Interventions from a Hospital System-Wide Patient Safety Monitoring Program for Child Maltreatment

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Disclosures

• **No potential conflicts of interest to disclose.**

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Background

- Hospital based patient safety monitoring programs
  - Surveillance of medical care by experts to:
    - Eliminate/reduce harm
    - Ensure appropriate allocation of resources
    - Allow for data collection and quality improvement
  - Examples
    - Antibiotic stewardship
    - Venous thromboembolism

Background

- Best practice recommendations exist for the evaluation of suspected child maltreatment
- Importance of early recognition of risk
- Importance of early recognition of abusive injury
- Value of subspecialty expertise

Program Overview

- A healthcare system-wide patient safety monitoring program was implemented for cases of alleged child maltreatment
  - Incorporated into the hospital policy on child abuse and neglect
  - Was implemented as the standard practice at our institution, across the entirety of the system

Program Setting

- Children's Hospital System
- 2 Freestanding Children's Hospitals
- 2 Pediatric Emergency Departments
- 3 Urgent Cares
- 2 Primary Care Centers
- Over 30 Specialty Clinics

Program Overview

- Hospital child maltreatment surveillance program
  - Involves daily review by child abuse pediatricians (CAPs) of all patients with maltreatment concerns
  - Allows for individual patient-level interventions
  - Allows for systemic error reduction

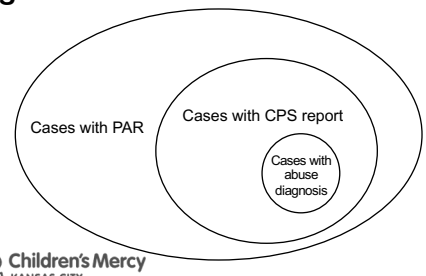
Program Overview

- Patient At Risk (PAR)
  - Completed for any patient for whom there is concern for child maltreatment
  - Documents the concern, demographic information, and psychosocial assessment

Program Overview

- "A PAR is initiated whenever abuse/neglect is under consideration"
  - Examples for which a PAR should be considered:
    - Disclosure of sexual abuse or medical findings indicating possible sexual abuse
    - Fracture in a patient under 1 year of age or a fracture otherwise indicating possible abuse
    - Intracranial bleeding or a skull fracture in a patient under 1 year of age
    - Bruising in a patient under 6 months of age or, for a patient of any age, buttock or ear bruising, or other suspicious bruising
- Different from mandated reporting requirements

Program Overview



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Program Overview: PAR Review

- PARs reviewed by CAP provider
  - Interventions:
    - Critical child abuse medical errors ("emergency call back")
    - Need for inpatient CAP consult
    - Need for further communication with investigators
    - Need for a follow-up appointment or referral
    - Other identified need
    - No intervention necessary

Program Evaluation Goals

1) Characterize the frequency of identification of patients who need further intervention based on expert review
2) Evaluate for associations between age/location and need for further intervention
3) Describe patients needing emergency interventions

Evaluation Process

- Retrospective review of PAR Excel database during a 30-month time period (2016-2018)
- Basic demographics
  - Gender/Ethnicity not included
- Interventions recommended by CAP reviewer

Program Outcomes

- 30-month data collection period:
  - Roughly 1.5 million healthcare system visits
  - 7693 PARs generated
    - 0.5% of all visits
  - Average of 8.44 PARs per day

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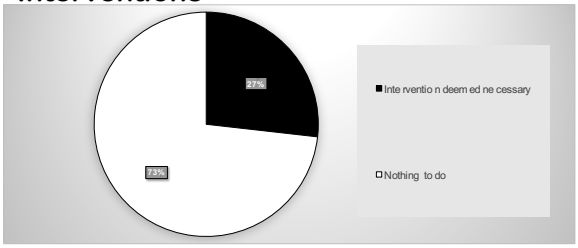
Interventions



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Program Outcomes

Intervention:	n=7697 (%)
Emergency call back	53 (0.7%)
Needs inpatient CAP consult	18 (0.23%)
Needs communication with investigators	419 (5.4%)
Needs follow-up and/or referral	1535 (19.9%)
Other	129 (1.7%)
Nothing to do	5636 (73%)

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Program Evaluation Goals

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Study Population:

Hospital Location

		Total: N=7697
Age	Median 5.4 years (IQR 2, 12.3)	Range 0 -38 years
Hospital Location	Inpatient	1218 (15.8%)
	Outpatient Clinic	1317 (17.1%)
	ED/UC	5162 (67.1%)
Reason for PAR	Physical Abuse	3321 (43.1%)
	Sexual Abuse	2405 (31.2%)
	Neglect	2279 (29.6%)
	Sibling Exam	244 (3.2%)
	Other	3445 (44.8%)
CAP Intervention	Nothing to do	5636 (73%)
	Emergency Callback	53 (0.7%)
	Inpatient Consult	18 (0.2%)
	Contact MDT	419 (5.4%)
	F/U appointment	1535 (19.9%)
	Other/clarify EMR	129 (1.7%)
MDT Involvement	Law Enforcement Called	3338 (43.4%)
	CPS Involved	5878 (76.4%)

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Study Population:

Reason for PAR

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Program Interventions

	No Intervention n(%)	ALL Interventions n(%)		
		Total	Emergency Callbacks	Other Interventions
n	5636	2154	53	2086
Median Age (IQR)	5.2 (1.9, 12.7)	5.6 (2.3, 10.8)	1.5 (0.6, 4.3)	5.7 (2.4, 10.9)
CMH Location				
Inpatient	109 (19.4%)	133 (6.2%)	1 (1.9%)	131(6.2%)
Outpatient	746 (13.2%)	25 (11.8%)	8 (15.1%)	242 (11.6%)
ED/UC	3795 (67.3%)	1767 (82%)	44 (83%)	1713 (82.1%)
LE Involved	2190 (38.9%)	1214 (56.4%)	30 (56.6%)	1176 (56.4%)
CPS Involved	4084 (72.4%)	1801 (83.6%)	39 (73.6%)	1751 (83.9%)

No significant age difference between No Intervention and All Interventions

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Emergency Callbacks were significantly younger than those requiring no intervention ($p<0.0001$) And those requiring other interventions ($p<0.0001$)

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A significantly greater proportion of the Intervention Group was evaluated in the Emergency Department/Urgent Care than the No Intervention Group (p<0.0001)

A significantly greater proportion of the Callback Group was evaluated in the Emergency Department/Urgent Care than the No Intervention Group (p=0.0054)

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Odds of Intervention Based on Location of PAR

OR (95% CI)

	ED vs. Inpatient	ED vs. Outpatient	Outpatient vs. Inpatient
All interventions vs. No interventions	3.8 (95% CI: 3.2 – 4.6)	2.0 (95% CI: 1.7 – 2.3)	2.8 (95% CI: 2.2 – 3.5)
Emergency Callback vs. No interventions	12.7 (95% CI: 1.7 – 92.3)	1.1 (95% CI: 0.5 – 2.3)	11.7 (95% CI: 1.5 – 94.1)

Odds of Intervention Based on Location of PAR

	OR (95% CI)		
	ED vs. Inpatient	ED vs. Outpatient	Outpatient vs. Inpatient
All interventions vs. No interventions	3.8 (95% CI: 3.2 – 4.6)	2.0 (95% CI: 1.7 – 2.3)	2.8 (95% CI: 2.2 – 3.5)
Emergency Callback vs. No interventions	12.7 (95% CI: 1.7 – 92.3)	1.1 (95% CI: 0.5 – 2.3)	11.7 (95% CI: 1.5 – 94.1)

Program Interventions: Summary

- Infants and younger children were more likely to require an emergency callback
- ED/UCC
  - Interventions were more likely
  - Emergency callbacks were more likely
- Inpatient and clinics were the visit locations for:
  - 17% of emergency callbacks
  - 18% of children needing interventions

Program Evaluation Goals

1) Characterize the frequency of identification of patients who need further intervention based on expert review
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Emergency Call Backs

- Cases in which an error in medical decision-making was made
  - Appropriate work-up not completed
  - Significant safety concern

	EMERGENCY CALLBACKS N=53
Reason for evaluation	
Bruising	23
Fracture	5
AHT	7
Abd trauma	3
SA	4
Neglect	5
Other	17
Reason for call back	
Radiology	21
Lab	6
Photos	23
Safety	12
Diagnostic Error	14

Case Example

- 15-year-old male with chromosomal anomalies and global developmental delay
  - Direct admit for failure to thrive from PCP
- Admitted to our hospital with acute femur fracture 1 month prior
  - No clear history
  - "May have" been caused by younger sibling jumping on him
- No medical care, developmental/educational services
- Ongoing weight loss
  - On admission: 17kg (z-score -12.4)

Emergency Callbacks

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Photos	23
Safety	12
Diagnostic Error	14

Emergency Callbacks: Diagnosis

CAP Diagnosis	Other Physician Diagnosis			
	Abuse (%)	Not Abuse (%)	No diagnosis (%)	Total (%)
Abuse	6	17	5	28
Not Abuse	1	14	3	18
Total	7 (15.2%)	31 (67.4%)	8 (17.4%)	46 (100%)

CAP Clinic assessment occurred in 46/53 cases (86.8%)

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Emergency Callbacks: Diagnosis

CAP Diagnosis	Other Physician Diagnosis			
	Abuse (%)	Not Abuse (%)	No diagnosis (%)	Total (%)
Abuse	6	17	5	28 (60.9%)
Not Abuse	1	14	3	18 (39.1%)
Total	7 (15.2%)	31 (67.4%)	8 (17.4%)	46 (100%)

The diagnosis regarding abuse changed in 39.1% of cases
From not abuse to abuse in 17/18 cases (94.4%)

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Emergency Callbacks with Diagnostic Change:

Not Abuse to Abuse

- Initial concern of physical abuse in (94.1%)
- 14/17 (82.3%) seen in ED/UC
- 9/17 (52.9%) were over 3 years old
  - 9 days to 15 years
- Reason for callbacks
  - 12/17 (70.6%): Inadequate work-up/occult injury screen
  - 6/17 (35.3%): Diagnostic error
  - 6/17 (35.3%): Safety concern

Case Example

- 14-month-old sibling of a physically abused patient
- PE: unremarkable
  - Skeletal survey (SS) not done
- Brought back to clinic the next day and repeat SS showed:
  - Healing mid-shaft clavicle fracture

Case Example

- 15-month-old female seen following the unexplained death of another infant in the home
- PE: patterned/linear injuries to trunk and extremities
  - Skeletal survey not done
- Psychosocial assessment: recent history of father "choking" patient's twin
- Brought back to clinic next day
  - Classic metaphyseal lesion (CML) on skeletal survey

Case Example

- 22-month female brought to ED for burn care
  - Occurred 5 days ago, but now “looks different”
  - Mom was not home when injury happened
  - Boyfriend reported he had heated the oven and opened the oven door and she tripped and fell landing on her R hand
  - Treated at home with OTC ointment
- ED diagnosis: second degree burn back of right hand
  - No SS, no safety plan, discharged home to mom, no police report
  - Hotline to CPS made for medical neglect

Case Example

Case Example

- Immediate call back for SS and clinic appointment
  - Requested safety plan by CPS and law enforcement
  - CAP dx: child physical abuse
- With police involvement, boyfriend disclosed he intentionally burned her hand under hot water because she wouldn’t eat her lunch

Limitations

- Hospital system requirements
  - Social work support
- Limited demographic data
- No way to measure safety program "bypasses"
- No objective measure of program acceptability
- Underlying requirement for staff to have concern for abuse

Conclusions

- Patient safety monitoring program addressing concerns for child maltreatment
  - Beneficial to children
  - Improves patient safety
  - Results in interventions across a health system

References

- Hansen J, Terreros A, Sherman A, Donaldson A, Anderst J. A System-Wide Hospital Child Maltreatment Patient Safety Program. http://pediatrics.aappublications.org/content/early/2021/08/20/peds.2021-050555
- Anderst J, Nielsen-Parker M, Moffatt M, Frazier T, Kennedy C. Using simulation to identify sources of medical diagnostic error in child physical abuse. *Child Abuse Negl.* 2016;52:62–69.
- Wood JN, Feudtner C, Medina SP, Luan X, Localio R, Rubin DM. Variation in occult injury screening for children with suspected abuse in selected US children's hospitals. *Pediatrics*. 2012;130(5):853–860.
- Sheets LK, Leach ME, Koszewski IJ, Lessmeier AM, Nugent M, Simpson P. Sentinel injuries in infants evaluated for child physical abuse. *Pediatrics*. 2013;131(4):701–707.

References

- Anderst J, Kellogg N, Jung I. Is the diagnosis of physical abuse changed when Child Protective Services consults a child abuse pediatrics subspecialty group as a second opinion? *Child Abuse Negl*. 2009;33(8):481–489.
- Rumball-Smith J, Fromkin J, Rosenthal B, et al. Implementation of routine electronic health record-based child abuse screening in general emergency departments. *Child Abuse Negl*. 2018;85:58–67.
- Berger RP, Saladino RA, Fromkin J, Heineman E, Suresh S, McGinn T. Development of an electronic medical record-based child physical abuse alert system. *J Am Med Inform Assoc*. 2018;25(2):142–149.

Questions?

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