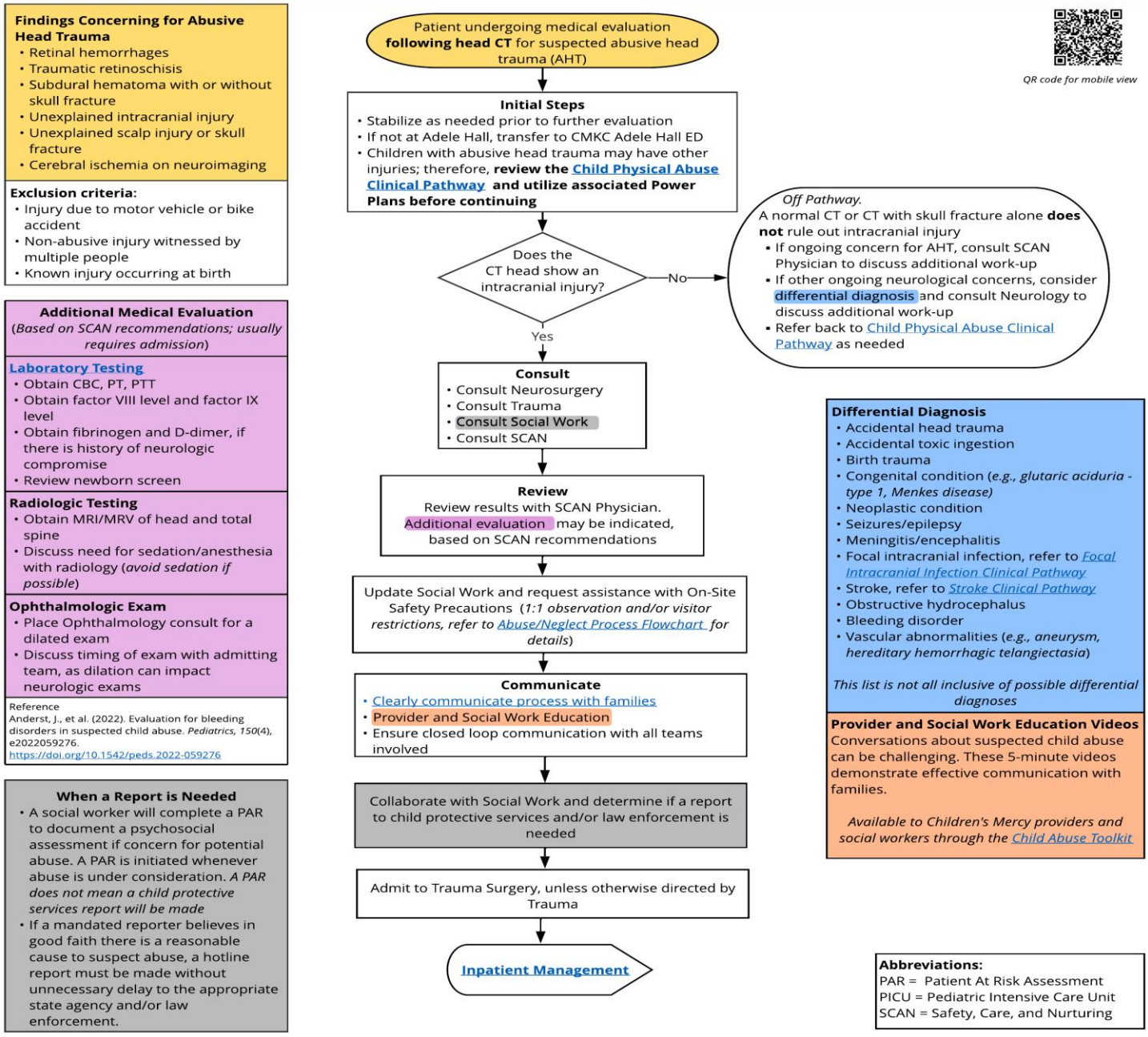
Suspected Abusive Head Trauma
Clinical Pathway Synopsis

Suspected Abusive Head Trauma: Initial Management Algorithm



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Suspected Abusive Head Trauma: Inpatient Management Algorithm

All children hospitalized for **suspected abusive head trauma** (AHT)

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Triage and Acute ICU care, (*e.g. fluids & electrolytes, ICP management, EEG monitoring*) are outside the scope of this pathway. Follow unit specific protocols to stabilize the child and medically manage the traumatic and/or anoxic brain injury.
For Children's Mercy ICU providers, refer to internal "Severe Traumatic Brain Injury Guideline."

Additional Inpatient Management Based on Severity of Injury
When transferring between teams (*Intensive Care, Neurosurgery, Gen Peds, Rehabilitation*) communicate about pending/incomplete action items

Injury Severity based on post-resuscitation Glasgow Coma Scale (GCS)

	Mild (13-15)	**Moderate** (9 -12)	**Severe** (≤ 8)

Consults
Timing can vary based on the child's needs. Some consults may take place in ICU vs Med/Surg
	• Trauma
	• SCAN
	• Social Work
	• Ophthalmology
	• Neuropsychology Service
	• Endocrinology
	• On **case-by-case basis**:
	  • Rehabilitation Medicine
	  • Physical Therapy
	  • Occupational Therapy
	  • Speech Therapy
	  • Neurology
	  • Neurosurgery
		• Trauma
		• SCAN
		• Social Work
		• Neurosurgery
		• Ophthalmology
		• Rehabilitation Medicine
		• Neuropsychology Service
		• Endocrinology
		• On **case-by-case basis**:
		  • Neurology
		  • Physical Therapy
		  • Occupational Therapy
		  • Speech Therapy
			• Trauma
			• SCAN
			• Social Work
			• Neurosurgery
			• Ophthalmology
			• Neurology
			• Rehabilitation Medicine
			• Neuropsychology Service
			• Endocrinology
			• Physical Therapy
			• Occupational Therapy
			• Speech Therapy
			• Audiology (*most appropriate at end of stay*)
			• On **case-by-case basis**:
			  • Palliative Care Team

Seizure prophylaxis and monitoring	**Mild/Moderate** If concern for clinical or subclinical seizure, contact Neurology to consider long-term EEG and/or antiepileptic medications		**Severe** • EEG monitoring for at least 24 hrs • Levetiracetam for minimum of 7 days. *If there are no seizures in 7 days, may discontinue.* • Additional recommendations per Neurology
Endocrine evaluation	**All Levels of Severity** • BMP • Cortisol (8 am), ACTH (8 am), IGF - 1, prolactin • TSH, free T4 • If urine output is > 5 cc/kg/hour over 3 - 4 hours, obtain: serum sodium, serum osmolality, urine sodium, urine specific gravity, urine osmolality		
Additional work-up for suspected abuse	Await SCAN consult recommendations		

Be aware of sub-acute complications such as DI, SIADH, cerebral salt wasting, seizures, obstructive hydrocephalus, autonomic instability

Discharge Preparation

Abbreviations:
DI = Diabetes insipidus
ICP = Intracranial pressure
SCAN = Safety, Care, and Nurturing
SIADH = Syndrome of Inappropriate Antidiuretic Hormone

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Suspected Abusive Head Trauma: Discharge Preparation Algorithm

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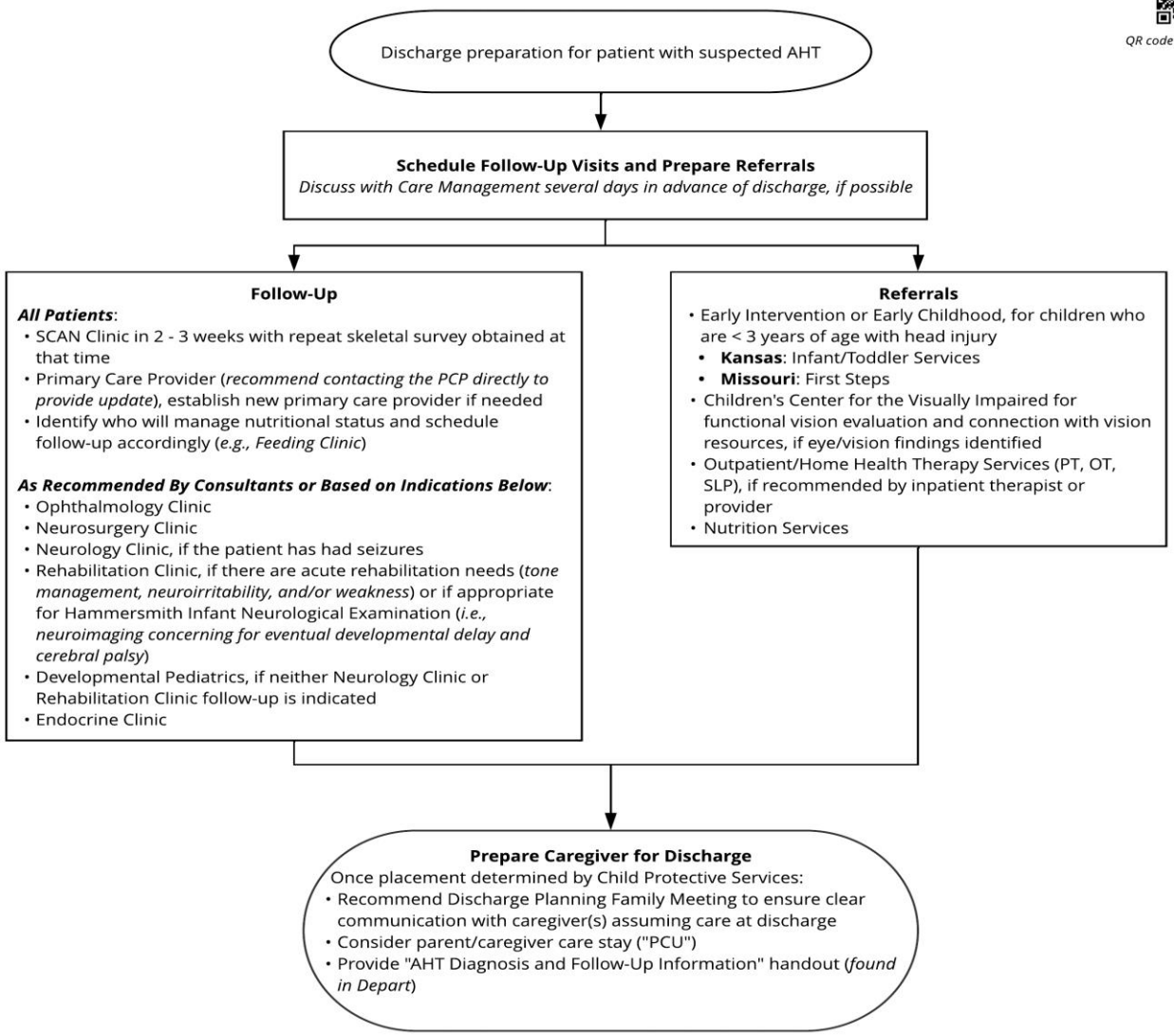

Abbreviations:
AHT = Abusive Head Trauma
OT = Occupational Therapy
PT = Physical Therapy
SCAN = Safety, Care, and Nurturing
SLP = Speech Language Pathologist

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Objective of Clinical Pathway

To provide care standards for the patient undergoing medical evaluation for suspected abusive head trauma. The Suspected Abusive Head Trauma Clinical Pathway guides consultative and follow-up care to address potential physical, cognitive, social, developmental, visual, and behavioral challenges and possible sequelae of abusive head trauma.

Background/Epidemiology

Abusive head trauma (AHT), while challenging to diagnose, can leave survivors with lasting impairments, such as neurocognitive deficits, seizure disorders, and blindness, that create difficulties throughout childhood and adulthood (Chen et al., 2019; Hung, 2020; Jenny, 2022; Narang et al., 2020; Nuño et al., 2018). These lasting impairments require long-term follow-up to achieve optimal medical, rehabilitative, educational, emotional, and social support needs (Chevignard & Lind, 2014). Social dynamics, such as caregiver changes, may add challenges to providing a well-coordinated transition from inpatient to outpatient care (Institute of Medicine & National Research Council, 2014; Nuño et al., 2018; O'Meara et al., 2020).

National guidelines provide practice recommendations to guide decision-making in the initial evaluation and management of AHT, particularly for children sustaining a mild or severe traumatic brain injury (Christian et al., 2015; Kochanek et al., 2019; Lumba – Brown et al., 2018; Narang et al., 2020). However, there is limited guidance beyond the initial acute management of AHT and for children whose traumatic brain injury is classified as moderate (Anderson et al., 2022; Chevignard & Lind, 2014; Keenen et al., 2023; Lind et al., 2016; Manfield et al., 2021). Additionally, most recommendations focus on initial stabilization, often in intensive care, and fail to identify specialty providers or processes necessary to coordinate the transition from inpatient to outpatient care. Therefore, the Suspected Abusive Head Trauma Clinical Pathway Committee aims to address these gaps by identifying additional inpatient management, consultative considerations, and follow-up needs when caring for an infant or child when AHT is suspected or confirmed.

Target Users

- Physicians (Emergency Medicine, Hospital Medicine, Intensivists, Fellows, Resident Physicians)
- Nurse Practitioners
- Nurses
- Social Workers
- Inpatient Care Managers

Target Population

Inclusion Criteria

- Any patient undergoing medical evaluation for suspected AHT -**AND-**
- A head CT has already been performed as part of the diagnostic testing for occult injury following presentation to a care setting with a physical injury and/or other indication of abuse; refer to Child Physical Abuse Clinical Pathway

Exclusion Criteria

- Accidental injury (i.e., due to motor vehicle or bike accident)
- Non-abusive injury witnessed by multiple people
- Known injury occurring at birth

AGREE II

Two American Academy of Pediatrics (AAP) national guidelines guided the Suspected Abusive Head Trauma Clinical Pathway Committee on the initial management of AHT (Christian et al., 2015; Narang et al., 2020). See Tables 1 and 2 for the AGREE II.

Table 1

AGREE II Summary for the Evaluation of Suspected Child Physical Abuse Clinical Report (Christian et al., 2015)

Domain	Percent Agreement	Percent Justification^
Scope and purpose	86%	The aim of the guideline, the clinical questions posed and target populations **were** identified.

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Stakeholder involvement	82%	The guideline **was developed** by the appropriate stakeholders and represents the views of its intended users.
Rigor of development	41%	The guideline developers **did not** provide how the evidence was gathered and synthesized, how the recommendations were formulated nor how the guidelines will be updated.
Clarity and presentation	94%	The guideline recommendations **are** clear, unambiguous, and easily identified. Different management options are also presented.
Applicability	57%	Barriers and facilitators to implementation and strategies to improve utilization **were addressed** in the guideline. The guideline **did not** address resource costs associated with implementation.
Editorial independence	71%	The recommendations **were not** biased by competing interests.
Overall guideline assessment	72%	
See Practice Recommendations		

Note: Four EBP Scholars completed the AGREE II on this guideline.
^Percentage justification is an interpretation based on the Children's Mercy EBP Department standards.

Table 2
AGREE II Summary for the Abusive Head Trauma in Infants and Children Policy Statement (Narang et al., 2020)

Domain	Percent Agreement	Percent Justification^
Scope and purpose	82%	The aim of the guideline, the clinical questions posed and target populations **were** identified.
Stakeholder involvement	79%	The guideline **was developed** by the appropriate stakeholders and represents the views of its intended users.
Rigor of development	34%	The guideline developers **did not** provide how the evidence was gathered and synthesized, how the recommendations were formulated nor how the guidelines will be updated.
Clarity and presentation	82%	The guideline recommendations **are** clear, unambiguous, and easily identified. Different management options are also presented.
Applicability	21%	The guideline **did not** address implementation barriers and facilitators, utilization strategies, or resource costs associated with implementation.
Editorial independence	92%	The recommendations **were not** biased by competing interests.
Overall guideline assessment	65%	
See Practice Recommendations		

Note: Four EBP Scholars completed the AGREE II on this guideline.
^Percentage justification is an interpretation based on the Children's Mercy EBP Department standards.

Practice Recommendations

Please refer to the American Academy of Pediatrics (Christian et al., 2015; Narang et al., 2020) Clinical Practice Guidelines for evaluation and intervention recommendations for the initial management of suspected abusive head trauma. The Suspected Abusive Head Trauma Clinical Pathway Committee relied on expert consensus when developing the recommendations for additional inpatient management outside of unit-specific protocols and discharge preparation, as these were areas not addressed in the national guidelines.

Additional Questions Posed by the Clinical Pathway Committee

No additional clinical questions beyond those addressed in the AAP Guidelines (Christian et al., 2015; Narang et al., 2020) were posed for formal literature review.

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Recommendation Specific for Children's Mercy

Children's Mercy adopted the practice recommendations made by the AAP Guidelines (Christian et al., 2015; Narang et al., 2020) for the initial management of suspected abusive head trauma. Additions include:

- The pathway strongly encourages the use of the Child Physical Abuse Clinical Pathway before proceeding to the Suspected Abusive Head Trauma Clinical Pathway to evaluate for any other injuries.
- Guidance when there are normal computed tomography (CT) scan findings or the CT scan reveals a skull fracture without evidence of intracranial injury
- Additional consultative considerations, seizure prophylaxis, and monitoring recommendations during inpatient management
- Discharge preparation guidance regarding follow-up visits, referrals, and caregiver education and training

Measures

Use of the Suspected Abusive Head Trauma Clinical Pathway

Value Implications

- Decreased risk of missed diagnosis of suspected abusive head trauma
- Improved standardization of diagnostic work-up based on patient age and presentation
- Improved safety following a concern for suspected abusive head trauma (i.e., disposition, safety plan)
- Improved coordination of care management needs while inpatient and when preparing for discharge
- Improved connection to services to support the best long-term outcome for children with AHT
- Increased equity by decreasing unwarranted variation in care

Organizational Barriers and Facilitators

Potential Barriers

- Challenges of recognizing abusive head trauma
- Challenges with closing the communication loop among providers, nursing staff, social workers, and patient's families or caregivers
- Challenges of connecting patients to the appropriate services upon discharge
- Social challenges related to potentially changing caregiver(s), caring for children who may have new and complex medical needs

Potential Facilitators

- Collaborative engagement across care continuum settings during clinical pathway development
- Multidisciplinary contribution to pathway development
- Anticipated high rate of use of the clinical pathway

Diversity/Equity/Inclusion

Our aim is to provide equitable care. These issues were discussed with the Suspected Abusive Head Trauma Clinical Pathway Committee, reviewed in the literature, and discussed before making any practice recommendations.

Associated Power Plans

- EDP Physical Abuse – Initial management only
- Inpatient Physical Abuse – Initial management only

Associated Policy

- Abuse and Neglect

Education Materials

- AHT Diagnosis and Follow-Up Information
  - Provides an overview of the diagnosis and information regarding possible follow-up needs
  - Found in Depart process
  - Available in English and Spanish

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Clinical Pathway Preparation

This pathway was prepared by the Evidence Based Practice (EBP) Department in collaboration with the Suspected Abusive Head Trauma Clinical Pathway Committee composed of content experts at Children's Mercy Kansas City. If a conflict of interest is identified, the conflict will be disclosed next to the committee member's name.

Suspected Abusive Head Trauma Clinical Pathway Committee Members and Representation

- Jessica Wallisch, MD | Critical Care Medicine | Committee Co-Chair
- Maria Korth, PhD | Developmental and Behavioral Health | Committee Co-Chair
- Sara Kilbride, DO, RN, MA | SCAN Clinic, Division of Child Adversity and Resilience | Committee Member
- James Anderst, MD, MSCI | SCAN Clinic, Division of Child Adversity and Resilience | Committee Member
- Ruairi Smith-Dewey, DO | Child Abuse, Pediatric Fellow| Committee Member
- Erin Scott, DO | Pediatric Emergency Medicine | Committee Member
- Hank Puls, MD | Hospital Medicine | Committee Member
- Christian Kaufman, MD, FAANS | Neurosurgery | Committee Member
- Elise Wright, DNP, APRN, CPNP AC-PC, CCRN | Trauma Surgery | Committee Member
- Ara Hall, MD | Neurology | Committee Member
- Jake Arends, MD | Neurology | Committee Member
- Marcie Files, MD | Neurology | Committee Member
- Sathya Vadivelu, DO | Rehabilitation Medicine | Committee Member
- Katie Foote, LSCSW, LCSW, OSW-C | Social Work | Committee Member
- Emily Beck, BSN, RN, ACM-RN | Inpatient Care Management | Committee Member
- Sarah Dierking, MSN, RN, CPHQ | Clinical Practice and Quality | Committee Member
- Angie Williams, BSN, RN-BC, CPN | Clinical Practice and Quality | Committee Member
- Emily Paprocki, DO | Endocrinology | Contributor
- Haya Azouz, MBBS | Endocrine, Pediatric Fellow | Contributor

EBP Committee Members

- Kathleen Berg, MD, FAAP | Hospitalist, Evidence Based Practice
- Kelli Ott, OTD, OTR/L | Evidence Based Practice

Clinical Pathway Development Funding

The development of this clinical pathway was underwritten by the following departments/divisions: Critical Care Medicine, Developmental and Behavioral Health, Safety Care and Nurturing (SCAN) Clinic, Pediatric Emergency Medicine, Hospital Medicine, Neurosurgery, Trauma Surgery, Neurology, Rehabilitation Medicine, Social Work, Inpatient Care Management, Clinical Practice and Quality, and Evidence Based Practice

Conflict of Interest

The contributors to the Suspected Abusive Head Trauma Clinical Pathway have no conflicts of interest to disclose related to the subject matter or materials discussed.

Approval Process

- This pathway was reviewed and approved by the Suspected Abusive Head Trauma Clinical Pathway Committee, Content Expert Departments/Divisions, and the EBP Department; after which they were approved by the Medical Executive Committee.
- Pathways are reviewed and updated as necessary every 3 years within the EBP Department at CMKC. Content expert teams are involved with every review and update.

Review Requested

Department/Unit	Date Obtained
Critical Care Medicine	November 2024
Developmental and Behavioral Health	November 2024
Safety Care and Nurturing Clinic	November 2024
Pediatric Emergency Medicine	November 2024

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Hospital Medicine	November 2024
Neurosurgery	October 2024
Trauma Surgery	November 2024
Neurology	November 2024
Rehabilitation Medicine	November 2024
Social Work	November 2024
Inpatient Care Management	December 2024
Clinical Practice and Quality	November 2024
Endocrinology	November 2024
Evidence Based Practice	November 2024

Version History

Date	Comments
December 2024	Version one – (*developed Suspected Abusive Head Trauma Clinical Pathway and synopsis; modified educational materials; reviewed associated powerplans*)
April 2025	Version two – (modified Inpatient Management algorithm to accurately reflect Endocrine evaluation labs (free T4)

Date for Next Review

- December 2027

Implementation & Follow-Up

- Once approved, the pathway was presented to appropriate care teams and implemented. Care measurements will be assessed and shared with appropriate care teams to determine if changes need to occur.
- The AHT Diagnosis and Follow-Up Information handout was reviewed for health literacy.
- Associated power plans were reviewed. The power plans were not amended during the development of the Suspected Abusive Head Trauma.
- The policies were reviewed. The policies detail the institutional processes for handling cases of possible child abuse or neglect and the obligations of a Mandated Reporter for reporting reasonable suspicions of abuse or neglect. The policies were not amended during the development of the Suspected Abusive Head Trauma Clinical pathway.
- Education was provided to all stakeholders:
  - Nursing units where the Suspected Abusive Head Trauma Clinical Pathway is used
  - Division/Department of Child Adversity and Resilience, Developmental and Behavioral Health, Social Work, Inpatient Care Management, Neurosurgery, and Trauma Surgery
  - Providers from Emergency Medicine, Critical Care Medicine, Hospital Medicine, Rehabilitation Medicine, Neurology
- Additional institution-wide announcements were made via email, the hospital website, and relevant huddles.

Disclaimer

When evidence is lacking or inconclusive, options in care are provided in the supporting documents and the power plan(s) that accompany the clinical pathway.

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These clinical pathways do not establish a standard of care to be followed in every case. It is recognized that each case is different, and those individuals involved in providing health care are expected to use their judgment in determining what is in the best interests of the patient based on the circumstances existing at the time. It is impossible to anticipate all possible situations that may exist and to prepare a clinical pathway for each. Accordingly, these clinical pathways should guide care with the understanding that departures from them may be required at times.