YIELD OF INJURY TESTING FOR CONTACTS OF CHILDREN EVALUATED FOR PHYSICAL ABUSE

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CAPNET

INTRODUCTION

The Clinical Challenge

Siblings and other child household members ("contacts") who share a care environment with an abused child ("index child") face an increased risk of physical abuse. Injury testing of contact children, including skeletal surveys (SS) and neuroimaging, has been recommended by some experts to detect injuries that may not be apparent on history or physical examination alone. However, precise indications for when such testing should be performed remain uncertain.

The Unknown

Guidelines from the American Academy of Pediatrics (AAP) recommend skeletal survey for household contacts under two years of age but provide no age-specific guidance on neuroimaging. This highlights a critical gap in the literature: the lack of contemporary, multicenter data on injury testing practices and diagnostic yield among contact children. This gap is particularly important given that testing decisions require substantial clinical coordination and resources and have meaningful implications for children's health and clinical management.

OBJECTIVES

1. To determine rates of injury testing among contact children evaluated within CAPNET;
2. To determine diagnostic yield among contact children evaluated within CAPNET;
3. To describe injuries identified by skeletal survey and neuroimaging.

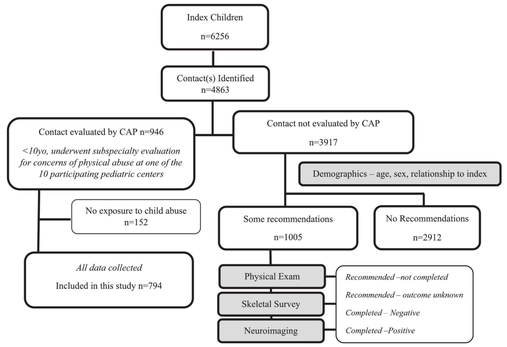
METHODS

STUDY DESIGN: Cross-sectional study using CAPNET, a U.S.-based, multi-center observational research network of children <10 years old who underwent subspecialty evaluation for concerns of physical abuse at 10 participating pediatric centers.

DATA COLLECTION: Data were abstracted from the medical record for children <10 years (120 months) old if they received care at the participating center and were evaluated by a CAP for recent concerns for physical abuse between February 1, 2021, and December 31, 2022.

CONTACTS: CAPNET collects different data for contacts depending on the information available to the clinical team as well as the level of recommendations made.

INJURY TESTING: Participating centers conducted skeletal surveys according to AAP/ACR guidelines. Neuroimaging included CT, MRI, or fast MRI. CAPs assessed abuse likelihood using a previously published 7pt scale ranging from 1 (Definitely Not Physical Abuse) to 7 (Definite Physical Abuse). We used descriptive statistics to describe injury testing rates and diagnostic yeld, and used odds ratios (ORs) with 95% CI to measure differences between groups.



RESULTS

of the **7202 children** evaluated by CAPNET centers

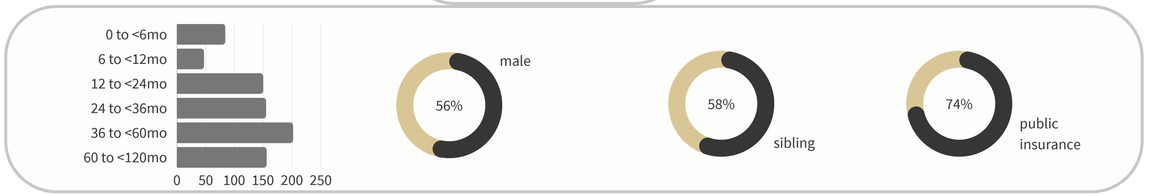
87%
n=6256

13%
n=946

6256 were index children and 946 were contacts with CAP evaluations

794 (84%) of contacts presented due to exposure to abuse in another child
(vs. other forms of abuse)

PRESENTATION	CHIEF COMPLAINT	PHYSICAL EXAM
87%	**90%**	**67%**
NO HISTORY OF TRAUMA	NONE	NORMAL EXAM



SKELETAL SURVEY (SS)

ACCORDING TO AAP GUIDELINES, skeletal survey would have been indicated for 316 contacts
<24mo and associated with an index child with a high level of concern for abuse

196 (62%) of those 316 received an initial SS

50 (16%) of those 316 were twins

123 (39%) of those 316 were <12 mo

39 (12%) of those 316 had findings on exam

OF THE 196 COMPLETED SS

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IDENTIFIED NEW FRACTURES

AMONG THESE 30:

37% did not have a normal exam

47% had at least 1 rib fracture identified

47% were twins

OUTSIDE OF AAP GUIDELINES, an additional 283 contacts received a SS
>24mo and/or associated with an index child with a low level of concern for abuse

OF THE 283 COMPLETED SS

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IDENTIFIED NEW FRACTURES

		SS completed	OR (95% CI)	Positive SS	OR (95% CI)
Twin Status	**Twins:**	37/50 (74%)	**3.26** (1.66–6.41)	**Twins:** 11/36 (31%)	**5.41** (2.03–14.36)
	Non-twins:	124/266 (47%)		**Non-twins:** 9/124 (7%)	
Age Group	**<12 months:**	76/123 (62%)	**2.05** (1.29–3.26)	**<12 months:** 14/76 (18%)	**2.97** (1.08–8.19)
	12–24 months:	85/193 (44%)		**12–24 months:** 6/85 (7%)	

NEUROIMAGING

IN THE ABSENCE OF GUIDELINES, 123 contacts identified who were
<12mo and associated with an index child with a high level of concern for abuse

84 (68%) of those 123 were <6mo

38 (31%) of those 123 were twins

63 (51%) of those 123 had a normal exam

neuroimaging was recommended for **56 (46%)** of those 123, with results available for 49 contacts

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IDENTIFIED NEW INJURIES

5 with intracranial hemorrhage

2 with skull fractures

6 were <6mo

all were twins

		Neuroimaging Performed	OR (95% CI)
Twin Status	**Twins:**	30/38 (79%)	**13.03** (5.13–33.08)
	Non-twins:	19/85 (22%)	
Age Group	**0–6 mo:**	39/84 (46%)	**2.51** (1.09–5.80)
	6–12 mo:	10/39 (26%)	

DISCUSSION

- In this large multicenter cohort, injuries were identified in a modest but clinically meaningful proportion of contact children;
- Younger contacts, twins, and children with abnormal physical examination findings were more likely to undergo testing and more likely to have injuries identified;
- These findings support current emphasis on higher-risk groups, particularly young children and twins, and provide contemporary multi-center data to inform future screening approaches.

Interpretation

- Because testing was performed more often in children perceived to be at highest risk, the true yield of universal testing likely lies between the observed yield among tested children and the assumption that all untested children were uninjured;
- In this cohort, observed yield among tested children was approximately 6–12% for skeletal survey and 6–14% for neuroimaging;
- Some identified injuries may not have changed acute clinical management but may still have had forensic importance.

Possible Reasons for Incomplete Testing

- We could not determine why recommended testing was not completed;
- Potential contributors include:
  - lack of recommendation,
  - inability to complete testing,
  - failure to communicate results to the CAP team,
  - and site-level variation in practice patterns or available resources;
- Completion of testing often requires coordination across CAPs, other clinicians, child protective services, and families.

Relation to Prior Work

- Our findings are broadly consistent with prior studies showing a meaningful injury yield in contact children;
- Unlike some prior cohorts, our study included contact children with physical examination findings or other concerns for abuse, which may partly explain differences in yield;
- In contrast with prior studies reporting no abnormal neuroimaging in infant contacts, abnormal neuroimaging findings were identified in this cohort.

Limitations

- Some children may have been misclassified as index vs contact children;
- Some untested contacts may have had undiagnosed injuries;
- Some injuries identified outside participating centers may not have been communicated to the CAP team and therefore may not have been captured;
- Because identification of contacts depended on information known to CAPs, some contacts may have been missed;
- Degree of exposure risk may vary by the contact child's relationship and proximity to the abuser.

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