

Clinical Pathways

Acute Management of Migraine and Migraine-Like Headache

Rahul Shah, MD

Henry Chicaiza, MD

Eric Hoppa, MD



What is a Clinical Pathway?



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

Objectives of Pathway



- To facilitate provider comfort in managing migraine-like headache through standardization of therapy, including second line agents
- To improve emergency department throughput of patients who present with migraine-like headache
- To standardize care of children with migraine-like headache, both in the emergency department and upon disposition

Why is this pathway necessary?

- New guidelines by the American Academy of Neurology published in 2019
 - Incorporation of sumatriptan NS
- Variation in provider practice
 - Use of prochlorperazine, metoclopramide, ondansetron, among others
- Unclear discharge planning
 - Which patients might benefit from admission?
 - With whom should patients with migraine headache refractory to initial outpatient management follow up?

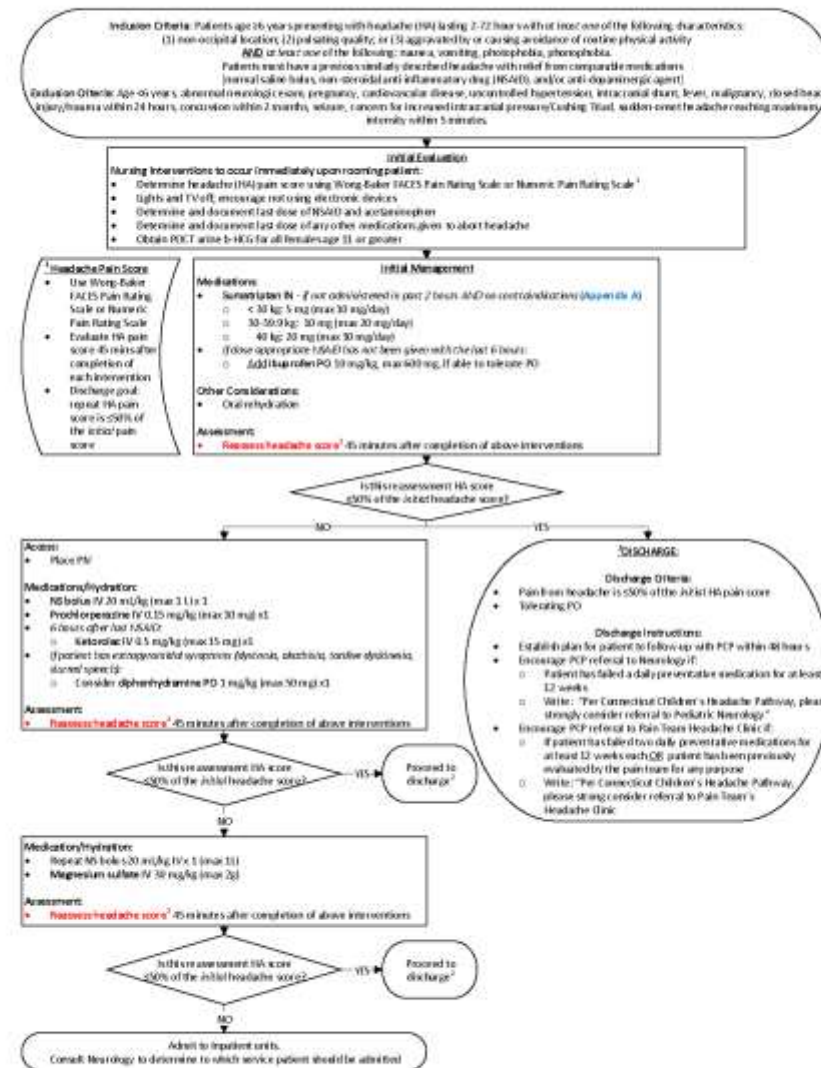
- Migraines: common reason for ED presentation
 - Most common cause of acute and recurrent headache in children and adolescents
 - Estimated 1% of all visits; translates to over 600 annual evaluations at CT Children's annually
 - Inpatient admissions: between 3-32%
- High morbidity
 - Depression
 - Decreased quality of life
- Large variability in practice
 - Intravenous normal saline, metoclopramide, prochlorperazine, promethazine, ondansetron, diphenhydramine, non-steroid analgesic drugs, steroids and triptans

CLINICAL PATHWAY: Acute Management of Migraine and Migraine-Like Headache

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

This is the Acute Management of Migraine and Migraine-Like Headache Clinical Pathway.

We will be reviewing each component in the following slides.



CONTACTS: RAHUL SHAH, MD | HENRY CHICAIZA, MD | ERIC HOPPA, MD

LAST UPDATED: 09/2023

©2023 CONNECTICUT CHILDREN'S HOSPITAL. ALL RIGHTS RESERVED. 1-0004

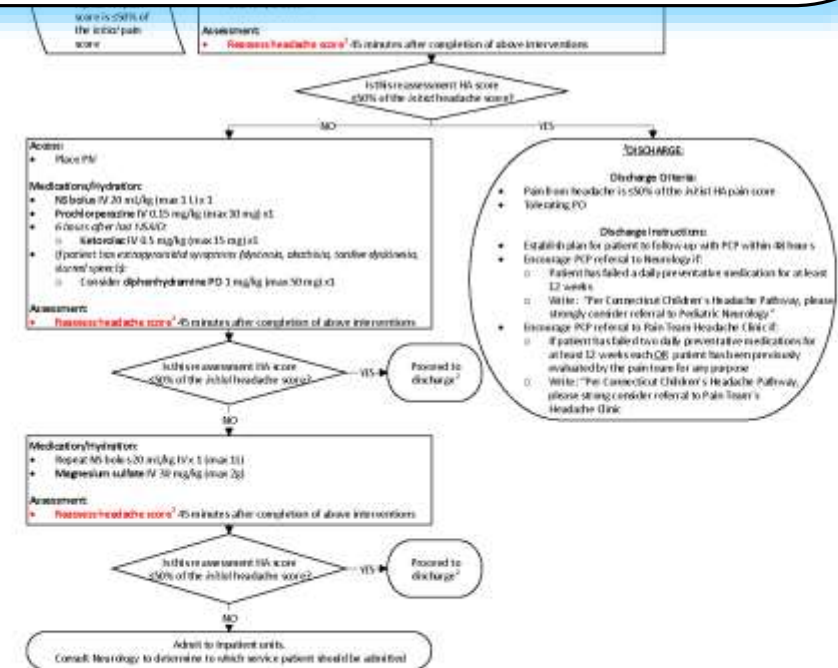
Inclusion Criteria: Patients age ≥ 6 years presenting with headache (HA) lasting 2-72 hours with *at least one* of the following characteristics:
(1) non-occipital location; (2) pulsating quality; or (3) aggravated by or causing avoidance of routine physical activity
AND *at least one* of the following: nausea, vomiting, photophobia, phonophobia.

Patients must have a previous similarly described headache with relief from comparable medications
[normal saline bolus, non-steroidal anti-inflammatory drug (NSAID), and/or anti-dopaminergic agent]

Exclusion Criteria: Age < 6 years, abnormal neurologic exam, pregnancy, cardiovascular disease, uncontrolled hypertension, intracranial shunt, fever, malignancy, closed head injury/trauma within 24 hours, concussion within 2 months, seizure, concern for increased intracranial pressure/Cushing Triad, sudden-onset headache reaching maximum intensity within 5 minutes.

It is important to note that only patients that meet these specific criteria can be managed like migraines.

The presence of any concerning features, such as fever, injury and seizures, are concerning for an alternative etiology and should be evaluated and treated off pathway.



Inclusion Criteria: Patients age 16 years presenting with headache (HA) lasting 2-72 hours with at least one of the following characteristics:
 (1) non-occipital location, (2) pulsating quality, or (3) aggravated by or causing avoidance of routine physical activity
 AND at least one of the following: nausea, vomiting, photophobia, phonophobia.
 Patients must have a previously unduly described headache with relief from comparable medications (oral analgesics, non-steroidal anti-inflammatory drug (NSAID), and/or anti-emergic agent).

Exclusion Criteria: Age < 16 years, abnormal neurologic exam, pregnancy, cardiovascular disease, uncontrolled hypertension, intracranial shunt, brain malignancy, closed-head injury/trauma within 24 hours, concussion within 2 months, seizure, concern for increased intracranial pressure/Coning Head, or other event to achieve reaching resolution.

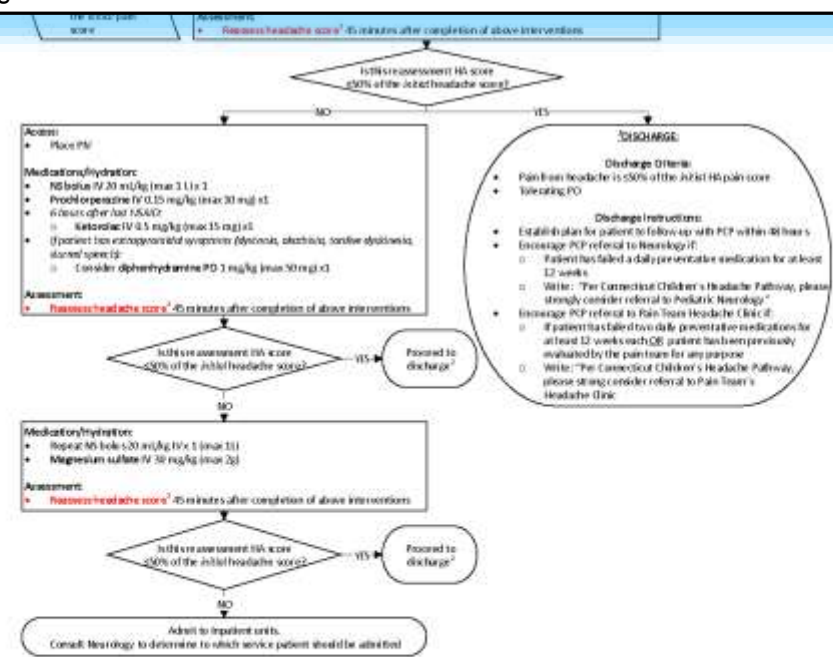
Initial Evaluation

Nursing Interventions to occur immediately upon rooming patient:

- Determine headache (HA) pain score using Wong-Baker FACES Pain Rating Scale or Numeric Pain Rating Scale¹
- Lights and TV off; encourage not using electronic devices
- Determine and document last dose of NSAID and acetaminophen
- Determine and document last dose of any other medications given to abort headache
- Obtain POCT urine b-HCG for all females age 11 or greater

Upon rooming the patient, nursing interventions include pain evaluation, controlling potential environmental triggers, and obtaining information on when medications were given last.

This will allow for accurate timing of additional medications, and avoid over (or under) medicating the patient.



¹ **Headache Pain Score**

- Use Wong-Baker FACES Pain Rating Scale or Numeric Pain Rating Scale
- Evaluate HA pain score 45 mins after completion of each intervention
- Discharge goal: repeat HA pain score is $\leq 50\%$ of the *initial* pain score

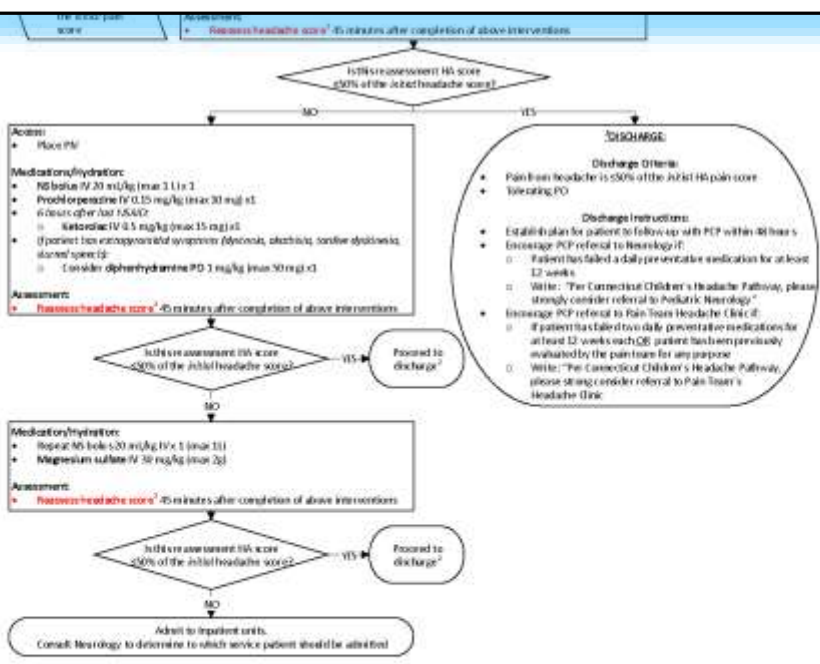
Nursing Interventions to occur immediately upon rooming patient:

- Determine headache (HA) pain score using Wong-Baker FACES Pain Rating Scale or Numeric Pain Rating Scale¹
- Lights and TV off; encourage not using electronic devices
- Determine and document last dose of NSAID and acetaminophen
- Determine and document last dose of any other medications given to abort headache
- Obtain POCT urine b-HCG for all females age 11 or greater

Inclusion Criteria: Patients age 16 years presenting with headache (HA) lasting 2-72 hours with at least one of the following characteristics:
(1) non-ocipital location, (2) pulsating quality, or (3) aggravated by or causing avoidance of routine physical activity
AND at least one of the following: nausea, vomiting, photophobia, phonophobia
Patients must have a previously and fully described headache with relief from comparably medications (oral analgesics, non-steroidal anti-inflammatory drug (NSAID), and/or anti-emetic agent)

Exclusion Criteria: Age < 16 years, abnormal neurologic exam, pregnancy, cardiovascular disease, uncontrolled hypertension, intracranial shunt, brain malignancy, closed-head injury/trauma within 24 hours, concussion within 2 months, seizure, concern for increased intracranial pressure/Coning Head, or other event for which seeking medical attention is warranted

Initial Evaluation



Note that pain scores are evaluated using either the Wong-Baker FACES Pain rating scale, or the Numeric Pain Rating Scale.

After a baseline pain score is determined, routine evaluations will occur 45 minutes after completion of each intervention outlined. This will allow providers to determine if pain is being appropriately managed.

Intranasal sumatriptan and NSAIDs have the best evidence for acute migraine management, and are utilized as the primary interventions here.

Sumatriptan can be used as long as no contraindications exist.

Initial Management

Medications:

- **Sumatriptan IN** - if not administered in past 2 hours AND no contraindications (Appendix A)
 - < 30 kg: 5 mg (max 10 mg/day)
 - 30-39.9 kg: 10 mg (max 20 mg/day)
 - ≥ 40 kg: 20 mg (max 30 mg/day)
- If dose appropriate NSAID has not been given with the last 6 hours:
 - Add **Ibuprofen PO** 10 mg/kg, max 600 mg, if able to tolerate PO

Other Considerations:

- Oral rehydration

Assessment:

- **Reassess headache score¹** 45 minutes after completion of above interventions



Appendix A outlines contraindications to Sumatriptan use.

Appendix A: Contraindications to Sumatriptan

- Sumatriptan administered < 2 hours prior
- Already received max daily dose of sumatriptan

Weight (kg)	Max Dose of IN Sumatriptan per 24 hours (mg)
<Less than 30 kg	10 mg
30-39.9 kg	20 mg
40 kg and above	40 mg

- Ischemic heart disease
- Prinzmetal's angina
- Peripheral vascular disease
- Uncontrolled HTN
- Stroke
- Severe hepatic impairment
- Pregnancy
- History of organ transplant
- Use of another 5HT1 agonist (other than sumatriptan) or ergotamine derivatives within the last 24 hours
- Use of MOA-i in past 2 weeks

1. Pain score
FCP within 48 hours
medication for at least
acute Pathway, please
Neurology"
the Clinic of
the medications for
directly and only
acute Pathway,
Team's

Inclusion Criteria: Patients age 16 years presenting with headache (HQ) lasting 2-72 hours with at least one of the following characteristics:
 (1) non-ocipital location, (2) pulsating quality, or (3) aggravated by or causing avoidance of routine physical activity
 (4) or at least two of the following: nausea, vomiting, photophobia, phonophobia
 Patients must have a previous acutely described headache with relief from comparable medications
Exclusion Criteria: Age < 16 years, abnormal neurologic exam, pregnancy, cardiovascular disease, uncontrolled hypertension, intracranial shunt, lesion, malignancy, closed-head injury/trauma within 24 hours, concussion within 2 months, seizure, concern for increased intracranial pressure/Cushing Triad, sudden onset headache reaching maximum intensity within 5 minutes

In addition, oral rehydration can be initiated.
 It is important to reassess the headache score 45 minutes after these interventions.

Initial Management

Medications:

- **Sumatriptan IN** - if not administered in past 2 hours AND no contraindications ([Appendix A](#))
 - < 30 kg: 5 mg (max 10 mg/day)
 - 30-39.9 kg: 10 mg (max 20 mg/day)
 - ≥ 40 kg: 20 mg (max 30 mg/day)
- If dose appropriate NSAID has not been given with the last 6 hours:
 - Add Ibuprofen PO 10 mg/kg, max 600 mg, if able to tolerate PO

Other Considerations:

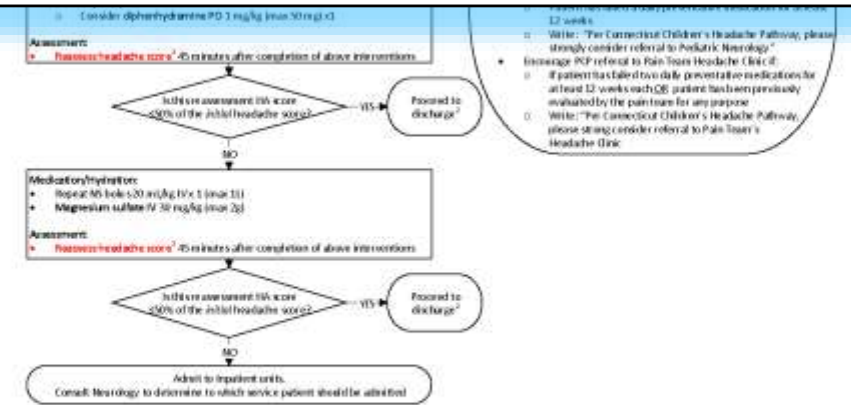
- Oral rehydration

Assessment:

- **Reassess headache score¹** 45 minutes after completion of above interventions

¹ Headache Pain Score

- Use Wong-Baker FACES Pain Rating Scale or Numeric Pain Rating Scale
- Evaluate HA pain score 45 mins after completion of each intervention
- Discharge goal: repeat HA pain score is ≤50% of the *initial* pain score

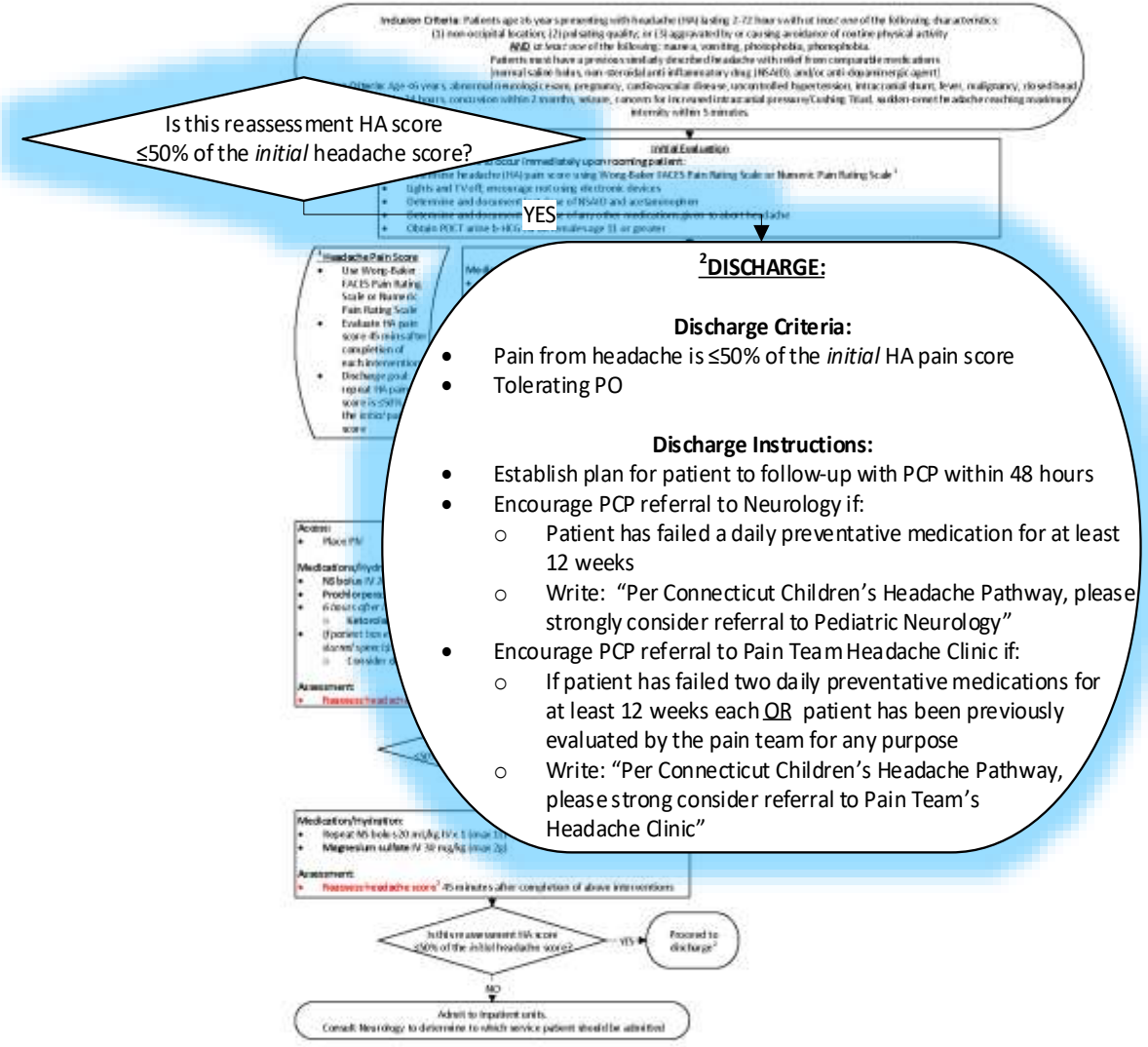


CLINICAL PATHWAY:
Acute Management of Migraine and Migraine-Like Headache

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

If the headache score decreased to $\leq 50\%$ of the initial headache score that the nurse obtained upon arrival, and is tolerating PO, then the patient can be prepped for discharge.

The outlined discharge plan is crucial for adequate outpatient management to avoid relapses and returns to ED.
 Primary management will be through the PCP, with specific criteria to refer to Neurology or the Pain Team Headache Clinic.



CONTACTS: RAHUL SHAH, MD | HENRY CHICAIZA, MD | ERIC HOPPA, MD

LAST UPDATED: 09/2023

©2023 CONNECTICUT CHILDREN'S HOSPITAL. ALL RIGHTS RESERVED. 1 | 10/23



Secondary Interventions:

After the initial management, if the reassessment headache score is not $\leq 50\%$ of the *initial* headache score obtained upon arrival, further interventions are recommended.

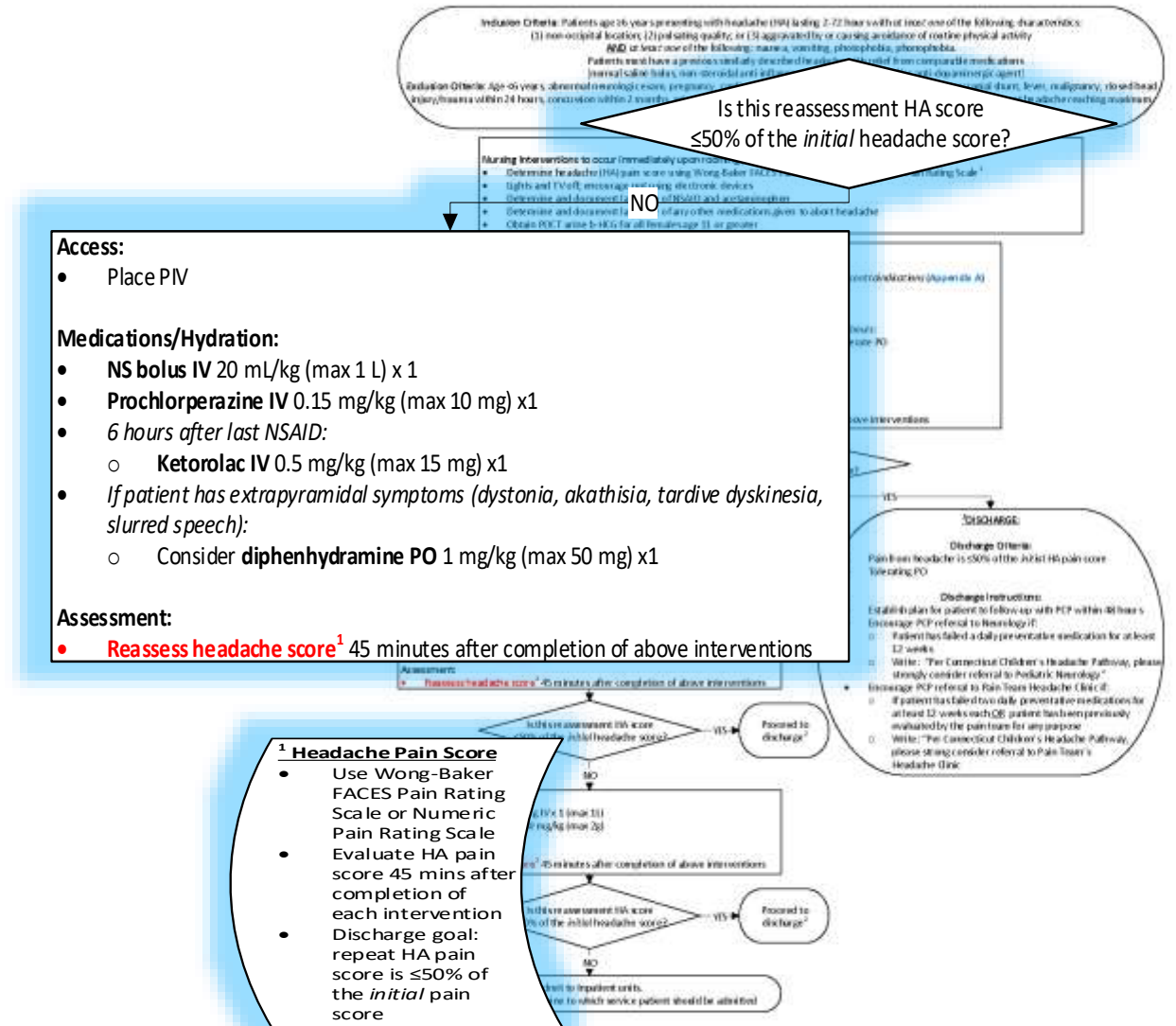
Recent studies show that prochlorperazine is superior to metoclopramide in reducing return visits – and is recommended as a secondary intervention.

Specific criteria for diphenhydramine are given, as recent studies show that it can be associated with return visits.

Adult literature suggests that 10 or 15 mg of ketorolac may be the therapeutic ceiling for analgesia, thus only 1 dose is recommended.

CLINICAL PATHWAY: Acute Management of Migraine and Migraine-Like Headache

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



CONTACTS: RAHUL SHAH, MD | HENRY CHICAIZA, MD | ERIC HOPPA, MD

LAST UPDATED: 09/2023

©2023 CONNECTICUT CHILDREN'S HOSPITAL. ALL RIGHTS RESERVED. | 18/24

Secondary Interventions:

After completion of all the secondary interventions, wait 45 minutes and reassess the headache score.

Access:

- Place PIV

Medications/Hydration:

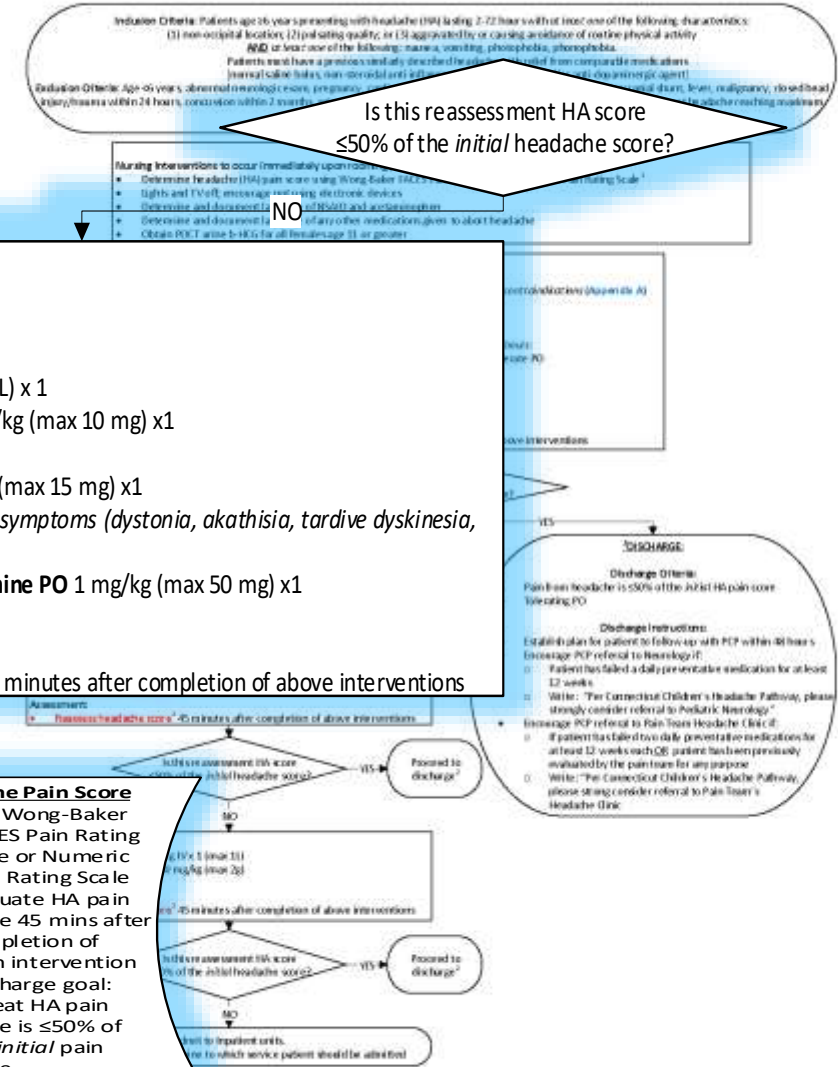
- NS bolus IV 20 mL/kg (max 1 L) x 1
- Prochlorperazine IV 0.15 mg/kg (max 10 mg) x1
- 6 hours after last NSAID:
 - Ketorolac IV 0.5 mg/kg (max 15 mg) x1
- If patient has extrapyramidal symptoms (dystonia, akathisia, tardive dyskinesia, slurred speech):
 - Consider diphenhydramine PO 1 mg/kg (max 50 mg) x1

Assessment:

- Reassess headache score¹ 45 minutes after completion of above interventions

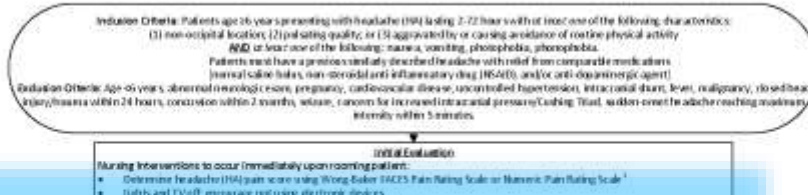
¹ Headache Pain Score

- Use Wong-Baker FACES Pain Rating Scale or Numeric Pain Rating Scale
- Evaluate HA pain score 45 mins after completion of each intervention
- Discharge goal: repeat HA pain score is $\leq 50\%$ of the initial pain score

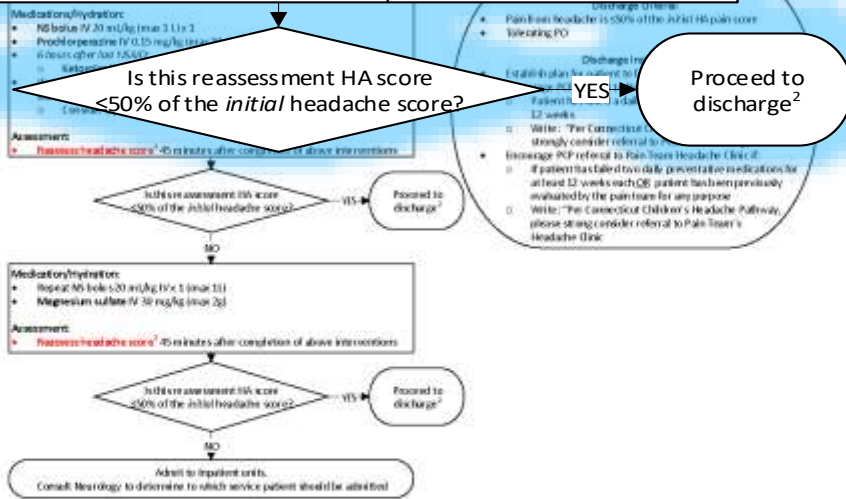


Secondary Interventions:

If the reassessment score has improved to be $\leq 50\%$ of the initial headache score obtained upon arrival, then discharge can be considered.



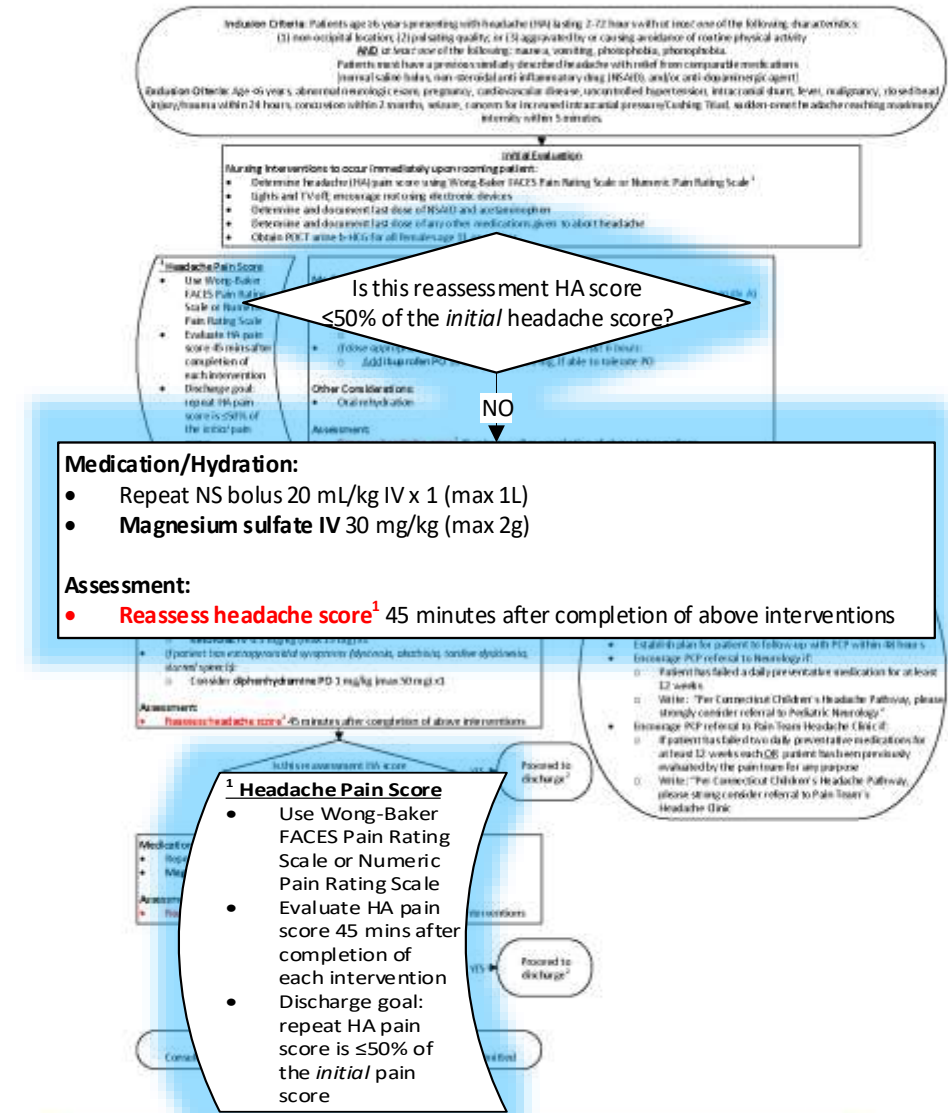
- Access:**
- Place PIV
- Medications/Hydration:**
- NS bolus IV** 20 mL/kg (max 1 L) x 1
 - Prochlorperazine IV** 0.15 mg/kg (max 10 mg) x1
 - 6 hours after last NSAID:**
 - Ketorolac IV** 0.5 mg/kg (max 15 mg) x1
 - If patient has extrapyramidal symptoms (dystonia, akathisia, tardive dyskinesia, slurred speech):*
 - Consider **diphenhydramine PO** 1 mg/kg (max 50 mg) x1
- Assessment:**
- Reassess headache score¹** 45 minutes after completion of above interventions



Tertiary Interventions:

However, if the headache score continues to be elevated after the secondary interventions are complete, tertiary interventions would include repeating the NS bolus and trialing magnesium sulfate.

Again, 45 minutes later, the headache score should be reassessed.



Tertiary Interventions:

If there is adequate improvement in headache score after the tertiary interventions, the patient may be considered for discharge.

Medication/Hydration:

- Repeat NS bolus 20 mL/kg IV x 1 (max 1L)
- Magnesium sulfate IV 30 mg/kg (max 2g)

Assessment:

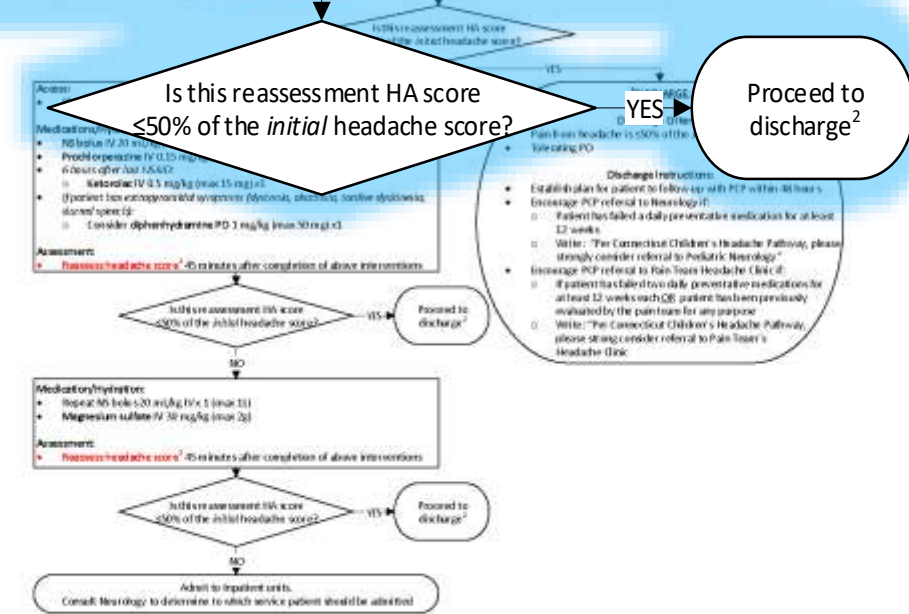
- Reassess headache score¹ 45 minutes after completion of above interventions

Inclusion Criteria: Patients age 16 years presenting with headache (HA) lasting ≥ 72 hours with at least one of the following characteristics:
 (1) non-ocipital location, (2) pulsating quality, or (3) aggravated by or causing avoidance of routine physical activity
 AND at least one of the following: nausea, vomiting, photophobia, phonophobia.
 Patients must have a previously undiagnosed headache with relief from comparable medications.
Exclusion Criteria: Age < 16 years, abnormal neurologic exam, pregnancy, cardiovascular disease, uncontrolled hypertension, intracranial shunt, fever, malignancy, closed-head injury/trauma within 24 hours, concussion within 2 months, seizure, concern for increased intracranial pressure/Cushing Triad, sudden onset headache reaching maximum intensity within 5 minutes.

Initial Evaluation

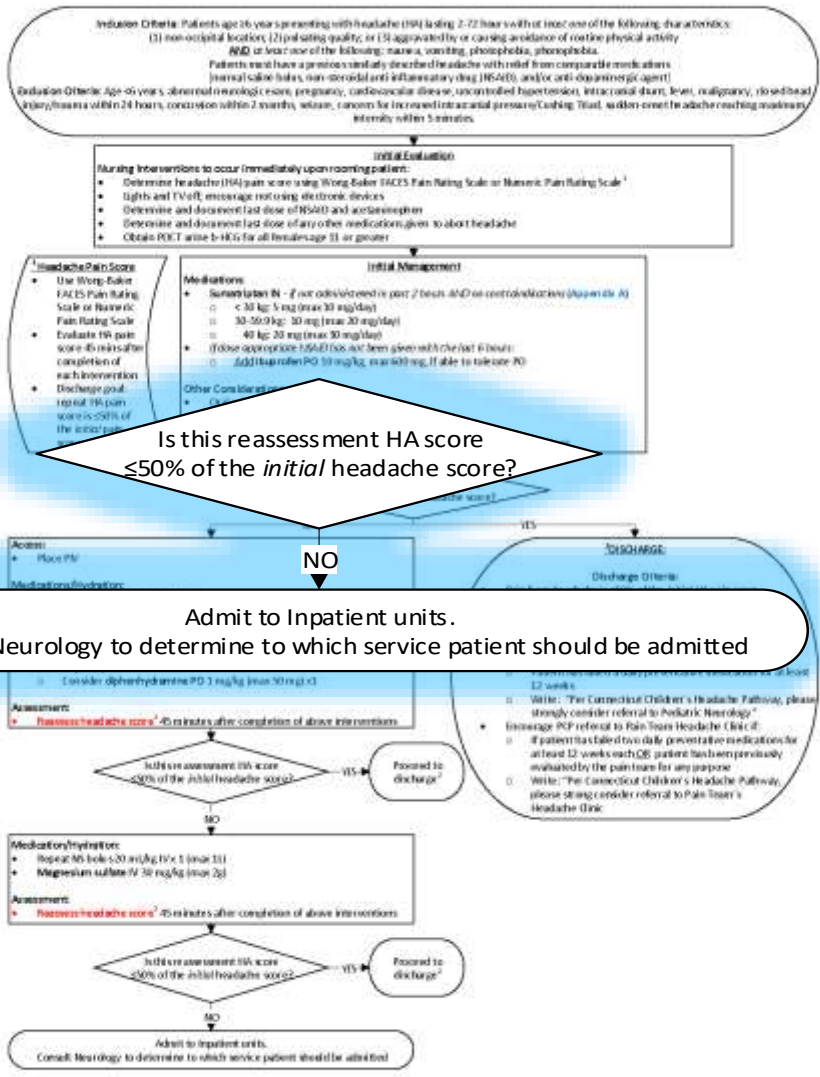
Monitoring interventions to occur (immediately upon rooming patient):

- Determine headache (HA) pain score using Wong-Baker FACES Pain Rating Scale or Numeric Pain Rating Scale¹
- Lights and TV off, encourage removing electronic devices
- Determine and document last dose of NSAID and acetaminophen
- Determine and document last dose of any other medications given to abort headache



CLINICAL PATHWAY:
Acute Management of Migraine and Migraine-Like Headache

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



If there is no adequate improvement after the tertiary interventions, admission to the inpatient units is warranted for further management.

Admit to Inpatient units.
 Consult Neurology to determine to which service patient should be admitted

CONTACTS: RAHUL SHAH, MD | HENRY CHICAIZA, MD | ERIC HOPPA, MD

LAST UPDATED: 09/2023

©2023 CONNECTICUT CHILDREN'S HOSPITAL CENTER. ALL RIGHTS RESERVED. 1.0.004



Review of Key Points

- Migraines may occur in school-aged children
- Among suggested therapies, intranasal Sumatriptan and NSAIDs have the best evidence of efficacy
- Most recent evidence suggests that:
 - Prochlorperazine is superior to metoclopramide in reducing return visits
 - Diphenhydramine may be associated with return visits
- Adult literature suggests that 10 or 15 mg of ketorolac may be the therapeutic ceiling for analgesia

Quality Metrics



- Percentage of eligible patients managed per pathway
- Percentage of patients with migraine who are admitted to the hospital
- Rate of return to ED for headache within 48 hours
- Rate of return to ED for headache within 7 days
- Time from arrival to ED to administration of first dose of medication
- Percentage of patients with neuroimaging during ED visit
- Average time from ED arrival to disposition
- Average pain score at disposition
- Percent change in pain score from time of initial evaluation to time of disposition

Pathway Contacts



- Rahul Shah , MD
 - Pediatric Emergency Medicine Fellow
- Henry Chicaiza, MD
 - Department of Pediatrics; Division of Pediatric Emergency Medicine
- Erica Hoppa, MD
 - Department of Pediatrics; Division of Pediatric Emergency Medicine

References



- Bachur RG, Monuteaux MC, Neuman MI. A comparison of acute treatment regimens for migraine in the emergency department. *Pediatrics*. 2015 Feb;135(2):232-8.
- Gelfand AA, Goadsby PJ. Treatment of pediatric migraine in the emergency room. *Pediatr Neurol*. 2012;47(4):233-41.
- Hershey AD. Current approaches to the diagnosis and management of paediatric migraine. *Lancet Neurol*. 2010;9(2):190-204.
- Kaar CR, Gerard JM, Nakanishi AK. The Use of a Pediatric Migraine Practice Guideline in an Emergency Department Setting. *Pediatr Emerg Care*. 2016 Jul;32(7):435-9.
- Kabbouche M. Management of Pediatric Migraine Headache in the Emergency Room and Infusion Center. *Headache*. 2015;55(10): 1365-70.
- Kanis JM, Timm NL. Chlorpromazine for the treatment of migraine in a pediatric emergency department. *Headache*. 2014;54(2):335-42.
- Leung S, Bulloch B, Young C, et al. Effectiveness of standardized combination therapy for migraine treatment in the pediatric emergency department. *Headache*. 2013 Mar;53(3):491-97.
- Lewis D, Ashwal S, Hershey A, et al. Practice parameter: pharmacological treatment of migraine headache in children and adolescents: report of the American Academy of Neurology Quality Standards Subcommittee and the Practice Committee of the Child Neurology Society. *Neurology*. 2004;63(12):2215-24.
- Oskoui M, Pringsheim T, Holler-Managan Y, et al. Practice guideline update summary: Acute treatment of migraine in children and adolescents: Report of the Guideline Development, Dissemination, and Implementation Subcommittee of the American Academy of Neurology and the American Headache Society. *Neurology*. 2019 Sep;93(11):487-499.
- Patniyot IR, Gelfand AA. Acute Treatment Therapies for Pediatric Migraine: A Qualitative Systematic Review. *Headache*. 2016;56(1):49-70.
- Richer LP, Laycock K, Millar K, et al. Treatment of children with migraine in emergency departments: national practice variation study. *Pediatrics*. 2010;126(1):e150-5.
- Skora CE, Worden LT, Oakley CB. Comprehensive Migraine Initiative in the Pediatric Emergency Department Improves Treatment Outcomes. *J Child Neurol*. 2020 Mar;35(3):235-241.
- Teleanu RI, Vladacenco O, Teleanu DM, et al. Treatment of Pediatric Migraine: a Review. *Maedica (Buchar)*. 2016;11(2):136-143.

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.