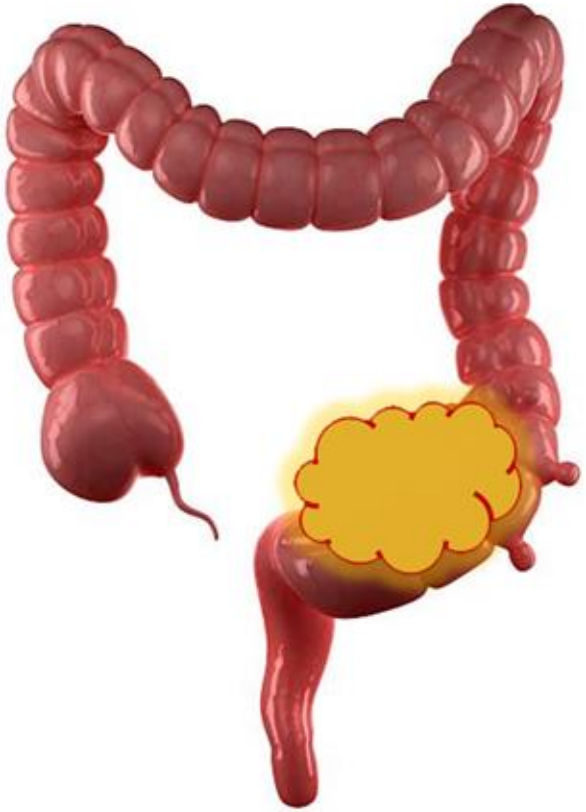
Hall J Dis Colon Rectum. 2020.

Complicated or Not?

Complicated Diverticulitis

- Uncontained, free perforation
- Fistula
- Stricture
- Obstruction

- And as of 2020…. abscess



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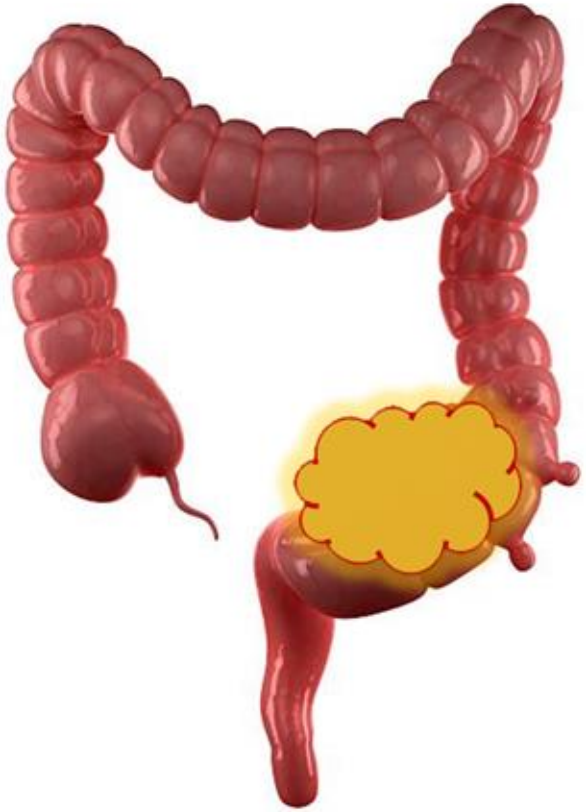
Hall J Dis Colon Rectum. 2020.
Peery AF. Gastroenterology. 2021.

Complicated Diverticulitis

- **7.9%** cancer on Colonoscopy
- **5%** need Emergency Surgery
- **30%** have complicated recurrence or admission
- **50%** need surgery within 6 months

Updated colonoscopy and surgical resection typically recommended



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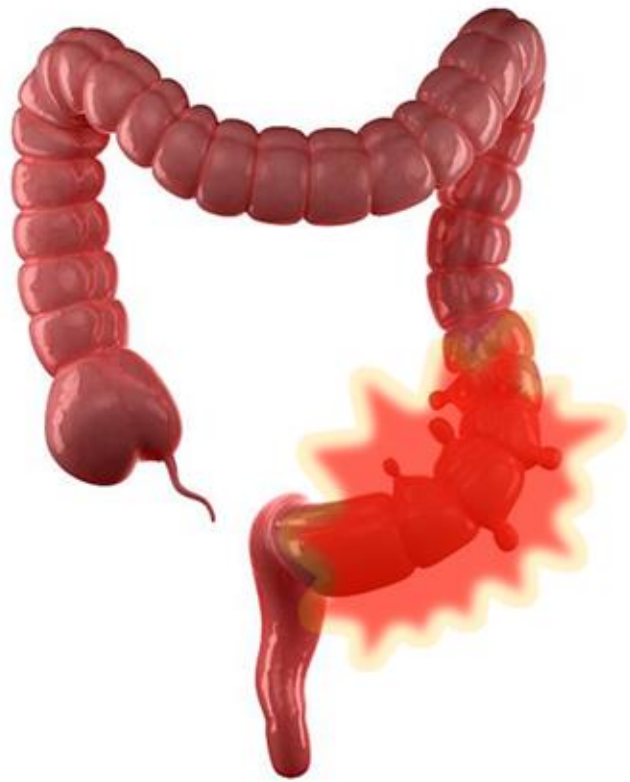
Hall J Dis Colon Rectum. 2020.
Peery AF. Gastroenterology. 2021.



UNcomplicated Diverticulitis

Anything not ‘complicated’

- **1.3%** adenoma or CA on Colonoscopy
- **5%** develop complicated diverticulitis
- **6%** have smoldering symptoms

- 15% have a recurrent episode
- 45% ongoing GI symptoms

Recommendation for colonoscopy and surgery are <u>individualized</u>

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Hall J Dis Colon Rectum. 2020.
Peery AF. Gastroenterology. 2021.

How should we quantify ‘burden’ of diverticulitis?

ASCRS guidelines – elective colectomy:

- 1995 – resection after 2 episodes is recommended
- 2000 – resection after 2 episodes is commonly recommended
- 2006 – decision should be made on case-by-case basis (IIIB)
- 2014 – decision for colectomy should be individualized (IB)
- 2020 – decision for colectomy should be individualized (IB)

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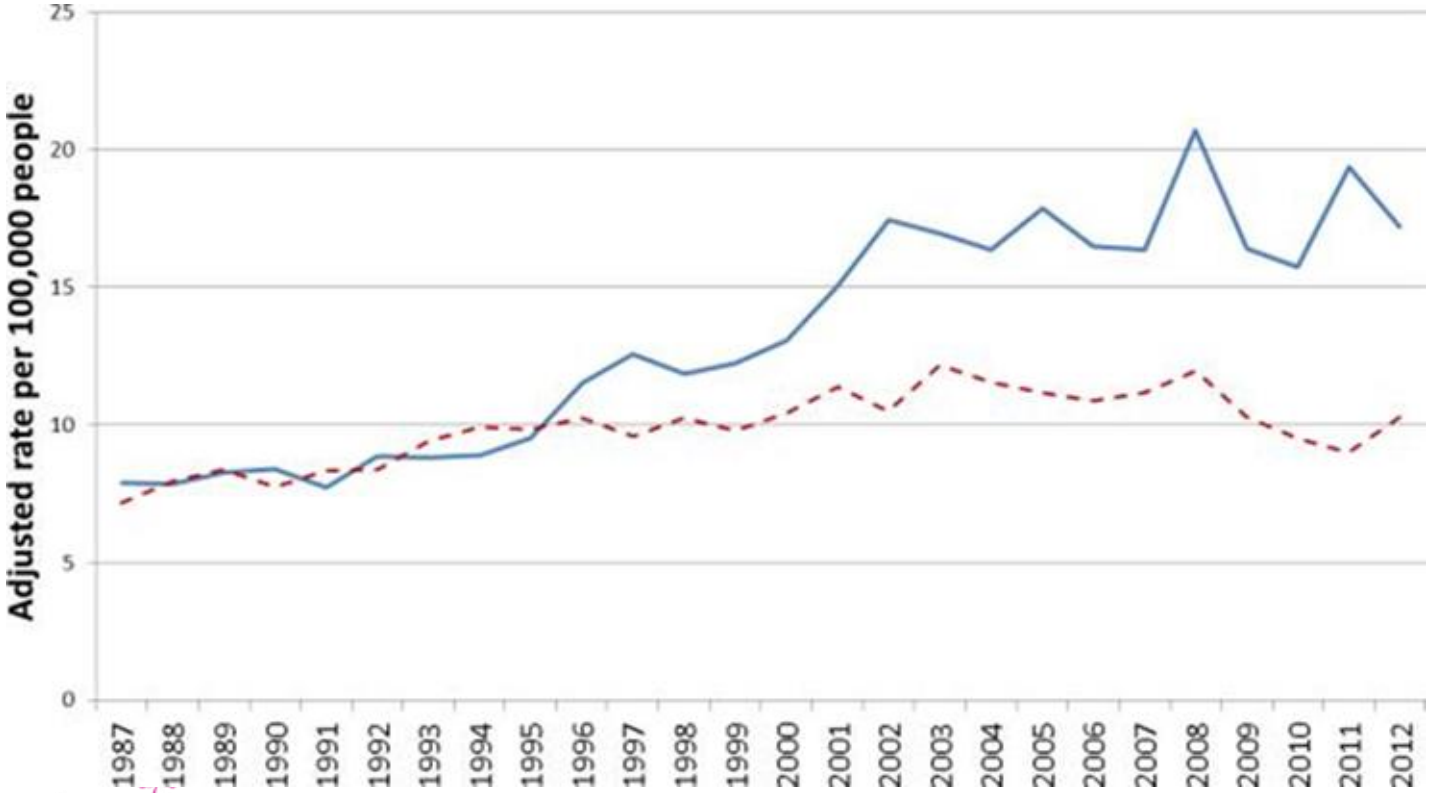
Simianu VV. Ann Surg. 2016.
Hall J Dis Colon Rectum. 2020.

Does more surgery work to avoid emergencies?



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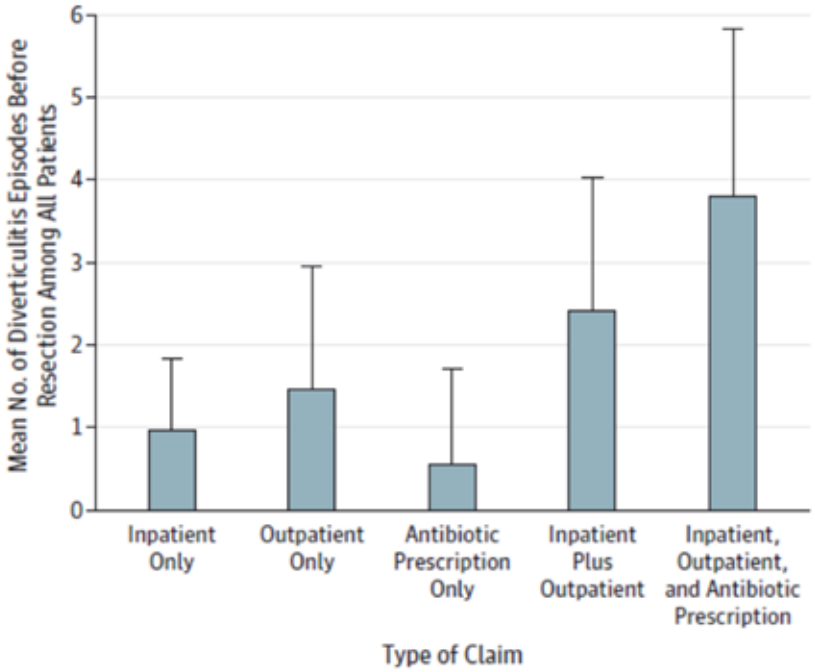
Simianu VV. Ann Surg. 2016.

Do all episodes of care count?

‘Counting’ episodes?

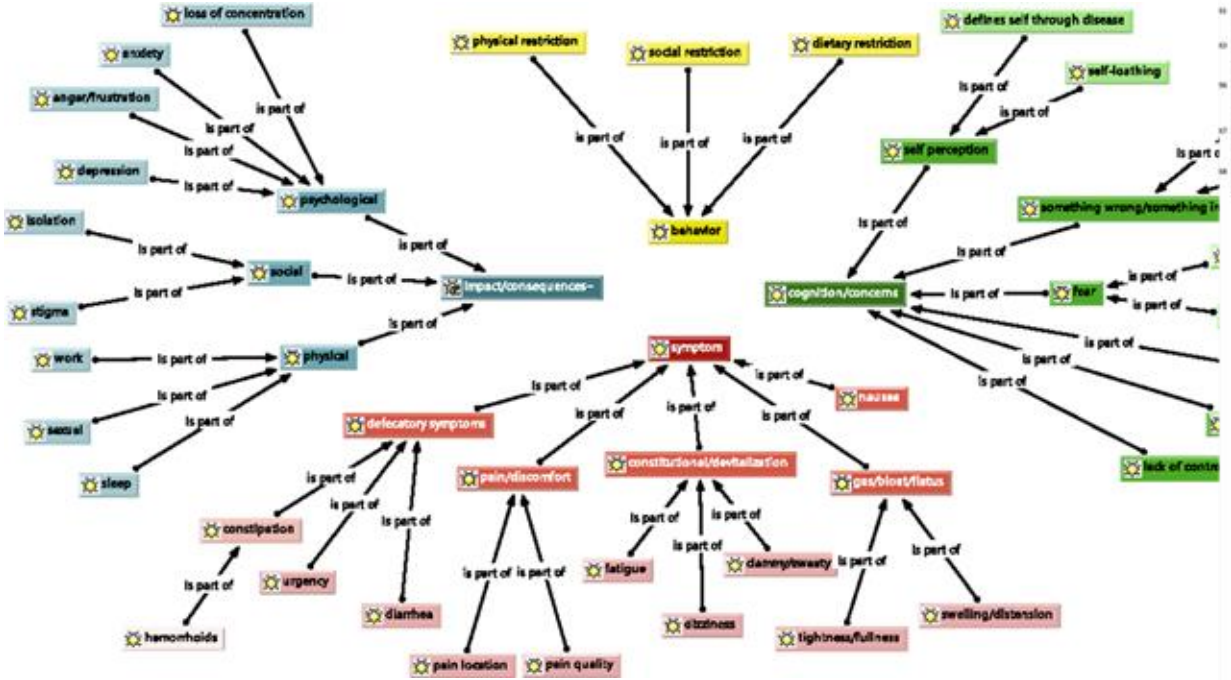
- What constitutes an ‘episode’?
- Are all episodes equal?
- How many is too many?

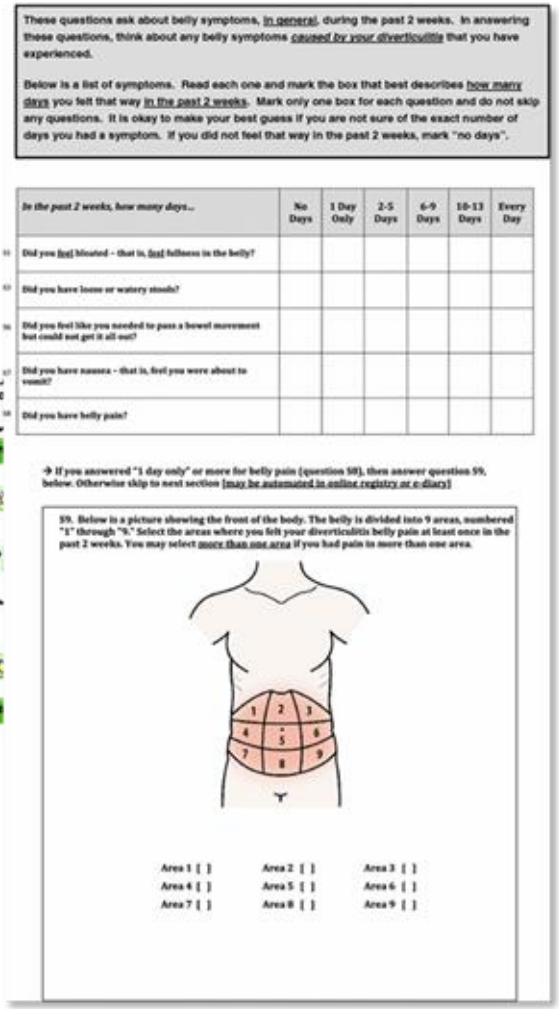
Figure. Number of Diverticulitis Episodes Before Resection Based on Types of Claims



Simianu VV. JAMA Surg. 2016.

Quality of life impairment?





These questions ask about belly symptoms, in general, during the past 2 weeks. In answering these questions, think about any belly symptoms caused by your diverticulitis that you have experienced.

Below is a list of symptoms. Read each one and mark the box that best describes how many days you felt that way in the past 2 weeks. Mark only one box for each question and do not skip any questions. It is okay to make your best guess if you are not sure of the exact number of days you had a symptom. If you did not feel that way in the past 2 weeks, mark "no days".

In the past 2 weeks, how many days...	No Days	1 Day Only	2-5 Days	6-9 Days	10-13 Days	Every Day
Did you feel bloated – that is, feel fullness in the belly?						
Did you have loose or watery stools?						
Did you feel like you needed to pass a bowel movement but could not get it all out?						
Did you have nausea – that is, feel you were about to vomit?						
Did you have belly pain?						

→ If you answered "1 day only" or more for belly pain (question 58), then answer question 59, below. Otherwise skip to next section [may be automated in online registry or e-diary]

59. Below is a picture showing the front of the body. The belly is divided into 9 areas, numbered "1" through "9." Select the areas where you felt your diverticulitis belly pain at least once in the past 2 weeks. You may select more than one area if you had pain in more than one area.

Area 1 [ ] Area 2 [ ] Area 3 [ ]
Area 4 [ ] Area 5 [ ] Area 6 [ ]
Area 7 [ ] Area 8 [ ] Area 9 [ ]

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Spiegel BM. Qual Life Res. 2015.

How can we ‘personalize’ outpatient treatment?

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Antibiotics or not?

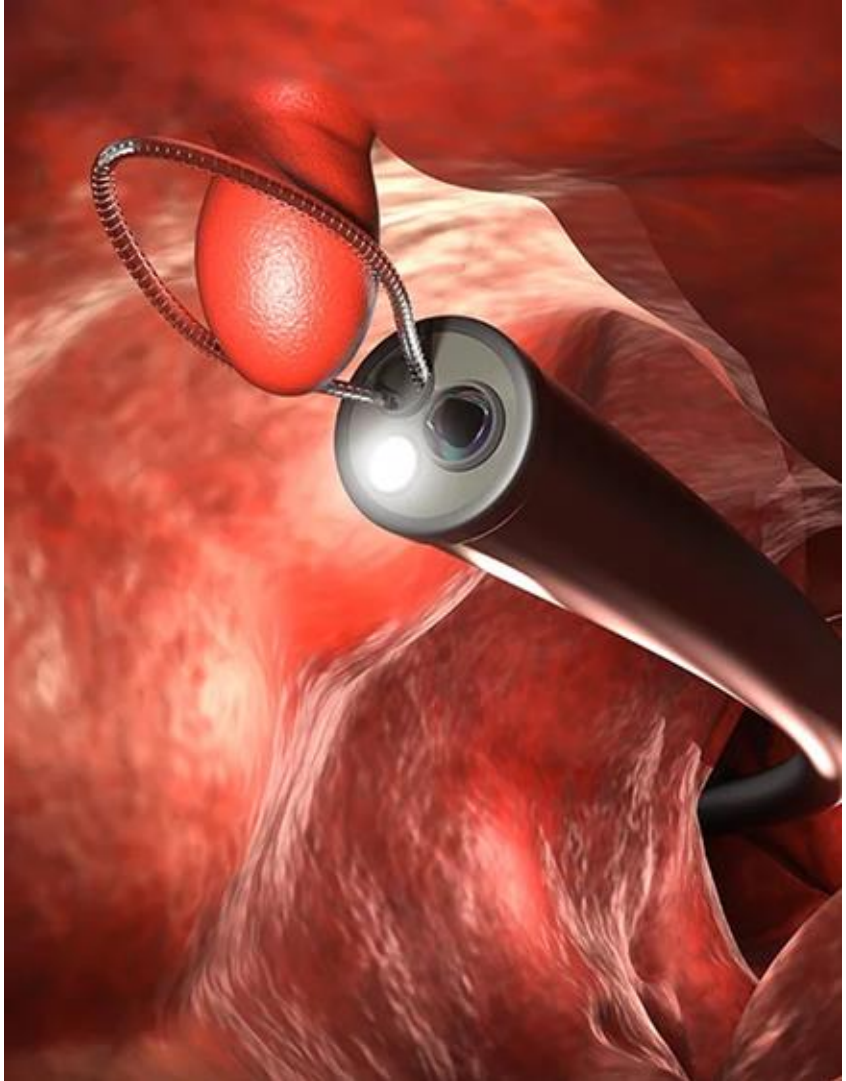
Four RCTS:

- DIABOLO (n=528), AVOD (n=556), no difference in:
  - complication free recovery
  - time to recover from index
  - surgery free survival
- STAND (n=180), no difference in hospital LOS, readmission
- DINAMO (n=480) readmission in 5.8% of antibiotic vs 3.3% of non-abx group

- AGA and ASCRS support “selective use” of antibiotics

- Trials excluded immunocompromised, pregnant, and poor representation in >70yo

Mora-López L. Ann Surg. 2021.
Daniels L. Br J Surg. 2017.
Isacson D. Br J Surg. 2019.



Who needs colonoscopy?

Old paradigm:

- 6-8 weeks after acute event

New recommendations:

- Adenoma or Colon cancer in 8-10% of complicated diverticulitis cases
  - **Update colonoscopy**

- 0.5-1% in uncomplicated diverticulitis
  - **Colonoscopy as per screening guidelines**

- CT findings suggestive of malignancy?
  - **Update colonoscopy**

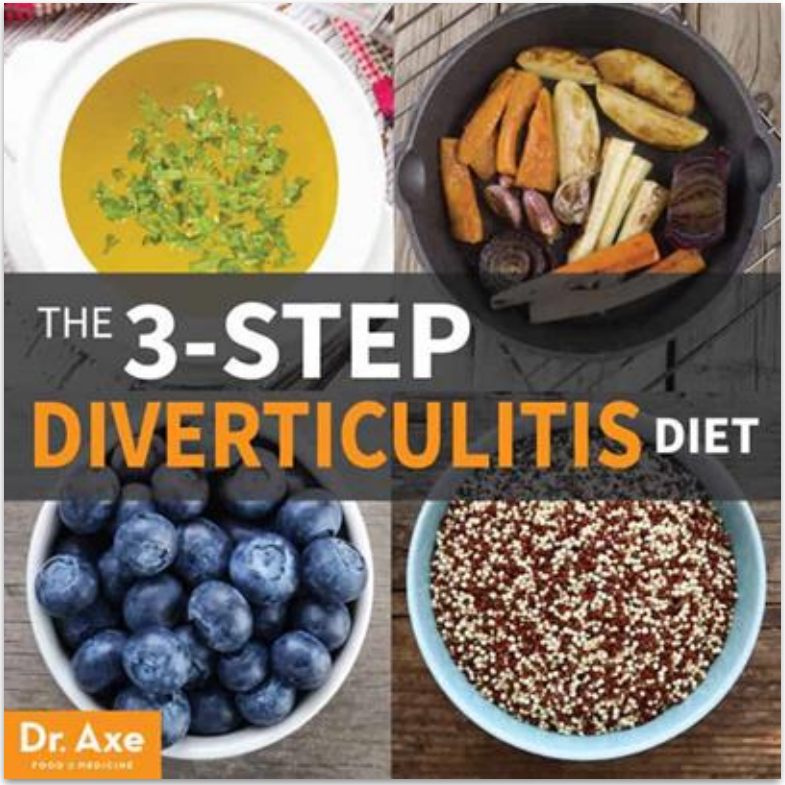
Hall J Dis Colon Rectum. 2020.
Peery AF. Gastroenterology. 2021.

Lifestyle Modification

There is no ‘diverticulitis diet’
- Clears after acute episode?
- Seeds, nuts popcorn are OK

Secondary prevention
- Tobacco cessation
- Increased physical activity
- Weight loss – goal BMI <30

Medications
- Rifamycin - Cochrane Review (7 RCTs)
- Mesalamine - meta-analysis (4 RCTs)
- Probiotics - systematic review (incl 7 RCTs)



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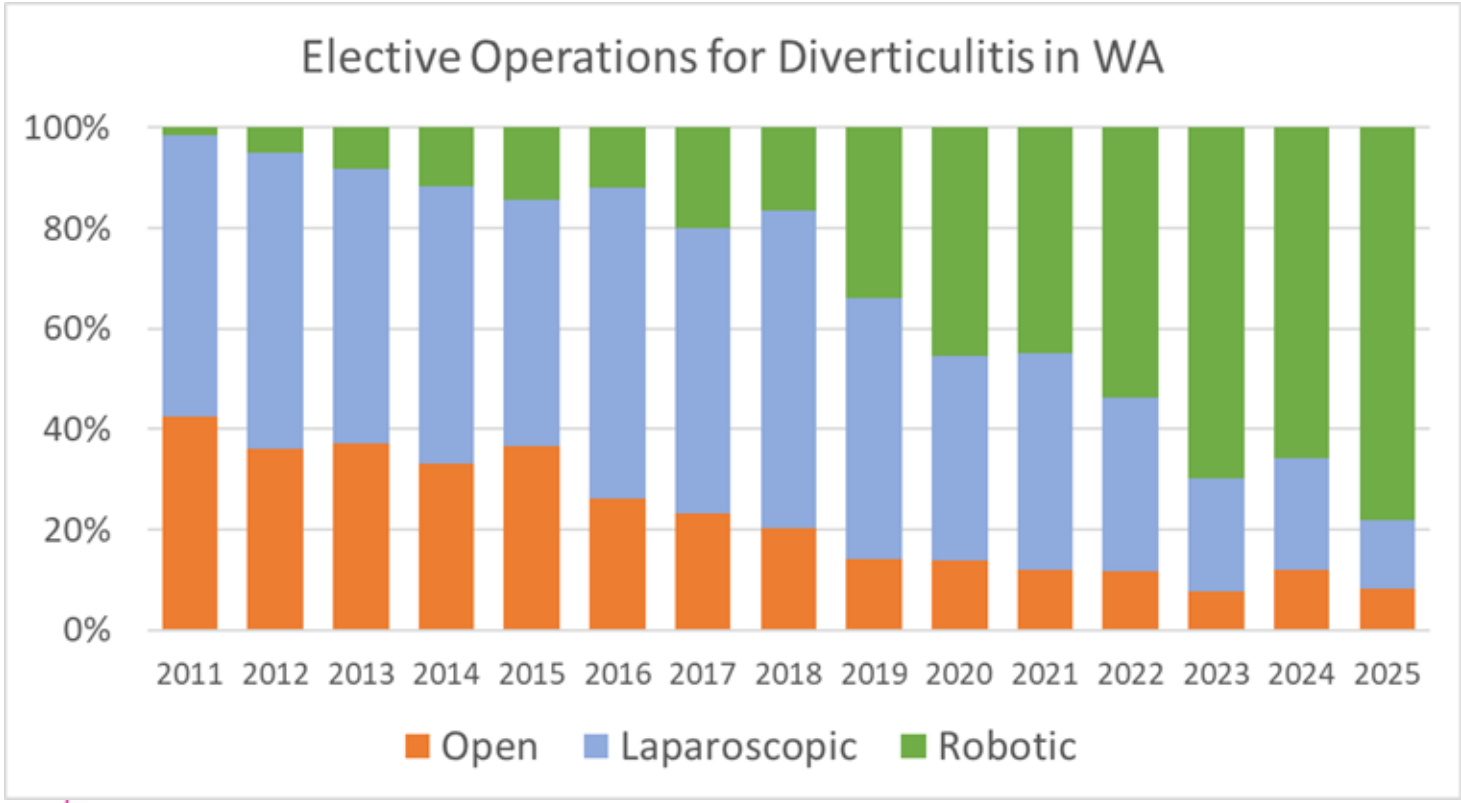
Hall J Dis Colon Rectum. 2020.
Peery AF. Gastroenterology. 2021.

Contemporary surgical approach to diverticulitis

Diverticulitis surgery is primarily minimally-invasive



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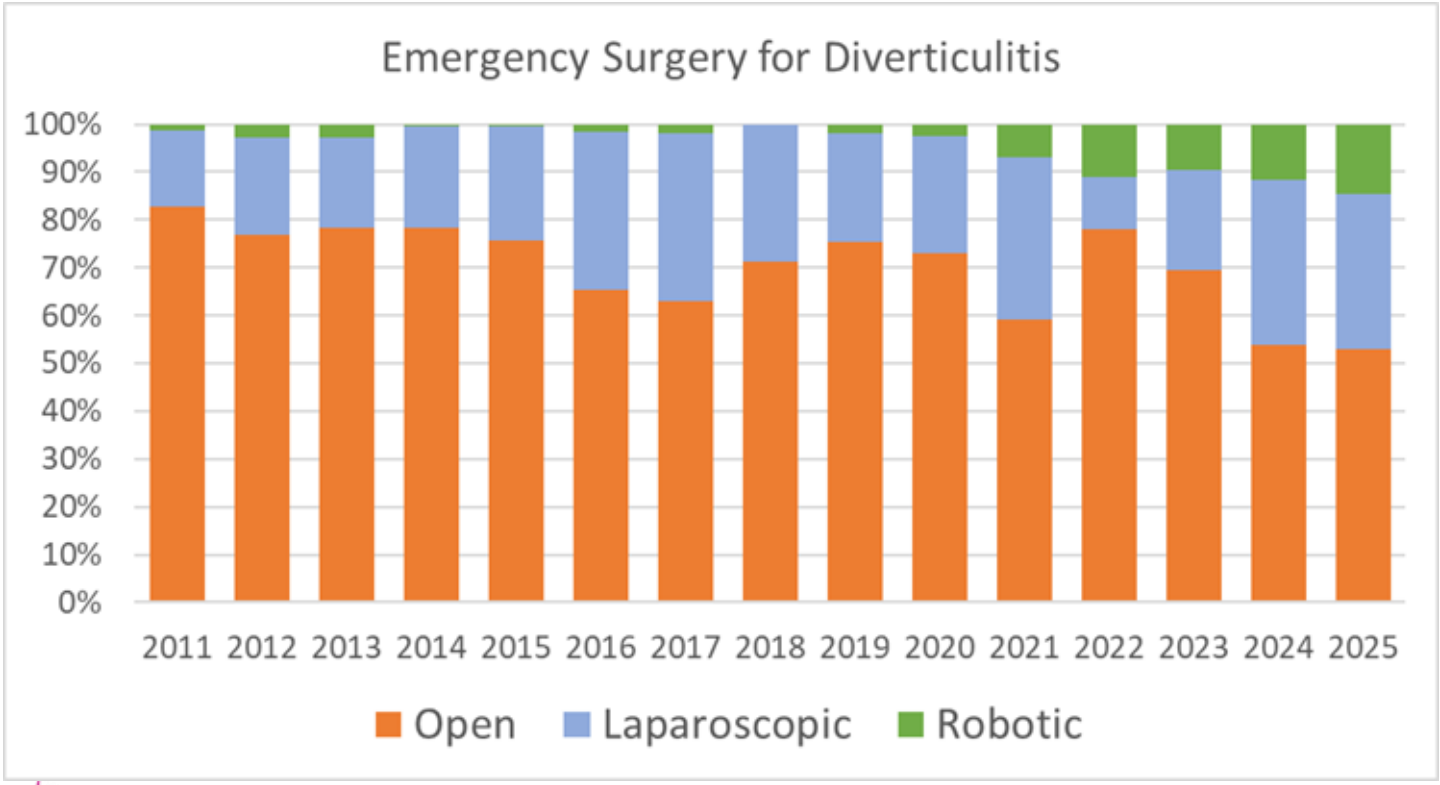
Liddy D. SCOAP Database. Unpublished data 2026.

Diverticulitis surgery is primarily minimally-invasive



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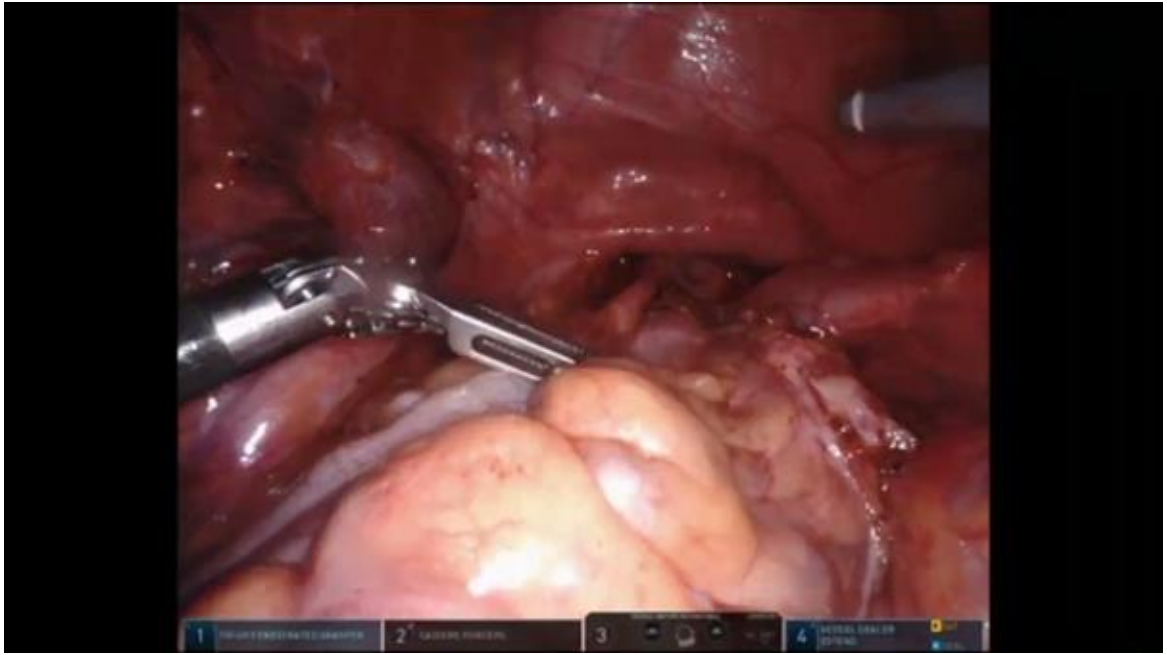
Liddy D. SCOAP Database. Unpublished data 2026.

MIS has transformed surgical outcomes

Compared to open surgery:
↓ wound complications
↓ pain
↓ length of stay
↓ incisional hernias

MIS is cost effective
at hospital and societal level



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Simianu VV. Ann Surg. 2020.
Simianu VV. J Gastrointest Surg. 2021.

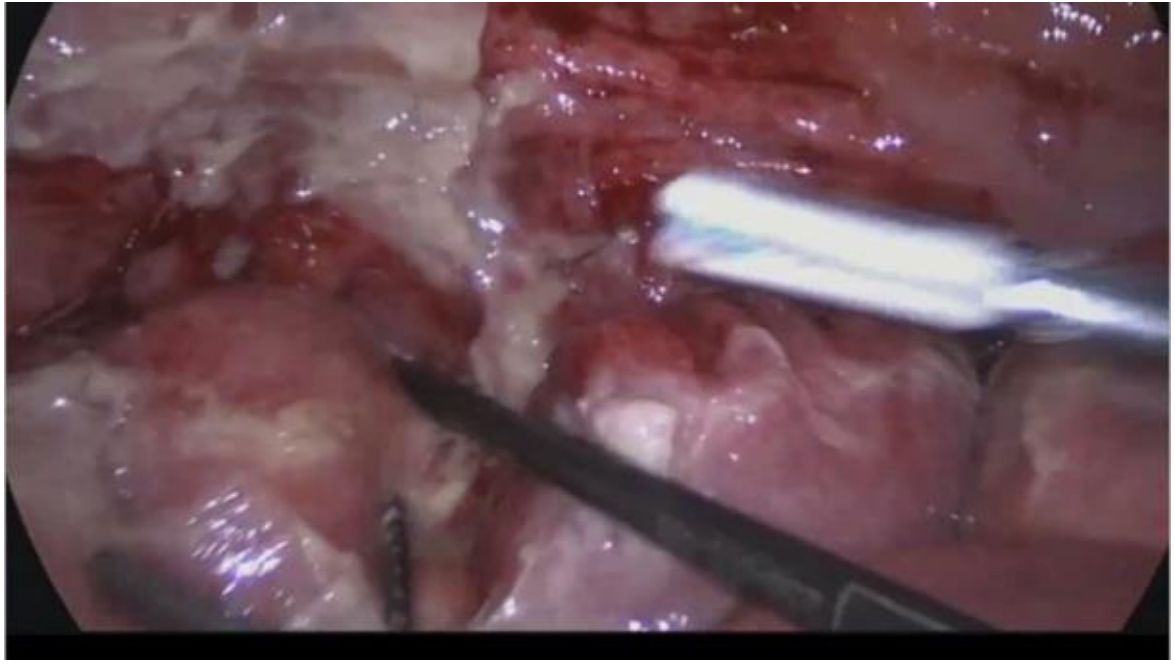
The end of emergency colostomy era?

Is it safe to anastomose the colon emergently?

DIVERTI Trial (n=102)
- Mortality equal
- Stoma free: 96% vs 65%

ColonPerfRCT (n=62)
- Ended early
- Morbidity higher in Hartmann's (20% vs 0%)

LADIES Trial (n=133)
- Morbidity, mortality equal
- Stoma free: 95% vs 72%



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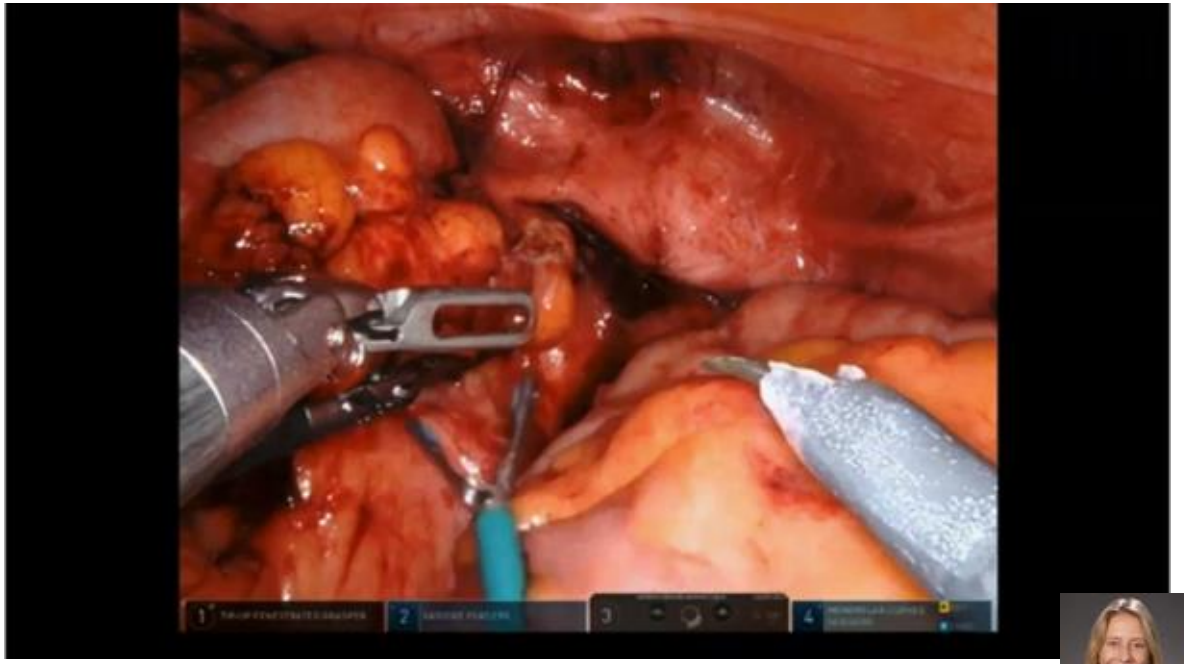
Oberkofler CE. Ann Surg 2012.
Bridoux V. J Am Coll Surg. 2017.
Lambrichts DP. Lancet Gastroenterol Hepatol. 2019.

Make emergency resection elective… again

Staged diversion for smoldering or obstructing diverticulitis

N=50

46/50 (92%) definitive resection
45/50 (90%) stoma reversal at same operation



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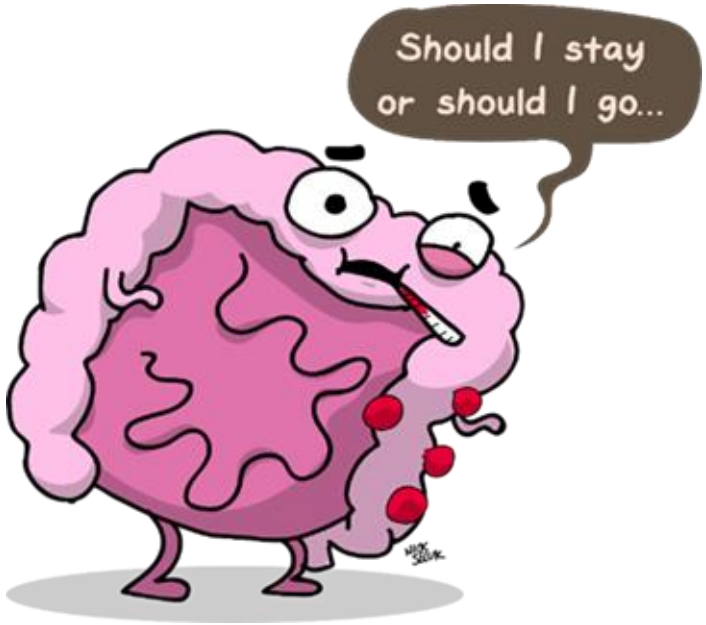
Liddy D. NW Society CRS. 2025.

Does surgery ‘prevent’ recurrence?

Does Surgery work at preventing diverticulitis?



DIRECT trial (RCT, n=109)

- Colectomy vs non-operative management
- QOL better at 5 years
- Healthcare costs better at 5 years
- 46% of conservative eventually operation

We see this in our practice

- 12,073 pts with 2+ episodes of diverticulitis
- At 1 year, recurrence after surgery 6% (vs 32%)
- At 5 years, recurrence after surgery 15% (vs 61%)

LASER trial (RCT, n=90)

- Higher GI QLI scores with surgery
- 5% recurrence after surgery, 31% after med mgnt

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Bolkenstein HE. Ann Surg. 2019.
Thornblade LW. Ann Surg. 2021.
Santos A. JAMA Surg. 2021.

Therapeutic Advances in Gastroenterology Review

Health-related quality of life and functional disorders after diverticular surgery

Daniel Segna, Paul J. Jaklin, Beat Schnüriger, and Benjamin Misselwitz

Ther Adv Gastroenterol
2021, Vol. 14: 1–18
DOI: 10.1177/17562848211066437

- **9 out of 10** longitudinal cohort studies showed increase HRQoL
- In RCT and retrospective cohort, **elective surgery superior** to conservative treatment regarding HRQoL
- Pts report satisfaction with choice for surgery as “high” or “very good”

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Segna D. Ther Adv Gastroenterol. 2021.

How do we advance diverticulitis care?

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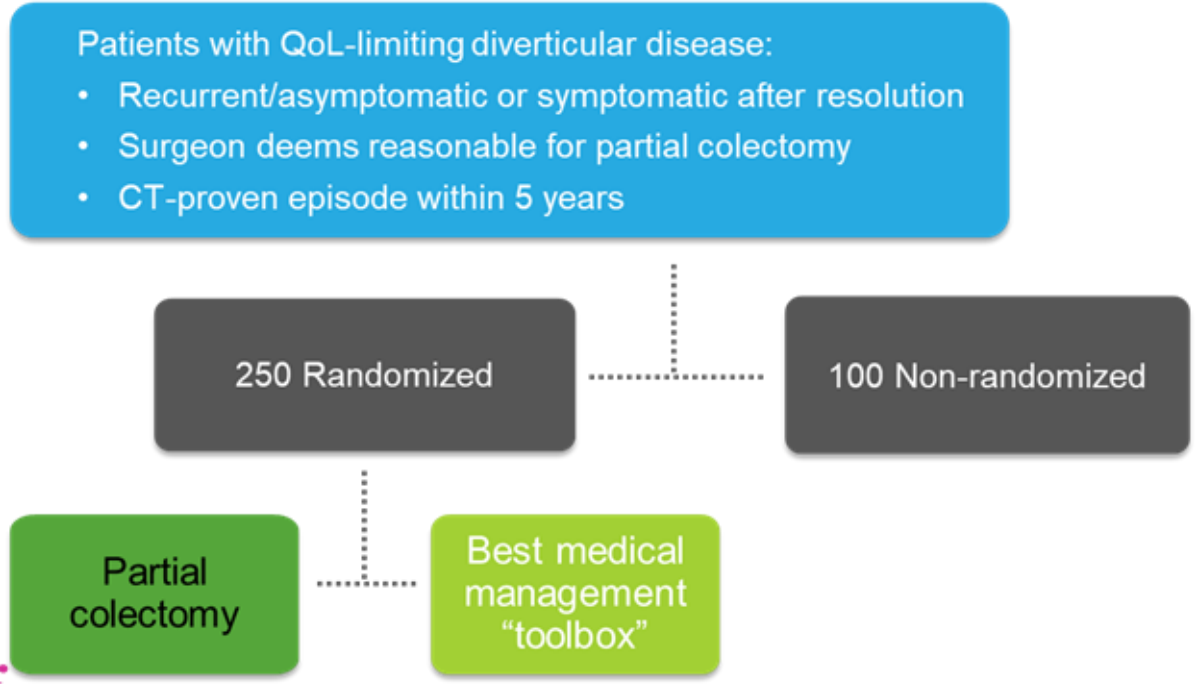
COSMID

Comparison of Surgery and Medicine on the Impact of Diverticulitis



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Hantouli MN. BMJ Open. 2026

COSMID Sites: 26 active

South:
- LBJ Medi
- Virginia
- UT South
- Universit
- Atrium H
- Medical
- Universit

Northeast
- Columbi
- Universit
- Alleghen
- Boston M
- NY Presb
- Rocheste
- Lahey Cli
- Weill Co

West:
- University of Washington
- Northwest Hospital
- Virginia Mason Med Center
- University of Utah
- U Colorado Denver
- UC San Francisco
- Stanford

Midwest:
- Rush University Med Center
- Mount Carmel Health System
- University of Iowa
- Northwestern

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TOP 5 RECRUITING SITES

COSMID RCT

1	VIRGINIA MASON MEDICAL CENTER	~~X~~..... 30!
2	UNIVERSITY OF FLORIDA	23
3	LYNDON B. JOHNSON HOSPITAL	22
4	ALLEGHENY HEALTH	14
5	NEW YORK-PRESBYTERIAN QUEENS	12

We've seen 3 enrollments over the last month, and with the latest randomization, Virginia Mason re-takes the first place spot, with 24 participants enrolled in the RCT!

Many thanks to all of you for your hard work in helping us reach our recruitment goals.
We are so close!

Planned Publications:

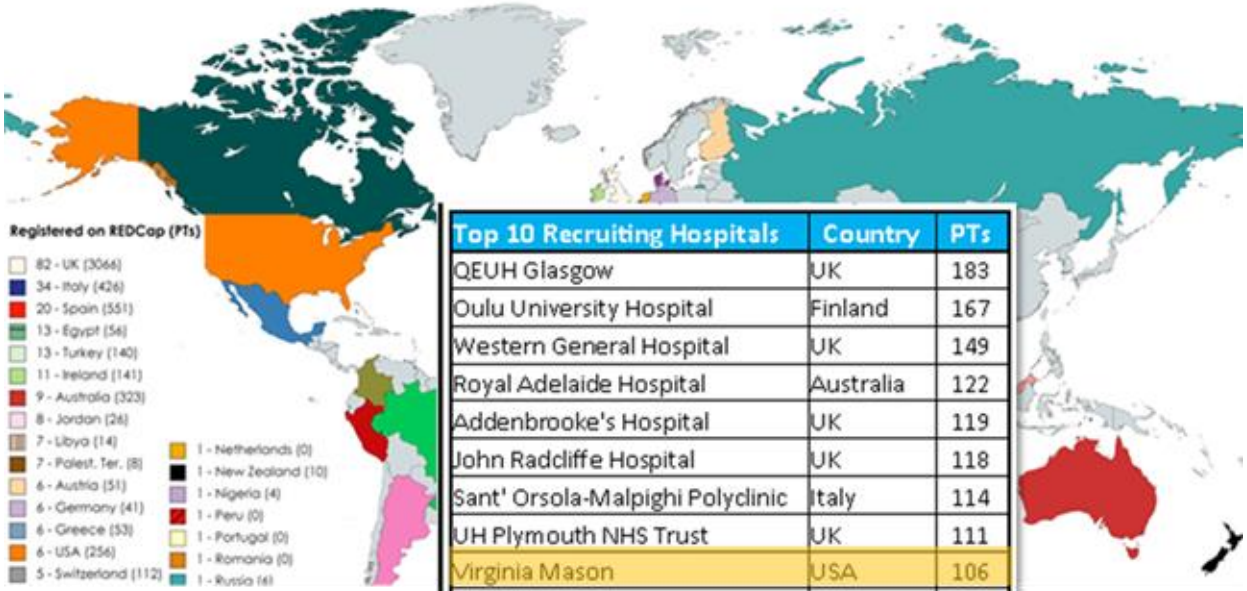
- Protocol paper – updated study recruitment timeline (October/2025)
- Main outcomes paper:
  - Primary outcome & high-level secondary outcomes.
- Secondary outcomes paper:
  - Key PROs: Diverticulitis QoL instrument (disease-specific), the Patient-Reported Outcomes Measurement Information System (PROMIS) global health, which assesses overall physical health and mental health, Work Productivity Index.
  - Clinical outcomes: Diverticulitis recurrence, complications, adverse events, serious adverse events
- Secondary analyses of subgroup(s):
  - GIQLI baseline score <92
  - Fiber intake and fiber score movement; GIQLI score change
  - Interrelationships between different secondary outcomes
- COSMID Score: predictive score to inform shared-decision making discussions
- Spanish/English speaking participant outcomes
- Observational cohort
- Long-term outcomes

Diverticulitis Management a SnApshot Collaborative aUdit Study

- Index admission
- Index management and outcome

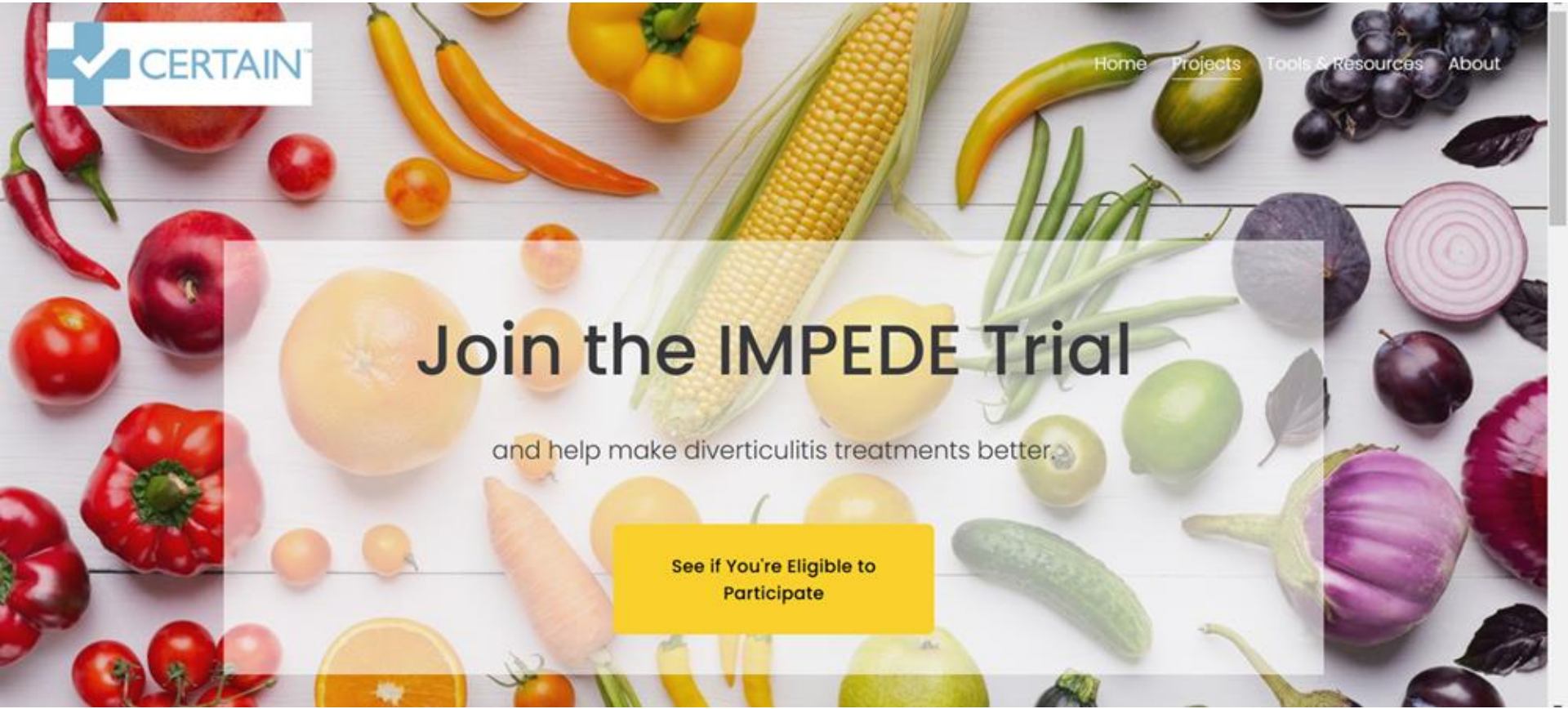
- 30-day and 6-month readmission and re-intervention

- Clinical outcomes



Top 10 Recruiting Hospitals	Country	PTs
QEUH Glasgow	UK	183
Oulu University Hospital	Finland	167
Western General Hospital	UK	149
Royal Adelaide Hospital	Australia	122
Addenbrooke's Hospital	UK	119
John Radcliffe Hospital	UK	118
Sant' Orsola-Malpighi Polyclinic	Italy	114
UH Plymouth NHS Trust	UK	111
Virginia Mason	USA	106
James Paget University Hospital	UK	102

Vimalachandran D. EClinicalMedicine. 2025.



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ClinicalTrials.gov NCT05681559

Reality: this is why it’s hard…

Consecutive Patients with Diverticulitis

- 310 patients (mean age 62 years, +/- 13)
  - 60.3% female
  - 71.3% new diagnoses of diverticulitis
  - 18.4% complicated diverticulitis

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Kim HK. Gastroenterology Res. 2025

Relationship of CT Setting, Characterization of Diverticulitis, and Treating Provider Specialty

Uncomplicated
253 (82%)

Complicated
57 (18%)

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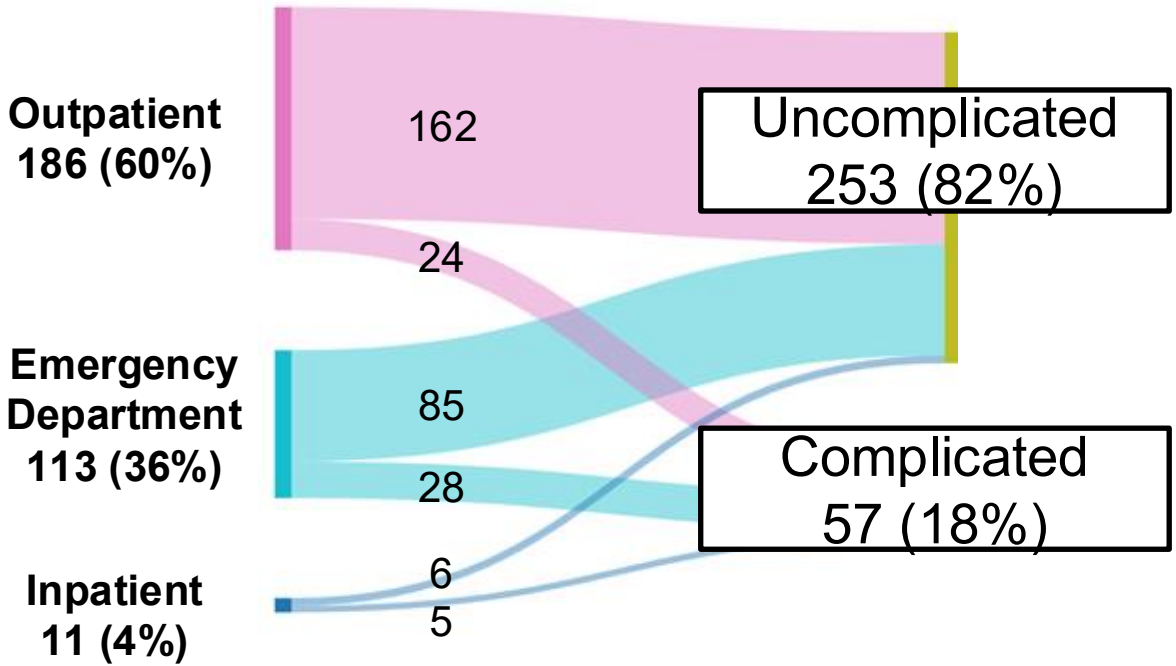
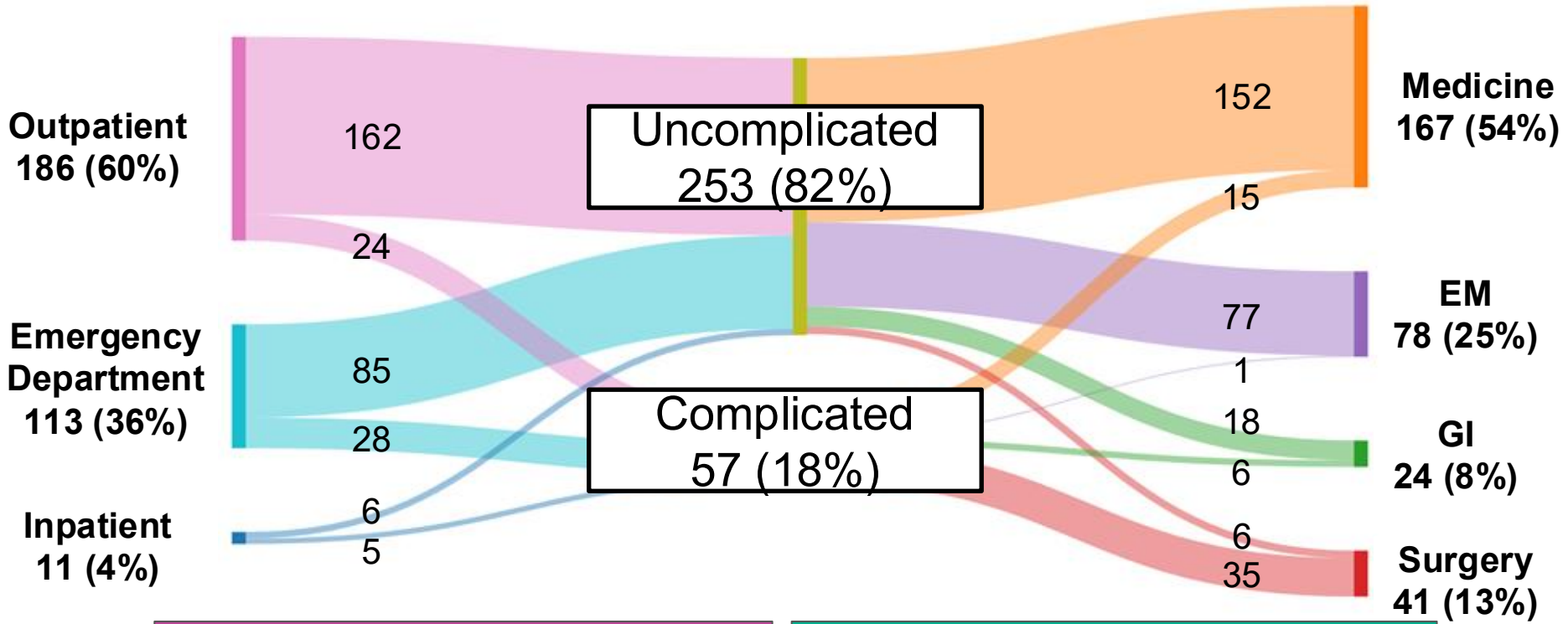
Relationship of CT Setting, Characterization of Diverticulitis, and Treating Provider Specialty



Most diagnoses in outpatient setting (60% OP, 36.5% ED, 3.5% IP)

Kim HK. Gastroenterology Res. 2025

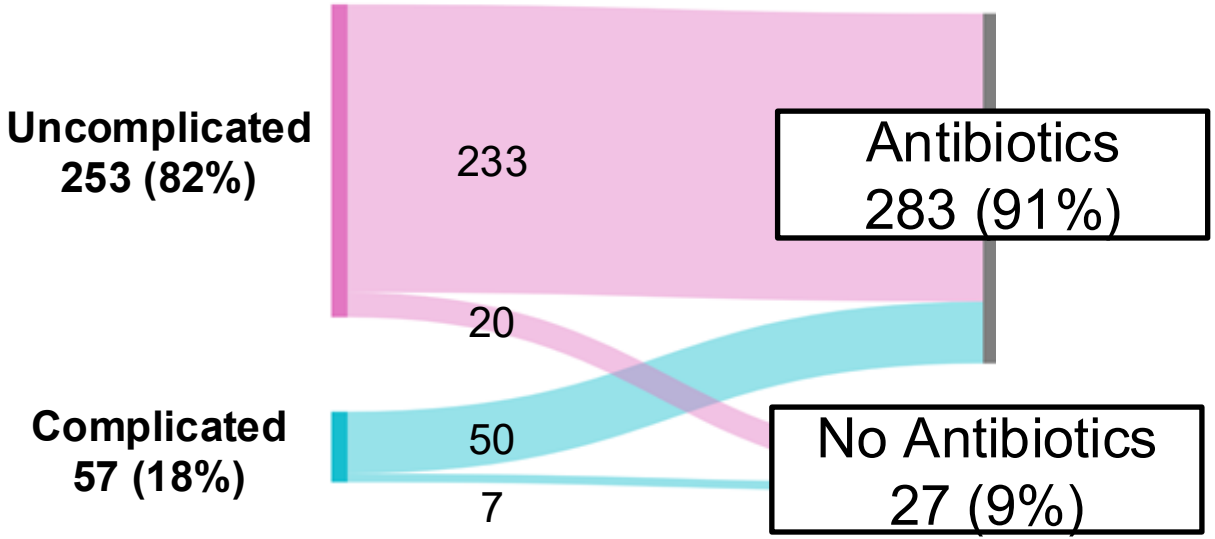
Relationship of CT Setting, Characterization of Diverticulitis, and Treating Provider Specialty



Most diagnoses in outpatient setting (60% OP, 36.5% ED, 3.5% IP)

Every specialty in every setting is involved

Patterns of **Antibiotic Prescription** by Treating Provider Specialty



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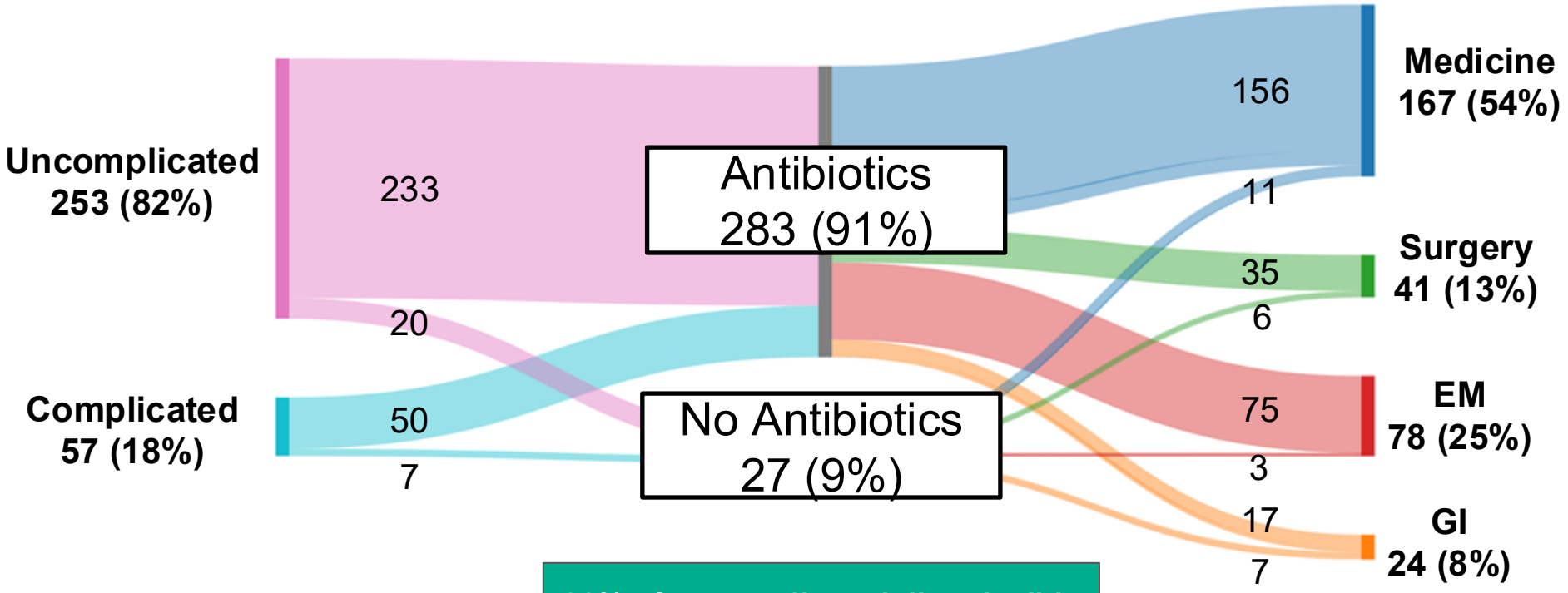
Patterns of **Antibiotic Prescription** by Treating Provider Specialty



92% of uncomplicated diverticulitis prescribed antibiotics

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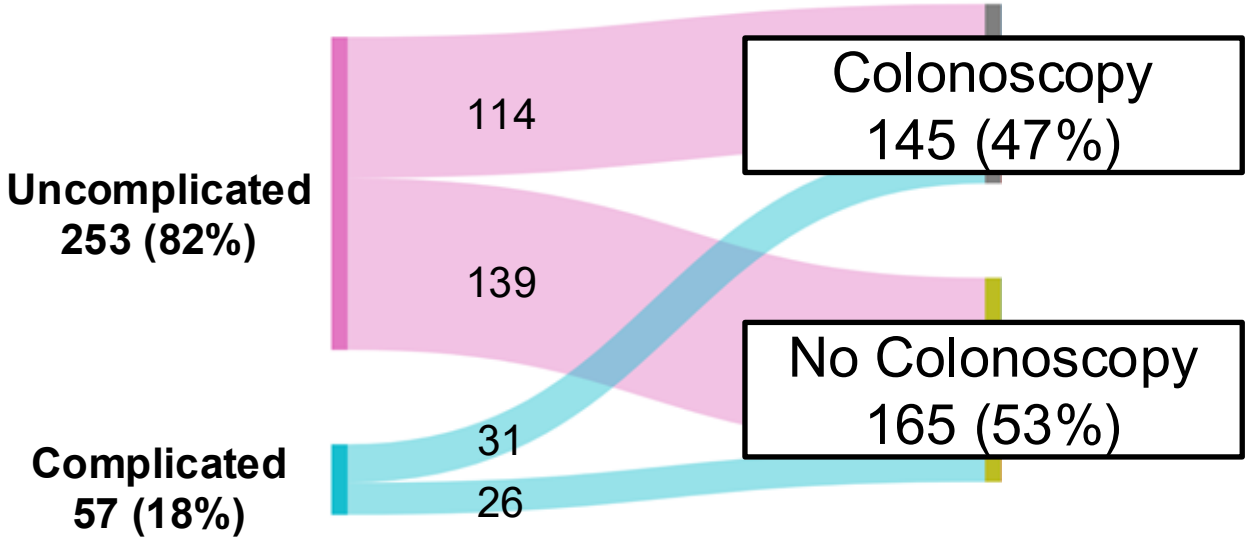
Patterns of **Updated Colonoscopy** by Treating Provider Specialty



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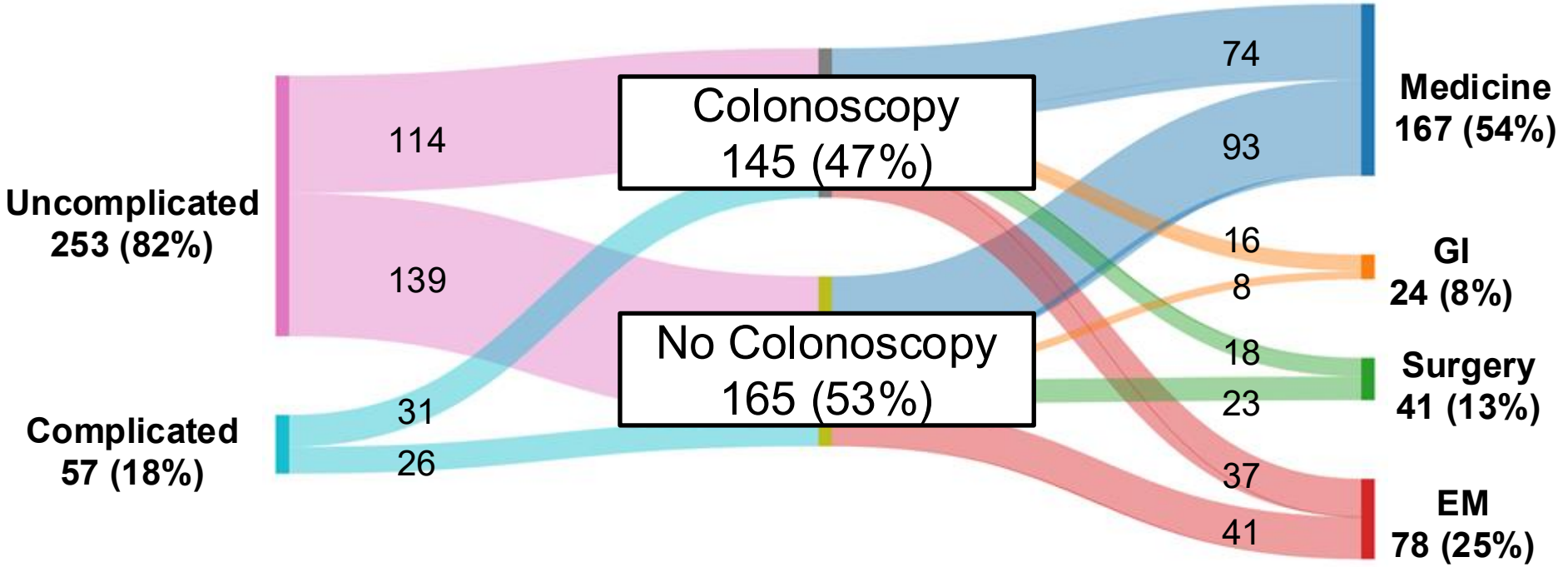
Patterns of **Updated Colonoscopy** by Treating Provider Specialty



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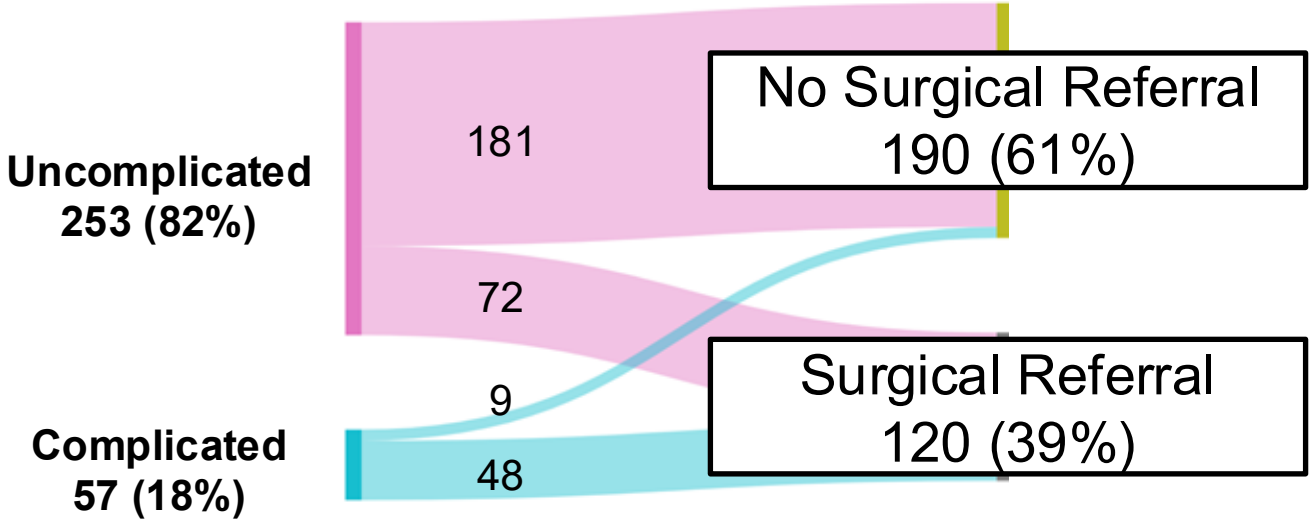
54% of complicated diverticulitis had up-to-date colonoscopy

45% of uncomplicated diverticulitis had up-to-date colonoscopy

Patterns of **Surgical Referral** by Treating Provider Specialty



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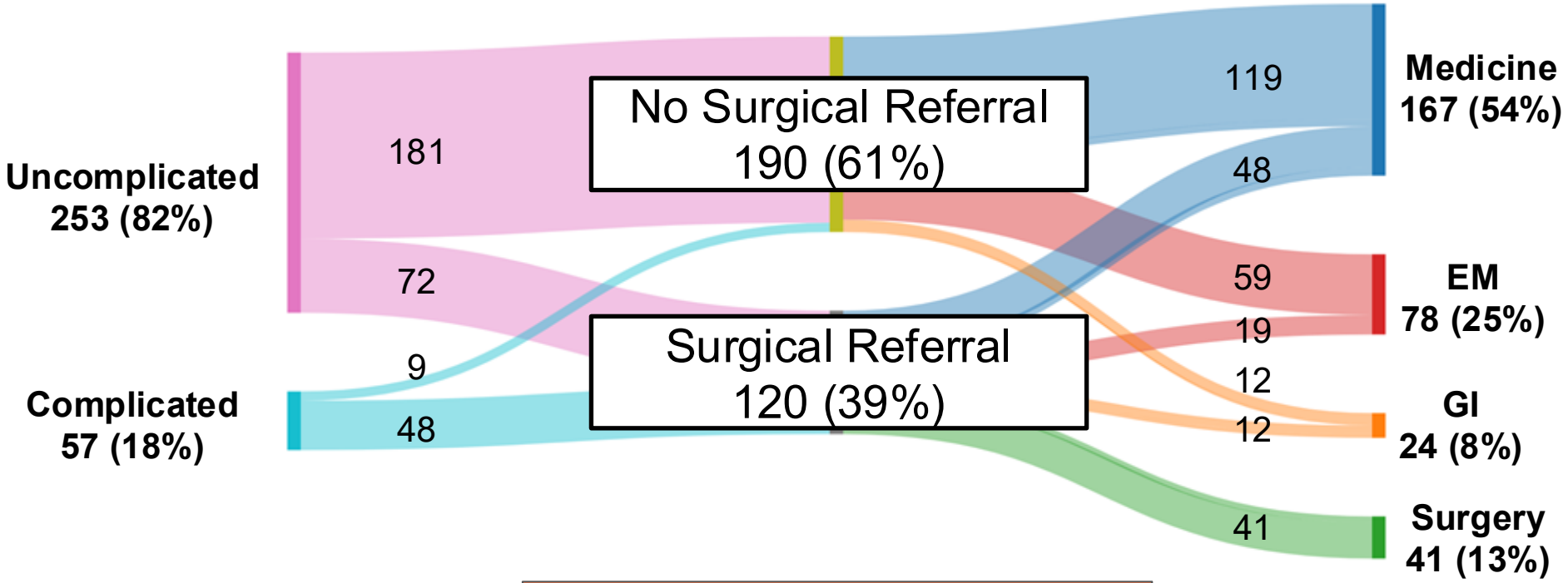
Patterns of **Surgical Referral** by Treating Provider Specialty



84.2% complicated diverticulitis referred to surgeon vs 28.6% uncomplicated

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Takeaway points

Distinguish **complicated** vs not

Recurrence prevention options are both medical and surgical

“Individualized” care means we need to reach shared goal with patient about disease burden and what “successful” treatment entails

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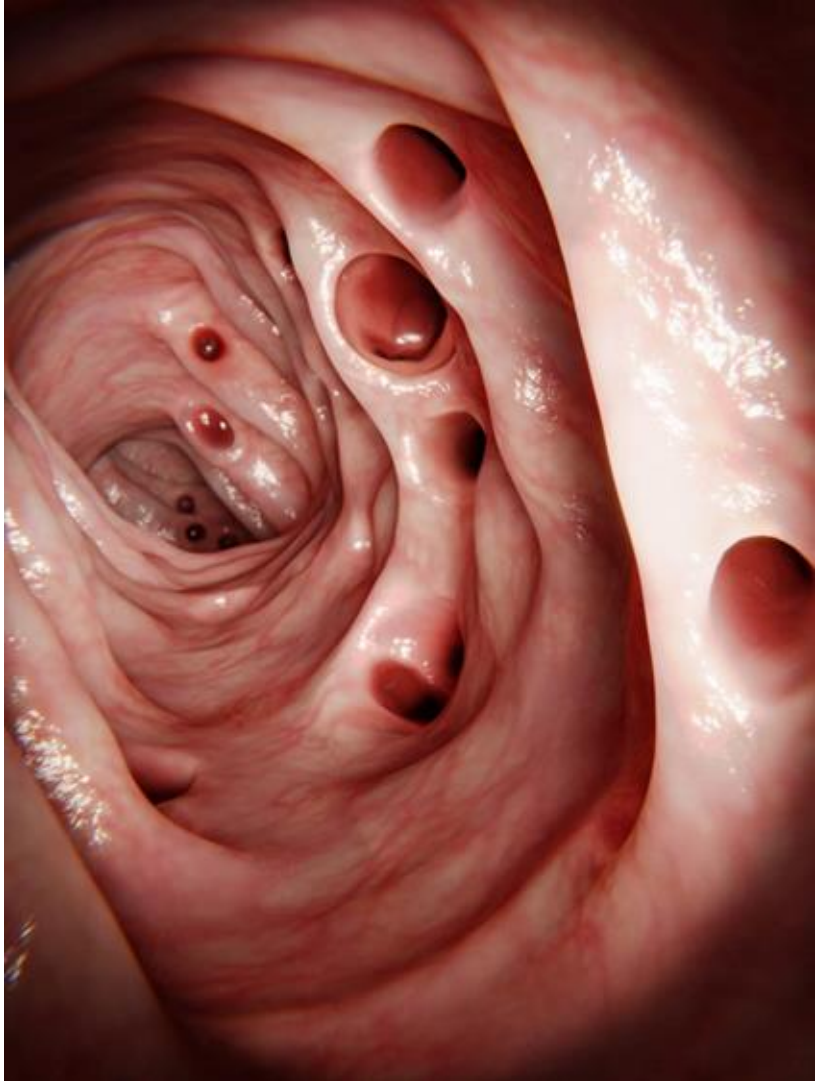

Multiple tiers of support result in excellent care

Center for Digestive Health

BRI - Wilske Grant Support

Radiology

Primary Care

Gastroenterology

Urology

Colorectal Surgery

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