



# Pediatric Appendicitis

Jeannie Chun, MD  
March 19, 2021



## Conflicts of interest

- Planning Committee & Faculty Disclosure: The Planning Committee and Faculty have no relevant financial relationships with commercial interests to disclose.



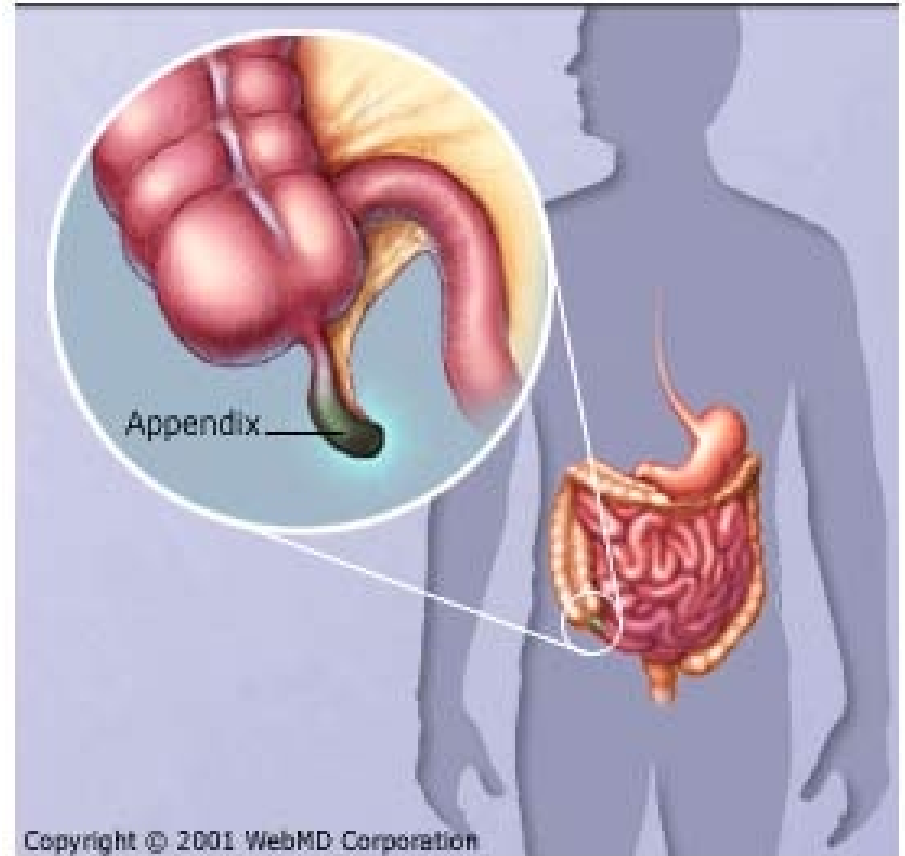
# Acute Appendicitis

- Most common surgical emergency in North America
- 5-10% of all pediatric ED patients are evaluated for potential acute appendicitis nationwide
- In US, highest incidence found in ages 10-19



- Blind ending diverticulum from base of cecum

## Appendicitis





# Classic Symptom Sequence

- Vague periumbilical pain
- Anorexia
- Nausea/vomiting
- Migration of pain to right lower quadrant
- Low grade fever
- Onset within past 24-36 hours



## Case

- Teenage female
- Awakened out of state with vague abdominal pain, localized to RLQ
- Associated with 2 episodes of emesis
- Improved but persistent mild pain next day and over next 12 days



## Case (2)

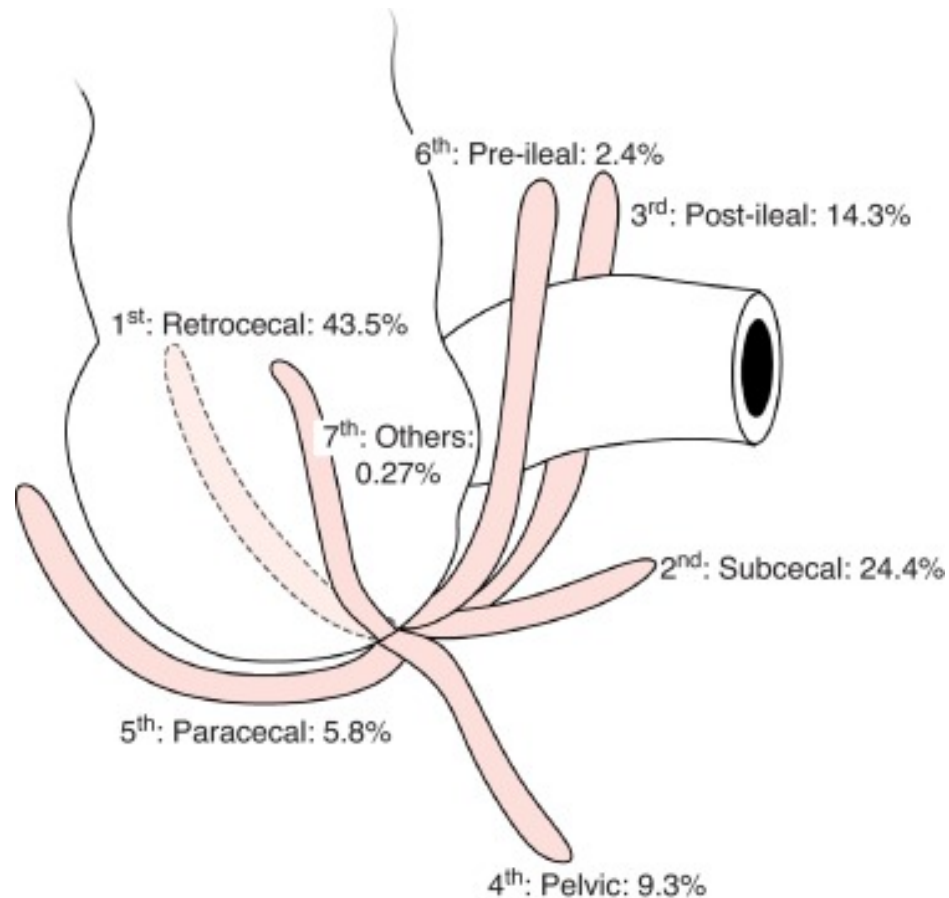
- Associated with anorexia
- Worsened in intensity, especially with voiding
- Presented to UC, sent to ED
- WBC 22.5
- US: inflammatory changes, right adnexal mass 7 x 8 x 10 cm







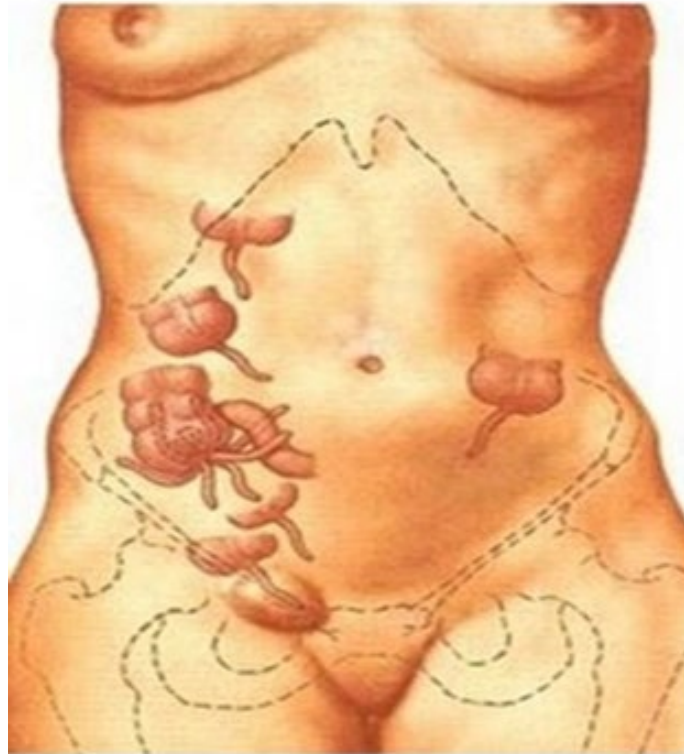
# Appendix Positions





# Appendix Positions

Variation in position in appendix





## Appendicitis CQI Workgroup

- Multidisciplinary: Peds ED, Radiology, Surgery, Biostatistician, Regional Program Manager for Children's Clinical Standardization
- Clinical Dashboard
- Meets monthly

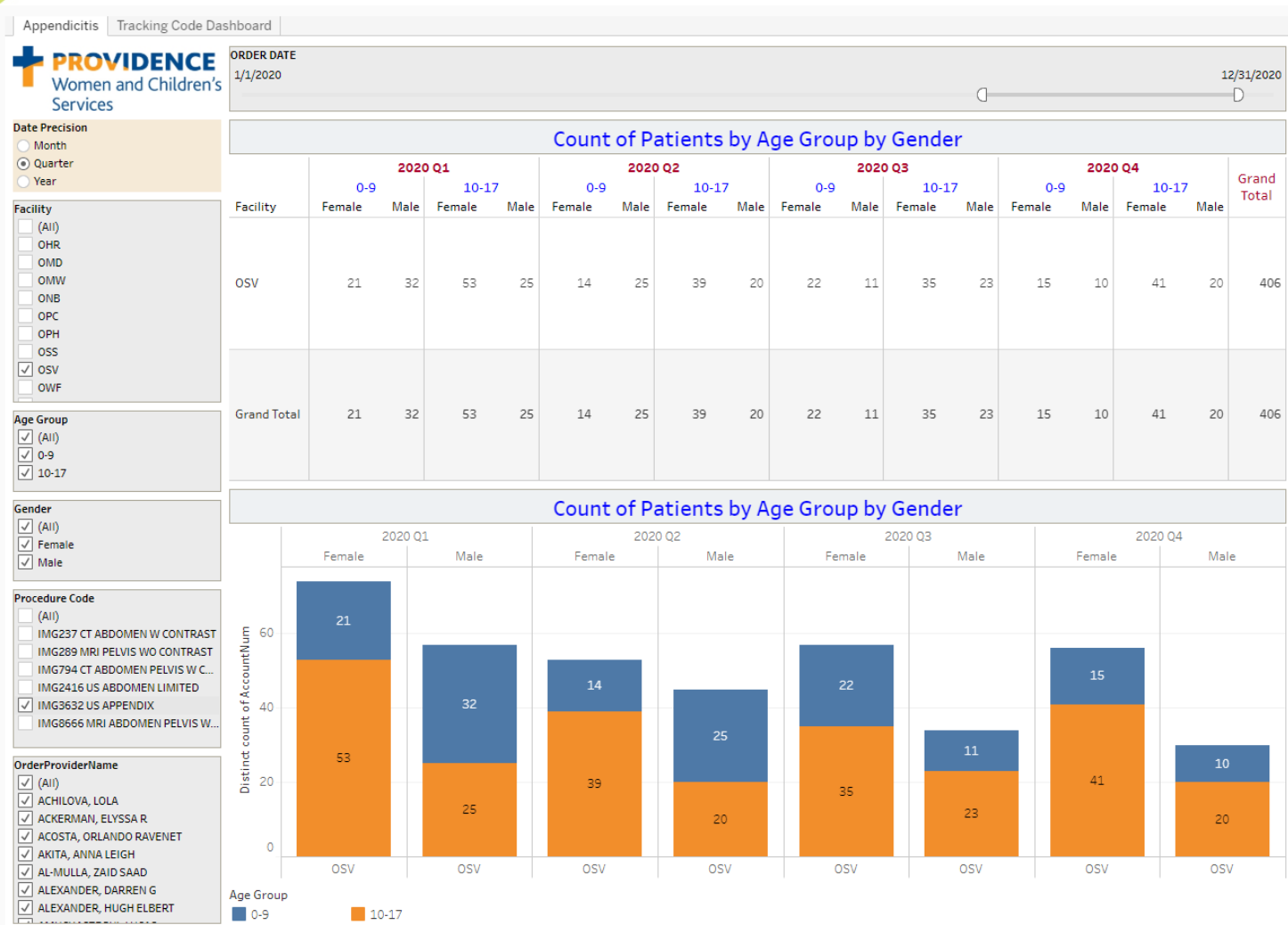


# Appendicitis CQI Agenda

- Dashboard Review
  - Ultrasound
    - Diagnostic rate
    - Symptom Duration
  - CT
  - MRI
  - Uncomplicated/Complicated



# Appendicitis CQI Tableau Dashboard





# Ultrasound Appendix

- Preferred first imaging choice in children
- Systematic approach
- Graded compression



# Ultrasound Appendix Key Findings

- Visualization
- Appendiceal Mural Hyperemia
- Compressibility
- Fecalith
- Tenderness on Exam
- Echogenic Fat
- Fluid Collection



## Ultrasound Appendix Providence 2020

OHR	OMD	OMW	ONB	OPH	OSS	OWF	OSV
43	67	53	87	16	5	95	415

- Total 781 pediatric patients
- Providence St Vincent (OSV) with highest volume





## 2020 Ultrasound Appendix

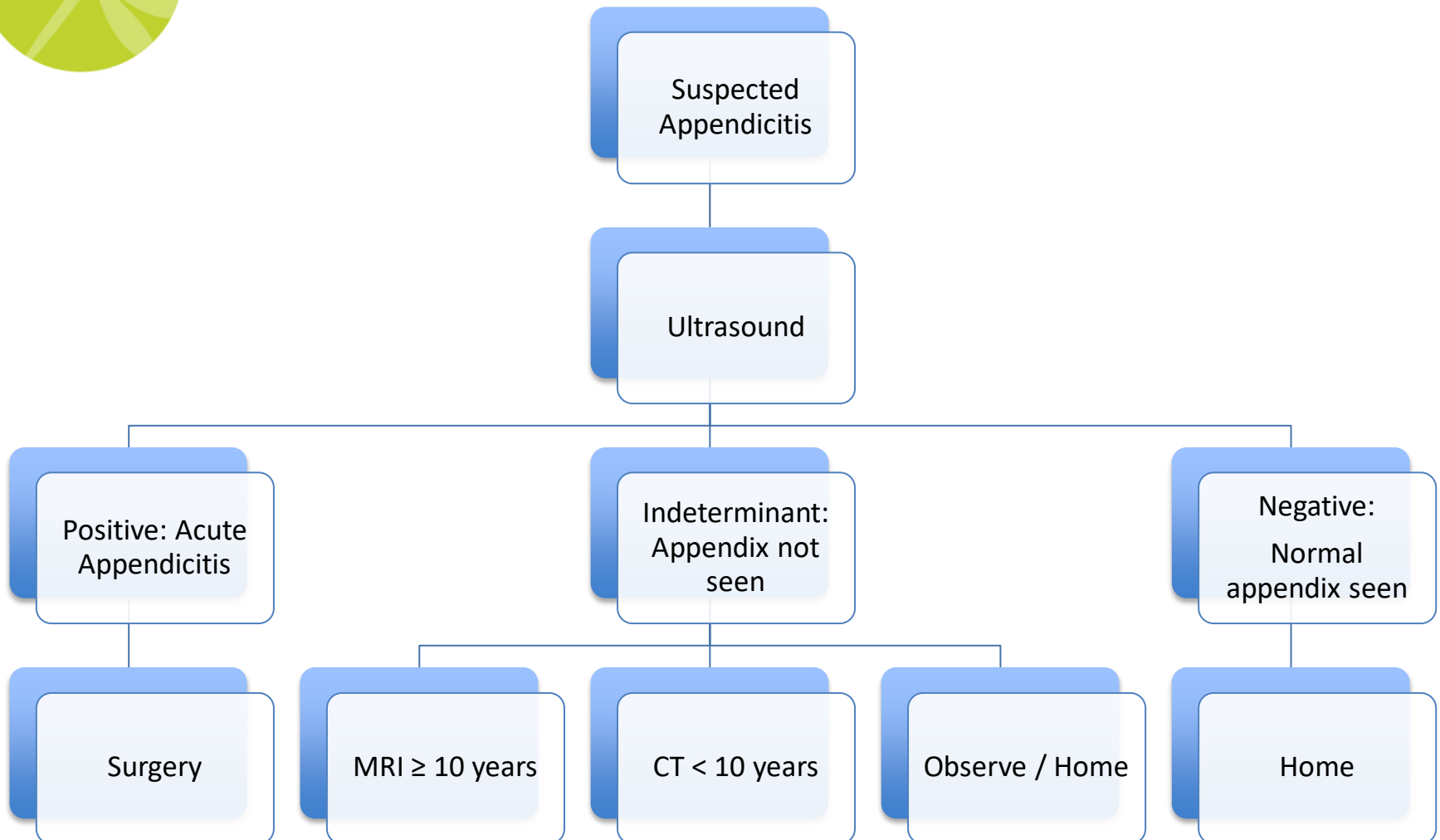
- Diagnostic rates were 49.4% at OSV
- Compared to 28% at referring Oregon ministries

OHR	OMD	OMW	ONB	OPH	OSS	OWF	OSV
17/43	15/67	24/53	28/87	6/16	0/5	13/95	205/415
39.5%	22.4%	45.3%	32.3%	37.5%	0	13.7%	49.4%



## Further Imaging

- MRI
- CT





# MRI Protocol

- Performed after indeterminant ultrasound
- Age greater than equal to 10 years
- No IV or PO contrast
- No sedation
- Short protocol of 8 sequences (30 minutes)



## 2020 OSV MRI

- Total 65
- Female 45: Male 20
- Diagnoses: normal appendix (16); no associated signs of inflammation (23); other (4): pyosalpinx (1), colitis (3); appendicitis (22)



## 2020 Regional MRI

OHR	OMD	OMW	ONB	OPH	OSS	OWF	OSV
0	0	0	6	0	0	1	65



## 2020 OSV CT

- Total 55
- Female 29: Male 26
- Diagnoses: normal appendix (32); other (12): enteritis (3), renal stone/abscess (3), constipation (2), SMV thrombus (1), ovarian torsion (1), SMA syndrome (1), ulcer dx (1); appendicitis (11)



## 2020 Regional CT

OHR	OMD	OMW	ONB	OPH	OSS	OWF	OSV
22	66	40	24	15	8	50	55





# Uncomplicated Acute Appendicitis

- Operative vs Nonoperative



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## ***Research Brief***

# Perspectives on Pediatric Appendicitis and Appendectomy During the Severe Acute Respiratory Syndrome Coronavirus 2 Pandemic

Stephanie F. Polites, MD, MPH, and Kenneth S. Azarow, MD

In conclusion, management of acute appendicitis in children will be challenged by the SARS-CoV-2 pandemic. With comparable outcomes for operative and NOM of UA, hospitals must consider capacity and resources in determining the best course of action.



# Complicated Acute Appendicitis

- Operative vs Nonoperative



# Appendectomies 2020

- Total OSV = 131
  - 35 complicated
  - 14 Interval Appendectomies
  - 16 Open Appendectomies



## Boston Children's 1/10-3/18

- Equivocal ultrasound
- Examined symptom duration in 24 hours intervals and WBC count
- 1018 patients
- Negative Predictive Value of equivocal ultrasound increased significantly with increasing symptom duration
- No patient with equivocal ultrasound, > 72 hours symptoms, and normal WBC had appendicitis



## Symptom Duration

- <24 hours
- 24-48 hours
- 48-72 hours
- >72 hours



# Narcotics Prescriptions

- System wide post-appendectomy multimodal pain strategy
- 5 month period in 2018 compared to 2017
- Average doses per patient decreased from 9.6 to 2.6
- Percentage of children prescribed narcotics decreased from 66 to 23 %



## Questions?

- Phone number: 503-216-6050
- Fax number: 971-282-0103
- Epic code for internal referrals: REF84BB
- Pediatric Emergency Room: 503-216-2361
- Diagnostic Imaging: Exam: 503-216-2167
  - Consult: 503-216-4830
- Transfer Center: 503-216-7768





## Questions?

- Jeannie Chun, MD
- [jeannie.chun@providence.org](mailto:jeannie.chun@providence.org)