

# Appendicitis Care Map

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When accessing a document, please use the browser return arrow (upper left-hand corner) to return to the Care Map

## Care Map Symbols

Links to more information or returns to a previous page.

Start of a Care Map Segment

Decision Point

Stop and Evaluate

Care Map Step  
Blue underlined text is a hyperlink

Progression of care – Patient Improving



Source Reference



Education Module



Hospital Policy



Hospital Reference



Provider Information



Download File

# Appendicitis Care Map

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[Quick Overview: Appendicitis Epidemiology, Pathophysiology, and Treatment](#)

[Appendicitis Care Map Dashboard](#)

## Suggested Inclusion Criteria for Appendicitis Care Map

- Age > than 3 months
- Presenting with the chief complaint or concern of acute abdominal pain



This care map document does not supersede the clinical judgment of a provider regarding the care that is ultimately ordered for a given patient. [Click to see full disclaimer.](#)



[Executive Summary](#)



[Prospective evaluation of a Clinical Pathway for Suspected Appendicitis](#)



[Patient Appendicitis Education Booklet](#)



# Appendicitis Care Map

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## Potential Reasons to Avoid Appendicitis Care Map

- Known Inflammatory Bowel Disease
- Sickle Cell DZ
- Chronic Steroids
- Immunosuppressed



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# The Pediatric Appendicitis Scoring Grid

Signs /Symptoms	Points
Cough/percussion/heel tapping tenderness at RLQ	2
Anorexia	1
Low-grade fever $\geq 38.0$ ( 100.4)	1
Nausea/Vomitting	1
RLQ tenderness on light palpation	2
Leucocytosis ( $>10,000/\text{mm}^3$ )	1
Left shift ( $>75\%$ neutrophils)	1
Migration of pain to RLQ	1



Original grid sourced from: [Prospective Evaluation of a clinical Pathway: Pediatrics 10.1542/peds.2013-2208](#)

# Emergency Department Care: Chief Complaint = acute abdominal pain



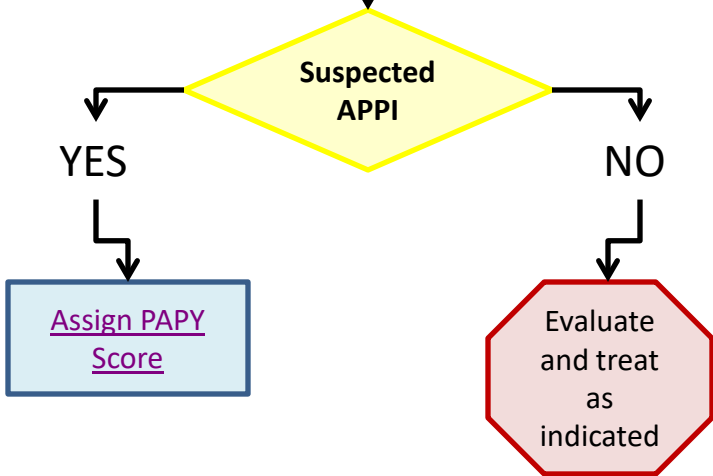
Diagnostic testing & therapies not routinely recommended:

- [CT Scan](#)
- KUB
- ESR

**Triage**

- Nurse performs initial assessment and assigns ESI\* level.

Provider Evaluation: H&P, Physical Exam, CBC, BMP, UA, HCG, +/- CXR/KUB , consider pelvic ultrasound if female



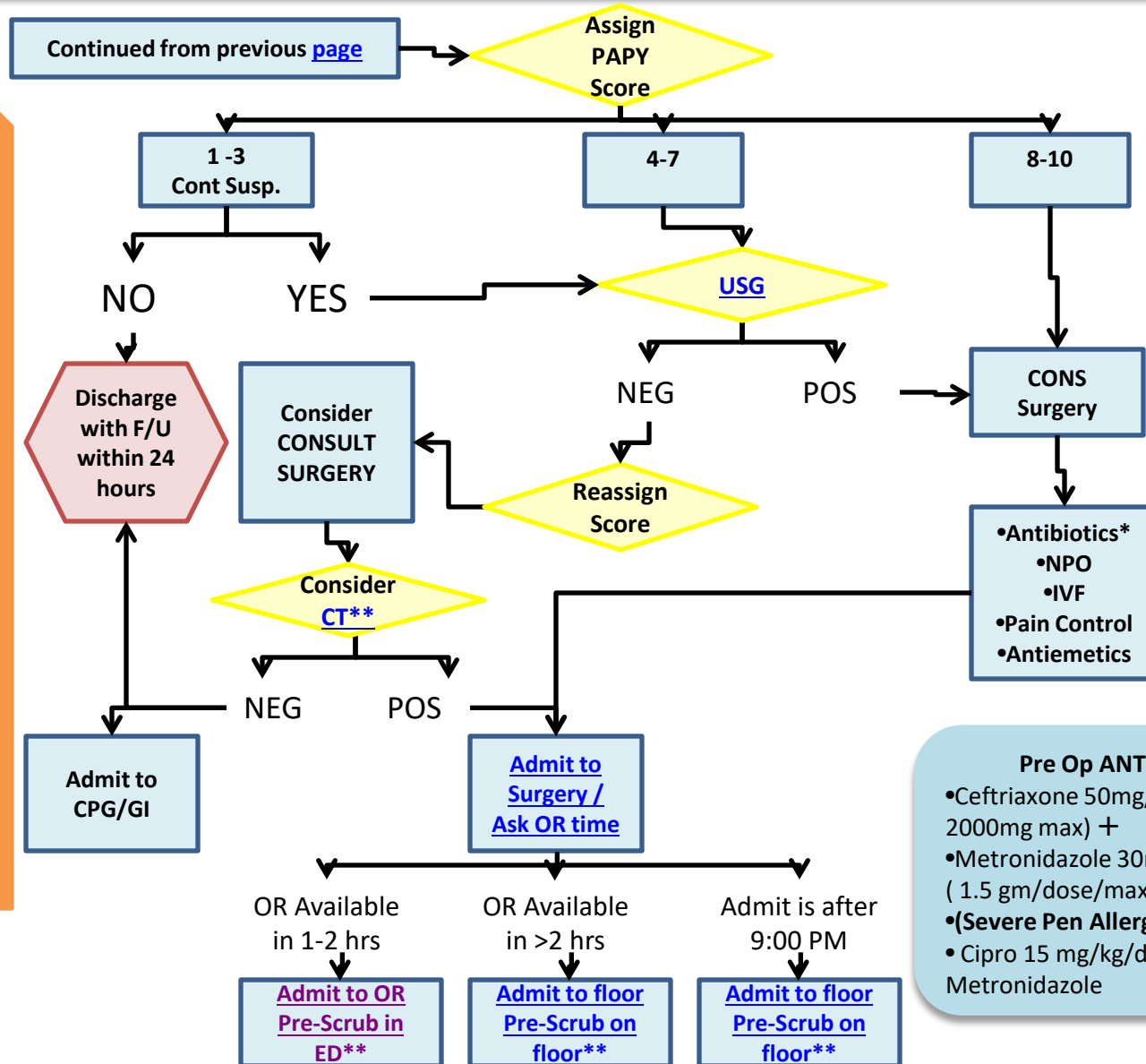
\*ESI = Emergency Severity Index

**TRANSFERS**  
A patient referred from a PCP to our radiology department who subsequently has a positive study( US or CT) for appendicitis can be directly referred to surgery if it is before 5 PM on Mon-Fri and the patient is clinically stable. Otherwise the patient should precede through our Ed triage process .

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# Emergency Department Care (continued)



Diagnostic testing & therapies not routinely recommended:

- [CT Scan](#)
- KUB
- ESR

**Pre Op ANTIBIOTICS\***

- Ceftriaxone 50mg/kg/dose q 24 (2000mg max) +
- Metronidazole 30mg/kg/dose q 24 (1.5 gm/dose/max)
- **(Severe Pen Allergic)**
- Cipro 15 mg/kg/dose + Metronidazole

# Intraoperative Redosing

- No severe penicillin / cephalosporin allergy
  - Give Cefoxitin IV ( 40 mg/kg/dose-max 2g/dose)  
× 1 within 60 mins prior to incision(unless Ceftriaxone dose documented within the prior 8 hours )
  - Repeat Cefoxitin q2h for procedures  $\geq$  2 hrs
- Severe Penicillin/cephalosporin allergy
  - If  $\geq$  12hrs from prior dose repeat Ciprofloxacin × 1 within 120 mins prior to incision
  - Intraoperative redosing is not needed

# Radiology Criteria for CT scan

(IV Contrast ONLY\*\*)

1. If diagnosis uncertain after scoring and ultrasound
2. If requested by surgery
3. Or to assess for intra-abdominal abscess.

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# Criteria for Positive Ultrasound

Radiology Department  
**Appendix Ultrasound Worksheet**

Date \_\_\_\_\_

Patient Name: \_\_\_\_\_ Age: \_\_\_\_\_

Ordering Physician: \_\_\_\_\_ Phone: \_\_\_\_\_

Radiologist: \_\_\_\_\_

Sonographer: \_\_\_\_\_

Reason for exam/clinical history  
\_\_\_\_\_  
\_\_\_\_\_

Identified       Partially identified       Unable to be identified

Diameter \_\_\_\_\_ mm (Normal <7mm)

Wall Thickness \_\_\_\_\_ mm (Normal <1.7mm)

Compressible  Yes  No

Hyperemic  Yes  No

Hyperechogenic Periappendiceal Fat  Yes  No

Local Dilatation and Hypoperistalsis of bowel in RLQ  Yes  No

Abscess  Yes  No

Appendicolith  Yes  No

Additional findings:  
\_\_\_\_\_  
\_\_\_\_\_

The information contained on this page is used as a communication tool between the Sonographer and the Reading Radiologist.  
IT IS NOT TO BE USED AS A PRELIMINARY REPORT.

## Ultrasound Diagnostic for Appendicitis

### Primary signs:

Max outer diameter >7 mm

Max wall thickness > 1.7 mm

### Secondary signs:

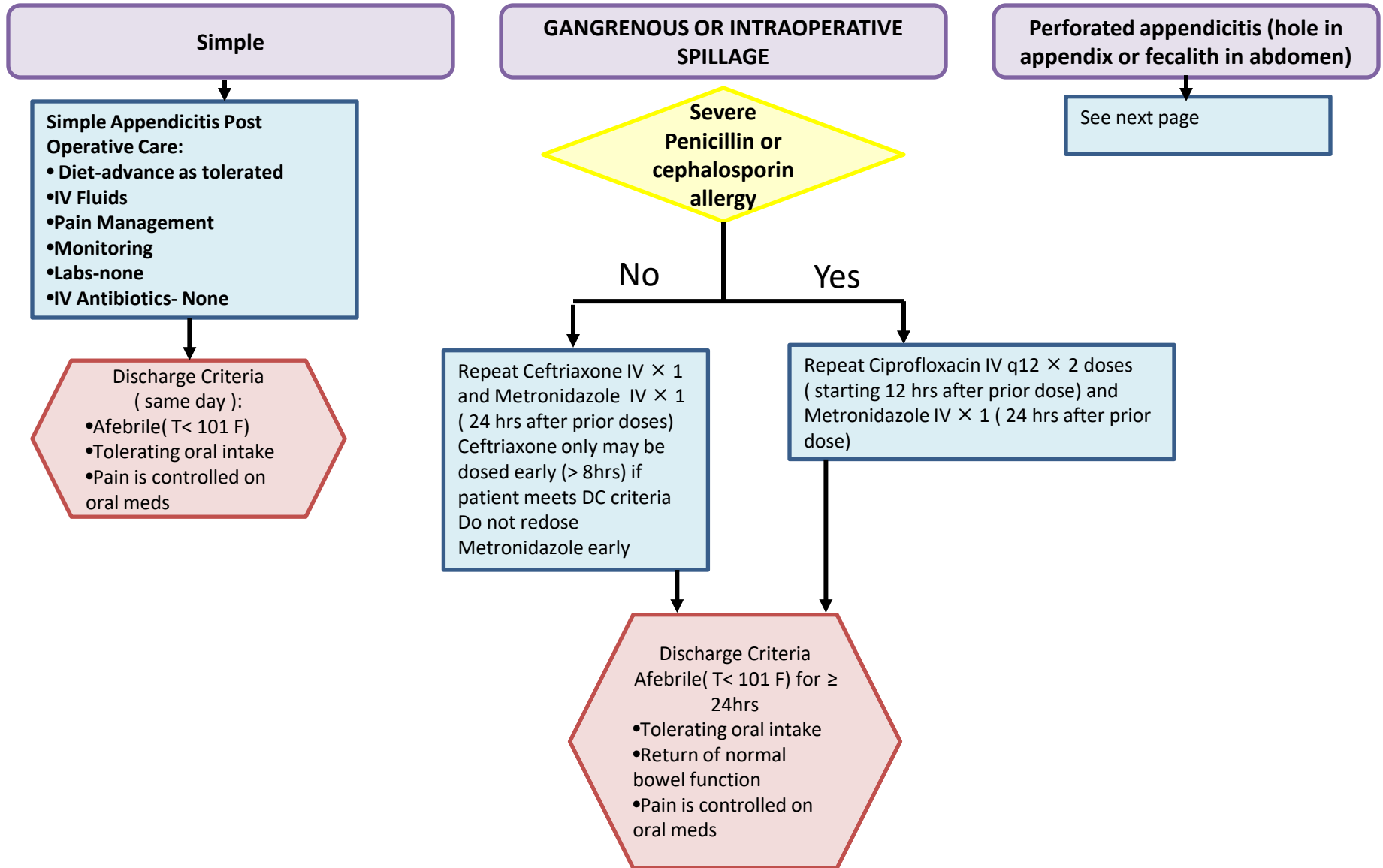
Presence of periappendiceal fat

Presence of a fluid collection

Presence of local dilatation and hypoperistalsis

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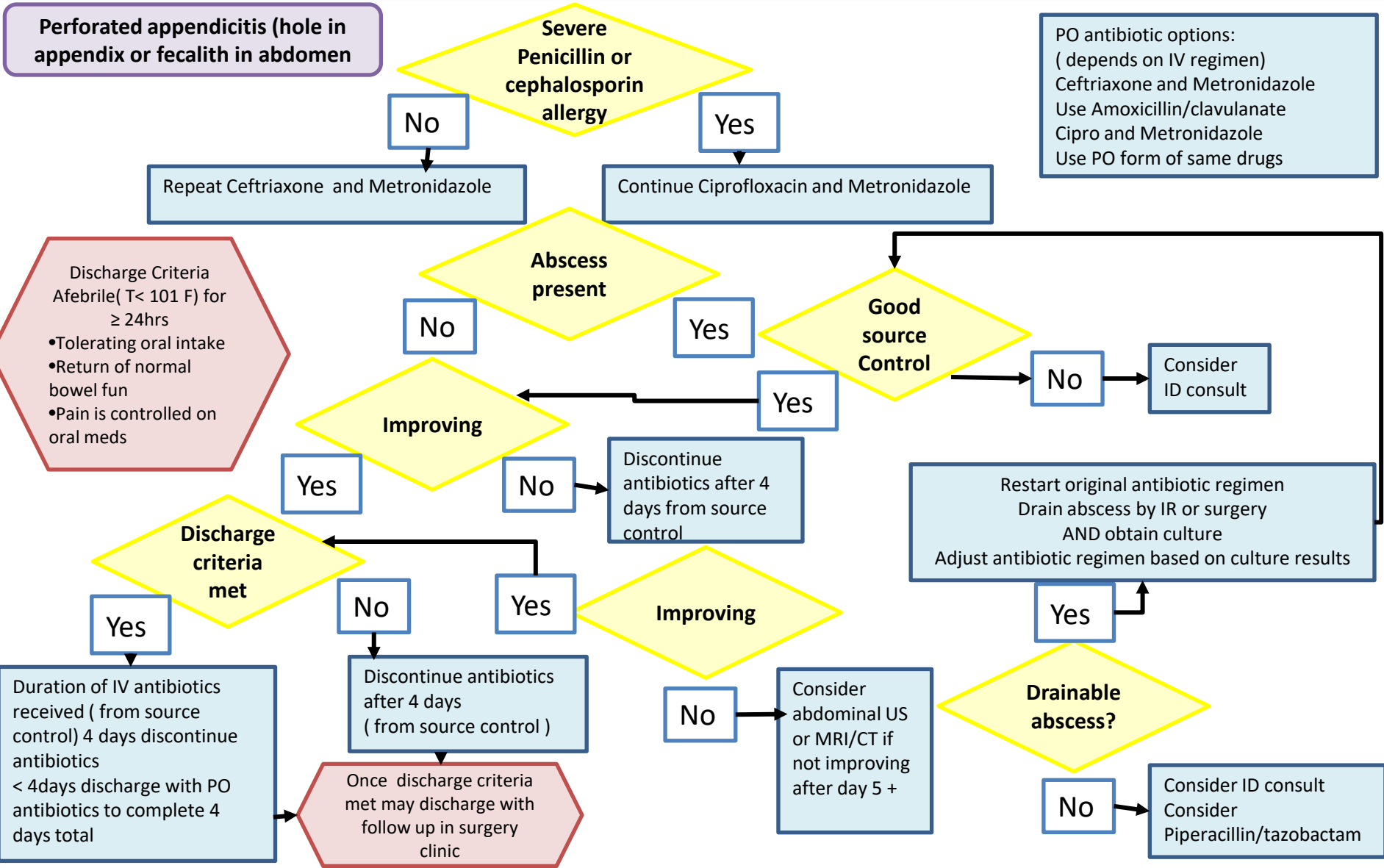
# OR Findings



# Perforated Appendicitis

**Perforated appendicitis (hole in appendix or fecalith in abdomen)**

PO antibiotic options:  
( depends on IV regimen)  
Ceftriaxone and Metronidazole  
Use Amoxicillin/clavulanate  
Cipro and Metronidazole  
Use PO form of same drugs



# Pre Op Surgical Scrub

- Bathe patient (shower or bath wipes)
- Scrub entire abdomen (sternum to pelvis, right flank to left flank) using 2% Chlorhexidine wipes, paying close attention to the umbilicus
  - Follow instructions on the product packaging
- Place clean gown on patient
  - Instruct the patient and family to not touch the cleaned area

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# Executive Summary

## EXECUTIVE SUMMARY

### OBJECTIVES

1. To provide standardized, evidence-based preoperative and postoperative care for patients admitted with non-complicated and complicated appendicitis (this includes diagnosis, admission, surgical treatment, and post-operative care).
2. To limit use of CT scan as a diagnostic tool, by first relying on a standardized appendicitis score for pediatric patients (PAPY score), and by supplementing this data with use of targeted ultrasound.
3. To streamline admission procedures for children with acute appendicitis regardless of time of day or the route of initial presentation (ER, outpatient imaging, hospital transfer).

### RECOMMENDATIONS

1. Diagnostic workup should include history, physical exam, supporting laboratory tests, and ultrasound of the appendix. For females, an ultrasound of the pelvis can also be useful to rule out pelvic source of pain.
2. If diagnosis remains uncertain, a CT scan can be obtained using IV contrast only.
3. For complicated appendicitis, duration of antibiotic treatment should be for total of seven days, with at least the first three in IV form, after which can transition to PO.

### RATIONALE

1. **Safety** will be improved by limiting exposure to ionizing radiation from CT scans during initial stages of diagnosis.
2. **Quality, Efficiency, and Delivery of care** will be improved by eliminating unnecessary steps in the workup, and streamlining admission and preop procedures.
3. **Cost** will be reduced by minimizing application of high cost imaging to only select patients.

### EVIDENCE

\*Salem PJ, Sammons H, Lippman J, et al. Ciprofloxacin safety in pediatrics: A systematic review. *Arch Dis Child (Appendix)*. 2013;98(12):1274-1280.

\*Lee SL, Islam S, Cassidy LD, Abdullah F, Jorgensen MJ, et al. American Pediatric Surgical Association Outcomes and Clinical Guidelines Committee. Antibiotics and appendicitis in the pediatric population: An American pediatric surgical association outcomes and clinical trials committee systematic review. *J Clin Pediatr (Appendix)*. 2013;93(11):1218-1223.

\*Salem PJ, Mays JE, Bradley JS, et al. Diagnosis and management of complicated intra-abdominal infection in adults and children: Guidelines by the surgical infection society and the infectious diseases society of America. *Clin Infect Dis (Appendix)*. 2013;56(1):122-126.

\*Salem PJ, Mays JE, Baron EJ, et al. Guidelines for the selection of anti-infective agents for complicated intra-abdominal infections. *Clin Infect Dis (Appendix)*. 2013;56(1):127-132.

### IMPLEMENTATION ITEMS

1. Pediatric Appendicitis Score (PAPY)—to be included in template for children presenting to ER with chief complaint of abdominal pain.
2. Standardization of order sets
3. Standardization of Preop Scrub
4. Standardization of post-op care through POD#7
5. Patient education materials at time of discharge.

### METRICS PLAN

#### CORE METRICS

1. Length of Stay
2. 7 day and 30 day readmit rate
3. Volume
4. % of total pt with abdominal pain from home who receive either US or CT (already have that)
5. % of total pt presenting with abdominal pain with a final diagnosis of appendicitis (already have that)
6. % of patient with a final diagnosis of appendicitis who receives (This is a little variation of the metric we have which includes the broader abdominal pain)
  - a. An Ultrasound alone
  - b. ACT alone
  - c. Or both

# Order Sets : Appendectomy Admission

**Order** SCH Status Start/Stop

**Sur - Appendectomy Admission**

\*\*Warning: Medication doses may calculate to a greater amount than the maximum dose, depending on the patie...

**Appendectomy Post-Op Admission**

**Quality Indicators**

**Admit to**

Inpatient

Observation

Observation

\* Admit to cpg

Comment

Outpatient

Please document additional diagnoses and modifiers within the problem list.

**Condition**

Critical

Fair

Fair

Good

Serious

Stable

**Isolation**

Per Policy

\* Type of Isolation New

Per Policy

\* Type of Isolation Ordered

**Activity**

**Activity**

Other

Up ad lib

Patient out of bed; encourage ambulation 3 times per day.

**Diet**

NPO (Provider Only)

NPO after midnight

NPO Only

**Clear Liquid Non-Anes/Sed(Provider Only)**

Advance as tolerated

Advance to Soft Diet

Clears Only

Sugar Free

**Nursing**

**Consent for**

Yes

**Pulse Oximeter**

Continuous

Spot check

**Vital Signs**

Routine

Routine

N/R Q1H

N/R Q2H

N/R Q4H

**I & O**

Strict

Notify Provider

Yes

**IV Fluids**

NS

D5 1/2 NS + 20 mEq KCl/Liter (Premix)

- Antibiotics**
- Cefepime [Maxipime IV (40 mg/ml) Ready To Use]
  - \*For patients < 40 kg\*
  - Cefepime [Maxipime IV (40 mg/ml) Ready To Use]
  - \*For patients > 40 kg\*
  - \*Max dose: 2000 mg\*
  - cefOXitin SODIUM [Mefoxin IV (40 mg/ml) Ready To Use]
  - \*Max dose: 12 grams/day\*
  - Ciprofloxacin [Cipro IV Ready To Use]
  - \*For patients < 40 kg\*
  - \*Max 1.2 grams/24 hours\*
  - Ciprofloxacin [Cipro IV Bag]
  - \*For patients > 40 kg\*
  - \*\*For 200 mg and 400 mg doses, select the appropriate Cipro IV bag above (DO NOT CHANGE DOSE for Cipro I...
  - METRONIDazole [Flagyl IV Ready To Use]
  - \*For patients < 66 kg\*
  - METRONIDazole [Flagyl IV Ready To Use]
  - \*For patients > 66 kg\*
  - \*Not to exceed 4 grams/24 hours\*
  - \*Use in combination with ceftriaxone for gangrenous or perforated apendicitis\*
  - Piperacillin/Tazobactam [Zosyn Ready To Infuse]
  - \*For patients < 40 kg\*
  - \*Dosing based on Piperacillin component\*
  - Piperacillin/Tazobactam [Zosyn Ready To Infuse]
  - \*For patients > 40 kg\*
  - \*Not to exceed 16 grams/24 hours\*
- GI Medications**
- Ondansetron [Zofran Injection]
  - \*For patients < 26 kg\*
  - Ondansetron [Zofran Injection]
  - \*For patients > 26 kg\*
  - \*Max dose: 4 mg\*

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# Order Sets: Post op Appendectomy

<b>Sur - Appendectomy Post-Op</b> **Warning Medication doses may calculate to a greater amount than the maximum dose, depending			
<b>Appendectomy Post-Operative</b>			
<b>Admit to</b> <input type="checkbox"/> Inpatient <input type="checkbox"/> Observation <input type="checkbox"/> Observation * Admit to Comment cpg Active Tue Oct 25 21:59			
<b>Isolation</b> <input checked="" type="checkbox"/> Per Policy New Wed Oct 26 11:15 * Type of Isolation Per Policy <input type="checkbox"/> Per Policy Ordered Tue Oct 25 21:59 * Type of Isolation Per Policy			
<b>Activity</b> <input type="checkbox"/> Ambulate TID <input type="checkbox"/> Bedrest <input type="checkbox"/> Other <input type="checkbox"/> Out of bed for activities <input type="checkbox"/> Up ad lib Ordered Tue Oct 25 21:59 <input type="checkbox"/> Up ad lib <input type="checkbox"/> Up to chair			
<b>Diets</b> <input checked="" type="checkbox"/> NPO (Provider Only) <input type="checkbox"/> NPO after midnight <input type="checkbox"/> NPO Only <input checked="" type="checkbox"/> Clear Liquid Non-Anes/Sed(Provider Only) <input type="checkbox"/> Advance as tolerated <input type="checkbox"/> Diet For Age (Provider Only) <input type="checkbox"/> Yes			
<b>Nursing</b> <input checked="" type="checkbox"/> Vital Signs <input type="checkbox"/> Routine Ordered Tue Oct 25 21:59 <input type="checkbox"/> Routine <input type="checkbox"/> N/R Q4H <input checked="" type="checkbox"/> I & O <input type="checkbox"/> Strict <input type="checkbox"/> Continue Foley <input type="checkbox"/> Yes Foley urinary cath to drain. <input type="checkbox"/> NG/NJ Maintenance <input type="checkbox"/> Yes NG to low intermittent suction. <input checked="" type="checkbox"/> Wound Care/Dressing Changes <input type="checkbox"/> Yes If drain present, change dressing every shift and as needed if soiled.			
<b>QI</b> <input type="checkbox"/> VTE Risk Assessment <input type="checkbox"/> Yes			
<b>Respiratory</b> <input checked="" type="checkbox"/> Pulse Oximeter <input type="checkbox"/> Continuous P <input type="checkbox"/> Spot check P <input type="checkbox"/> Oxygen <input type="checkbox"/> Yes <input type="checkbox"/> Cardiac/Apnea Monitor <input type="checkbox"/> Yes <input checked="" type="checkbox"/> Incentive Spirometer <input type="checkbox"/> Q2H while awake			
<b>Laboratory</b> <input checked="" type="checkbox"/> CBC WITH AUTOMATED DIFF <input type="checkbox"/> Routine			
<b>IV Fluids</b> <input checked="" type="checkbox"/> D5 1/2 NS + 20 mEq KCl/Liter (Premix)			
<b>Medications</b>			
<b>Antibiotics</b> <input type="checkbox"/> ceFOXitin SODIUM [Mefoxin IV (40 mg/ml) Ready To Use] <input type="checkbox"/> 1,270 mg IV Q6H injection SCH 40 mg/kg IV Q6 Maximum Dose: 2,000 MG <input type="checkbox"/> METRONIDazole [Flagyl IV Ready To Use] <input type="checkbox"/> 240 mg IV Q6H injection SCH 7.5 mg/kg/dose IV Q6 *Max dose: 4 grams/24 hours* <input type="checkbox"/> Piperacillin/Tazobactam [Zosyn Ready To Infuse] <input type="checkbox"/> 3,170 mg IV Q8H injection SCH 100 mg/kg/dose* IV Q8 Maximum Dose: 4,000 MG *For patients < 40 kg* *Dosing based on Piperacillin component* <input type="checkbox"/> Piperacillin/Tazobactam [Zosyn Ready To Infuse] <input type="checkbox"/> 3,000 mg IV Q6H injection SCH *For patients > 40 kg* *Max dose: 16 grams/24 hours*			
<b>Analgesics/Anesthetics</b> <input type="checkbox"/> Acetaminophen [Tylenol Liquid (160 mg/5 ml)] <input checked="" type="checkbox"/> 475 mg PO Q4HPRN liquid PRN New Wed Oct 26 11:07 Edit P 15 mg/kg Q4HPRN (160 mg/5 ml) Maximum Dose: 650 MG <input type="checkbox"/> 480 mg PO Q4HPRN liquid PRN Active Tue Oct 25 21:59 Edit P *For patients < 43 kg* <input checked="" type="checkbox"/> Acetaminophen [Tylenol Liquid (160 mg/5 ml)] <input type="checkbox"/> 480 mg PO Q4HPRN liquid PRN Active Tue Oct 25 21:59 Edit P *For patients > 43 kg* <input checked="" type="checkbox"/> Acetaminophen [Tylenol Suppository] *For patients < 43 kg* <input checked="" type="checkbox"/> Acetaminophen [Tylenol Suppository] *For patients > 43 kg*			
<b>Discharge for Simple Appendectomy</b> <input type="checkbox"/> Discharge Criteria <input checked="" type="checkbox"/> Yes New Fri Oct 28 11:31 Edit * Discharge Criteria For Simple Appendectomy: <ul style="list-style-type: none"> <li>Afebrile( T &lt; 101 F)</li> <li>Tolerating oral intake</li> <li>Pain is controlled on oral meds</li> </ul> <input type="checkbox"/> Discharge Home <input checked="" type="checkbox"/> Yes New Fri Oct 28 11:31 Edit Comment Conditional Comment When patient with a simple appendectomy meets discharge criteria . Fax all paperwork to PCP and Surgery office. <input type="checkbox"/> Followup Appointment <input checked="" type="checkbox"/> Yes New Fri Oct 28 11:31 Edit * Comment With simple appendectomy:Patient is to F/U if fever, concerns with wound infection, increased pain, or additional concerns. <input type="checkbox"/> School Excuse <input checked="" type="checkbox"/> Yes New Fri Oct 28 11:30 Edit <input type="checkbox"/> Work Excuse <input checked="" type="checkbox"/> Yes New Fri Oct 28 11:30 Edit			

# References

- Adefurin A, Sammons H, Jacqz-Aigrain E, Choonara I. Ciprofloxacin safety in paediatrics: A systematic review. *Arch Dis Chil[Appendectomy]*.2011;96(9):874-880
- Lee SL, Islam S, Cassidy LD, Abdullah F, Arca MJ, 2010 American Pediatric Surgical Association Outcomes and Clinical Trials,Committee. Antibiotics and appendicitis in the pediatric population: An american pediatric surgical association outcomes and clinical trials committee systematic review. *J Pediatr Surg [Appendectomy]*. 2010;45(11):2181-2185.
- Solomkin JS, Mazuski JE, Bradley JS, et al. Diagnosis and management of complicated intra-abdominal infection in adults and children: Guidelines by the surgical infection society and the infectious diseases society of america. *Clin Infect Dis [Appendectomy]*. 2010;50(2):133-164.
- Solomkin JS, Mazuski JE, Baron EJ, et al. Guidelines for the selection of anti-infective agents for complicated intra-abdominal infections. *Clin Infect Dis [Appendectomy]*. 2003;37(8):997-1005
- Seattle Children’s Hospital, Ledbetter D, Mazor S, Beardsley E, Hsieh V, Magin J, Moriarty E, Leu M, Popalisky J. 2014 July. Appendicitis Pathway. Available from: <http://etch-etchnet/intranet/departments/Policies/nssup/1006633.pdf?CFID=46056&CFTOKEN=13327542>

# Physician Disclaimers: Appendicitis Care Map

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The authors of this Care Map have checked with sources believed to be the most current and reliable in their efforts to provide information that is complete and generally in accord with the standards accepted at the time of publication.

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# Contact and Revisions Number

- **For questions concerning this care map, contact: [CareMap@etch.com](mailto:CareMap@etch.com)**
- **Last Update: 06/01/21**