



Examining Self-Reported Pain of School-Age Children Undergoing Treatment for Cancer Using a Game-Based App

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Pain is a distressing and common experience in pediatric oncology



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Pain can be difficult for children to quantify and describe

Limited information is available on pain experiences outside of clinical settings

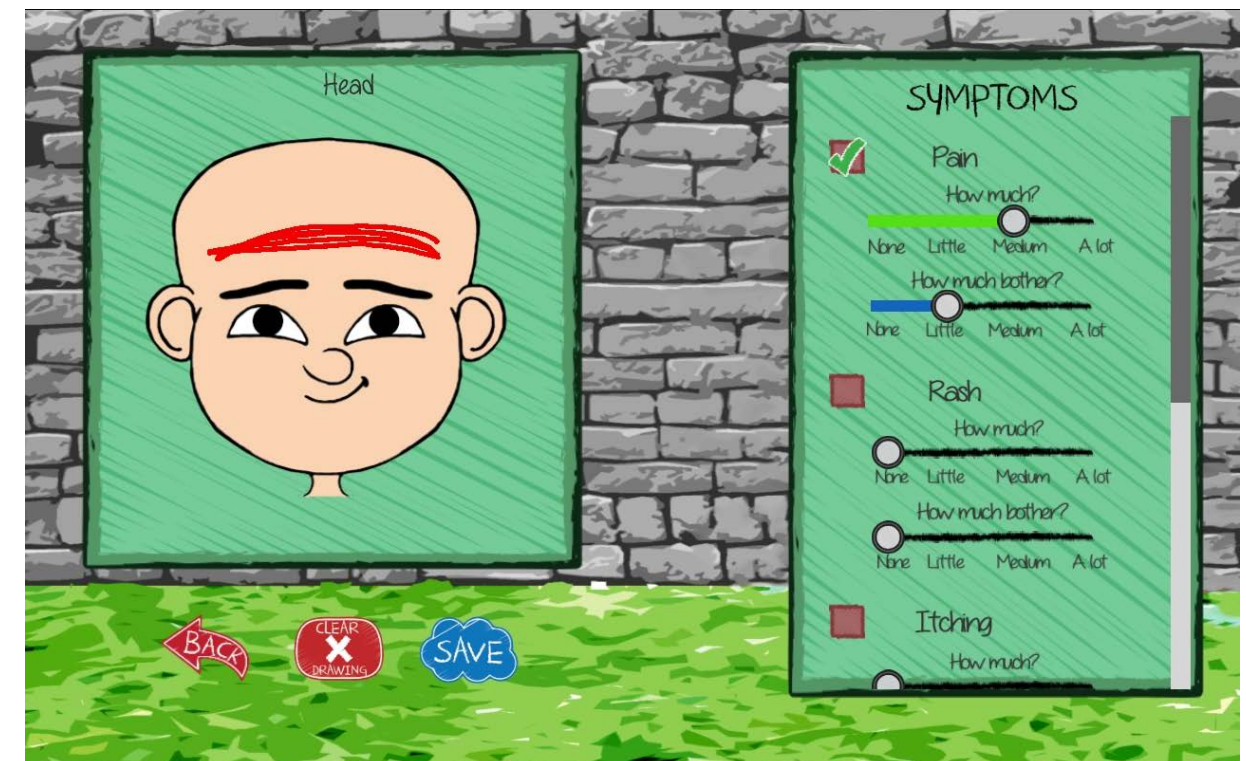
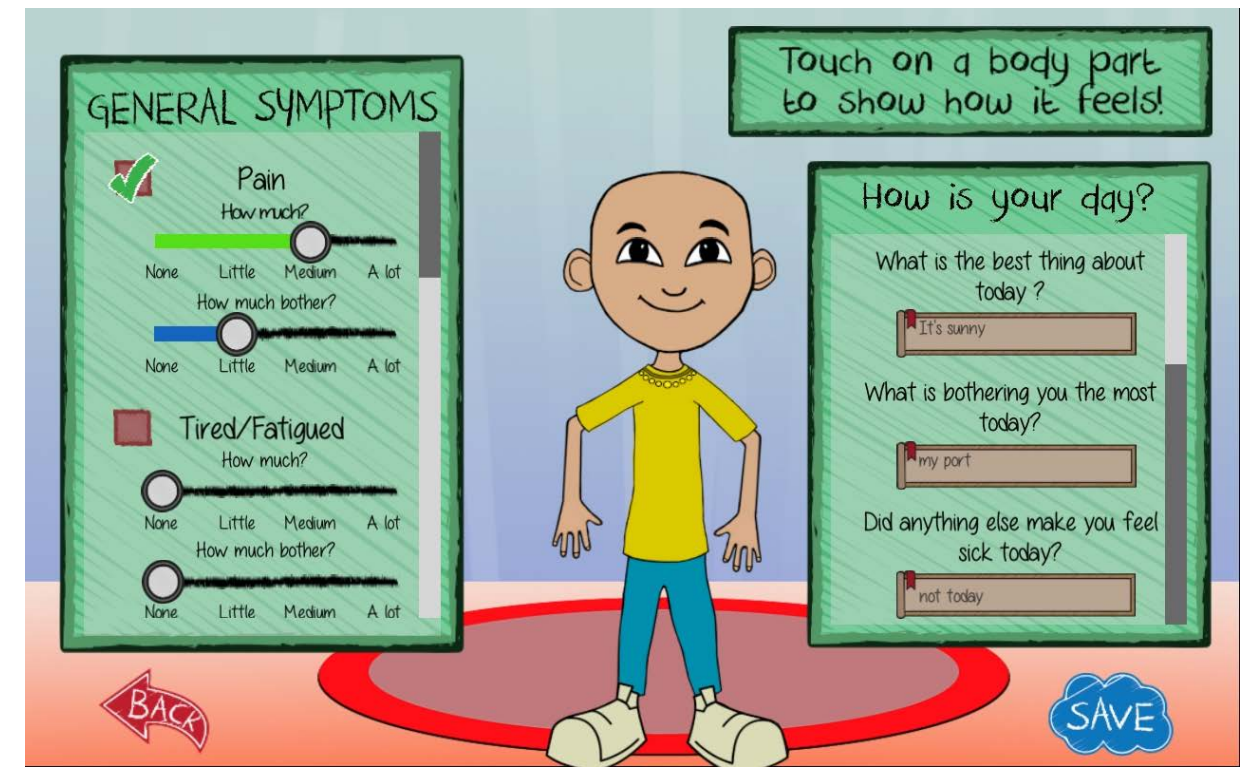
Purpose: To describe pain experiences reported by school-aged children participating in a trial of a game-based symptom assessment app.

Color Me Healthy App Trial

- 19 children (ages 6-12, *Mdn.* 8; 12 boys) receiving treatment for cancer at Primary Children's Hospital, Salt Lake City, UT
- Participants asked to use app for at least 5 days between clinical encounters
 - 13 participants recorded in app for at least 4 days (*Mdn.* 4 days, range 1-12 days)
- Symptoms reported as “general symptom” and/or “localized symptom”, open-ended questions, daily diary

Data analysis

- Descriptive statistics used to evaluate prevalence and characteristics of pain reported as a general symptom or specified as a location
- Free-text questions and daily diary reviewed for pain-related statements and analyzed using content analysis
 - How are you feeling today?
 - What is the best thing about today?
 - What is bothering you the most today?
 - Did anything else make you feel sick today?



Results: Prevalence of pain

- All 19 children reported pain at least once
 - Total of 67 reports across 48 days
- Severity and bother positively correlated, $(rs(50) = 0.414, p < .01)$

	General symptom (N = 39)		Pain location (N = 28)	
	n	%	n	%
Pain Severity				
Little	18	46.1	15	53.6
Medium	5	12.8	8	28.6
A lot	4	10.3	2	7.1
NR	12	30.8	3	10.7
Pain Bother				
None	8	20.5	4	14.3
Little	16	41.0	9	31.2
Medium	1	2.6	8	28.6
A lot	4	10.3	4	14.3
NR	10	25.6	3	10.7

Note. NR = not reported

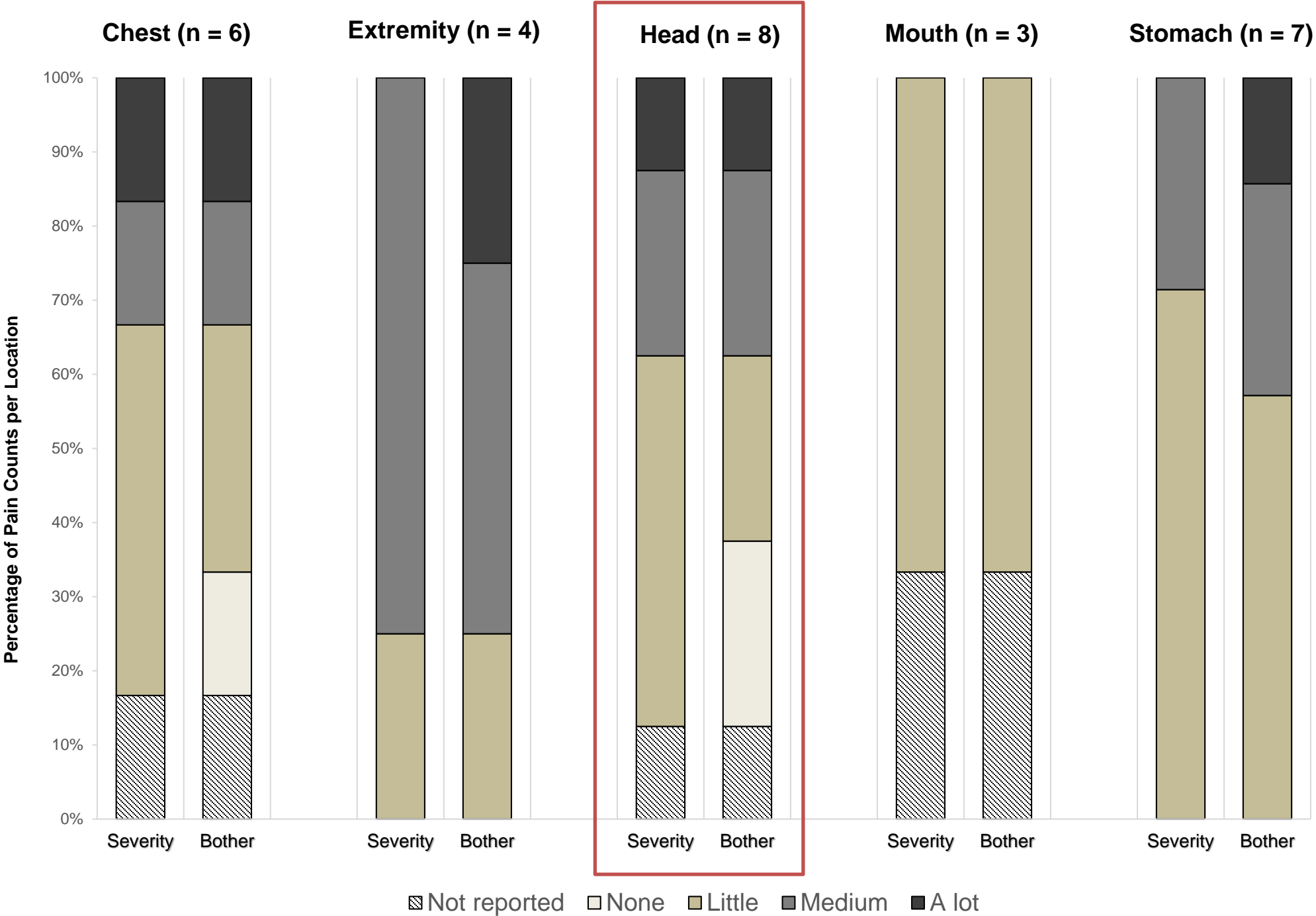
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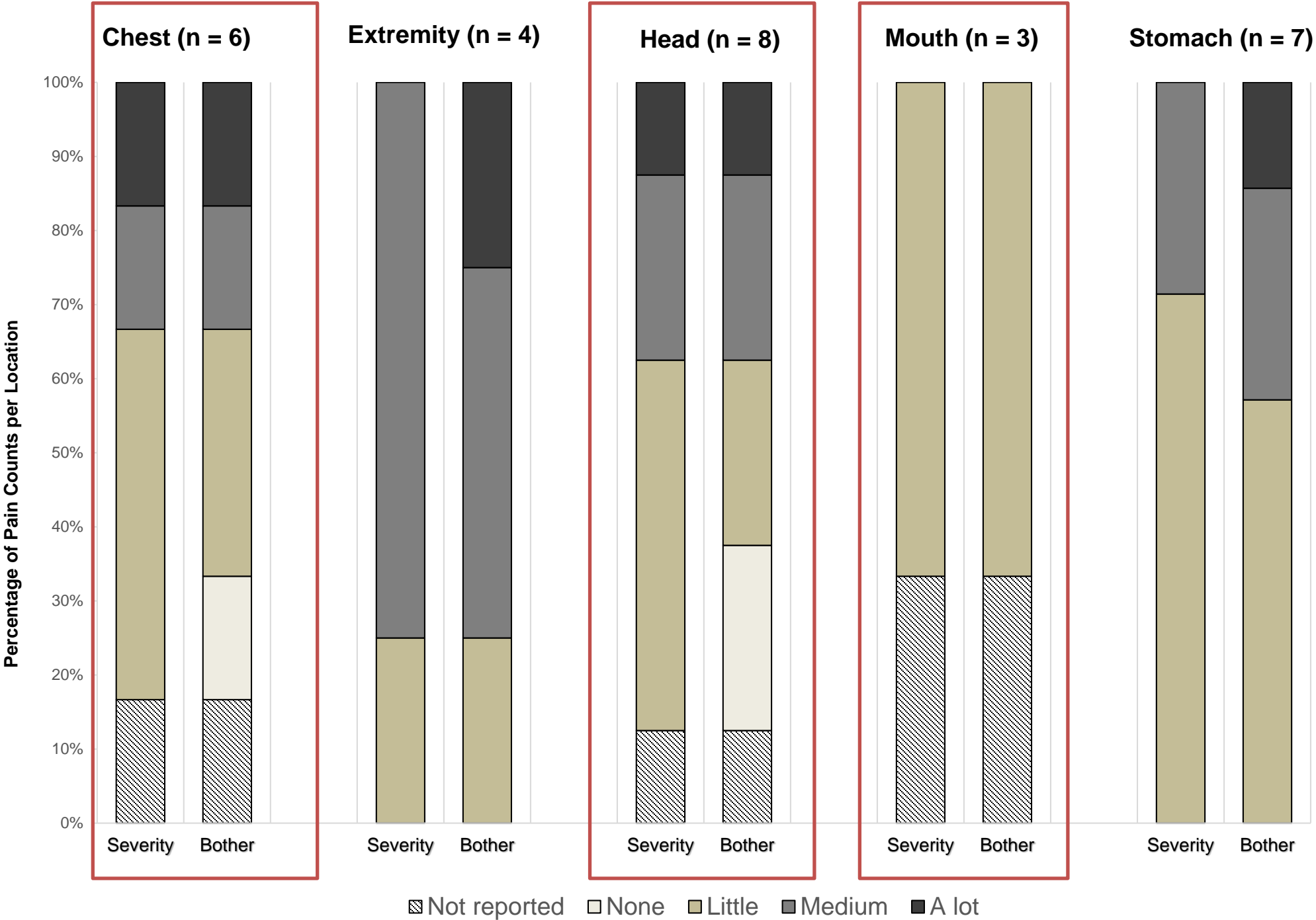
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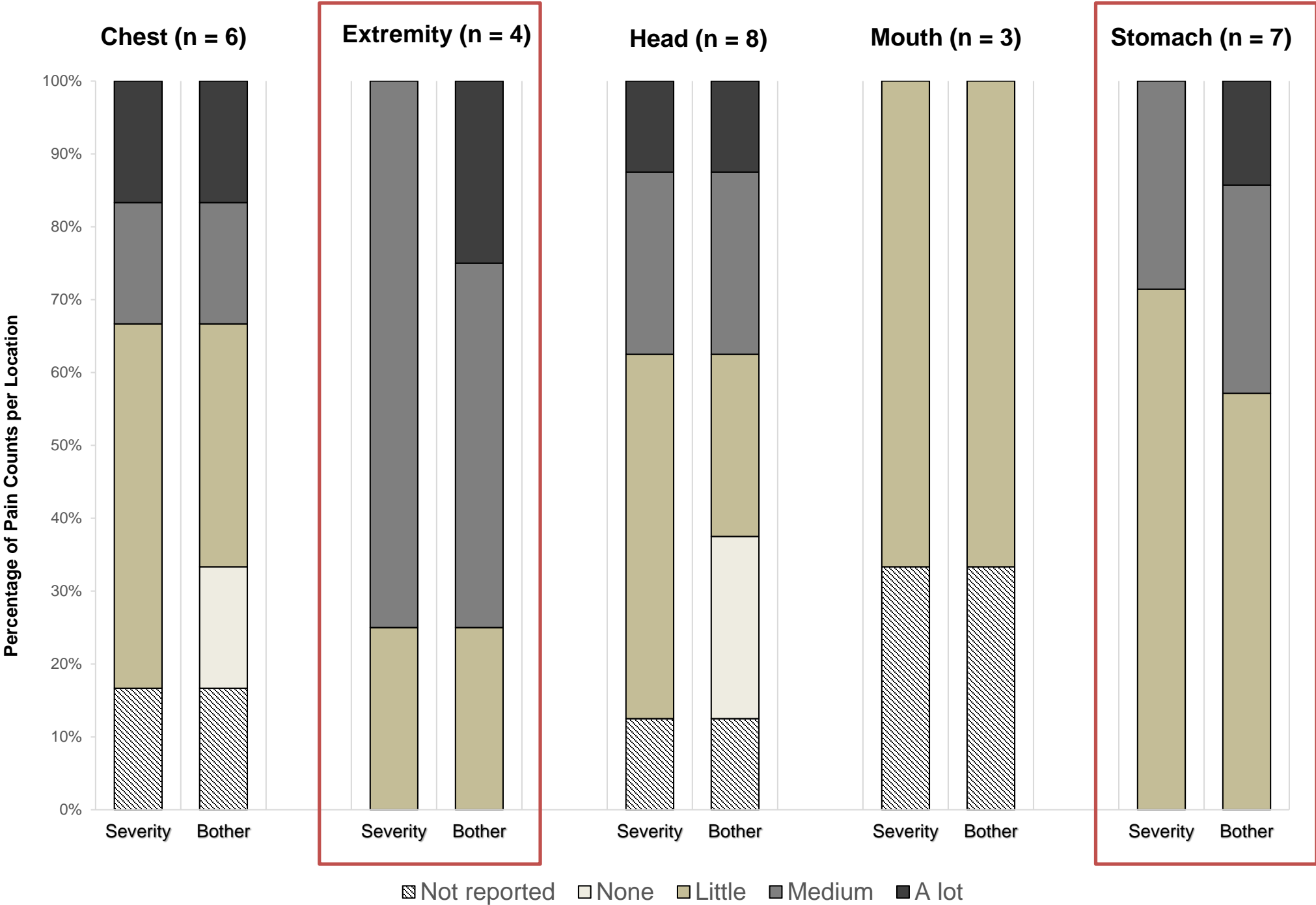
Results: Locations of pain reported



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Results: Pain related-descriptive statements

- Eleven children documented 32 pain-related qualitative statements
 - 65.6% (n = 21) in reply to *What is bothering you the most today?*
 - 15.6% (n = 5) in reply to *Did anything else make you feel sick today?*
 - 12.5% (n = 4) written in the app daily diary
 - 6.3% (n = 2) in reply to *How are you feeling today?*
- The most frequently documented topic was in reference to the central line (28.1%, n = 9)
- The second most frequent topic referenced the stomach or gastrointestinal tract (25%, n = 8)

Results: Pain related-descriptive statements

“head ache”

7-year-old girl with a brain tumor

“leg and arm pain”

10-year-old boy with Hodgkin
Lymphoma

“Feeding tube/meds”

12-year-old boy with ALL

“the neupegen shot”

11-year-old boy with Non-Hodgkin
Lymphoma

“lump in throat
(heartburn?)”

7-year-old girl with ALL

“around 9 pmish my
port sgarted to hurt”

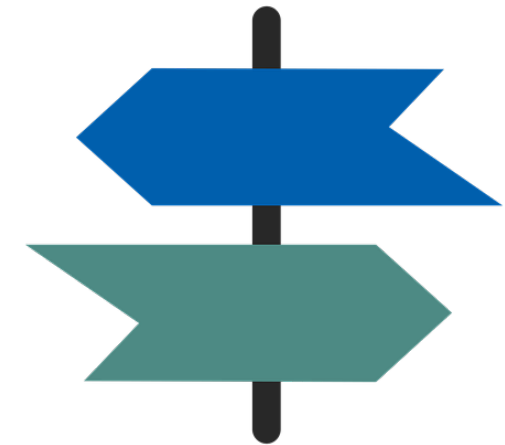
11-year-old girl with a brain tumor

***Color Me Healthy* supports pain communication**

- Pain persists between clinical visits
 - Any pain may disrupt daily activities
 - Clinicians should inquire about pain and its consequences between clinical encounters
- Mobile health tools provide unique opportunities to support children in expressing their pain experiences
 - Permit and encourage children to use their own words in a developmentally-friendly way
 - *Color Me Healthy* allowed children to report pain in ways that were relevant and meaningful to them
- Pain not reported in a discrete assessment does not eliminate the possibility of a localized source of discomfort

***Color Me Healthy* supports pain communication**

- Limitations:
 - Small feasibility trial at a single institution
 - No exclusion criteria for a diagnosis of chronic pain
 - No requirement to document all pain characteristics (severity/bother)
- Directions for future research:
 - How can we improve *Color Me Healthy* to support school-age children in their pain reporting?
 - What is the role of the app to support pain-related decision making?



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