Clinical Pathways

# Preseptal and Orbital Cellulitis

Majida Gaffar, MD
Eric Hoppa, MD
Scott Schoem, MD
Ebla Abd Alrahman, MD

Connecticut Children's

BEST CHILDREN'S HOSPITALS U.S.News RANKED IN 4 SPECIALTIES 2018-19

MAGNET RECOGNIZED AMERICAN NURSES CREDENTIALING CENTER

2019 WOMEN'S CHOICE AWARD® BEST CHILDREN'S HOSPITALS

# What is a Clinical Pathway?

An evidence-based guideline that decreases unnecessary variation and helps promote safe, effective, and consistent patient care.

# Pathway Objectives

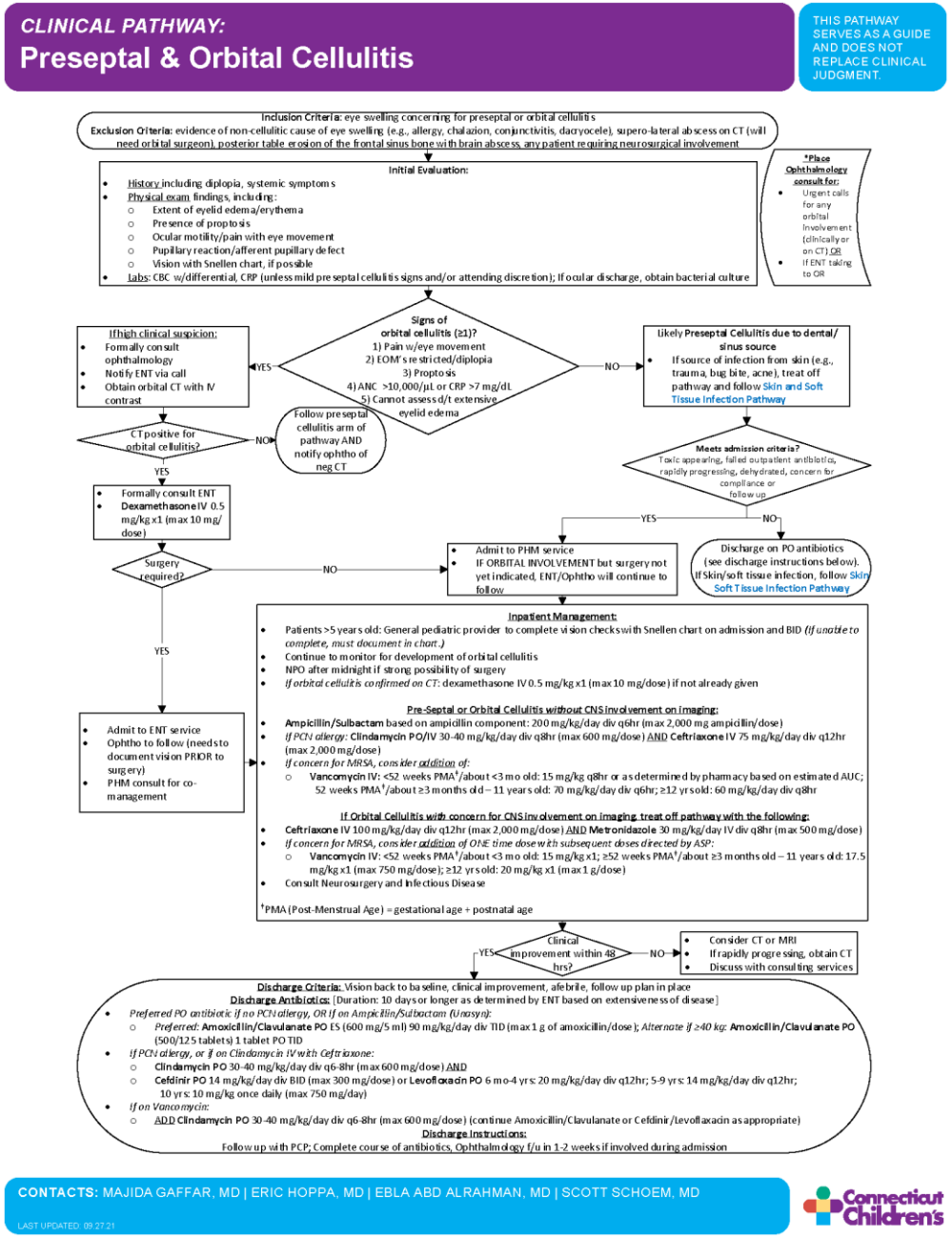
- To quickly identify patients with orbital cellulitis who may require surgery
- To identify those patients who require a CT Scan
- To improve coordination of the multiple subspecialists often involved in care of this group of patients
- To standardize antibiotics for these infections

# Why is the Pathway Necessary?

- Orbital cellulitis is a fairly rare condition but has significant complications
- Requires the coordinated efforts of multiple services
- Important to define the responsibilities of each service
- CT imaging of the orbit is needed to determine the need for surgery, but currently there is no standard for when to get imaging
- Need to standardize recommended antibiotics

This is the Pre-septal and Orbital Cellulitis Clinical Pathway.

We will be reviewing each component in the following slides.



*CLINICAL PATHWAY:*

# Preseptal & Orbital Cellulitis

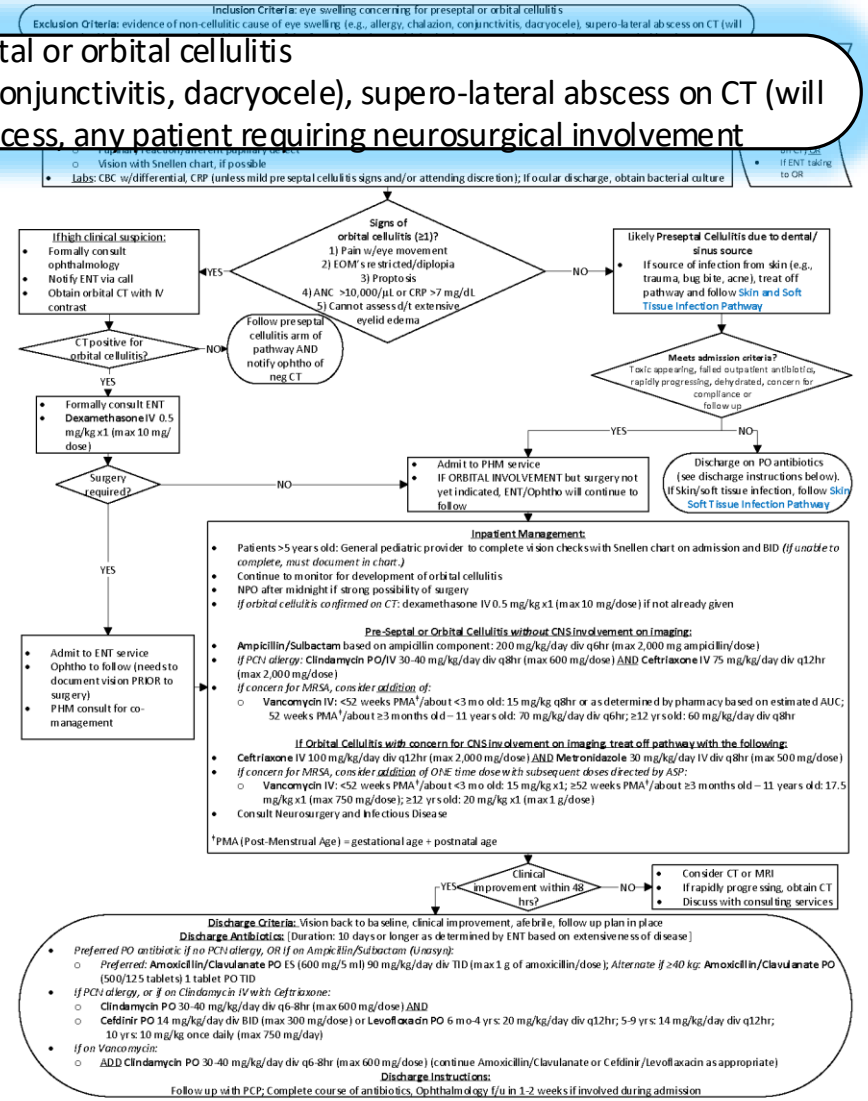
THIS PATHWAY SERVES AS A GUIDE AND DOES NOT REPLACE CLINICAL JUDGMENT.

**Inclusion Criteria**: eye swelling concerning for preseptal or orbital cellulitis

**Exclusion Criteria:** evidence of non-cellulitic cause of eye swelling (e.g., allergy, chalazion, conjunctivitis, dacryocele), supero-lateral abscess on CT (will need orbital surgeon), posterior table erosion of the frontal sinus bone with brain abscess, any patient requiring neurosurgical involvement

**Inclusion Criteria:** eye swelling and concern for cellulitis

*NOTE: If cellulitis is clearly the result of a break in the skin (i.e., infected insect bite), consider using the Skin and Soft Tissue Infection (SSTI) pathway.





**CONTACTS:** MAJIDA GAFFAR, MD | ERIC HOPPA, MD | EBLA ABD ALRAHMAN, MD | SCOTT SCHOEM, MD



LAST UPDATED: 09.27.21

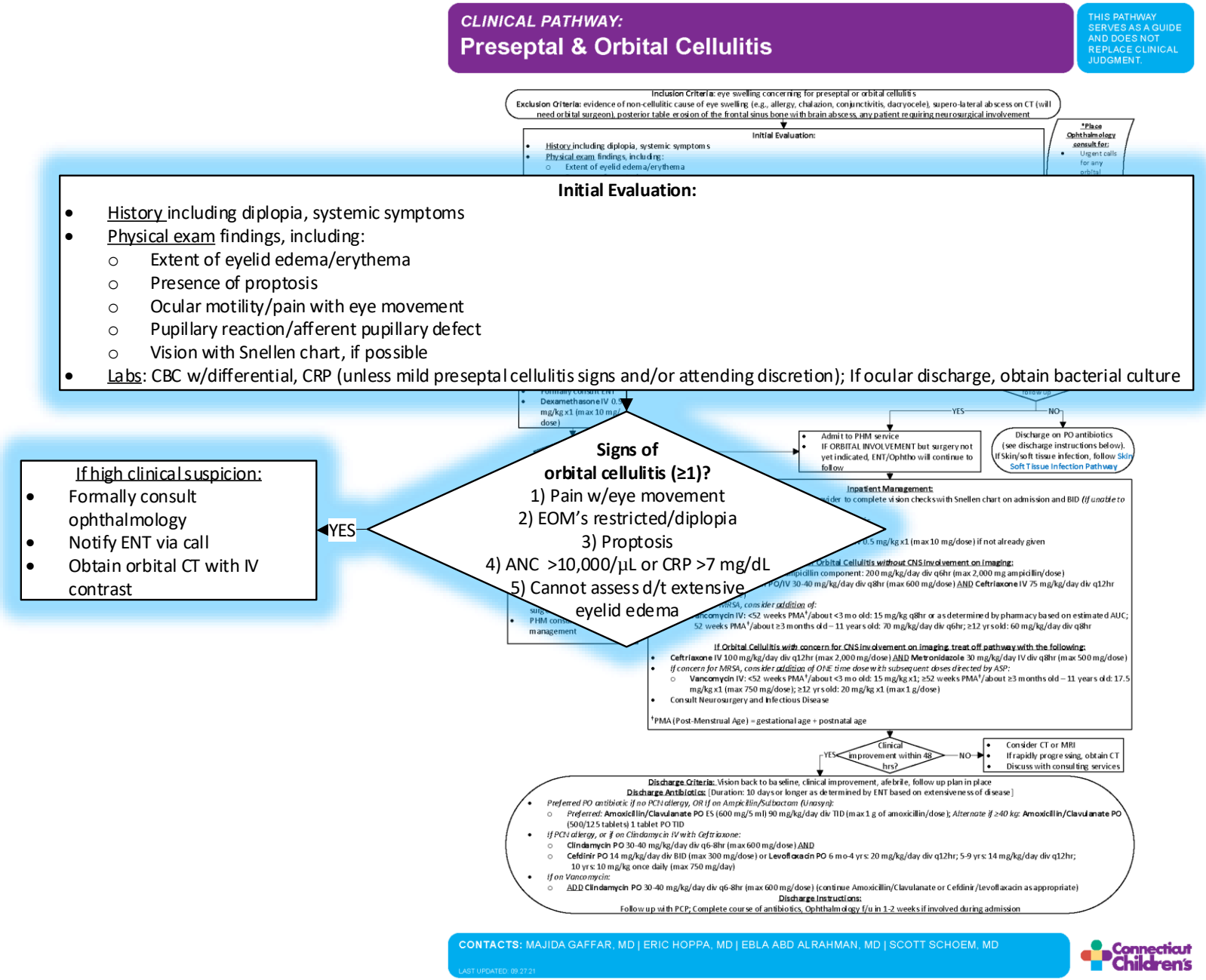
## Initial evaluation:

The initial evaluation helps determine if orbital cellulitis is present.

Symptoms that indicate a concern for orbital cellulitis and subsequent need for a CT include:

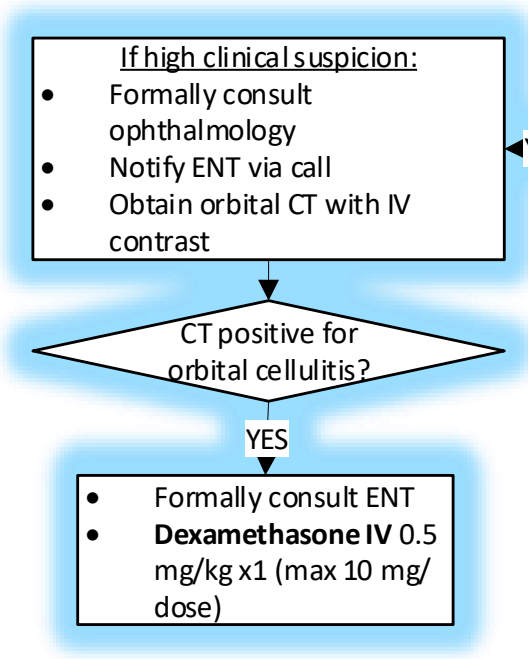
- Pain with eye movement
- EOM's restricted or diplopia
- Proptosis
- ANC >10,000 (ANC = WBC x [%neutrophils + %bands])
- Cannot assess above due to extensive eyelid edema

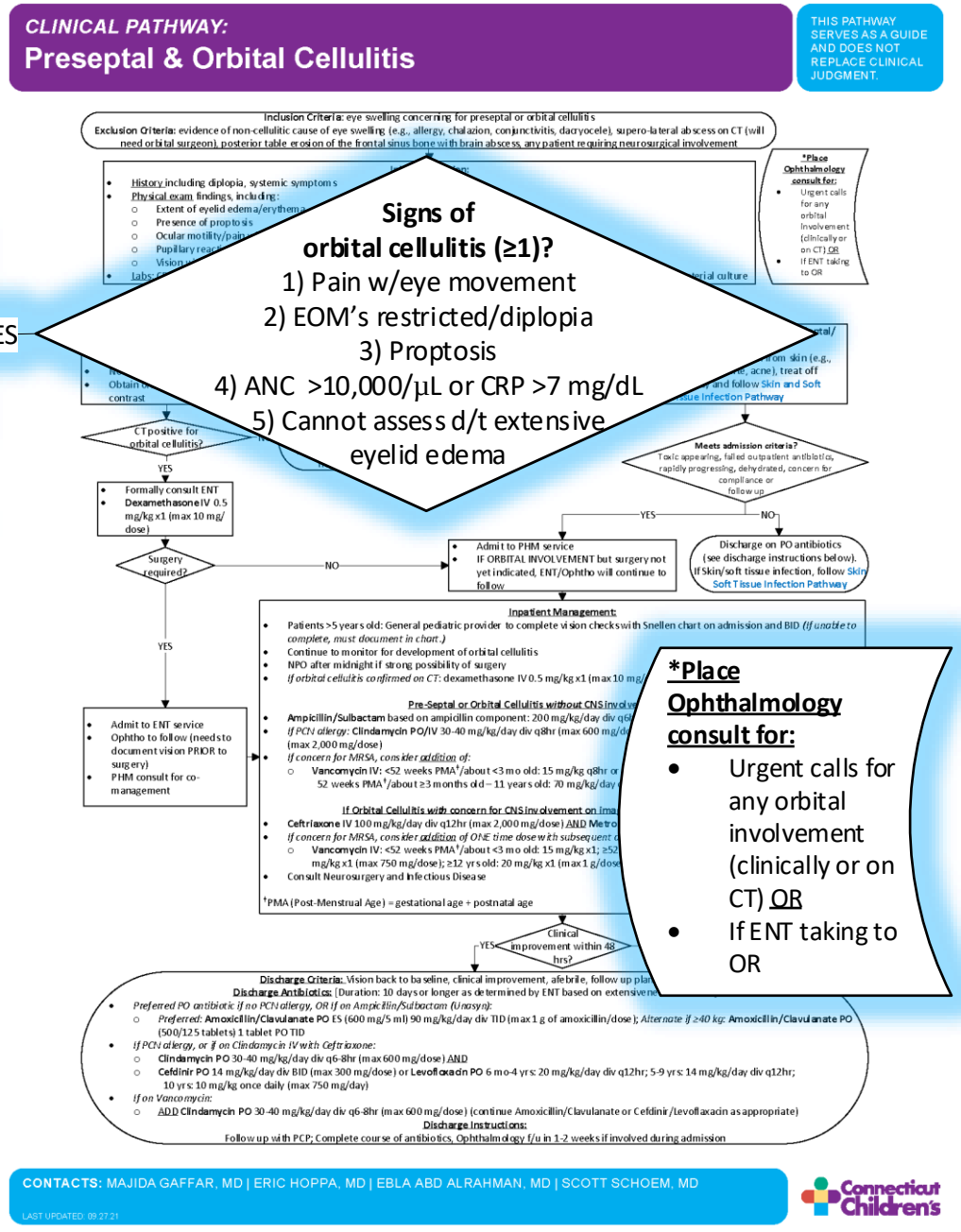
The provider may always order a CT if there is clinical suspicion.



**Timely communication is <u>essential</u>** if there is a high clinical suspicion for orbital cellulitis based on the initial examination alone.

- Formally consult ophthalmology, notify ENT (with a call) and obtain a CT.
- If the CT is positive, formally consult ENT and administer steroids.

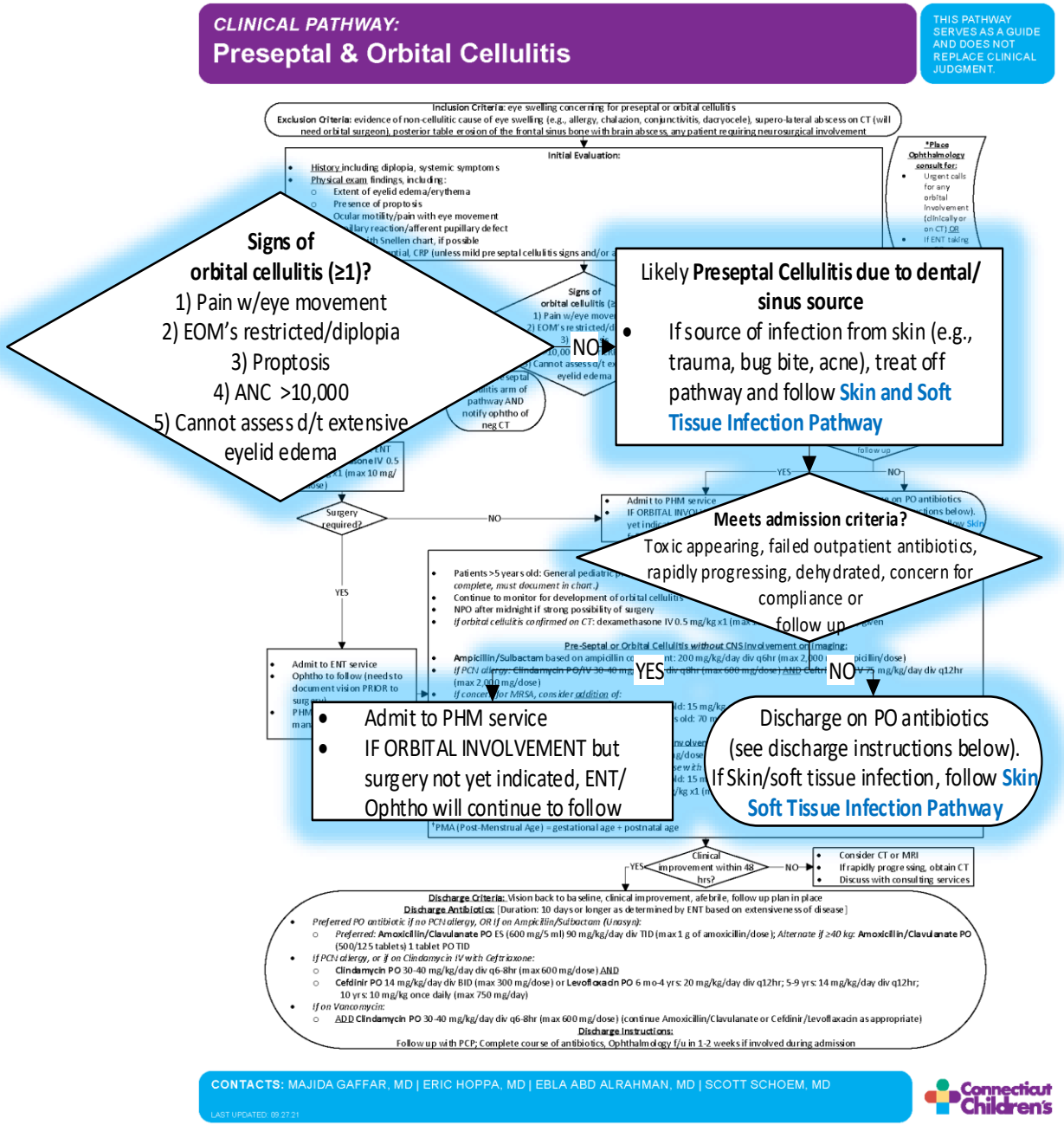


If there is low suspicion for orbital cellulitis and/or the CT is negative, the diagnosis is likely preseptal cellulitis due to a dental or sinus source.

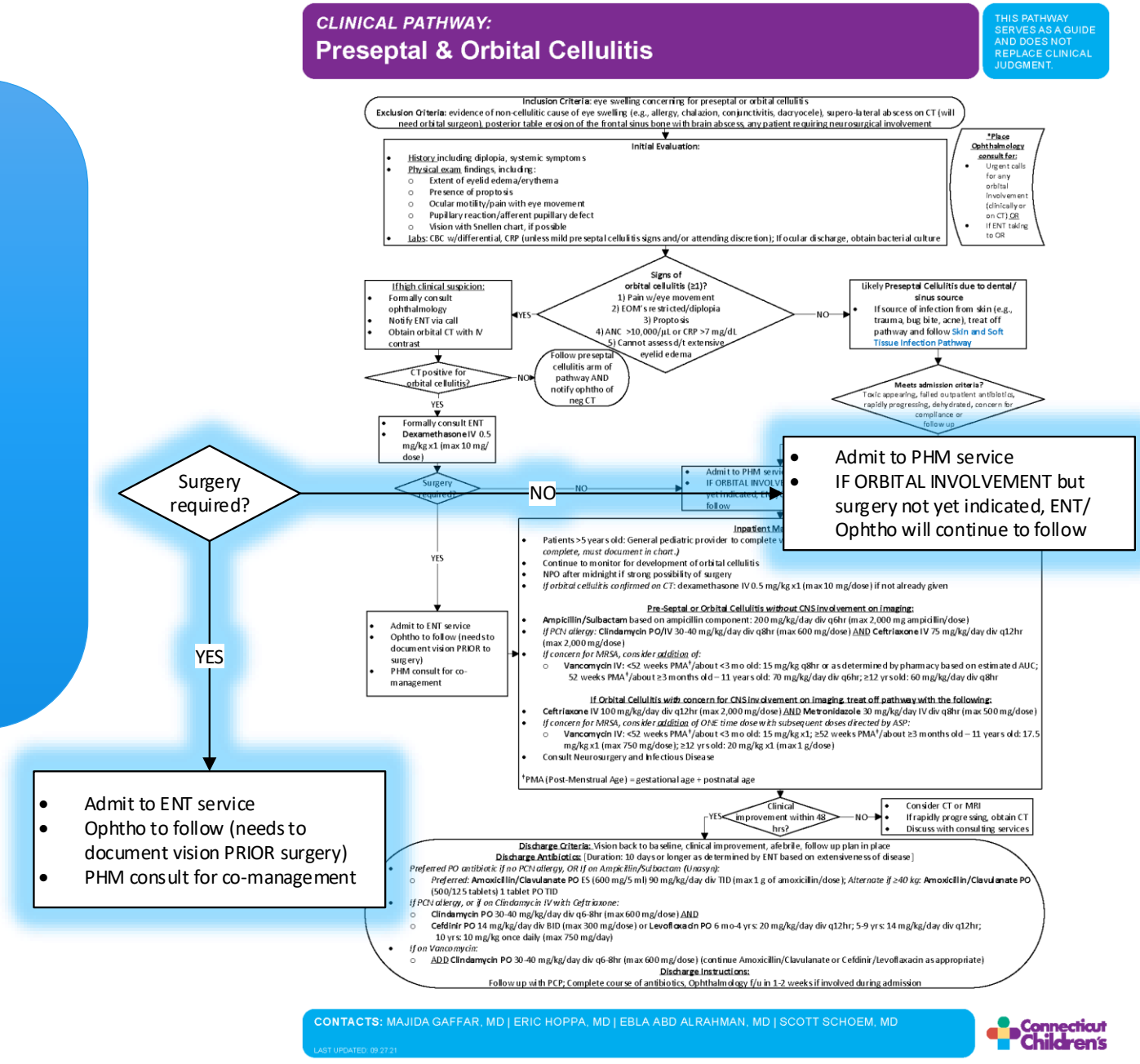
If the source of infection is from the skin, we recommend following the Skin and Soft Tissue Infection Pathway – which outlines more appropriate antibiotics based on likely pathogens.

Those with preseptal cellulitis may either be discharged or admitted based on specific criteria.



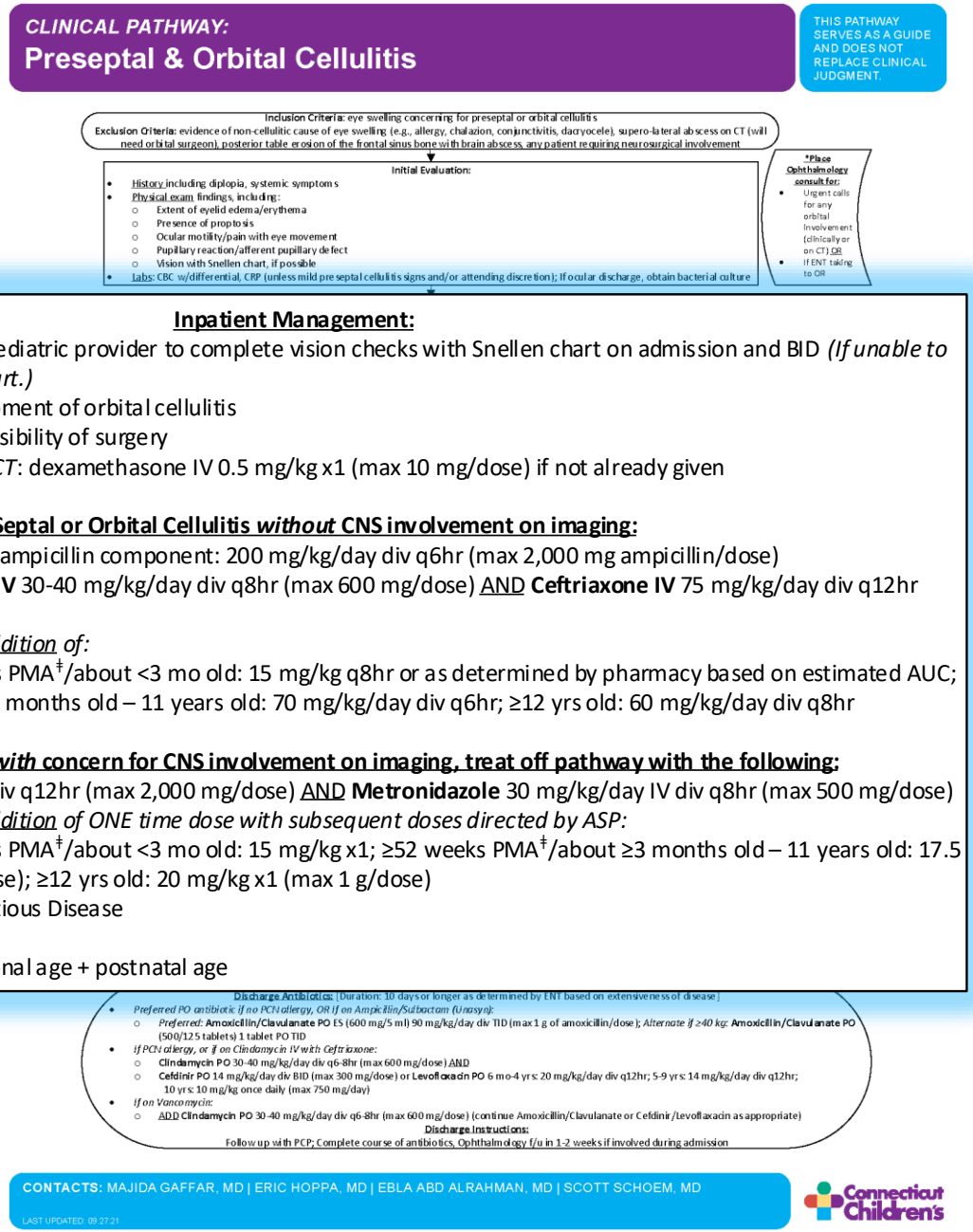
## Determining admitting service

- Orbital cellulitis with surgical intervention: admit to ENT with Pediatric Hospital Medicine (PHM) co-management
  - Ophthalmology will follow
- Orbital cellulitis but surgery not indicated: admit to PHM
  - ENT and Ophthalmology will follow
- Preseptal Cellulitis: admit to PHM



## Inpatient assessments

- Pediatric provider to do vision checks with Snellen chart upon admission, then twice daily.
  - MUST document results in the chart (particularly if not able to be done)
- Contact ENT and Ophthalmology IMMEDIATELY if there is a change!
- Snellen charts will be available in pod B of med/surg units



CLINICAL PATHWAY:

Preseptal & Orbital Cellulitis

THIS PATHWAY SERVES AS A GUIDE AND DOES NOT REPLACE CLINICAL JUDGMENT.

**Inclusion Criteria:** eye swelling concerning for preseptal or orbital cellulitis

**Exclusion Criteria:** evidence of non-cellulitic cause of eye swelling (e.g., allergy, chalazion, conjunctivitis, dacryocele), supero-lateral abscess on CT (will need orbital surgeon), posterior table erosion of the frontal sinus bone with brain abscess, any patient requiring neurosurgical involvement

**Initial Evaluation:**

- History including diplopia, systemic symptoms
- Physical exam findings, including:
  - Extent of eyelid edema/erythema
  - Presence of proptosis
  - Ocular motility/pain with eye movement
  - Pupillary reaction/afferent pupillary defect
  - Vision with Snellen chart, if possible
- Labs: CBC w/differential, CRP (unless mild preseptal cellulitis signs and/or attending discretion); If ocular discharge, obtain bacterial culture

***Place Ophthalmology consult for:**

- Urgent calls for any orbital involvement (clinically or on CT) OR
- If ENT taking to OR

**Inpatient Management:**

- Patients >5 years old: General pediatric provider to complete vision checks with Snellen chart on admission and BID *(If unable to complete, must document in chart.)*
- Continue to monitor for development of orbital cellulitis
- NPO after midnight if strong possibility of surgery
- *If orbital cellulitis confirmed on CT*: dexamethasone IV 0.5 mg/kg x1 (max 10 mg/dose) if not already given

**Pre-Septal or Orbital Cellulitis *without* CNS involvement on imaging:**

- **Ampicillin/Sulbactam** based on ampicillin component: 200 mg/kg/day div q6hr (max 2,000 mg ampicillin/dose)
- *If PCN allergy:* **Clindamycin PO/IV** 30-40 mg/kg/day div q8hr (max 600 mg/dose) AND **Ceftriaxone IV** 75 mg/kg/day div q12hr (max 2,000 mg/dose)
- *If concern for MRSA, consider addition of:*
  - **Vancomycin IV:** <52 weeks PMA‡/about <3 mo old: 15 mg/kg q8hr or as determined by pharmacy based on estimated AUC; ≥52 weeks PMA‡/about ≥3 months old – 11 years old: 70 mg/kg/day div q6hr; ≥12 yrs old: 60 mg/kg/day div q8hr

**If Orbital Cellulitis *with* concern for CNS involvement on imaging, treat off pathway with the following:**

- **Ceftriaxone IV** 100 mg/kg/day div q12hr (max 2,000 mg/dose) AND **Metronidazole** 30 mg/kg/day IV div q8hr (max 500 mg/dose)
- *If concern for MRSA, consider addition of ONE time dose with subsequent doses directed by ASP:*
  - **Vancomycin IV**: <52 weeks PMA‡/about <3 mo old: 15 mg/kg x1; ≥52 weeks PMA‡/about ≥3 months old – 11 years old: 17.5 mg/kg x1 (max 750 mg/dose); ≥12 yrs old: 20 mg/kg x1 (max 1 g/dose)
- Consult Neurosurgery and Infectious Disease

‡PMA (Post-Menstrual Age) = gestational age + postnatal age

**Discharge Antibiotics:** [Duration: 10 days or longer as determined by ENT based on extensiveness of disease]

- *Preferred PO antibiotic if no PCN allergy, OR if on Ampicillin/Sulbactam (Unasyn):*
  - *Preferred:* **Amoxicillin/Clavulanate PO** ES (600 mg/5 ml) 90 mg/kg/day div TID (max 1 g of amoxicillin/dose); *Alternate if ≥40 kg:* **Amoxicillin/Clavulanate PO** (500/125 tablets) 1 tablet PO TID
- *If PCN allergy, or if on Clindamycin IV with Ceftriaxone:*
  - **Clindamycin PO** 30-40 mg/kg/day div q6-8hr (max 600 mg/dose) AND
  - **Cefdinir PO** 14 mg/kg/day div BID (max 300 mg/dose) or **Levofloxacin PO** 6 mo-4 yrs: 20 mg/kg/day div q12hr; 5-9 yrs: 14 mg/kg/day div q12hr; 10 yrs: 10 mg/kg once daily (max 750 mg/day)
- *If on Vancomycin:*
  - ADD **Clindamycin PO** 30-40 mg/kg/day div q6-8hr (max 600 mg/dose) (continue Amoxicillin/Clavulanate or Cefdinir/Levofloxacin as appropriate)

**Discharge Instructions:**

Follow up with PCP; Complete course of antibiotics, Ophthalmology f/u in 1-2 weeks if involved during admission

CONTACTS: MAJIDA GAFFAR, MD | ERIC HOPPA, MD | EBLA ABD ALRAHMAN, MD | SCOTT SCHOEM, MD

LAST UPDATED: 09.27.21

Connecticut Children's

## Antibiotics:

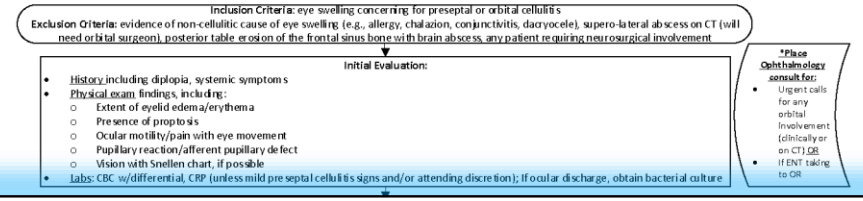
- Typical organisms for orbital cellulitis are staph aureus, strep pneumo, other streptococci, anaerobes
- Consider Haemophilus influenza B in the unimmunized patient
- Likely pathogens depend on site of origin of the infection → thus, follow SSTI pathway for skin sources, and this pathway for sinus or dental sources of infection

Note that antibiotics differ based on suspicion of CNS involvement.

*CLINICAL PATHWAY:*

# Preseptal & Orbital Cellulitis

THIS PATHWAY SERVES AS A GUIDE AND DOES NOT REPLACE CLINICAL JUDGMENT.




### Inpatient Management:

- Patients >5 years old: General pediatric provider to complete vision checks with Snellen chart on admission and BID *(If unable to complete, must document in chart.)*
- Continue to monitor for development of orbital cellulitis
- NPO after midnight if strong possibility of surgery
- *If orbital cellulitis confirmed on CT*: dexamethasone IV 0.5 mg/kg x1 (max 10 mg/dose) if not already given

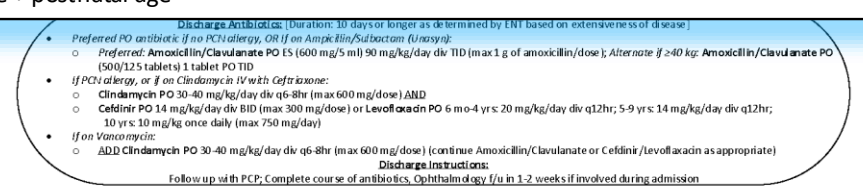
### Pre-Septal or Orbital Cellulitis *without* CNS involvement on imaging:

- **Ampicillin/Sulbactam** based on ampicillin component: 200 mg/kg/day div q6hr (max 2,000 mg ampicillin/dose)
- *If PCN allergy:* **Clindamycin PO/IV** 30-40 mg/kg/day div q8hr (max 600 mg/dose) AND **Ceftriaxone IV** 75 mg/kg/day div q12hr (max 2,000 mg/dose)
- *If concern for MRSA, consider addition of:*
  - **Vancomycin IV:** <52 weeks PMA‡/about <3 mo old: 15 mg/kg q8hr or as determined by pharmacy based on estimated AUC; ≥52 weeks PMA‡/about ≥3 months old – 11 years old: 70 mg/kg/day div q6hr; ≥12 yrs old: 60 mg/kg/day div q8hr

### If Orbital Cellulitis *with* concern for CNS involvement on imaging, treat off pathway with the following:

- **Ceftriaxone IV** 100 mg/kg/day div q12hr (max 2,000 mg/dose) AND **Metronidazole** 30 mg/kg/day IV div q8hr (max 500 mg/dose)
- *If concern for MRSA, consider addition of ONE time dose with subsequent doses directed by ASP:*
  - **Vancomycin IV**: <52 weeks PMA‡/about <3 mo old: 15 mg/kg x1; ≥52 weeks PMA‡/about ≥3 months old – 11 years old: 17.5 mg/kg x1 (max 750 mg/dose); ≥12 yrs old: 20 mg/kg x1 (max 1 g/dose)
- Consult Neurosurgery and Infectious Disease

‡PMA (Post-Menstrual Age) = gestational age + postnatal age

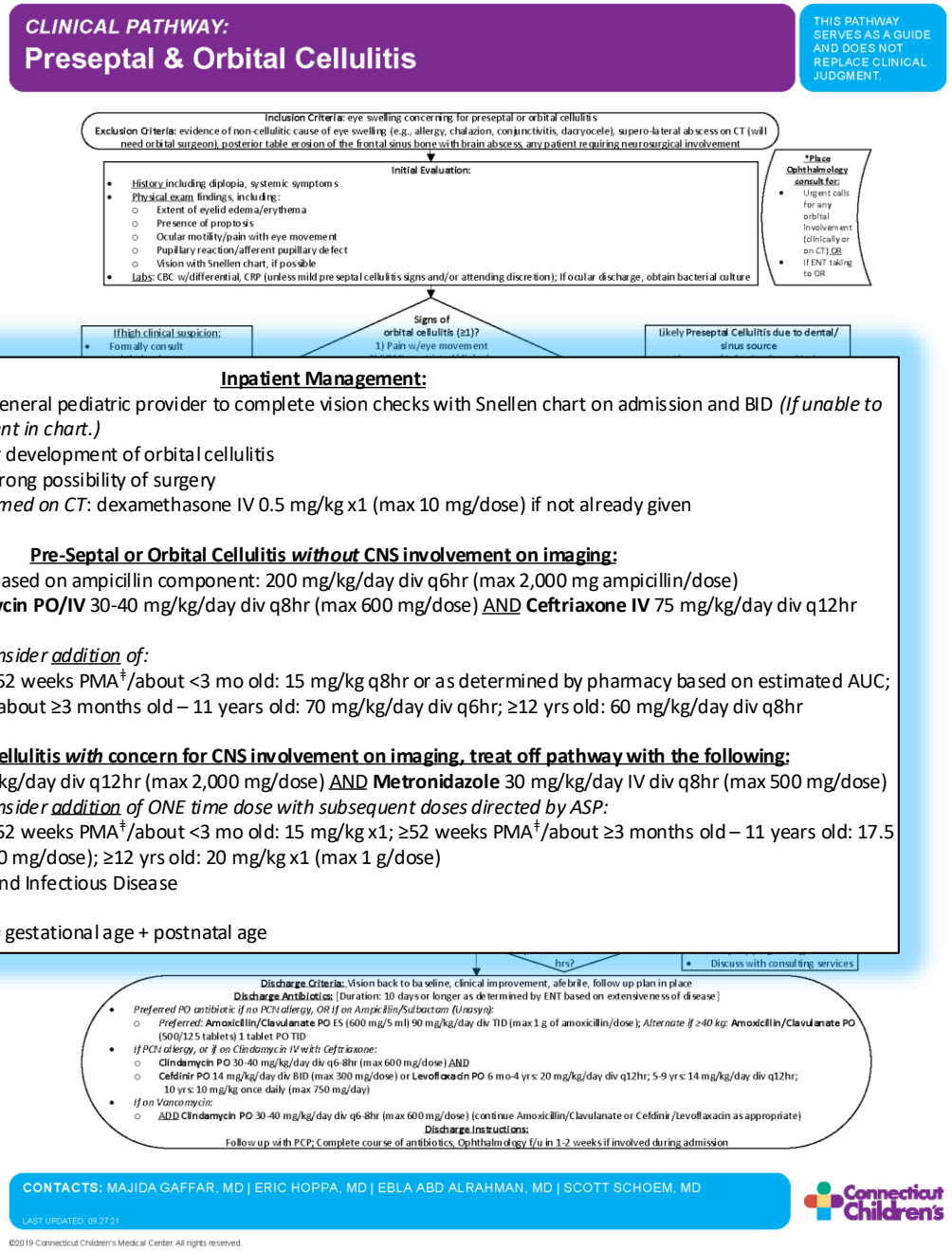



**CONTACTS:** MAJIDA GAFFAR, MD | ERIC HOPPA, MD | EBLA ABD ALRAHMAN, MD | SCOTT SCHOEM, MD

LAST UPDATED: 09.27.21

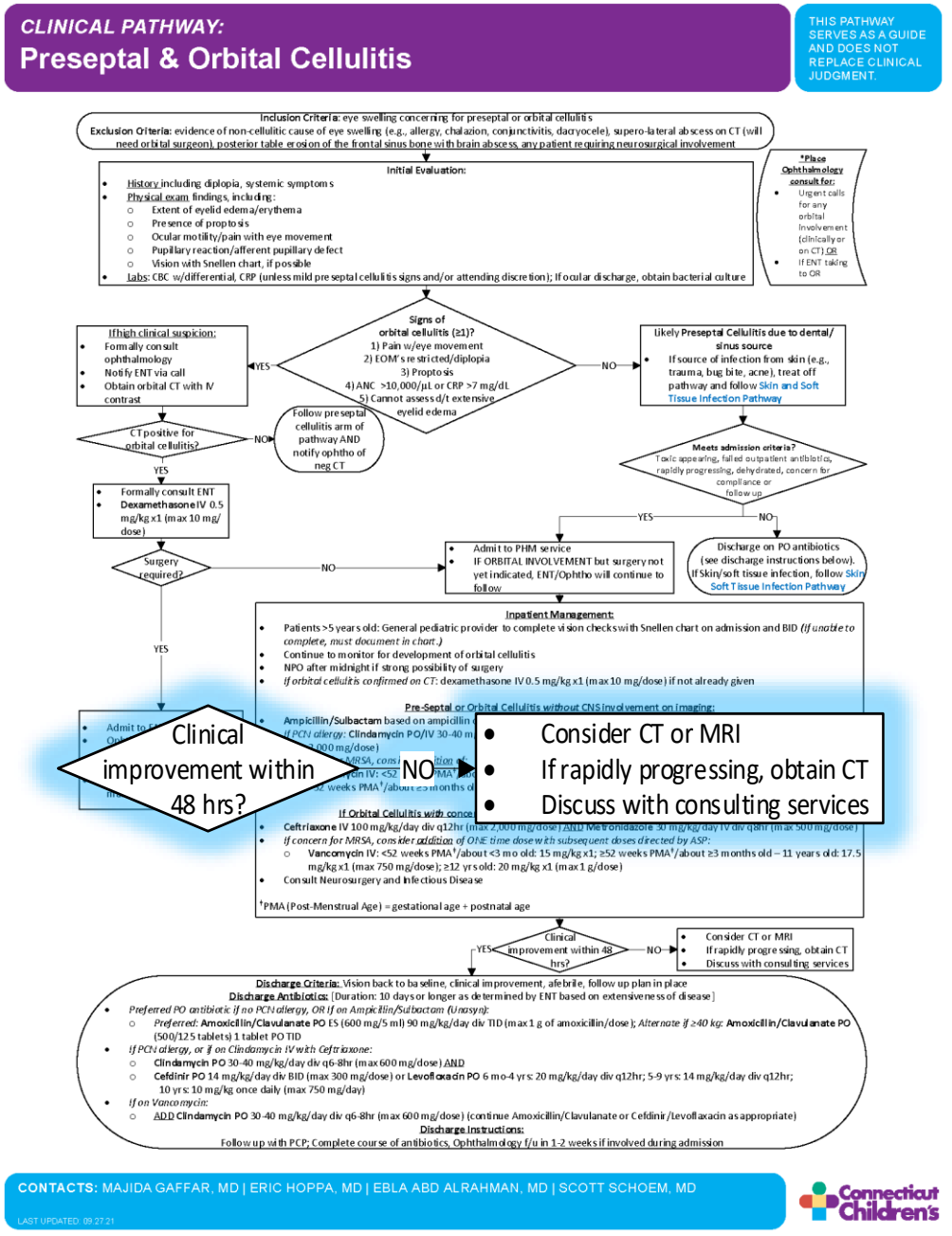
**The pharmacy's vancomycin protocol was updated in Feb 2021.**

- All patients who have vancomycin IV ordered will be followed by the clinical pharmacist to help determine appropriate dosing parameters.
- Providers will order initial doses per pathway/order set and provide indication within the order.
- IV vancomycin dosing and recommended labs will be managed by pharmacy in conjunction with primary teams.



Would expect clinical improvement within 48 hours of starting appropriate therapy.

If there is no improvement, would consider imaging studies to further assess, and utilize a collaborative approach for further management decisions.



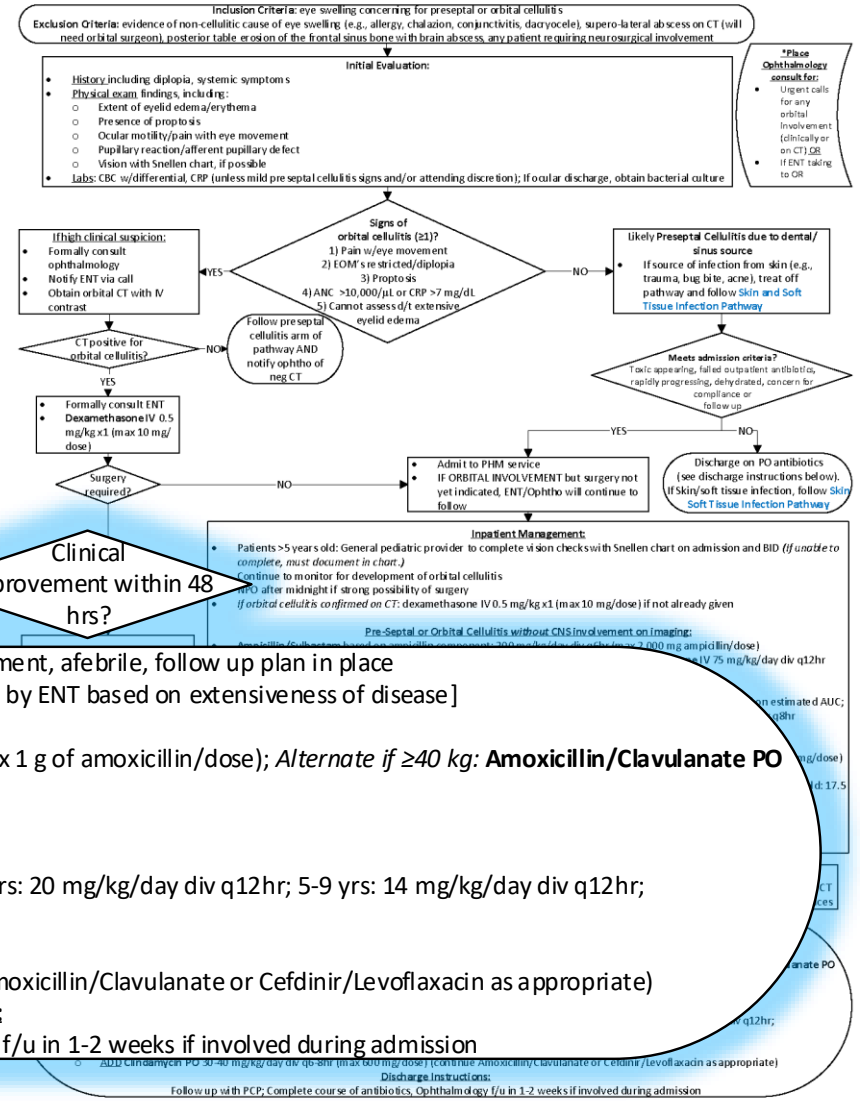
*CLINICAL PATHWAY:*

# Preseptal & Orbital Cellulitis

THIS PATHWAY SERVES AS A GUIDE AND DOES NOT REPLACE CLINICAL JUDGMENT.

If the patient continues to improve on appropriate therapy, start prepping for discharge.

Ensure the patient's vision is back to baseline and they are able to tolerate antibiotics by mouth.




CONTACTS: MAJIDA GAFFAR, MD | ERIC HOPPA, MD | EBLA ABD ALRAHMAN, MD | SCOTT SCHOEM, MD

LAST UPDATED: 09.27.21

# Review of Key Points

- Indications for obtaining a CT of the orbits with IV contrast
  - Pain with EOM or restricted EOM
  - Proptosis
  - ANC > 10,000/µL or CRP >7 mg/dL
  - Inability to assess due to edema
- Antibiotic selection should be based on likely source.
  - If sinus or dental source, ampicillin/sulbactam is the most appropriate for preseptal or orbital cellulitis **without** CNS involvement.
  - If concern for CNS infection, utilize Ceftriaxone AND Metronidazole
  - If there is ever a concern for MRSA, add Vancomycin

# Quality Metrics

- Percentage of patients with pathway order set usage
- Percentage of patients with ophthalmology consult
- Percentage of patients who require surgery
- Percentage of patients with appropriate antibiotic choice per pathway recommendation
- Percentage of patients with appropriate antibiotic duration per pathway recommendation
- Inpatient average length of stay (days)
- Number of returns to ED within 48 hours
- Number of returns to ED within 3 weeks

# Pathway Contacts

- Majida Gaffar, MD
  - Division of Ophthalmology
- Eric Hoppa, MD
  - Pediatric Emergency Medicine
- Ebla Abd Alrahman, MD
  - Pediatric Hospital Medicine
- Scott Schoem, MD
  - Division of Otolaryngology (ENT)

# References


- Rudloe TF, Harper MB, Prabhu SP, Rahbar R, Vanderveen D, Kimia AA. Acute periorbital infections: who needs emergent imaging? *Pediatrics*, 2010 Apr;125(4):e719-726.
- Botting AM, McIntosh D, Mahadevan M. Paediatric pre- and post-septal peri-orbital infections are different diseases. A retrospective review of 262 cases. *Int J Pediatr Otorhinolaryngol,* 2008 Mar;72(3):377-83.
- Nageswaran S, Woods CR, Benjamin DK Jr, Givner LB, Shetty AK. Orbital cellulitis in children. *Pediatr Infect Dis J,* 2006 Aug;25(8):695-9.

# Thank You!

## About Connecticut Children's Clinical Pathways Program

The Clinical Pathways Program at Connecticut Children's aims to improve the quality of care our patients receive, across both ambulatory and acute care settings. We have implemented a standardized process for clinical pathway development and maintenance to ensure meaningful improvements to patient care as well as systematic continual improvement. Development of a clinical pathway includes a multidisciplinary team, which may include doctors, advanced practitioners, nurses, pharmacists, other specialists, and even patients/families. Each clinical pathway has a flow algorithm, an educational module for end-user education, associated order set(s) in the electronic medical record, and quality metrics that are evaluated regularly to measure the pathway's effectiveness. Additionally, clinical pathways are reviewed annually and updated to ensure alignment with the most up to date evidence. These pathways serve as a guide for providers and do not replace clinical judgment.