

# Risk factors and trends in child physical abuse in Illinois, 2011-2013

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# Child Physical Abuse

- Increased risk of poor health outcomes
  - Severe injury, mental health issues, substance abuse
- Increased risk of future abusive relationships
  - Cycle of abuse
- 3,000,000+ referrals reported to CPS annually
  - 1/4 are confirmed cases - 18% physical abuse
- Hospitalization Rates – 6.2-30.1/100,000 children
  - 8.2 visits/10,000 ER person-days

# Child Physical Abuse

- Perpetrator
  - ~50% male
  - Persons 18-44 years old, NH Whites, biological parents
- Injuries
  - Skin – overall, head – mortality due to abuse
- Risk Factors
  - Domestic violence, parental/guardian history of abuse, substance use, young maternal age
  - Preterm birth, excessive crying, <12mo, twin+, hyperactivity, lack of social support, low socioeconomic status, Medicaid insurance

# Traumatic Brain Injury (TBI)

- “Caused by a bump, blow, or jolt to the head or a penetrating head injury that disrupts the normal function of the brain” (CDC)
  - Result of severe physical abuse
- Leading cause of child fatality
- Large economic burden
  - Hospital fees, intensive care, life-long disability
    - Few cases treated per hospital

# Current Reporting Systems

- Primary – Child Protective Services (CPS)
  - Limitations:
    - Unreported cases: poor recognition, infrequent/lack of visits because of maltreatment, parental/guardian insistence of no maltreatment
    - Surveillance System: mandatory reporting
      - Overwhelm current resources
- Alternative – hospital discharge data
  - De-identified, “timely”

# Research Questions

1. What are the risk factors for child physical abuse in Illinois between 2011 and 2013?
  1. What are the risk factors for TBI due to child physical abuse and among children assaulted at home between 2011 and 2013 in Illinois and how do they differ?
2. How do the risk factors for child physical abuse differ compared to other children who were assaulted at home between 2011 and 2013 in Illinois?
3. How does the association between child abuse (and TBI) and its respective risk factors change over time in Illinois from 2011 to 2013?

# Methods

- Data Source – Illinois Hospital Discharge Data
  - 2011-2013
  - Inpatient and Emergency Room
- Study Population (N=6226)
  - children 0-18 years old
- Dependent Variable – Physical Abuse
  - Ecodes & ICD-9-CM codes
  - Comparison population - other Assaults at Home
- Dependent Variable – Traumatic Brain Injury

# Methods

- Independent Variable – Physical Abuse
- Additional Covariates:
  - Age, gender, race/Hispanic ethnicity, perpetrator
  - Hospital & injury measures:
    - Barrel Matrix, NISS, Elixhauser Index (comorbidities), length of stay, ventilator, and discharge status
  - Time
    - Visit year and month



# Methods – Statistical Analysis

- Descriptive Analyses
  - Univariate and bivariate analyses
  - Stratified analyses
    - Year, gender, inpatient/outpatient (ER)
  - Rates for physical abuse & TBI
- Multivariable regression
  - Log-binomial: physical abuse
  - Logistic: TBI
- Analyses conducted in SAS 9.4 (Cary, NC)

# Results

- 76.7% suspected cases of physical abuse
  - Rate: 50.6/100,000 children 2011-2013
    - Low- 47.3 in 2011, High- 52.6 in 2012
  - Males: similar across ages
  - Females: highest among 13-17
  - Perpetrator: Missing (27.4%), Male figure (24.6%)
- 6.3% diagnosed with TBI
  - 57.0% suspected physical abuse
  - Rate: 4.1 /100,000 children 2011-2013
    - Low-3.95 in 2012, High- 4.25 in 2011
- Majority were female (55.1%), 13-17 (43.9%), non-Hispanic Black (39.5%)

# Results – Physical Abuse

**Table 1. Distribution of population characteristics among cases of child abuse and other children 0-18 years old assaulted in home in Illinois, Illinois Hospital Discharge 2011-2013 (N=6226)**

Demographic	Physical Abuse		Assault in Home	
	n	%	n	%
<b>Gender</b>				
Female	2742	57.4	688	47.4
Male	2033	42.6	763	52.6
<b>Age</b>				
<1	519	10.9	17	1.2
1-4	947	19.8	102	7.0
5-8	848	17.8	108	7.4
9-12	765	16.0	185	12.8
13-17	1696	35.5	1039	71.6
<b>Race and Ethnicity</b>				
Non-Hispanic White	1558	32.9	591	40.8
Non-Hispanic Black	1899	40.0	545	37.6
Hispanic	914	19.3	198	13.7
Non-Hispanic Others	372	7.8	114	7.9

# Results – Physical Abuse

## ■ Hospital Measures

### ■ Cases:

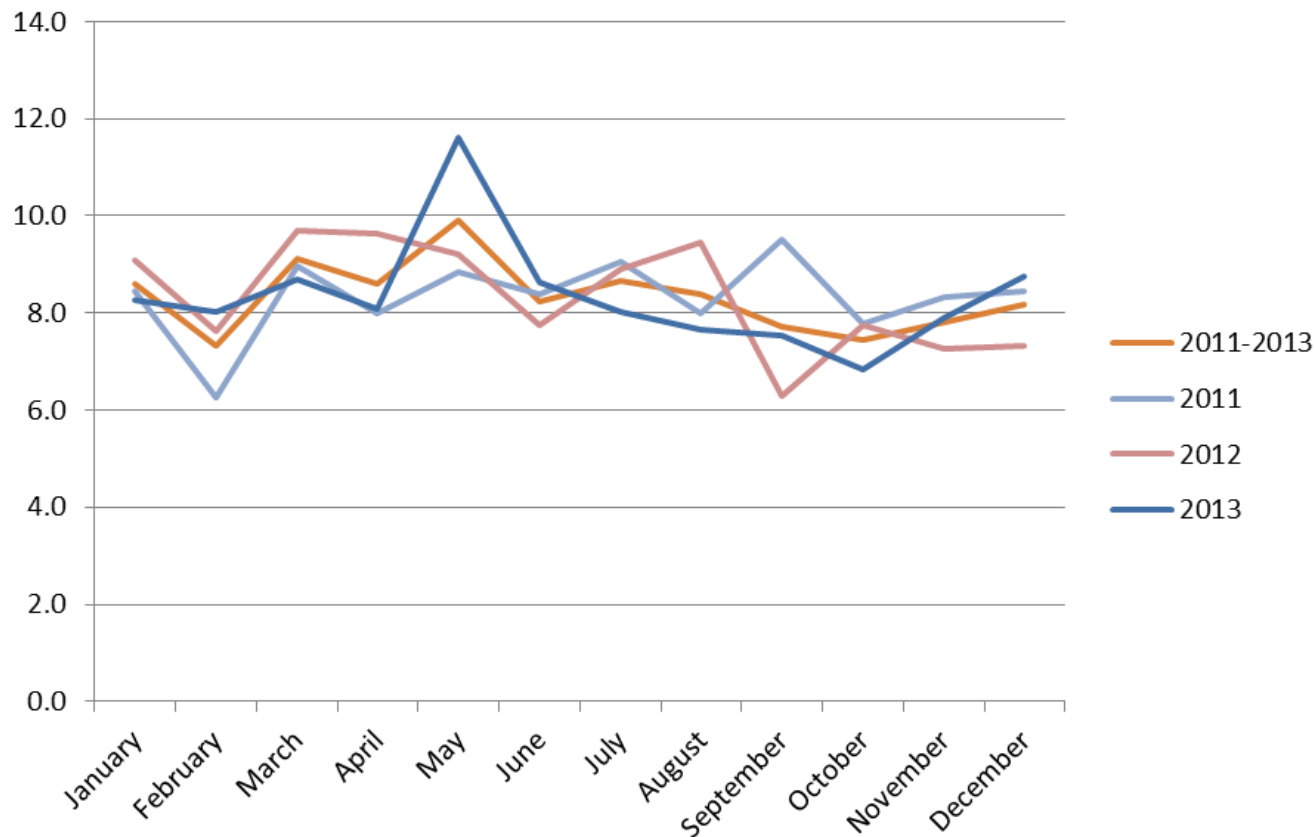
- Admitted (16.9 vs 4.2%)
- Longer hospital stays (1.8 vs 0.5 days)
- Ventilator (1.6 vs 0.4%)
- CFR (123.6 vs. 68.9 per 10,000 cases)

### ■ Other assaults at home:

- Discharged home (92.2 vs 81.2 %)
- Fractures (11.3 vs. 6.4%), open wounds (23.9 vs. 5.5%), contusions or superficial injuries (50.3 vs. 40.9%), penetrating injuries (10.5 vs. 1.4%)

# Results – Physical Abuse

Figure 1. Rates of child physical abuse by month among children who visited an ER or were admitted to a hospital, IL Hospital Discharge 2011-2013



# Results - TBI

- Majority Inpatient (52.1 vs. 47.9%)
- TBI
  - Ventilator (17.8 vs 0.5%)
  - Undergo operation (21.3 vs 2.0%)
  - Physical abuse (82.6 vs 76.0%)
  - Die (5.4 vs 0.9%)
- No-TBI
  - Discharge home (94.5 vs 75.1%)

**Table 2. Multivariable results for child physical abuse and for traumatic brain injury among children 0-18 who visited an emergency room or were hospitalized in Illinois, Illinois Hospital Discharge 2011-2013 (N=6226)**

	Physical Abuse		TBI	
	aPR	95%CI	aOR	95%CI
<b>Diagnosed CPA</b>	-	-	0.70	(0.51, 0.98)
<b>Female</b>	1.03	(1.01, 1.05)	0.64	(0.50, 0.82)
<b>Age (years)</b>				
<1	1.12	(1.08, 1.17)	6.32	(4.47, 8.95)
1-4	1.10	(1.07, 1.13)	1.37	(0.96, 1.96)
5-8	1.09	(1.06, 1.12)	0.41	(0.25, 0.69)
9-12	1.06	(1.04, 1.09)	0.44	(0.27, 0.73)
13-17	Referent		Referent	
<b>Race/Hispanic Ethnicity</b>				
Non-Hispanic White	Referent		Referent	
Non-Hispanic Black	1.02	(1.00, 1.04)	0.68	(0.51, 0.90)
Hispanic	1.03	(1.00, 1.05)	1.06	(0.76, 1.48)
Non-Hispanic Others	1.01	(0.98, 1.04)	0.68	(0.41, 1.14)
<b>Elixhauser Index - Comorbidities</b>				
Paralysis & Other Neurological Disorders <sup>a</sup>	0.98	(0.86, 1.11)	2.05	(0.94, 4.47)
Cardiac & Blood Disorders <sup>b</sup>	1.03	(0.93, 1.14)	37.42	(25.57, 54.75)
Chronic Disease <sup>c</sup>	1.02	(0.97, 1.06)	1.54	(0.93, 2.56)
Nutritional Disorders	1.01	(0.91, 1.13)	0.50	(0.28, 0.87)
Substance Abuse	1.00	(0.94, 1.07)	1.08	(0.39, 3.04)
Depression & Psychoses	1.05	(1.01, 1.09)	0.57	(0.29, 1.10)

# Discussion

- Physical Abuse
  - Females and infants were at greatest risk
  - No difference by race/Hispanic ethnicity
  - Comorbidities did not differ
  - Higher on hospital measures, lower on injuries
- TBI
  - Males and infants had greatest odds
  - Non-Hispanic Black & Other had decreased odds
  - Cardiac & blood disorders had greatest odds
  - Depression & psychoses had decreased odds
  - Higher on hospital measures
- No meaningful differences over time



# Strengths & Limitations

- Strengths
  - Multiple years of data
  - Included inpatient and ER data
  - Comparison group
- Limitations
  - HDD – low utilization of maltreatment codes
  - Small sample size
    - Physical abuse comparison group
    - TBI
  - Only three years of data

# Conclusion

- Comparison children were unlikely to be additional cases of physical abuse
- More works needs to be done at hospital level to use HDD for surveillance
  - Meaningfully lower than reported cases
    - DCFS - ~8.5 cases/1000 children(abuse and neglect)
  - Time trends are consistent

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