Michigan Acute Care Surgery Collaborative

Ypsilanti, MI
April 27, 2022

Disclosures

- Mark Hemmila Grants
  - Blue Cross Blue Shield of Michigan
  - Michigan Department of Health and Human Services
  - National Institutes of Health - NIGMS

No Photos Please

Agenda

- Welcome/Updates
- Mark Hemmila
  - Data/Reports
- John Scott
  - Operative vs. non-operative acute appendicitis
- Kim Kramer
  - Data Updates
  - Validation

Guests

- Speaker – Appendicitis Management
  - John Scott MD
- SCOAP (Surgical Care and Outcomes Assessment Program
  - Richard Thirlby MD
  - Scott Helton MD
  - Vickie Kolios-Morris, Senior Program Director
- Visiting Junior Faculty
  - Anne Stey MD

Future Meetings

- 3 per year
- Thursday September 15, 2022
- Thursday December 8, 2022
- Wednesday April 26, 2023
- Wednesday September 7, 2023

- Let us know if you see problems with dates
- In-person if possible
  - Virtual – Weather, COVID

Recruitment

- Potentials
  - Bronson
    - Kalamazoo
    - Battle Creek
  - St. Marys Saginaw

BCBSM 2021 and 2022

- SOW Deliverables
  - 3 Meetings/yr
  - ArborMetrix reporting - up
  - Data validation program - 2022
  - Performance Index - 2022
    - Participation 2022
    - 2 metrics 2023

Data and Reports

Mark Hemmila, MD

Overview of Data Capture

- Data pull March 4, 2022
- Qualtrics since May 2020
- Diseases
  - Acute Appendicitis
  - Acute Gallbladder disease
    - Cholecystitis
    - Choledocholithiasis/Cholangitis
    - Gallstone pancreatitis
  - SBO
    - Hernia (if present)
  - Emergent Exploratory Laparotomy

Reports

- Time frame
  - 7/1/2019 to 3/4/2022
- Risk-adjustment
  - Summary
  - Acute appendicitis
  - Gallbladder
  - Emergent Ex. Laparotomy
  - SBO
- Tables
- Graphs

Reports

- Index
  - Primary disease for which admitted
  - Days post-discharge restriction
    - Acute appendicitis, 12, 24, 36 mo
  - Mortality and complications are collapsed down into the index admission
    - Joey Gall – admit and cholecystectomy, discharge home
    - Joey Gall – readmit for cystic duct stump leak
    - Joey Gall – readmit for c. diff colitis
  - Joey Gall - readmit Y, cystic duct stump leak Y, and c. diff colitis Y

Reports

- Patients can cross over and be in two diseases
  - Joey Gall – admit and cholecystectomy, discharge home
  - Joey Gall – readmit for cystic duct stump leak
  - Joey Gall – readmit for SBO
- Joey Gall – Gallbladder index, readmit Y, cystic duct sump leak Y
- Joey Gall – SBO index

Spectrum

- Two hospitals
- Butterworth
- Blodgett
- Good volume at both
- Split to provide better insight for QI
  - Butterworth = SH
  - Blodgett = BL > SB

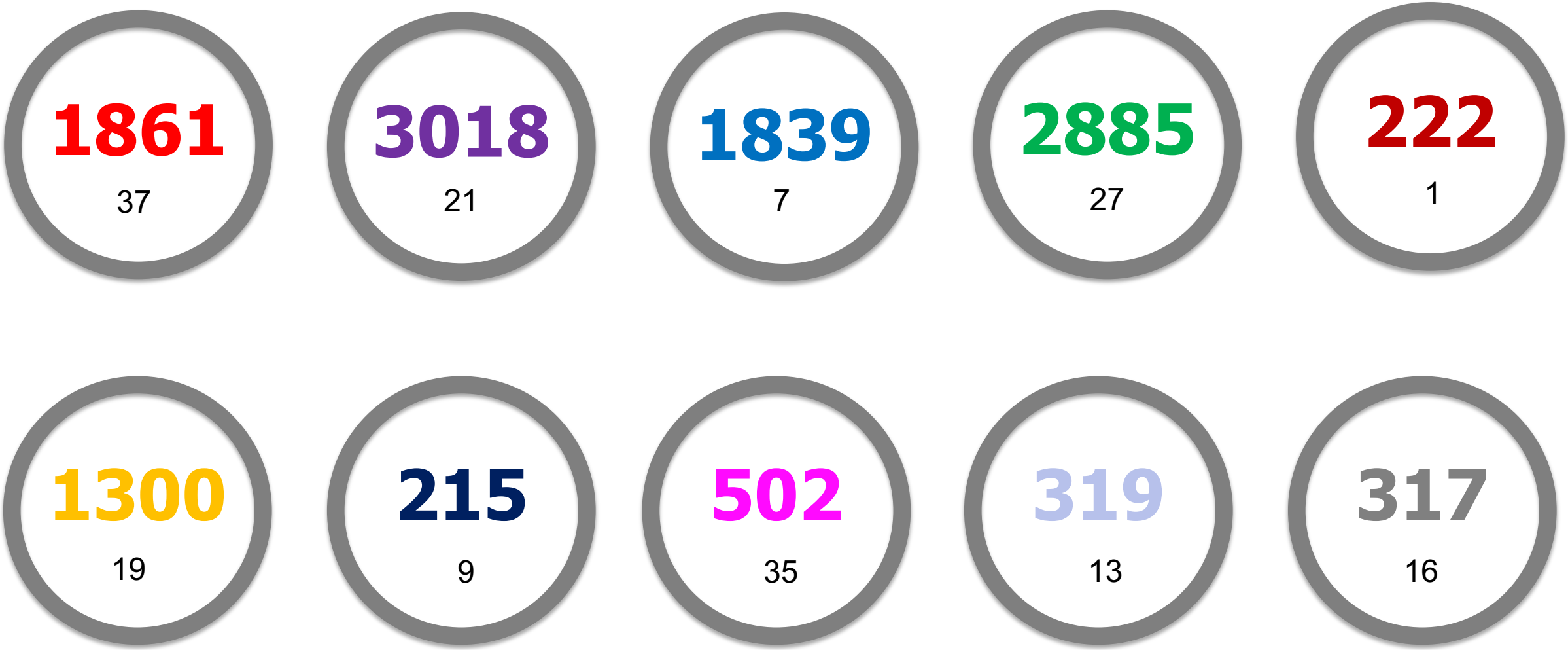
Things to think about

- Data sampling frame
  - All Qualtrics May 2020, about 2 years
  - 3 years?
- Risk adjustment models
  - Do they make sense?
  - Credible?
- Index disease reset
  - SBO
    - Time?
    - Operation?

Risk Adjustment Models

- Summary
  - All
  - Operative
  - Non-operative
  - Account for disease and operation
- Disease specific
  - Acute appendicitis
  - Gallbladder disease
  - SBO
  - Emergent Ex. Lap

Total = 12,478 Index



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Michigan Acute Care Surgery Report
Summary • 27 • 7/1/2019-3/4/2022

Index Admission		Your Center N = 2885		Aggregate N = 12478	
Variable		**N**	**%**	**N**	**%**
Total Cases	Index Admissions	2885	23.1	12478	100.0
	Total Admissions (with Readmissions)	3614	25.3	14276	100.0
By Disease	Appendicitis	585	20.3	3177	25.5
	Gallbladder	883	30.6	5021	40.2
	SBO	570	19.8	2368	19.0
	Exploratory Laparotomy	226	7.8	1094	8.8
	Other/None	621	21.5	818	6.6

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Operation	Appendicitis				
	Operative	424	72.5	2747	86.5
	Non-operative	161	27.5	430	13.5
	Gallbladder				
	Operative	676	76.6	4226	84.2
	Non-operative	207	23.4	795	15.8
	SBO				
	Operative	167	29.3	833	35.2
	Non-operative	403	70.7	1535	64.8
	Other/None				
	Operative	251	40.4	412	50.4
	Non-operative	370	59.6	406	49.6

Index Admission		Aggregate N = 12478		
Variable		**N**	**%**	
CPT Code 15 most frequent	47562, Laparoscopic cholecystectomy	3423	27.4	36.93
	44970, Laparoscopic appendectomy	2566	20.6	27.68
	47563, Lap cholecystectomy w IOC	485	3.9	5.23
	44120, Resection of small intestine	383	3.1	4.13
	44005, Freeing of bowel adhesion	289	2.3	3.12
	47600, Open cholecystectomy	211	1.7	2.28
	49000, Exploration of abdomen	136	1.1	1.46
	44143, Partial colectomy w colostomy	134	1.1	1.45
	44140, Partial colectomy w anast	125	1.0	1.35
	43840, Gastorrhaphy, Graham patch	119	1.0	1.28
	49561, Repair ventral/inc hernia	98	0.8	1.06
	44160, Partial colectomy with TI	96	0.8	1.04
	44950, Open appendectomy	91	0.7	0.98
	49587, Repair umbilical hernia	69	0.6	0.74
	49320, Laparoscopy, diagnostic	60	0.5	0.65
	All other	984	7.9	10.6

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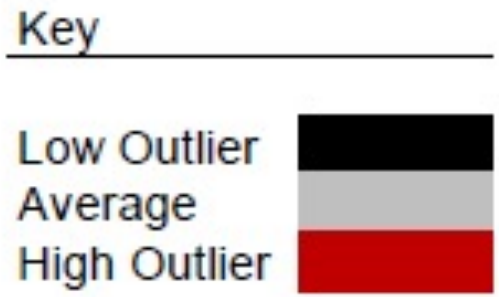
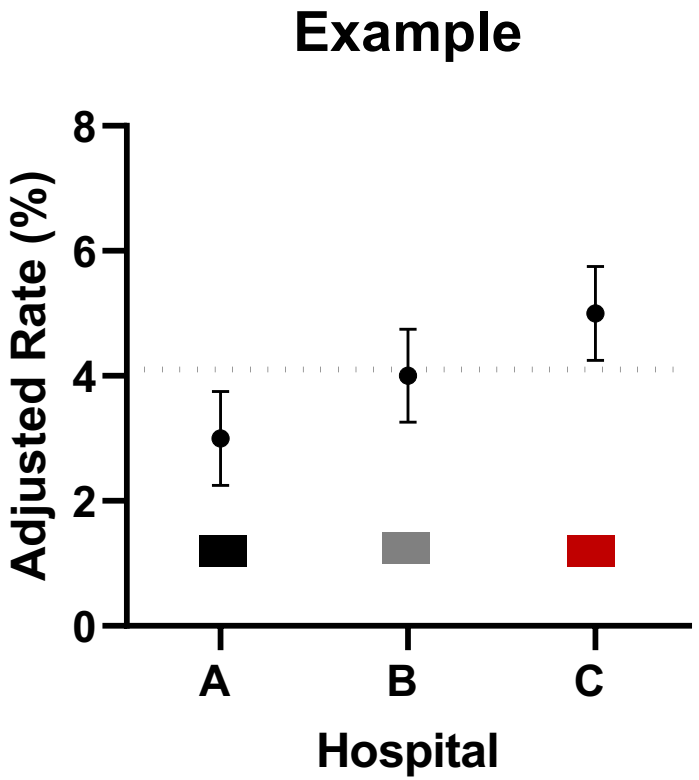
Risk Adjusted Outcomes
Index Admission with Readmissions

Variable		Your Center N = 2885		Aggregate N = 12478			
		N	%	N	%	P*	Outlier
Any complication	Overall, unadjusted	594	20.6	2490	20.0		
	Overall, risk-adjusted		20.9		20.0	0.257	
	With operation, unadjusted	416	22.1	1942	20.1		
	With operation, risk-adjusted		21.8		20.1	0.087	
	Without operation, unadjusted	178	17.8	548	19.6		
	Without operation, risk-adjusted		20.5		19.6	0.541	
Incisional SSI	With operation, unadjusted	42	2.2	143	1.5		
	With operation, risk-adjusted		2.1		1.5	0.049	
Management	Operation	1883	65.3	9680	77.6		
	Non-operative	1002	34.7	2798	22.4		

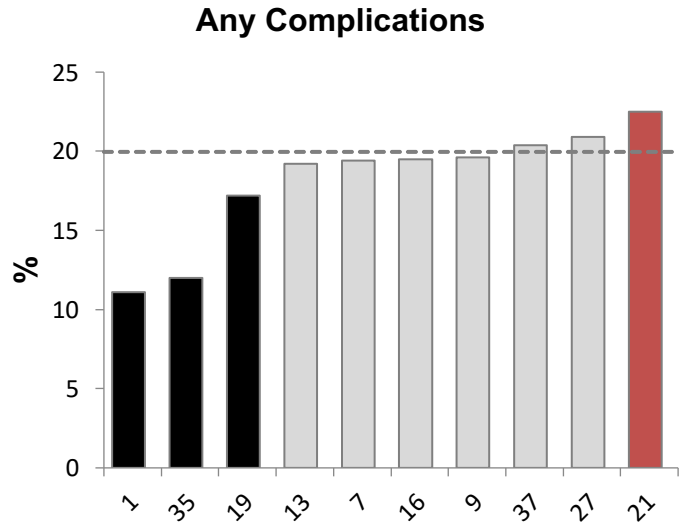

Key
Low Outlier
Average
High Outlier

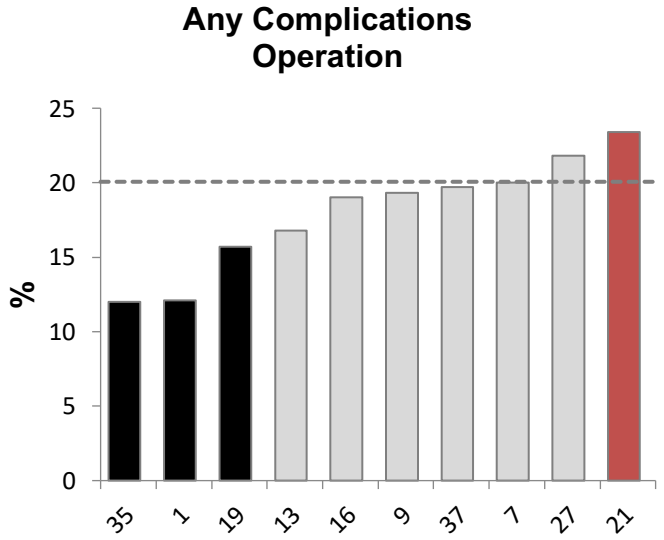

Example
Adjusted Rate (%)
8
6
4
2
0
A
B
C
Hospital

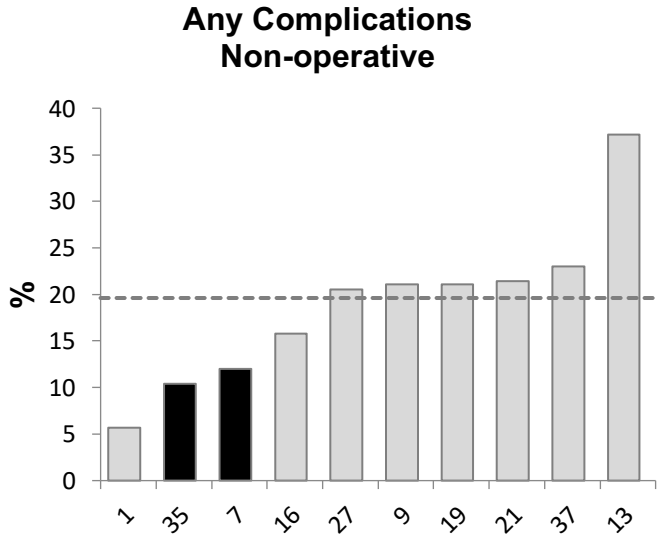
Summary Risk Adjustment

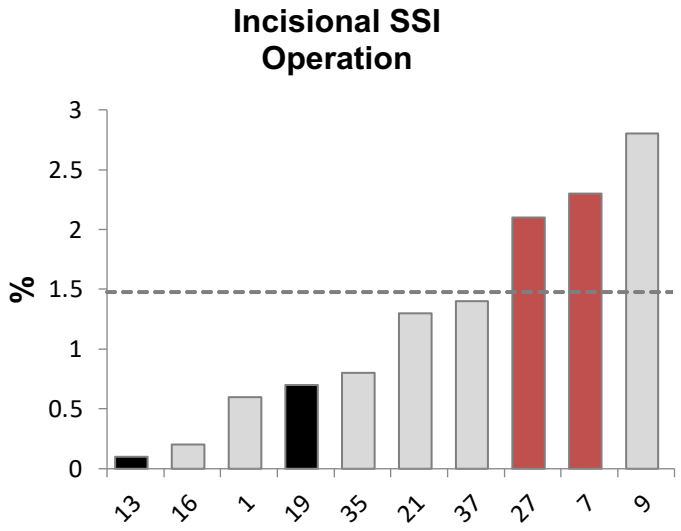
- Age (categorical)
- Sex
- Race
- Ethnicity
- Transfer
- Insurance type
- Disease
- AAST grade ≥ 3
- ASA score ≥ 3
- Operation
- Operation type
- Time to operation
- Perforation
- Ostomy
- IR procedure index admit
- Number of comorbid conditions
- BMI (categorical)
- Individual comorbids
- Risk ratio mortality
- Risk ratio any complication

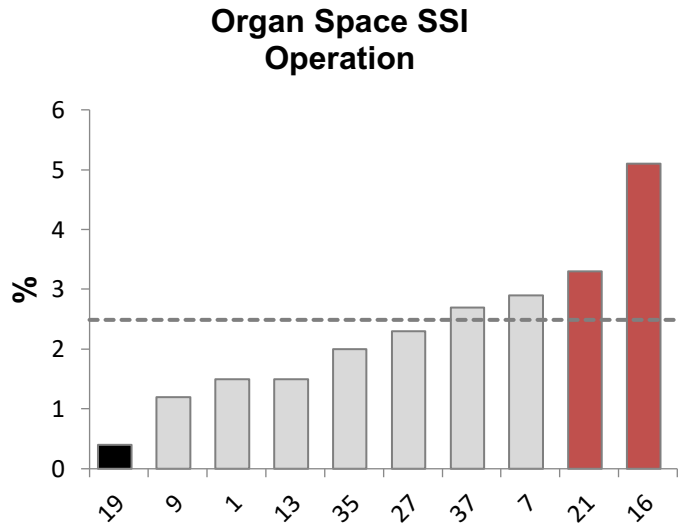
C-index = 0.961 to 0.610

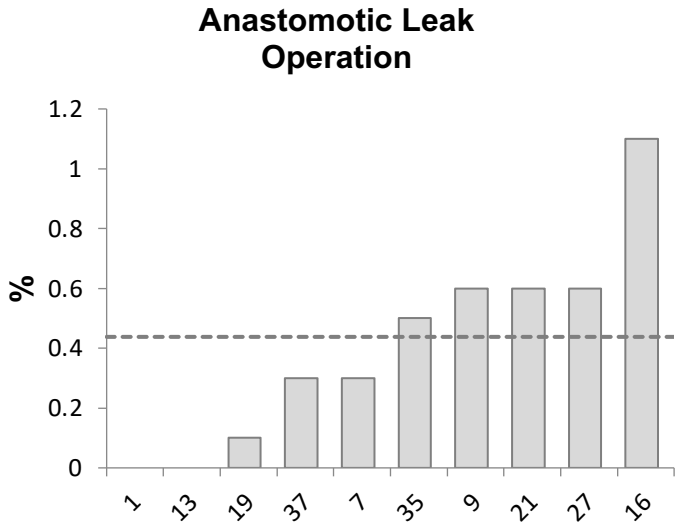

Any Complications
%
25
20
15
10
5
0
1
35
19
13
7
16
9
37
27
21

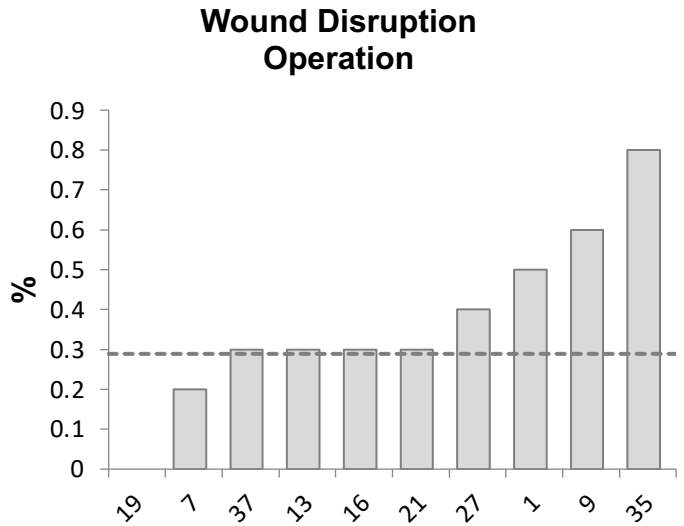

Any Complications
Operation
%
25
20
15
10
5
0
35
1
19
13
16
9
37
7
27
21

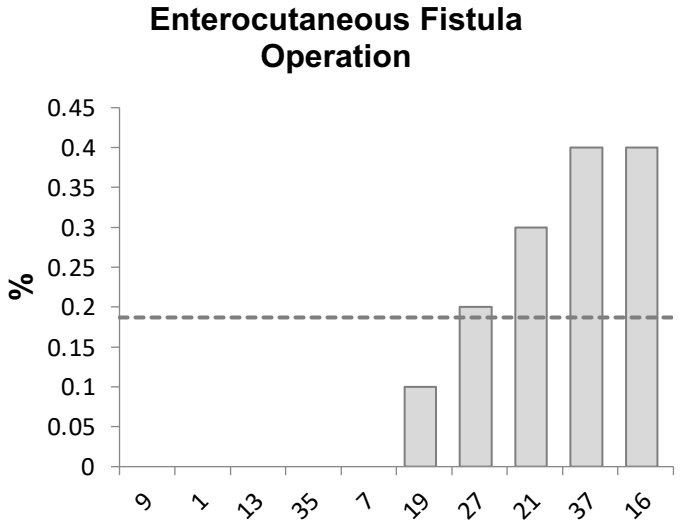

Any Complications
Non-operative
%
40
35
30
25
20
15
10
5
0
1
35
7
16
27
9
19
21
37
13

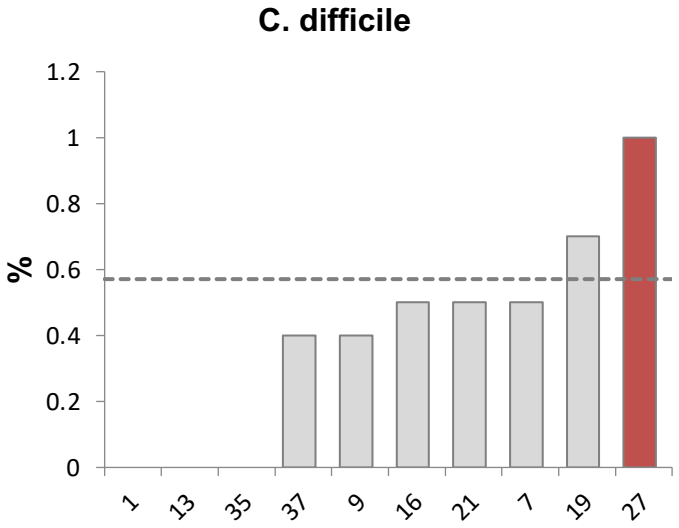

Incisional SSI
Operation
%
3
2.5
2
1.5
1
0.5
0
13
16
1
19
35
21
37
27
7
9


Organ Space SSI
Operation
%
6
5
4
3
2
1
0
19
9
1
13
35
27
37
7
21
16


Anastomotic Leak
Operation
%
1.2
1
0.8
0.6
0.4
0.2
0
1
13
19
37
7
35
9
21
27
16


Wound Disruption
Operation
%
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
19
7
37
13
16
21
27
1
9
35


Enterocutaneous Fistula
Operation
%
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
9
1
13
35
7
19
27
21
37
16


C. difficile
%
1.2
1
0.8
0.6
0.4
0.2
0
1
13
35
37
9
16
21
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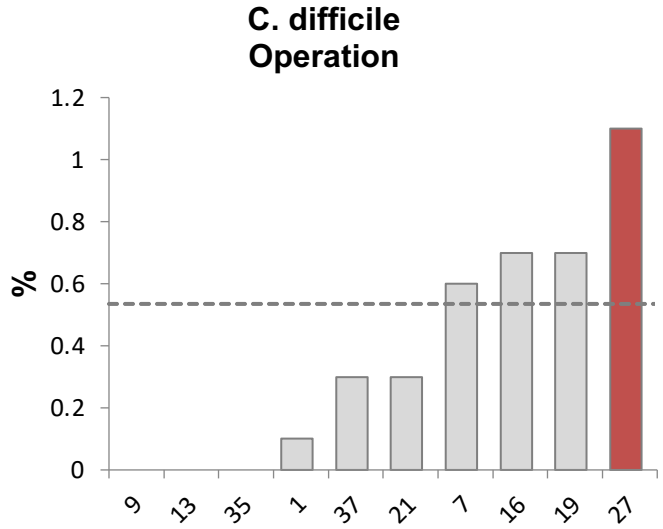
19
27


C. difficile
Operation
%
1.2
1
0.8
0.6
0.4
0.2
0
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13
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37
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19
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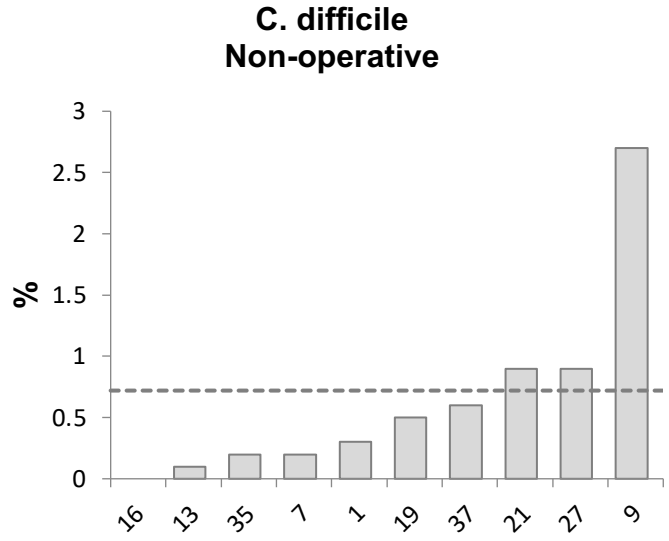
C. difficile
Non-operative
%
3
2.5
2
1.5
1
0.5
0
16
13
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19
37
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27
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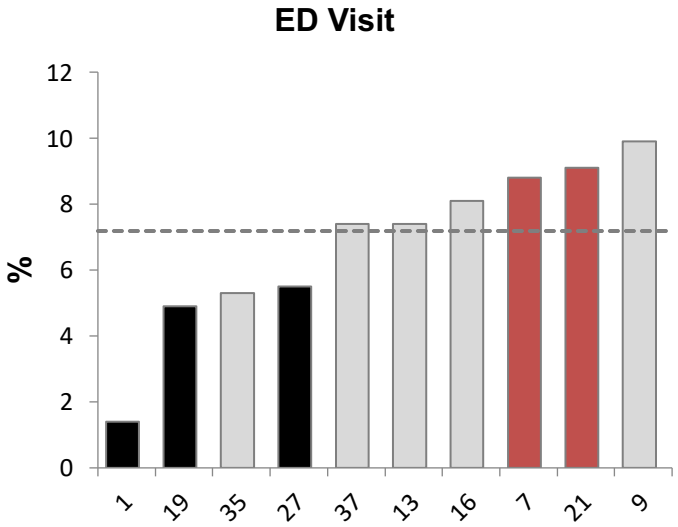
ED Visit
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12
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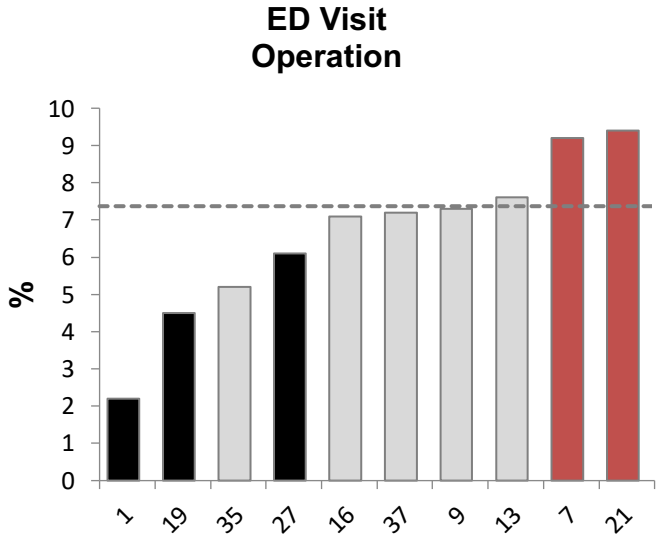
ED Visit
Operation
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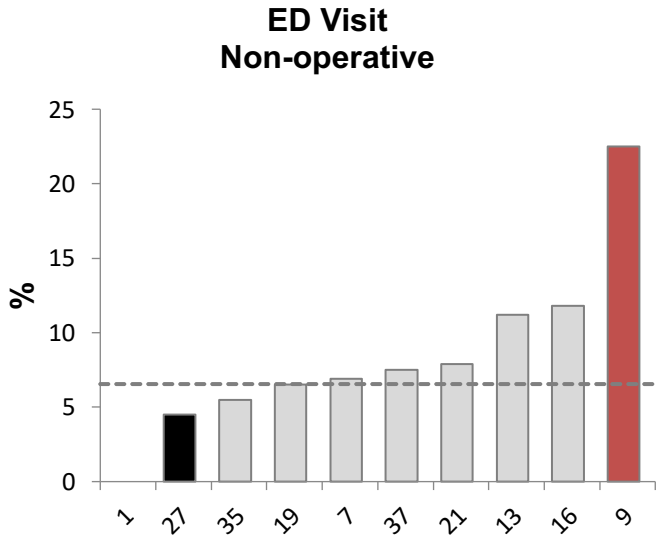
ED Visit
Non-operative
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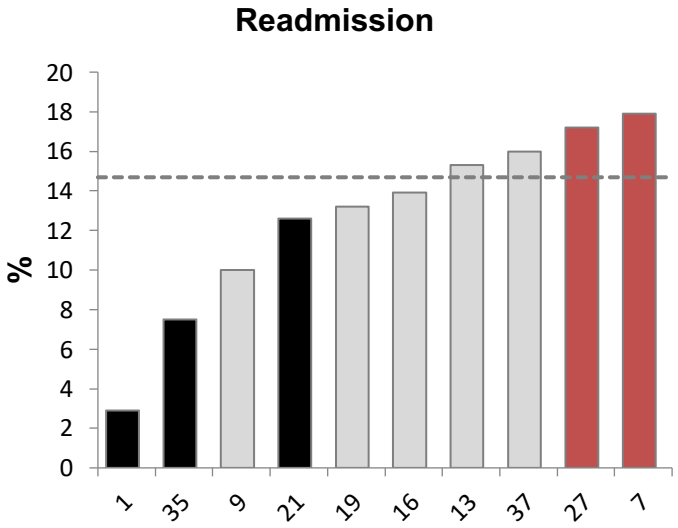
Readmission
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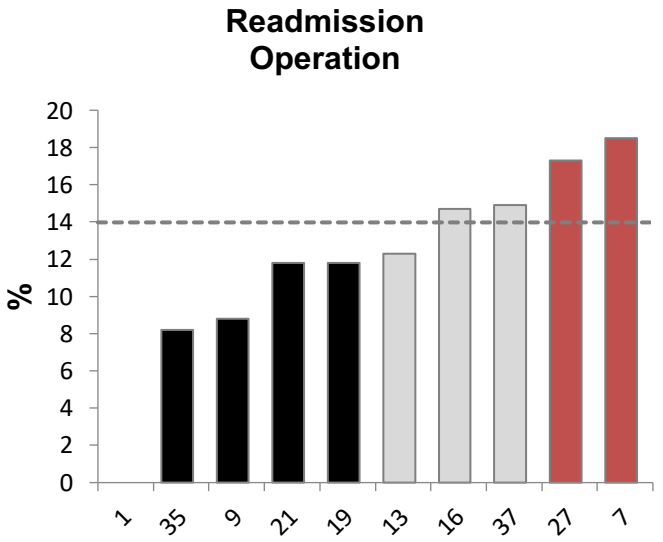
Readmission
Operation
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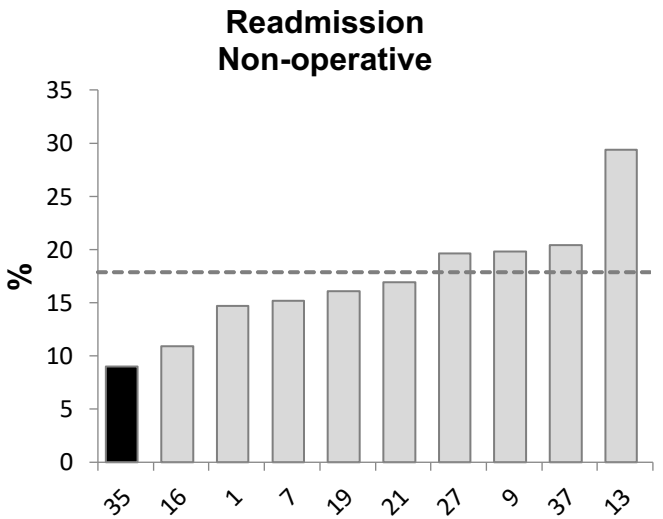
Readmission
Non-operative
%
35
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Questions

Questions

Okay to roll-up diseases and outcomes in risk adjusted summary? Believable, or not?

Should any of the individual complications be excluded from any complications category? Example sepsis.

SBO

- 10 Hospitals
- 2,458 Index cases of SBO
- 3,043 cases total
  - Index or readmission
  - 1 or >1 readmission - 19%

SBO

- Point of Entry
  - ED= 81%
  - OSH ED = 13%
  - OSH = 2.1%
- Cause
  - Adhesive (SBO) = 89%
  - Other = 11% (Other, Malignancy, Crohn, Vascular)
- Operative
  - All = 35%

SBO (clean) - Adhesive

- Prior SBO = 35% (568/1582)
  - Operation = **19%** (109/568)
  - Number prior SBO admissions
    - 1 = 32%
    - 2 = 12%
    - Multiple = 44%
- Gastrografin challenge = 44%
  - Positive to colon = 78%
    - Operation = 4%
  - Negative to colon = 22%
    - Operation = 42%

SBO (clean) - Adhesive

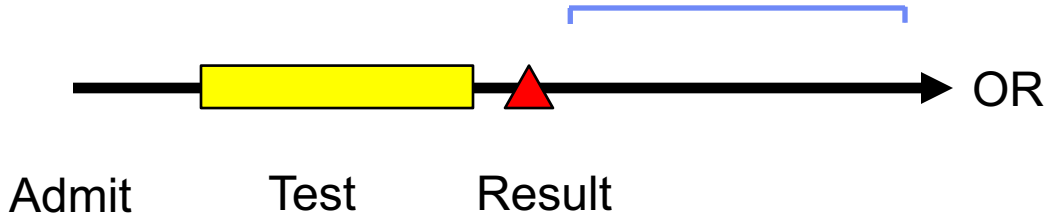
- No Prior SBO = 65%
  - Operation = **40%**
- Gastrografin challenge = 41%
  - Positive to colon = 76%
    - Operation = 6%
  - Negative to colon = 24%
    - Operation = 54%
- No Gastrografin challenge = 59%
  - Operation = 55%

SBO Gastrografin (All)

Time to gastro challenge	Gastro result		
	Positive colon	725	75.4
	Negative colon	196	20.4
	Other	41	4.3
	Time to OR **from** Gastro, hours		
	Mean ± Standard deviation	58.1 ±197.9	
	Median (25th — 75th percentiles)	26.1 (12.9—54.7)	
	Time to OR without Gastro, hours		
	Mean ± Standard deviation	32.9 ±64.7	
	Median (25th — 75th percentiles)	10.4 (6.0—34.7)	
	Time to OR with Gastro, hours		
	Mean ± Standard deviation	105.6 ±198.2	
	Median (25th — 75th percentiles)	66.8 (40.1—111.5)	

Gastrografin

- Adhesive disease
- No Prior SBO



- Test Yes or No
- Times to
- Results

- Standardize timing and protocol?

SBO Type Operation (Clean/Adhesive)

SCOAP Mean for Lap = 40%

center	Conversion Open	Laparosco	Lap to Open	Robotic	Total
37	67 73.63	17 18.68	7 7.69	0 0.00	91 100.00
9	7 38.89	9 50.00	2 11.11	0 0.00	18 100.00
1	32 71.11	10 22.22	1 2.22	2 4.44	45 100.00
13	8 61.54	2 15.38	3 23.08	0 0.00	13 100.00
35	12 60.00	6 30.00	2 10.00	0 0.00	20 100.00
16	7 63.64	3 27.27	1 9.09	0 0.00	11 100.00
21	105 70.47	26 17.45	18 12.08	0 0.00	149 100.00
7	133 87.50	11 7.24	8 5.26	0 0.00	152 100.00
19	40 64.52	15 24.19	7 11.29	0 0.00	62 100.00
27	122 89.05	7 5.11	8 5.84	0 0.00	137 100.00
Total	533 76.36	106 15.19	57 8.17	2 0.29	698 100.00

Risk Adjustment

- Candidate Variables
- Outcomes
  - Mortality
  - Morbid
  - LOS
- Models
  - C-index .948 to .508
  - Most are .9 to .7’s

Patient Characteristics

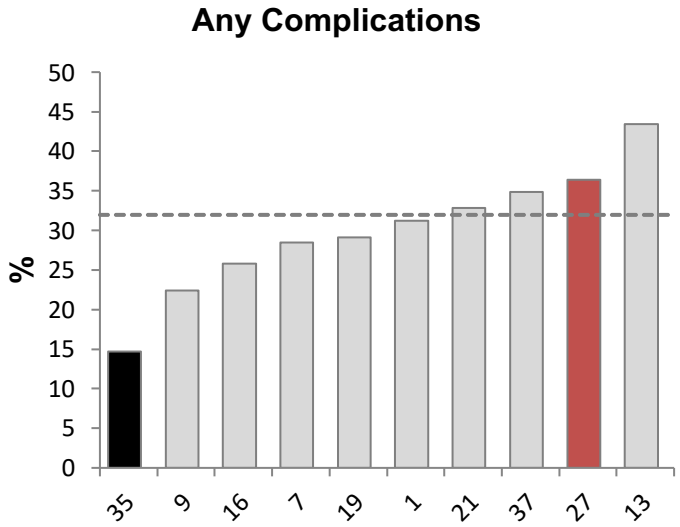
- Age
- Sex
- Race
- Ethnicity
- ASA Class
- Transfer In
- BMI
- Prior SBO
- Type SBO (Adhesive, Crohn, Vasc, Malig, Other)

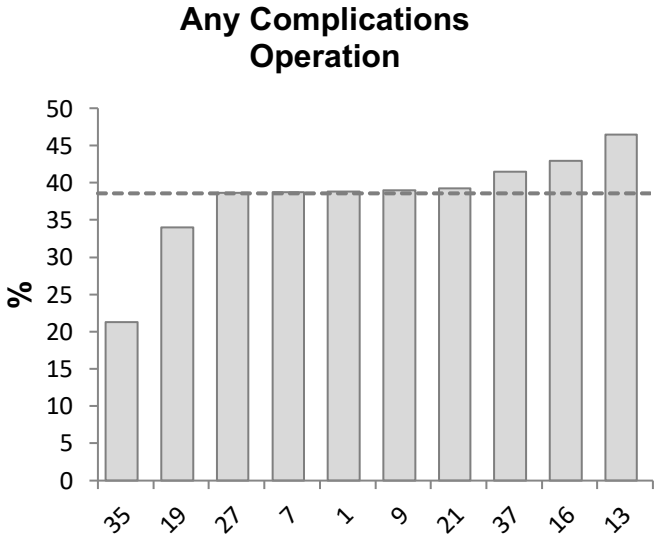
Comorbids

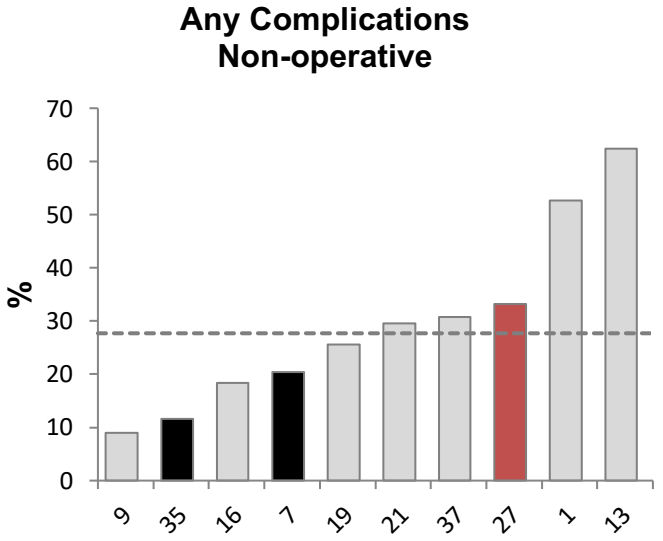
- Number Comorbids
- FDHS
- Hypertension
- Transplant
- Sleep Apnea
- CHF
- DVT or PE
- Diabetes
- Disseminated Cancer
- Tobacco
- COPD
- Ascites
- Vent Dependent
- COVID
- Dialysis
- Sepsis

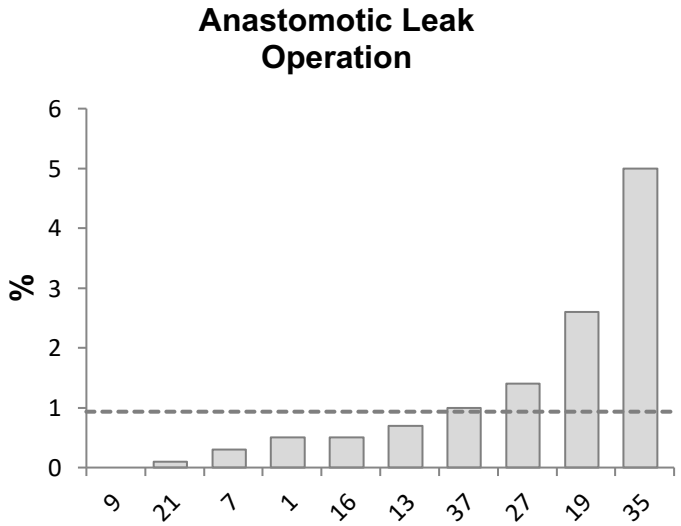
Special

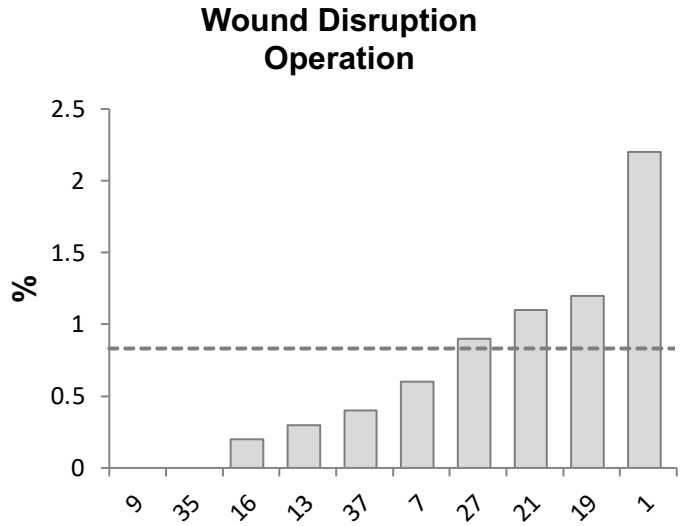
- IR procedure at index
- Operation at Index
- Operation Type
- Time to Operation
- Conversion
- Risk ratio Any Complication
- Risk ratio Death
- Risk ratio Readmit

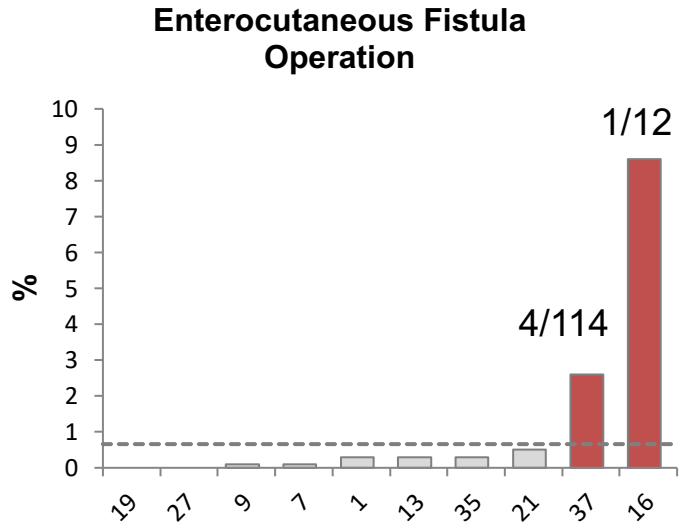

Any Complications
%
50
45
40
35
30
25
20
15
10
5
0
35
9
16
7
19
1
21
37
27
13

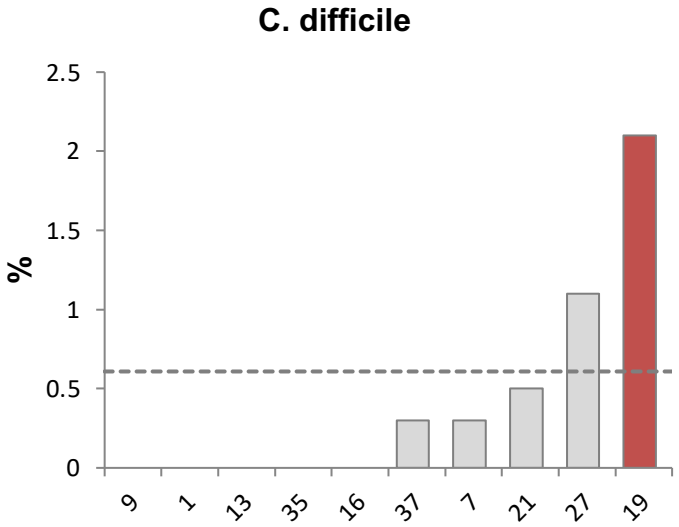

Any Complications
Operation
%
50
45
40
35
30
25
20
15
10
5
0
35
19
27
7
1
9
21
37
16
13

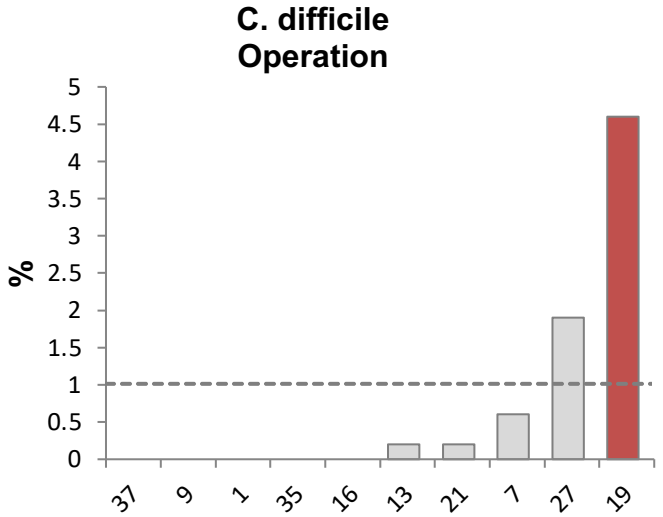

Any Complications
Non-operative
%
70
60
50
40
30
20
10
0
9
35
16
7
19
21
37
27
1
13

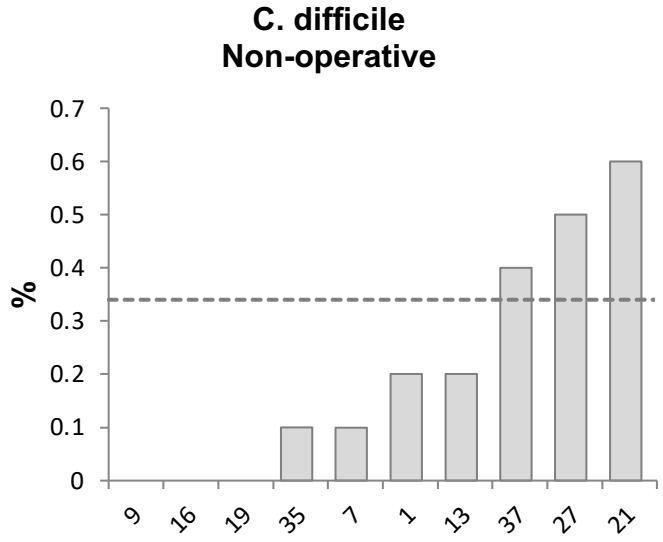

Anastomotic Leak
Operation
%
6
5
4
3
2
1
0
9
21
7
1
16
13
37
27
19
35

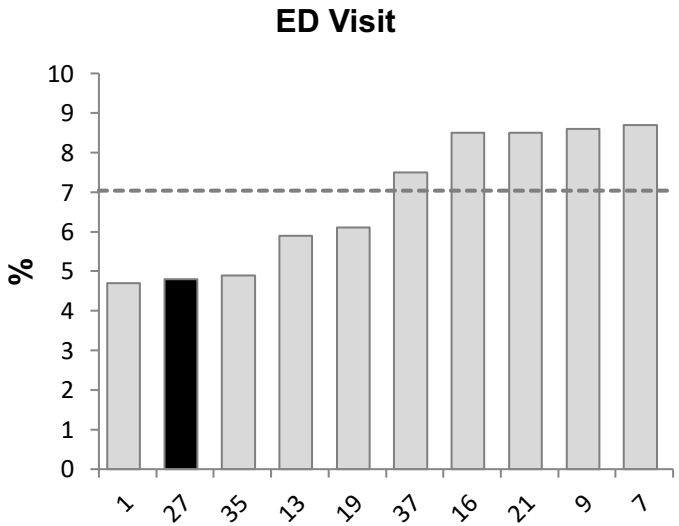

Wound Disruption
Operation
%
2.5
2
1.5
1
0.5
0
9
35
16
13
37
7
27
21
19
1


Enterocutaneous Fistula
Operation
%
10
9
8
7
6
5
4
3
2
1
0
1/12
4/114
19
27
9
7
1
13
35
21
37
16


C. difficile
%
2.5
2
1.5
1
0.5
0
9
1
13
35
16
37
7
21
27
19


C. difficile
Operation
%
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
37
9
1
35
16
13
21
7
27
19


C. difficile
Non-operative
%
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
9
16
19
35
7
1
13
37
27
21


ED Visit
%
10
9
8
7
6
5
4
3
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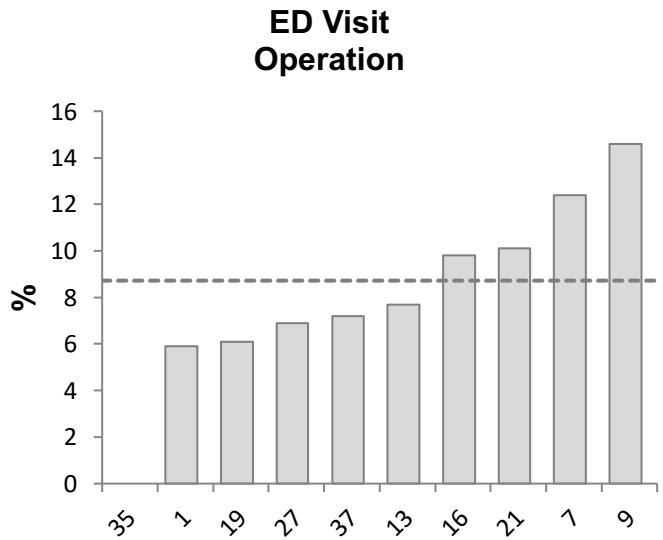
1
27
35
13
19
37
16
21
9
7


ED Visit
Operation
%
16
14
12
10
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4
2
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35
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13
16
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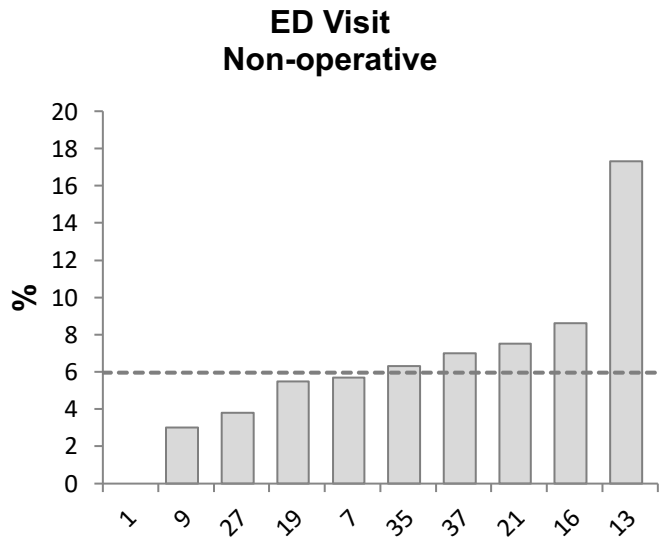
7
9


ED Visit
Non-operative
%
20
18
16
14
12
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6
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2
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27
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35
37
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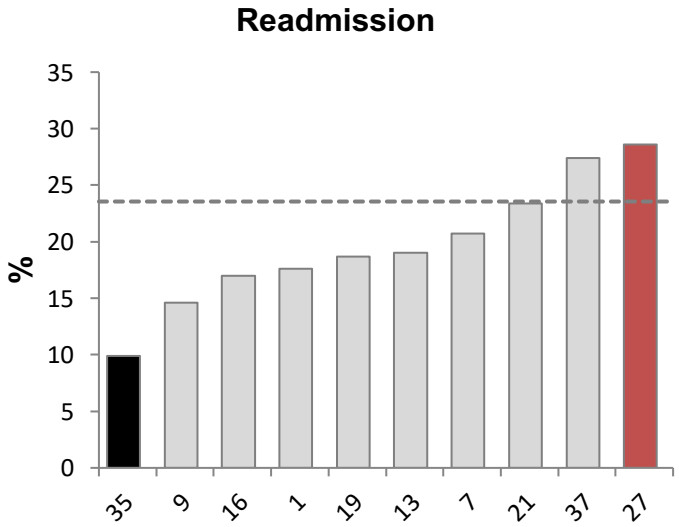
Readmission
%
35
30
25
20
15
10
5
0
35
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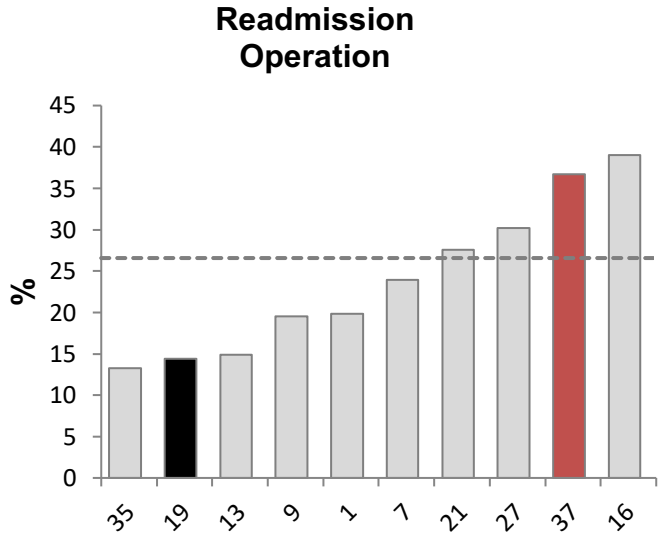
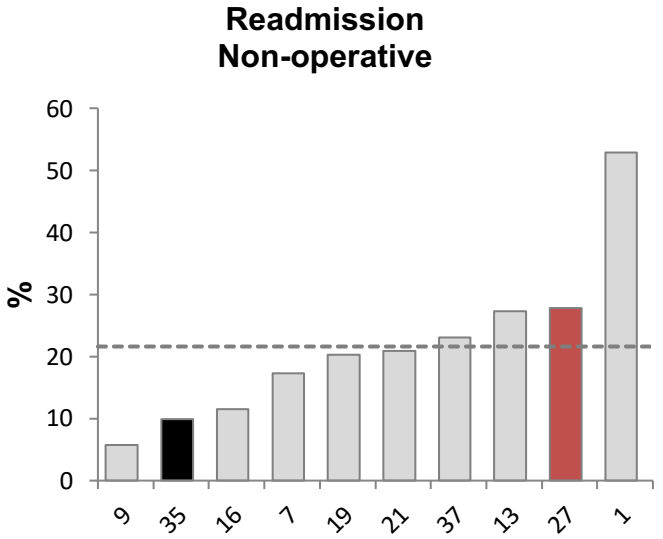
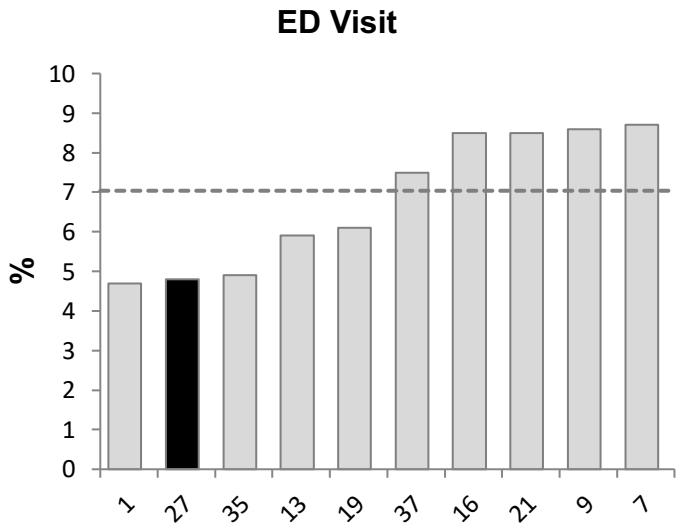
16
1
19
13
7
21
37
27


Readmission
Operation
%
45
40
35
30
25
20
15
10
5
0
35
19
13
9
1
7
21
27
37
16


Readmission
Non-operative
%
60
50
40
30
20
10
0
9
35
16
7
19
21
37
13
27
1


ED Visit
%
10
9
8
7
6
5
4
3
2
1
0
1
27
35
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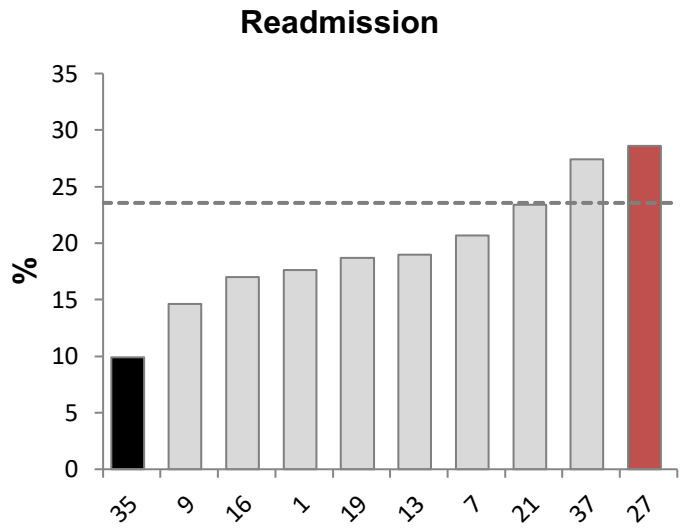
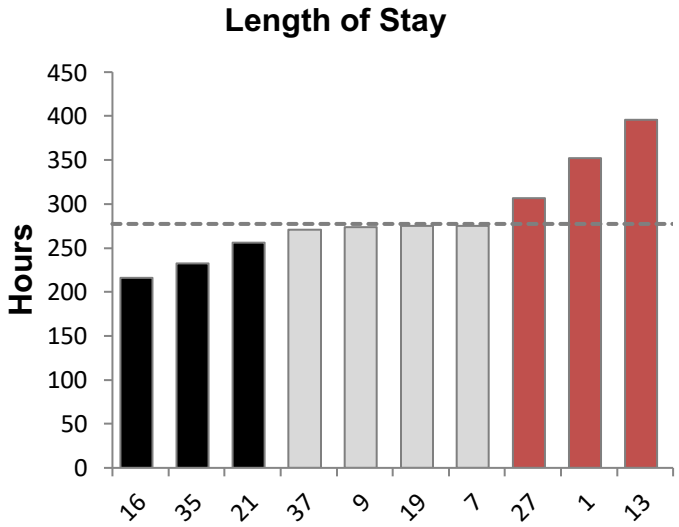
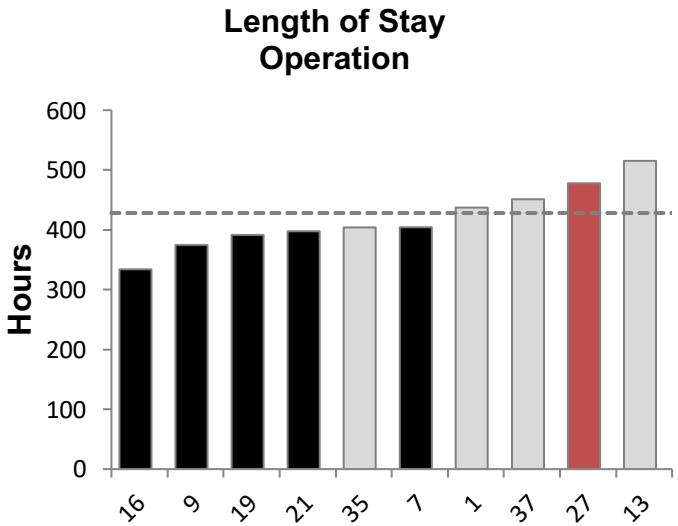
19
37
16
21
9
7


Readmission
%
35
30
25
20
15
10
5
0
35
9
16
1
19
13
7
21
37
27

(max) readmit_num _sbo	Freq.	Percent	Cum.
2	305	70.28	70.28
3	82	18.89	89.17
4	25	5.76	94.93
5	10	2.30	97.24
6	5	1.15	98.39
7	2	0.46	98.85
8	1	0.23	99.08
9	1	0.23	99.31
10	3	0.69	100.00
Total	434	100.00	

.


Length of Stay
Hours
450
400
350
300
250
200
150
100
50
0
16
35
21
37
9
19
7
27
1
13


Length of Stay
Operation
Hours
600
500
400
300
200
100
0
16
9
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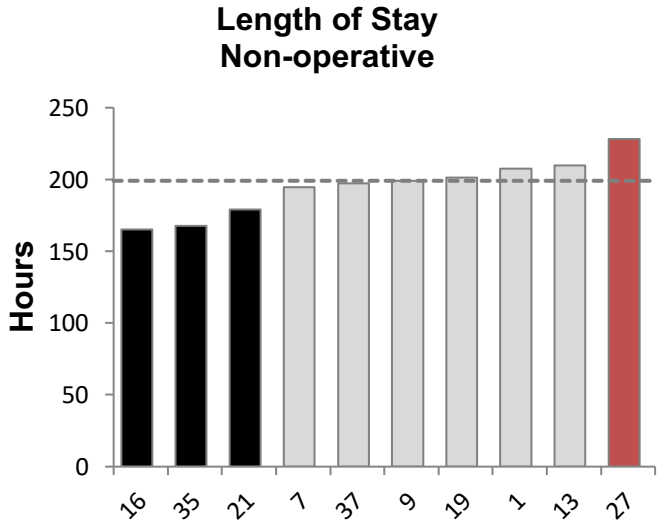
1
37
27
13


Length of Stay
Non-operative
Hours
250
200
150
100
50
0
16
35
21
7
37
9
19
1
13
27

SCOAP Data (Adhesive Disease)

- Admit Service
  - Medicine
  - Surgery
  - Operation or no-operation
  - Medicine non-op ↑, Medicine operate ↓
- Type operation
  - Open, Lap, Lap to open
  - Findings and conduct (lysis, SBR)
- Gastrografin challenge
  - 50-55%

SCOAP Data (Adhesive Disease)

- LOS
  - 5 days
  - 120 hrs
  - MACS Mean 277, Median 87 hrs
- Readmit
  - 10-12%, 30 day
  - MACS 23%
- Gastrografin challenge
  - 50-55%

What is an episode of care?

- SBO Non-op
  - Subsequent Readmit or ED visit
  - Multiple ?
  - Role of an operation ?
- SBO Operative
  - Subsequent Readmit or ED visit
  - Another operation ?
- Clock
  - Duration ? 6 mo, 12 mo, etc.
  - When to reset index
    - Time
    - Intervention

Questions

Questions

Interest in data from another collaborative?

Focus on no prior SBO and adhesive disease?

Standardize Gastrografin challenge?

Laparoscopic approach? Admit service?

M·ACS

Michigan Acute Care Surgery Report
Appendicitis • 27 • 7/1/2019-3/4/2022

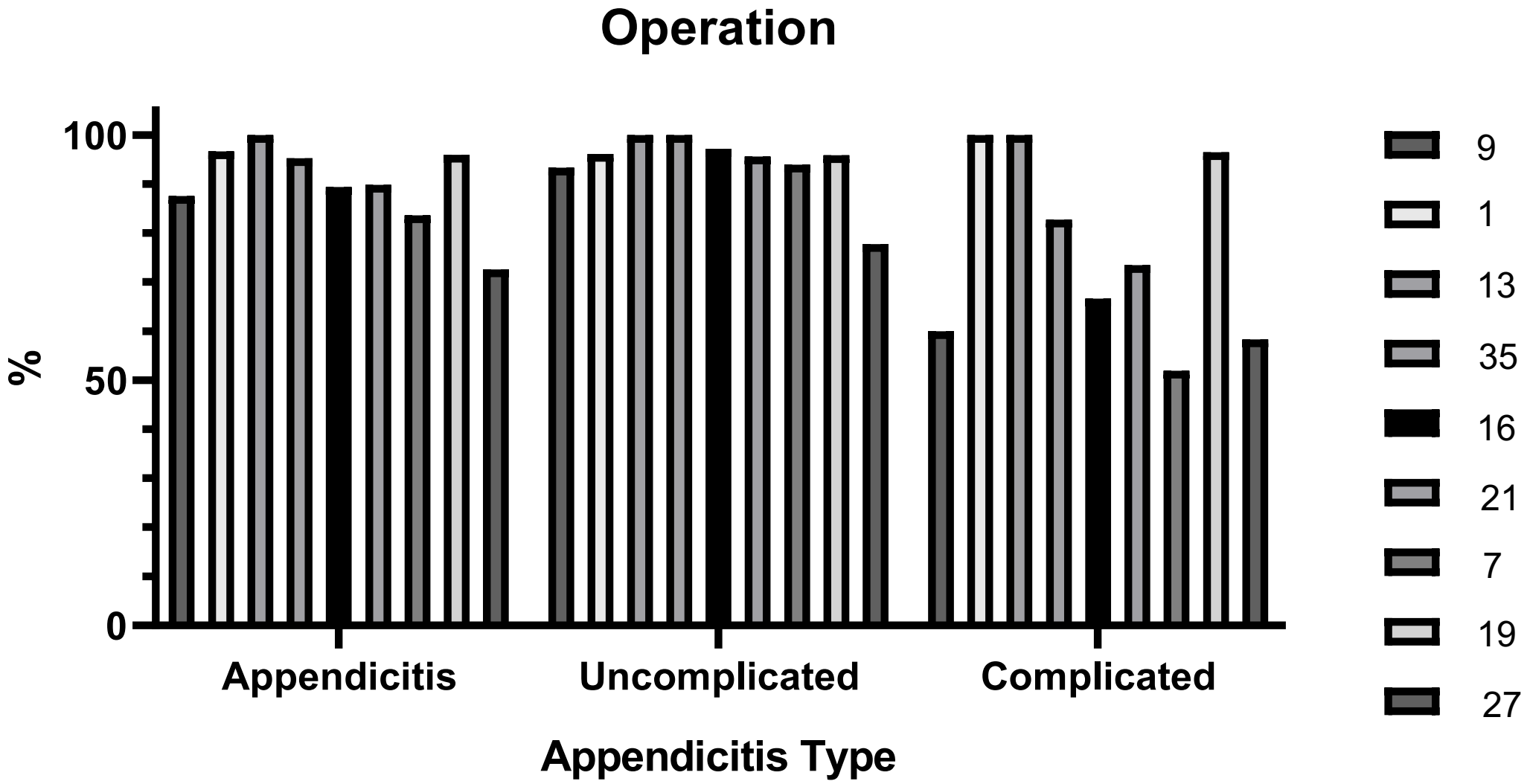
Index Admission		Your Center N = 588		Aggregate N = 3188	
Variable		**N**	**%**	**N**	**%**
Total Cases	Index Admissions	588	18.4	3188	100.0
	Total Admissions (with Readmissions)	655	18.9	3463	100.0
Management	Total cases	588	100.0	3188	100.0
	Operation	425	72.3	2754	86.4
	Non-operative	163	27.7	434	13.6
AAST Grade	AAST grade in operative patients				
	1	300	70.6	1942	70.5
	2	31	7.3	226	8.2
	3	42	9.9	300	10.9
	4	34	8.0	141	5.1
	5	8	1.9	93	3.4
	NA	6	1.4	47	1.7

Acute Appendicitis

- Age (categorical)
- Sex
- Race
- Ethnicity*
- AAST grade ≥ 3*
- ASA score ≥ 3*
- Number of comorbid conditions
- Time to operation*
- Perforation*
- BMI (categorical)*
- Operation type*
- Insurance type*
- IR procedure index admit*

C-index = 0.863 to 0.624

Acute Appendicitis



Index

	Uncomplicated	Complicated
Operation	What patients? Why?	What patients? Why? Why not?
No Operation	What patients? Why? No interval appendectomy	What patients? Why? Interval appendectomy? Workup? For what age?

Acute Appendicitis

- Type
  - Uncomplicated 76%
  - Complicated 24%
- Perforation - 27% (853 patients)
  - Operation – 70%
  - Non-op – 30% > 254 patients

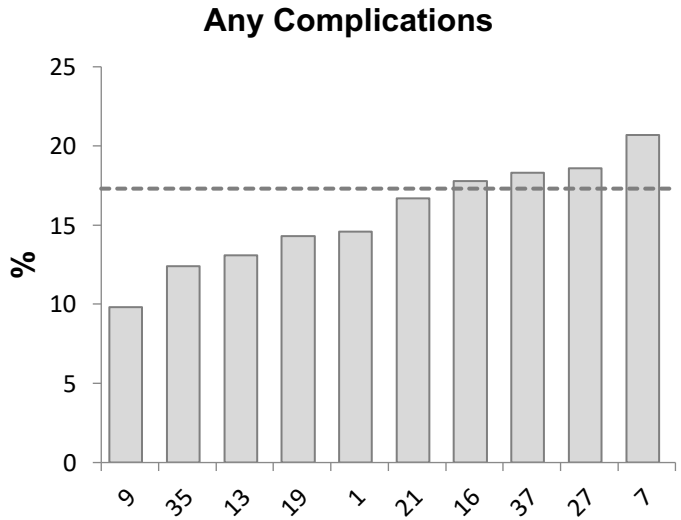
Acute Appendicitis - Medical Management

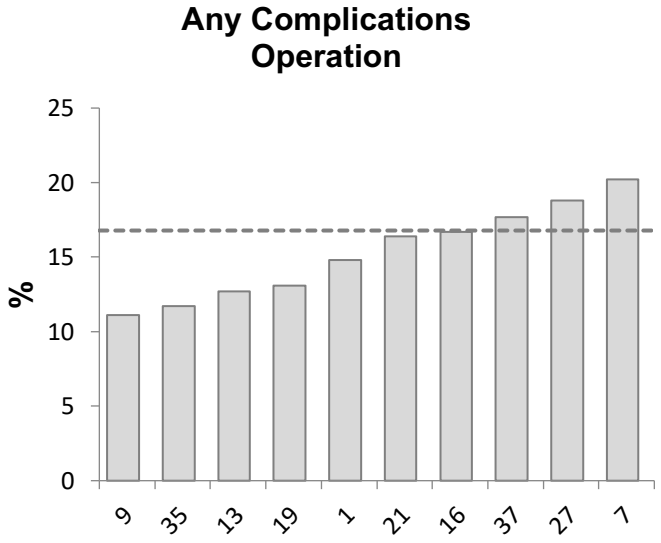
- Medical management = 13.7%, 438 patients
- 17 failed and got operation index = 3.9%
- 12 months
  - 109 failed and got operation = 24.9%
- 24 months and 36 months
  - 110 failed and got operation = 25.1%
  - Probably just about to 2 years on Qualtrics data
- IV Abx Mean 3.1, Median 3 days
- po Home Abx Mean 9.1, Median 10 days

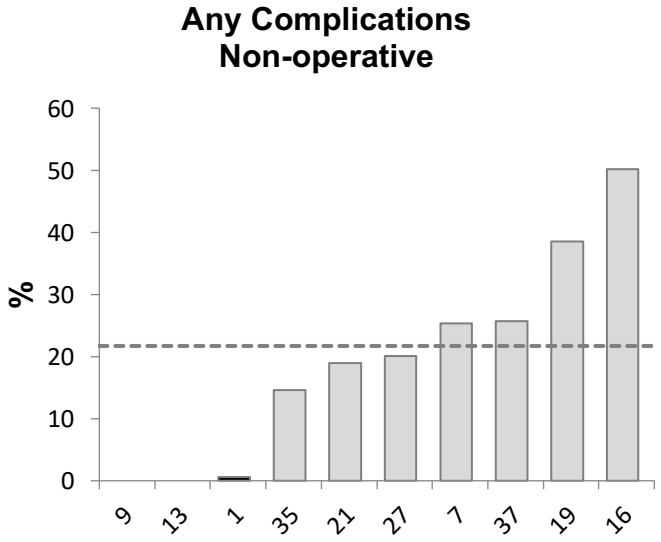
Acute Appendicitis - Medical Management

- Do you have to admit patient?
- IV or po antibiotic initially?

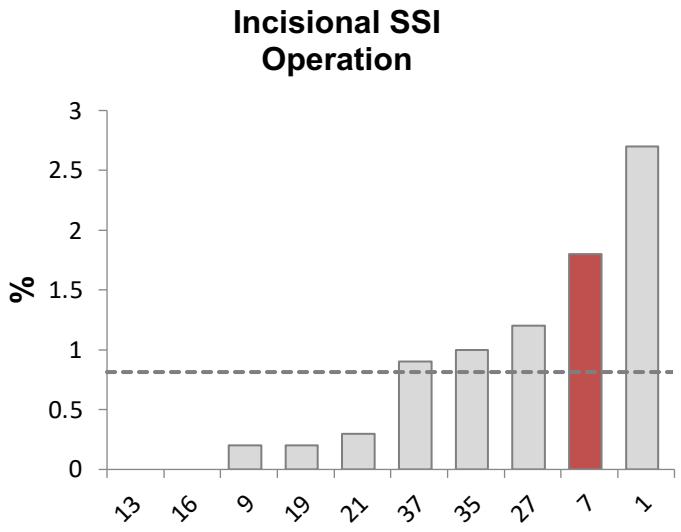
Risk Adjusted Outcomes

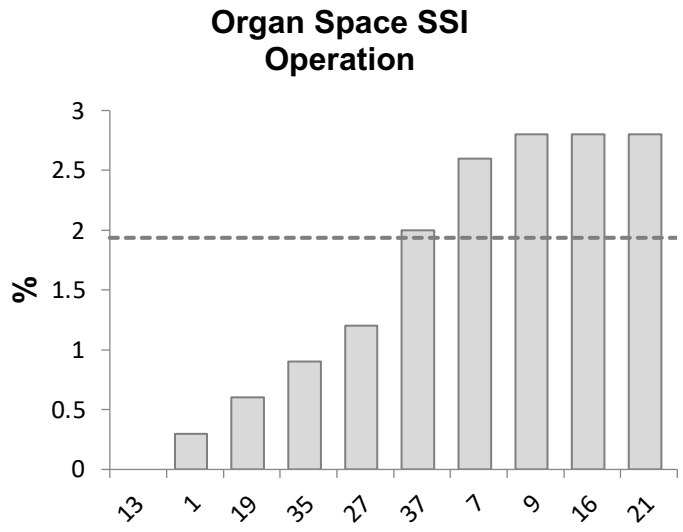




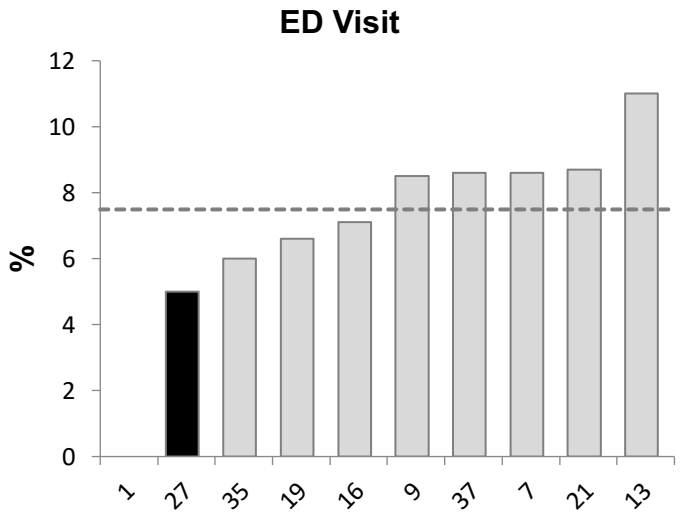


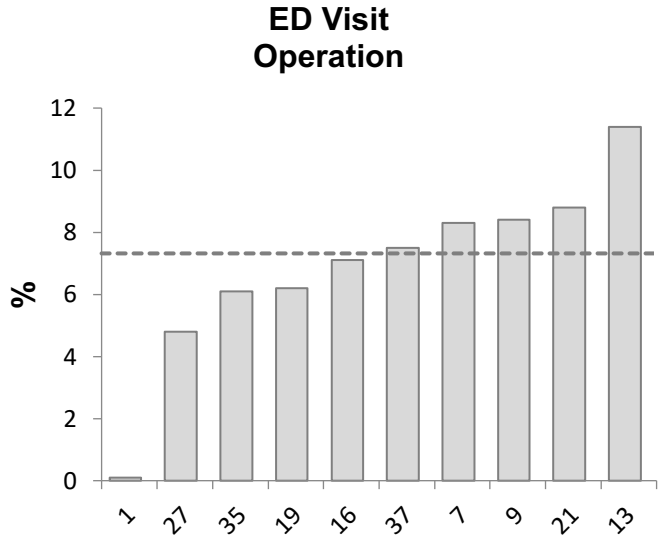
Risk Adjusted Outcomes

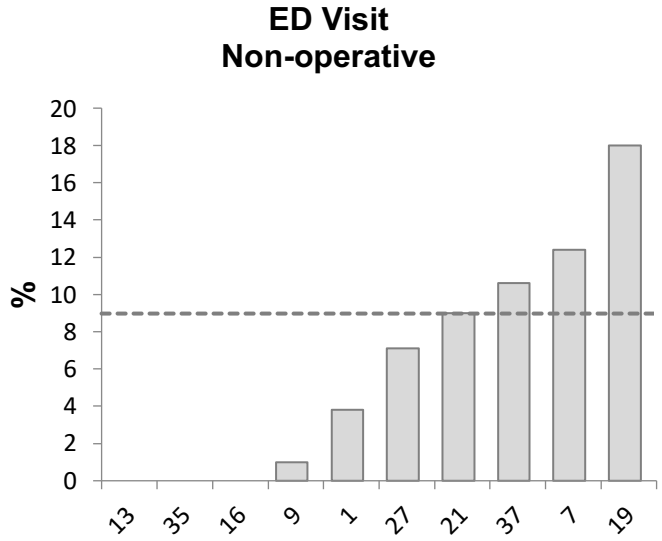




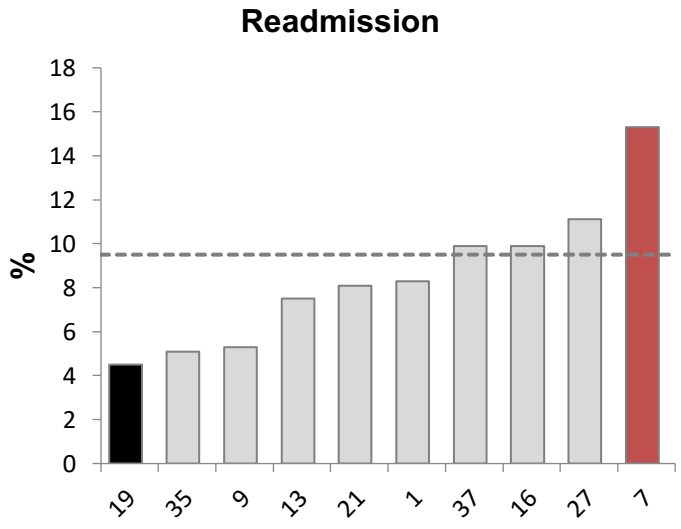
Risk Adjusted Outcomes

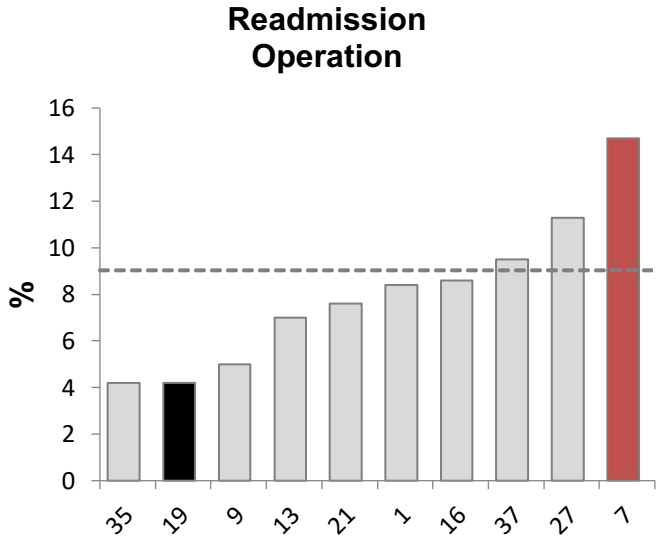


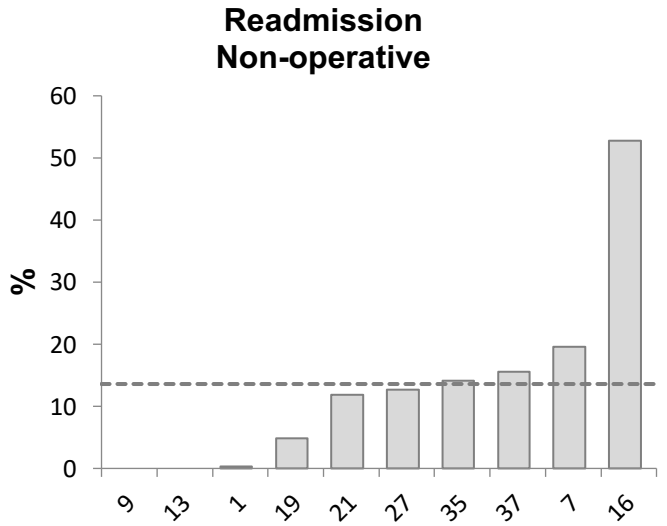




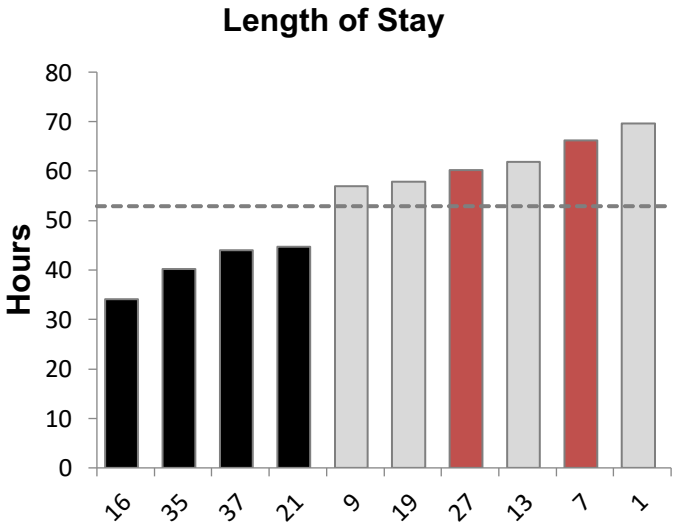
Risk Adjusted Outcomes

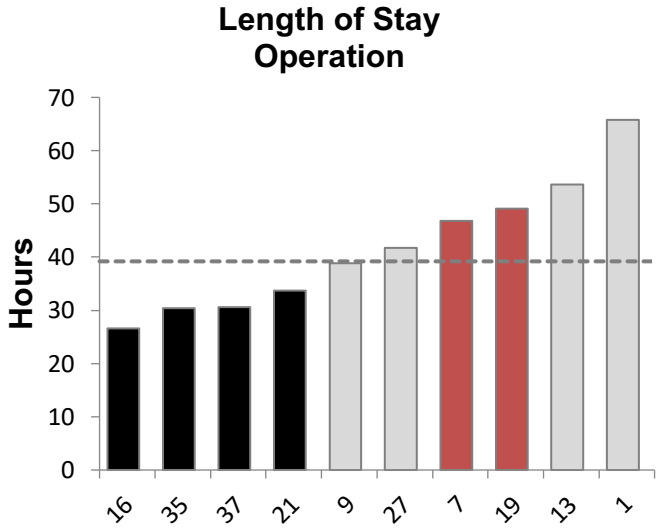


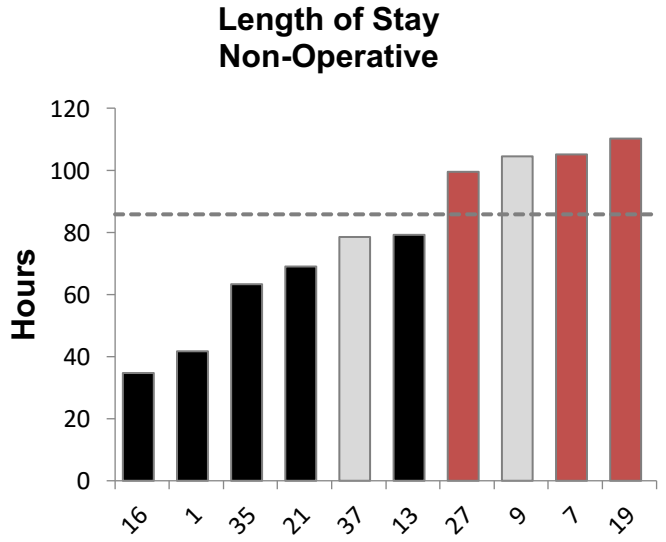




Risk Adjusted Outcomes







Acute Appendicitis – Index with Readmission (3,188 admits)

- Outcomes
  - Readmission = 9.5% (304 pts)
  - Any complication = 17.3% (552 pts)
  - Incisional SSI = 0.8% (23 pts)
  - Organ space SSI = 1.9% (55 pts)
  - Sepsis = 1.3% (42 pts)
  - Post-discharge ED visit = 7.5% (239 pts)
  - Mortality = 0.3% (9 pts)

Acute Appendicitis – Outcomes

	All		Perforated Op		Perforated Non Op	
	N	%	N	%	N	%
Any Complication	552	17.3	161	24.2	45	23.3
Incisional SSI	23	0.7	11	1.7	0	0.0
Organ space SSI	55	1.7	38	5.7	1	0.5
Sepsis	42	1.3	21	3.2	6	3.1
Post-discharge ED visit	239	7.5	58	8.7	19	9.8
Readmission	304	9.5	131	19.7	27	14.0
Mortality	9	0.3	4	0.6	1	0.5

Questions

Break

Back at 12:45p

Current Controversies in the Management of Acute Appendicitis

John W. Scott, MD, MPH

Division of Acute Care Surgery,

Department of Surgery, University of Michigan

Two questions for discussion today:

- **What is the current state of non-operative management for patients presenting with acute appendicitis?**
  - Acute uncomplicated
  - Perforated appendicitis

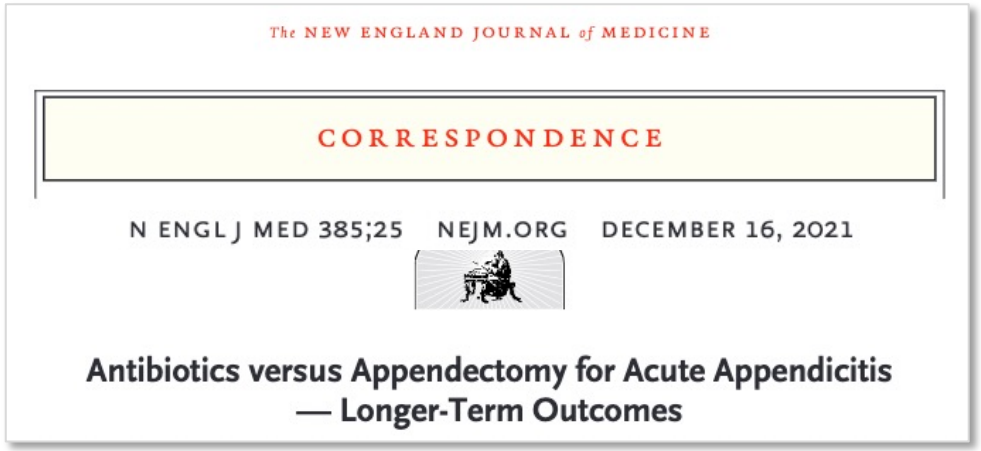
- **Which patients should get an interval appendectomy after non-operative management?**
  - Acute uncomplicated
  - Perforated appendicitis

Two questions for discussion today:

- **What is the current state of non-operative management for patients presenting with acute appendicitis?**
  - Acute uncomplicated
  - Perforated appendicitis

- **Which patients should get an interval appendectomy after non-operative management?**
  - Acute uncomplicated
  - Perforated appendicitis

CODA Trial has led to a rise in non-operative management of acute uncomplicated appendicitis



Approx. 1,500 pts with Acute Appendicitis
- Excluded: Abscess, severe phlegmon, free air, sepsis, concern for cancer

776 pts underwent appendectomy
776 pts received antibiotics only

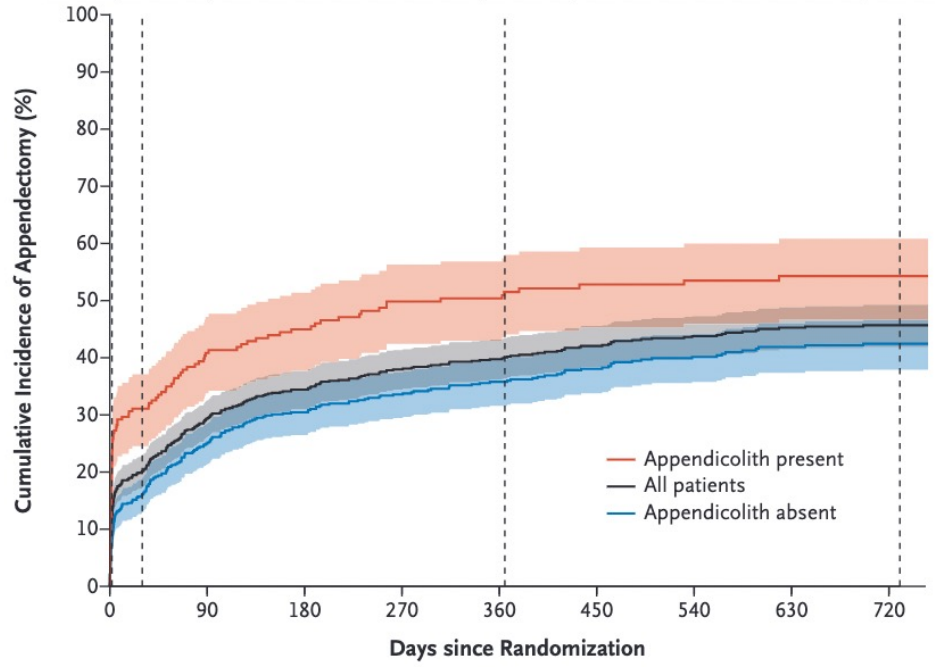
Health-related quality of life at 30d:
- Antibiotics not inferior

Days missed work in 90d:
- Antibiotics better (5d vs 8d)

Hospitalization within 90d from index treatment:
- Surgery better (5% vs 24%)

Debate regarding interpretation of the high rate of treatment failure after antibiotics only

	30 Days	1 Year	2 Years
All Patients	0.20 (0.17–0.23)	0.40 (0.36–0.44)	0.46 (0.42–0.49)
Appendicolith Absent	0.16 (0.13–0.19)	0.36 (0.32–0.40)	0.43 (0.38–0.47)
Appendicolith Present	0.31 (0.25–0.37)	0.52 (0.44–0.58)	0.54 (0.47–0.61)



No. at Risk									
Appendicolith present	212	120	106	91	89	70	69	57	57
All patients	776	522	472	430	401	337	326	254	251
Appendicolith absent	564	402	366	339	312	267	257	197	194

Figure 1. Cumulative Incidence of Appendectomy among Patients in the Antibiotics Group, According to the Presence or Absence of an Appendicolith.

Long-term outcome =

Eventual appendectomy among those initially randomized to antibiotics

All patients	Fecolith present
30days = 20%	30days = 30%
1 year = **40%**	1 year = **50%**
2 years = 45%	2 years = 55%
3+ yrs = **50%**	

Brief overview of 20 months of MACS data

INCIDENCE OF NON-OPERATIVE MANAGEMENT in MACS

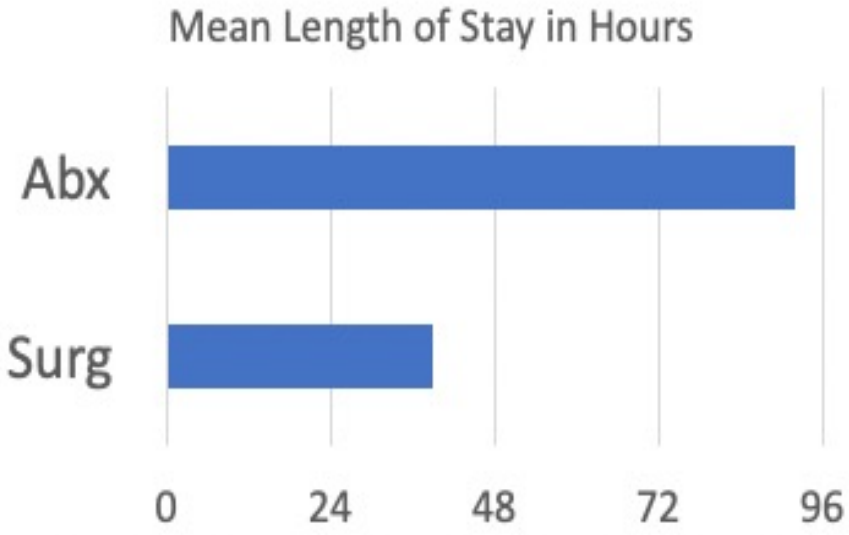
Among ***all*** 3,188 index admissions for appendicitis
- **14%** get antibiotics only (28% at 27 , a CODA study site)

Among 2,418 pts with ***UNCOMPLICATED appendicitis***
- **8%** antibiotics only (22% at 27)

Among 853 pts with ***PERFORATED appendicitis***
- **30%** antibiotics only (40% at 27)

M·ACS
Michigan Acute Care Surgery Report
Appendicitis • 27 • 7/1/2019-3/4/2022

SELECTED OUTCOMES:



Interval appendectomy w/in 12m = **25%**

Two questions for discussion today:

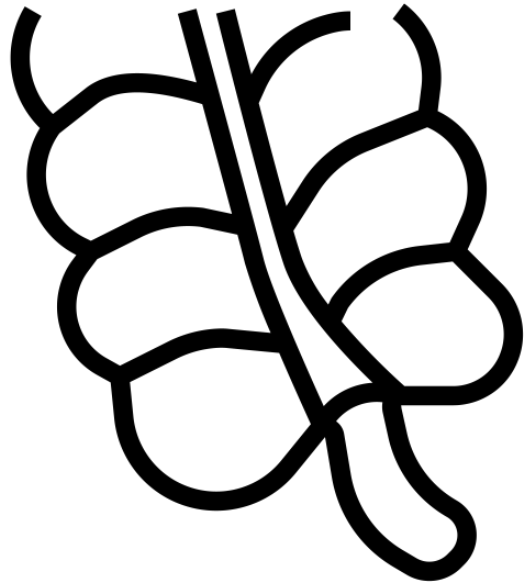
- **What is the current state of non-operative management for patients presenting with acute appendicitis?**
  - Acute uncomplicated
  - Perforated appendicitis

- **Which patients should get an interval appendectomy after non-operative management?**
  - Acute uncomplicated
  - Perforated appendicitis

Consensus is lacking on indications for interval appendectomy after non-operative management

- **Issue #1**: Two different **indications** for interval appendectomy
  - Reduce risk of occult neoplasm
  - Reduce risk of future episode of acute appendicitis

- **Issue #2**: **Perforated** vs non-perforated are distinct clinical entities
  - Regarding their risk of occult neoplasm
  - Regarding the rationale for non-operative management at index presentation



The rate of occult neoplasm is higher in patients with complicated appendicitis, and increases with age

THE SURGEON 19 (2021) E549–E558

Risk of appendiceal neoplasm after interval appendectomy for complicated appendicitis: A systematic review and meta-analysis

Roberto Peltrini [a,], Valeria Cantoni [b], Roberta Green [b], Ruggero Lionetti [a], Michele D'Ambra [a], Carolina Bartolini [a], Marcello De Luca [a], Umberto Bracale [b], Alberto Cuocolo [b], Francesco Corcione [a]*

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[b] Department of Advanced Biomedical Sciences, University of Naples Federico II, Naples, Italy

Teixeira *et al. World Journal of Emergency Surgery* (2017) 12:12
DOI 10.1186/s13017-017-0122-9

World Journal of Emergency Surgery

REVIEW Open Access

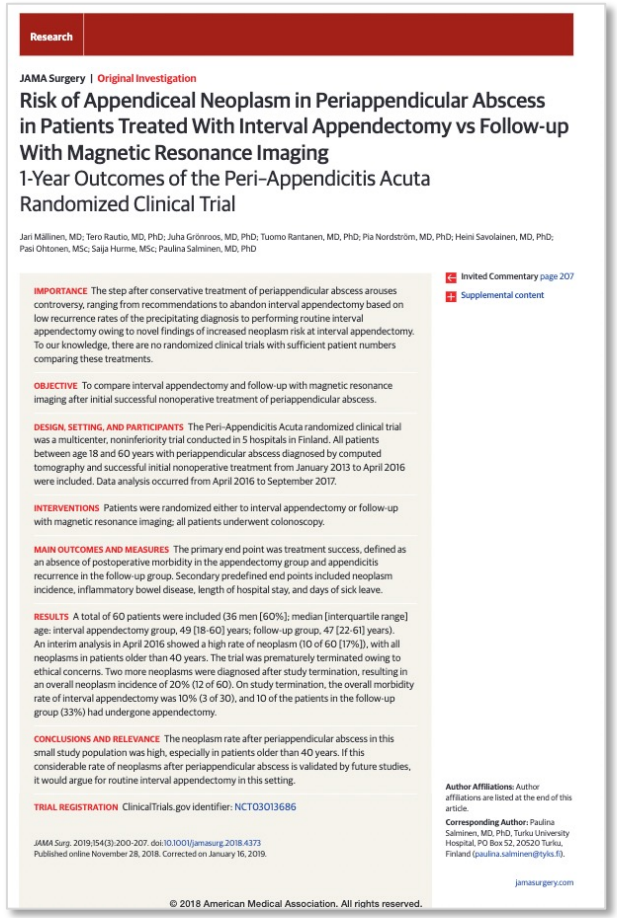
Acute appendicitis, inflammatory appendiceal mass and the risk of a hidden malignant tumor: a systematic review of the literature

Frederico José Ribeiro Teixeira Jr[1], Sérgio Dias do Couto Netto[2,3,6*], Eduardo Hiroshi Akaishi[4], Edivaldo Massazo Utiyama[5], Carlos Augusto Metidieri Menegozzo[7] and Marcelo Cristiano Rocha[8]

Neoplasm Incidence in Interval Appendectomy after Complicated Appendicitis (Abscess, Perforation, etc)		
Furman et al	5 / 17	29%
Cerame et al.	56 / 192	29%
Carpenter et al	5 / 18	28%
Son et al	14 / 111	13%
Wright et al.		12%
Mallinen et al.		12%
de jonge et al.		11%
Deelder et al.		10%
Lai et al.		10%
Tingstedt et al.	3 / 30	10%
Roberts et al	4 / 41	10%
Mima et al.	4 / 47	9%
Al-Kurd et al.	6 / 106	6%
Pooled	**137 / 929**	**15%**

15%
(5-30%)

High-quality RCT for Interval Appy vs MRI follow-up among pts <60y was terminated early for high rate of neoplasm



Research

JAMA Surgery | Original Investigation

Risk of Appendiceal Neoplasm in Periappendicular Abscess in Patients Treated With Interval Appendectomy vs Follow-up With Magnetic Resonance Imaging
1-Year Outcomes of the Peri–Appendicitis Acuta Randomized Clinical Trial

Jari Mällinen, MD; Tero Rautio, MD, PhD; Juha Grönroos, MD, PhD; Tuomo Rantanen, MD, PhD; Pia Nordström, MD, PhD; Heini Savolainen, MD, PhD; Pasi Ohtonen, MSc; Saija Hurme, MSc; Paulina Salminen, MD, PhD

Invited Commentary page 207
Supplemental content

IMPORTANCE The step after conservative treatment of periappendicular abscess arouses controversy, ranging from recommendations to abandon interval appendectomy based on low recurrence rates of the precipitating diagnosis to performing routine interval appendectomy owing to novel findings of increased neoplasm risk at interval appendectomy. To our knowledge, there are no randomized clinical trials with sufficient patient numbers comparing these treatments.

OBJECTIVE To compare interval appendectomy and follow-up with magnetic resonance imaging after initial successful nonoperative treatment of periappendicular abscess.

DESIGN, SETTING, AND PARTICIPANTS The Peri-Appendicitis Acuta randomized clinical trial was a multicenter, noninferiority trial conducted in 5 hospitals in Finland. All patients between age 18 and 60 years with periappendicular abscess diagnosed by computed tomography and successful initial nonoperative treatment from January 2013 to April 2016 were included. Data analysis occurred from April 2016 to September 2017.

INTERVENTIONS Patients were randomized either to interval appendectomy or follow-up with magnetic resonance imaging; all patients underwent colonoscopy.

MAIN OUTCOMES AND MEASURES The primary end point was treatment success, defined as an absence of postoperative morbidity in the appendectomy group and appendicitis recurrence in the follow-up group. Secondary predefined end points included neoplasm incidence, inflammatory bowel disease, length of hospital stay, and days of sick leave.

RESULTS A total of 60 patients were included (36 men [60%]; median [interquartile range] age: interval appendectomy group, 49 [18-60] years; follow-up group, 47 [22-61] years). An interim analysis in April 2016 showed a high rate of neoplasm (10 of 60 [17%]), with all neoplasms in patients older than 40 years. The trial was prematurely terminated owing to ethical concerns. Two more neoplasms were diagnosed after study termination, resulting in an overall neoplasm incidence of 20% (12 of 60). On study termination, the overall morbidity rate of interval appendectomy was 10% (3 of 30), and 10 of the patients in the follow-up group (33%) had undergone appendectomy.

CONCLUSIONS AND RELEVANCE The neoplasm rate after periappendicular abscess in this small study population was high, especially in patients older than 40 years. If this considerable rate of neoplasms after periappendicular abscess is validated by future studies, it would argue for routine interval appendectomy in this setting.

TRIAL REGISTRATION ClinicalTrials.gov identifier: NCT03013686

JAMA Surg. 2019;154(3):200-207. doi:10.1001/jamasurg.2018.4373
Published online November 28, 2018. Corrected on January 16, 2019.

Author Affiliations: Author affiliations are listed at the end of this article.
Corresponding Author: Paulina Salminen, MD, PhD, Turku University Hospital, PO Box 52, 20520 Turku, Finland (paulina.salminen@tyks.fi).

jamasurgery.com

Mallnen et al. JAMA Surg. 2018

Figure. Flowchart of Trial Participants

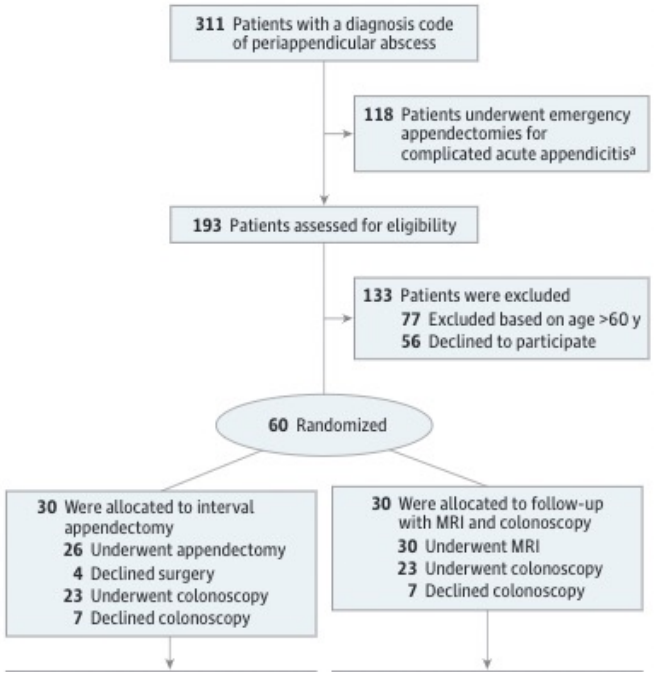


Table 4. Neoplasms Found in the Study Population

Patient Sex/Age, y	Reason for Intervention	Time to Intervention, d	Intervention	Histological Findings	Time to Secondary Intervention, d	Secondary Intervention
F/56	Allocated intervention	90	Appendectomy	LAMN and pseudomyxoma peritonei	156	Cytoreductive surgery and hyperthermic intraperitoneal chemotherapy
M/47	Allocated intervention	120	Appendectomy	LAMN	NA	Surveillance
M/59	Allocated intervention	134	Appendectomy	Sessile serrated adenoma	NA	Surveillance
M/59	Recurrent symptoms	329	Ileocecal resection	Adenocarcinoma of the appendix	378	Right hemicolectomy
M/59	Recurrent symptoms	18	Appendectomy	LAMN	98	Ileocecal resection
M/61	Recurrent symptoms	330	Appendectomy	Mucinous cystadenoma	NA	Surveillance
M/55	Recurrent symptoms	189	Appendectomy	Goblet cell carcinoid	252	Cytoreductive surgery and hyperthermic intraperitoneal chemotherapy
F/58	MRI tumor suspicion	199	Appendectomy	Sessile serrated adenoma	NA	Surveillance
F/53	CT tumor suspicion	171	Chemotherapy	Cecal adenocarcinoma and sessile serrated appendiceal adenoma	332	Right hemicolectomy (palliative)
M/61	Recommended	429	Appendectomy	LAMN	NA	Surveillance
F/41	Recommended	142	Appendectomy	LAMN	NA	Surveillance

- Study terminated early
- 18% of patients with some neoplasm (11/60)
- None under age 40

Consensus is lacking on indications for interval appendectomy after non-operative management

- **Issue #1**: Two different **indications** for interval appendectomy
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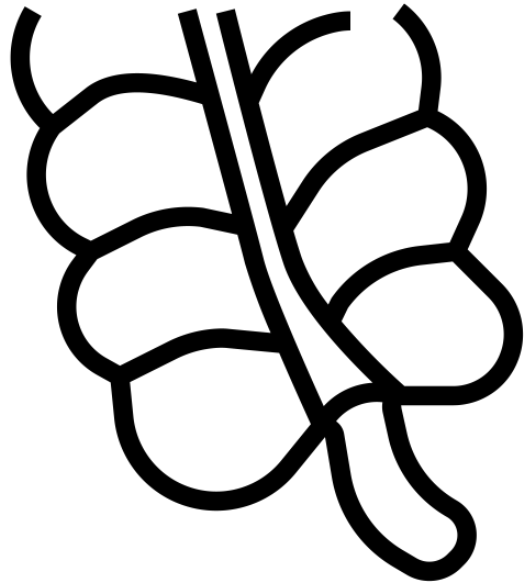


Group Discussion: What is your current practice?

	Acute, **Uncomplicated** Appendicitis	**Complicated** (Abscess, Perforation, Severe Phlegmon)
Surgery at Index	1. Which patients? 2. Why Surgery?	1. Which patients? 2. Why Surgery?
Non-op at Index	1. Why non-op? 2. Who gets c-scope? 3. Does anyone get IA? 4. Work-up before IA? 5. Age >30, >40, >50?	1. Why non-op? 2. Who gets c-scope? 3. Who gets IA? 4. Work-up before IA? 5. Age >30, >40, >50?

IA = Interval Appy

Discussion Questions:

- Who gets **non-operative** management at index presentation?
- Who gets a **colonoscopy** after after non-op management?
- Who gets **interval appendectomy** (IA) after non-op management?
- What is the **rationale for IA**?
- Who gets a **repeat CT scan** prior to interval appendectomy?
- How does **age** impact your decision making? Any cutoffs?

Data Updates Validation

Kim Kramer, PA-C

MICHIGAN ACUTE CARE SURGERY CQI

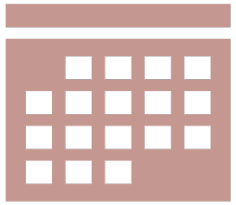
April 27, 2022

DATA VALIDATION UPDATES

COMPLETED VALIDATION: 4 CENTERS

- Michigan Medicine
- Spectrum
- St. Joseph's Ann Arbor
- Sparrow

GETTING READY



First year: Zoom with Kim & Shauna the week before access is granted

Follow up with your IT department

Access to same views/modules

Example: Admit dates

Ideally access to your EMR granted the Monday prior to scheduled validation date.

VALIDATION RESULTS

8 cases validated = **850** data points reviewed

Average discrepancy rate = 2.6%

Average consistency rate = 97.4%

More leniency this year

DISCREPANCY BY DISEASE

Appendix: 2.9 %

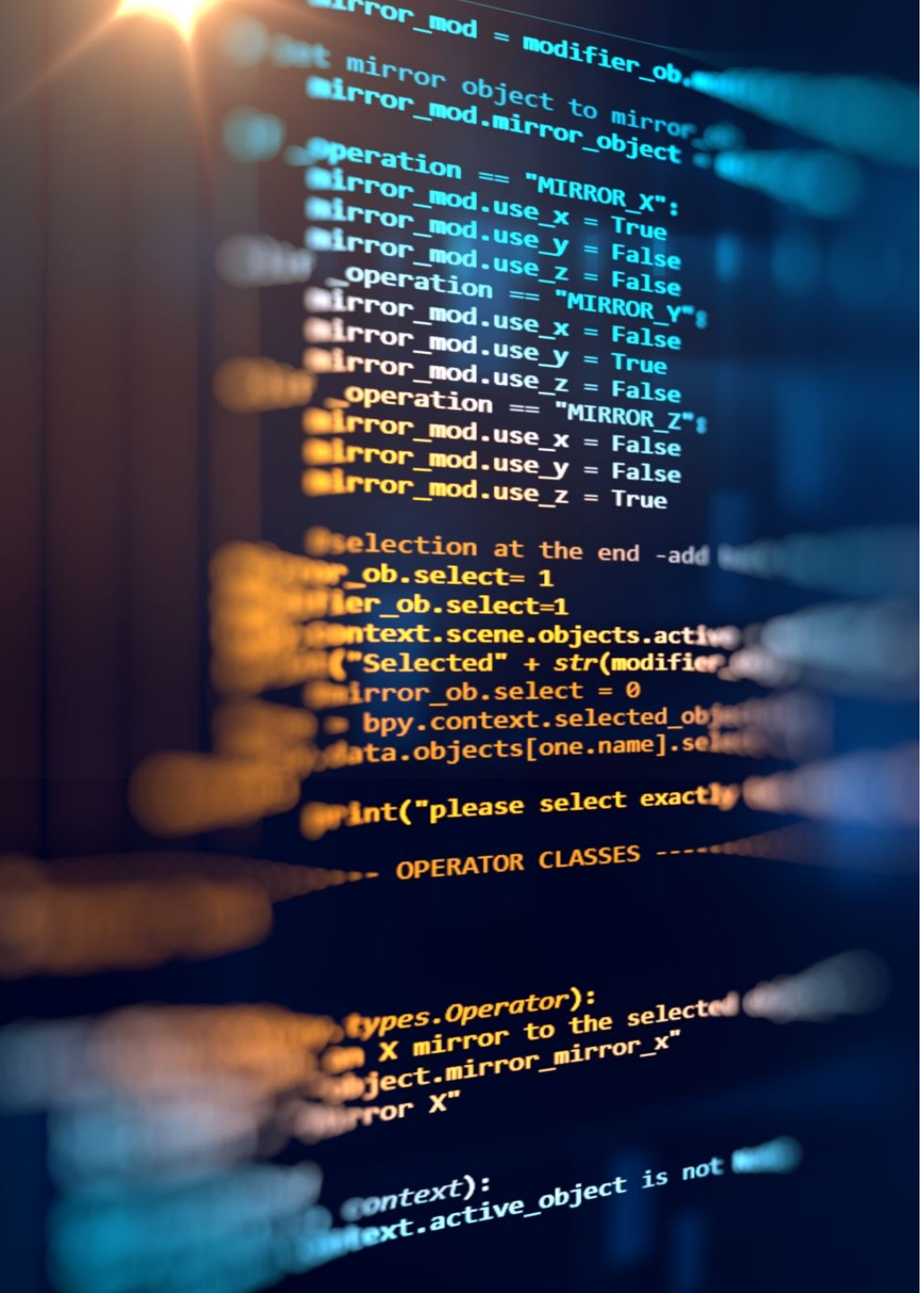
Ex-lap: 3.0%

Gallbladder: 2.5%

SBO: 2.8%

DISCREPANCY BY SECTION

- Demographics: 3.2%
- Arrival: 6.7%
- Risk Factors: 4.3%
- Disease: 7.8% (2 centers with 0%, 1 high outlier)
- Appendix: 5.2%
- Gallbladder: 3.8%
- SBO: 0.8%
- Ex-lap: 4.3%
- IR: 3.1% (3 centers with 0%)
- OR: 1.1%
- Intraoperative: 0%
- Occurrences: 0.5%
- Discharge: 2.0%



APPEALS

- Send us screenshots of your EMR
  - One word document
  - List case number and data point
  - Upload to Dropbox

TEACHING POINTS - APPENDICITIS

- Fecalith = Appendicolith

TEACHING POINTS – SBO

“Obstruction Related To Adhesions”

- On CT reports, terms such as tethering, abnormal angulation, or kinking of the bowel can be used as proxies for “adhesions” in the absence of other modifiers such as mass or inflammation.
- If adhesions or “possible adhesion-related” is documented in the surgeon’s progress notes or operative report, you may select “Yes” to this variable.

TEACHING POINTS – EX-LAP

“Hypercapnic respiratory failure”

- The blood gas must be an ABG (not a VBG)
- $PaCO_2 > 45$ mmHg

DATA DEFINITIONS TO CLARIFY

- Functional health status
- Free fluid amount on CT studies; does small amount of fluid count
- Sepsis antibiotic date
- ICU dates
- Follow up date

ARBORMETRIX ANALYTICS PLATFORM

- Surgeon Champion
- MACS Primary Administrator
- Data Abstractors

*Any additional access needs to be approved by your hospital's MACS Primary Administrator

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MACS

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PASSWORD

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LOGIN

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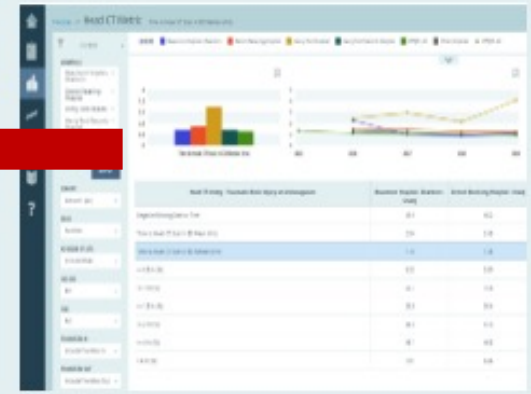
New Features from Arb

Data Through Febru



Login

Request User Access

Request User Access

Requested User Name *
Requested User Name

First Name *
First Name

Last Name *
Last Name

User Type *
choose only one

Work Email *
Work Email

Work Phone
2345678910

Cell Phone
2345678910

Sites
Select Some Options

Please describe the purpose for access below:

Requesting access to MACS or leave section blank

UPCOMING FOR AMX LOG IN

- New multifactor authenticator requirement coming 5/24
- Download Authy app to your phone
- Once set up, enter the Authy code on the AMX site
- Step by step help document available from AMX

M·TQIP

Kikramer

MTQIP List
MTQIP Reports
PRQ Reports
MACS List
MACS Reports
Push Reports
Resources
Help
POWERED BY

Dashboard // Summary

FILTERS

HOSPITALS

Select All

APPLY

COHORT
Cohort 00 (All)

DEAD
No Filter

AGE
All

ASA SCORE
No Filter

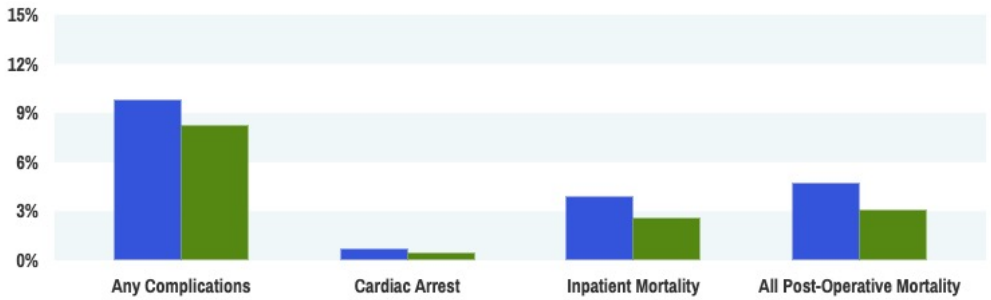
TRANSFERS IN
Include Transfers In

PERIOD GROUP
Default Periods

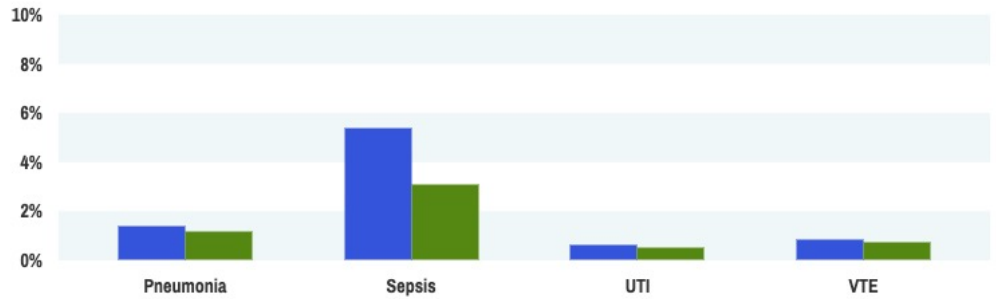
DEFAULT PERIODS
Program To Date

LEGEND MTQIP - All

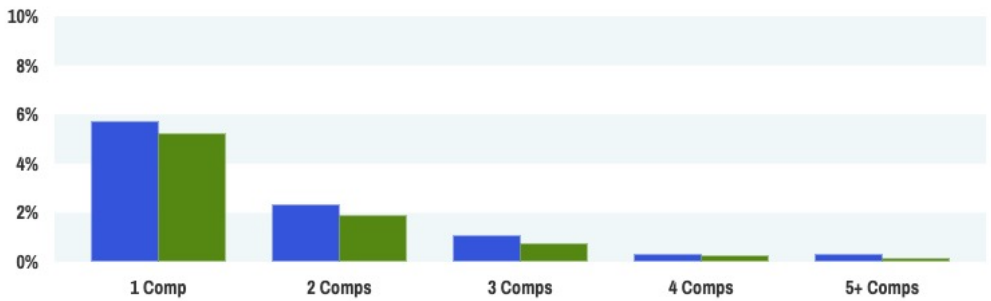
Outcomes Overview



Complications by Type



of Complications



Service Utilization


M·TQIP
Kikramer
MTQIP List
MTQIP Reports
PRQ Reports
MACS List
MACS Reports
Push Reports
Resources
Help
Case List
Record #
MRN
First Name
Last Name
Age
Organ System
ED Arrival Date
Admit Date
Discharge Date
Death
Appendix
Yes
1 - 7 of 7 items
1

CQI Index and Future Directions

Mark Hemmila MD

CQI Index

- 2022
  - Attendance
  - Data Submission
  - Validation visit
- 2023
  - 1-2 Metrics

Appendix III. Hospital P4P Performance Index Measure Weighting

CQI Performance/Participation Weighting Schedule for Newly Established CQIs		
Year	**Performance**	**Participation**
1	0%	100%
2	20%	80%
3	30%	70%
4	45%	55%
5	60%	40%
6	70%	30%

CQI Performance/Participation Weighting Schedule for Newly Participating Sites in Established CQIs		
Year	**Performance**	**Participation**
1	0%	100%
2	20%	80%
3	70%(or aligned with most established cohort's performance)	30%

CQI Index

- 2022
  - Attendance
  - Data Submission
  - Validation visit
- 2023
  - 1-2 Metrics

Michigan Acute Care Surgery (MACS)
2022 Performance Index
January 1 to December 31, 2022

Measure	Weight	Measure Description	Points	
#1	30	**Data Submission**		PARTICIPATION (100%)
		On time and complete 3 of 3 times	30	
		On time and complete 2 of 3 times	5	
		On time and complete 1 of 3 times	0	
#2	25	**Meeting Participation-Surgeon**		
		Participated in 3 of 3 meetings	25	
		Participated in 2 of 3 meetings	10	
		Participated in 1 of 3 meetings	5	
		Participated in 0 of 3 meetings	0	
#3	25	**Meeting Participation-Program Manager or Data Abstractor**		
		Participated in 3 of 3 meetings	25	
		Participated in 2 of 3 meetings	10	
		Participated in 1 of 3 meetings	5	
		Participated in 0 of 3 meetings	0	
#4	20	**Data Validation**		
		Completed	20	
		Not completed	0	
		Total (Max Points) =	100	

Additional Information

Measure 1: Data Submission: Partial/incomplete submissions receive no points. Complete data submission is defined as all cases submitted for the requested interval.

Measure 2: Meeting Participation: Surgeon represents one center only; alternate must be an attending level equivalent.

Feedback (mhemmila@umich.edu)

- Reports
  - Questions
  - Problems/Mistakes
  - Improvements
- CQI Index for 2023
- Speakers, Topics, Information

- See you in September

Questions