

Association of Pediatric Abusive Head Trauma Rates With Macroeconomic Indicators

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ABSTRACT

OBJECTIVE: We aimed to examine abusive head trauma (AHT) incidence before, during and after the recession of 2007–2009 in 3 US regions and assess the association of economic measures with AHT incidence.

METHODS: Data for children <5 years old diagnosed with AHT between January 1, 2004, and December 31, 2012, in 3 regions were linked to county-level economic data using an ecologic time series analysis. Associations between county-level AHT rates and recession period as well as employment growth, mortgage delinquency, and foreclosure rates were examined using zero-inflated Poisson regression models.

RESULTS: During the 9-year period, 712 children were diagnosed with AHT. The mean rate of AHT per 100,000 child-years increased from 9.8 before the recession to 15.6 during the recession before decreasing to 12.8 after the recession.

The AHT rates after the recession were higher than the rates before the recession (incidence rate ratio 1.31, $P = .004$) but lower than rates during the recession (incidence rate ratio 0.78, $P = .005$). There was no association between the AHT rate and employment growth, mortgage delinquency rates, or foreclosure rates.

CONCLUSIONS: In the period after the recession, AHT rate was lower than during the recession period yet higher than the level before the recession, suggesting a lingering effect of the economic stress of the recession on maltreatment risk.

KEYWORDS: child abuse; economic recession; traumatic brain injury

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WHAT'S NEW

Results of this study demonstrate that after rising during the 2007–2009 recession, rates of abusive head trauma decreased slightly in the period after the recession but remained elevated compared to rates before the recession.

ABUSIVE HEAD TRAUMA (AHT) is the leading cause of death from child physical abuse and the most common cause of severe traumatic brain injury in infants.^{1–3} Poverty and stress have both been identified as important family-level risk factors for child abuse.^{4–8} A strong relationship has also been established between community-level measures of economic stress, such as poverty and housing instability,

and rates of child maltreatment.^{5,8–10} A recently published study by Eckenrode and colleagues⁸ demonstrated a relationship between higher county-level rates of substantiated child maltreatment and higher levels of poverty and income inequality. Increased rates of physical abuse, including AHT, have also been observed after natural disasters.^{11,12} The well-documented relationship between economic stress at both the family and community levels and an increased risk for abuse raised concern that rates of abuse, particularly AHT, would increase during the great recession of 2007–2009.

The great recession, the longest recession since World War II, began in December 2007 and was characterized by significant decline in economic activity across multiple aspects of the economy, including gross domestic product, income,

employment, industrial production, and retail sales.¹³ The magnitude of the foreclosure and housing crisis distinguished this recession from other recession periods; nearly 45% of families with children reported difficulties with stable housing.^{14–17} The National Bureau of Economic Research determined that the great recession ended in June 2009 on the basis of indications that the declining phase of the business cycle had ended and the rising phase had begun. The official end of the great recession did not, however, indicate that economic conditions were favorable or that the economy had returned to normal.

Several publications reported increases in the AHT rate during the great recession. A study by Berger and colleagues¹⁸ reported an increased rate of AHT in a 74-county catchment area during the 17 months of the recession compared with the rate of AHT during the previous 4 years. Another study demonstrated an increase in the number and severity of AHT cases during the recession compared with the period before the recession.¹⁹ Finally, a study using a national sample of emergency department data reported that rates of AHT in children 4 years old or younger were higher during 2007 and 2008 compared with 2006 and 2009, suggesting an increase in AHT during the recession.²⁰ A recent systematic review of pediatric studies evaluating the impact of the great recession on health behaviors, child physical abuse, mental health, and health-related quality of life concluded that “the evidence to date demonstrates the plausibility of the association between the crisis and violence against children.”²¹

There is mixed evidence regarding which specific measures of economic stress in communities, such as mortgage foreclosure and unemployment rates, were associated with abuse rates during the great recession. A study by Wood and colleagues²² using data from 38 pediatric hospitals demonstrated an association between local mortgage foreclosure rates and rates of admissions for physical abuse and high-risk traumatic brain injury (a proxy for AHT) between 2000 and 2009. Neither the study by Wood and colleagues nor the study by Berger and colleagues¹⁸ found an association between unemployment rates and rates of AHT or physical abuse. A study by Frioux and colleagues,²³ however, found that county-level unemployment rates and foreclosure rates were both associated with the rates of investigated and substantiated child maltreatment reports in Pennsylvania from 1990 to 2010. Thus, while there are data to suggest that rates of physical abuse, including AHT, increased in the United States during the recent recession, the specific economic changes associated with this increase remain unclear. Furthermore, it remains unknown whether the observed increases in AHT rates during the recession have persisted or returned to levels before the recession.

Therefore, the objectives of the study were to evaluate the AHT rate in 3 regions of the United States in the periods before, during, and after the great recession using an ecologic time series analysis, and to assess whether there was a relationship between the AHT rate and several local macroeconomic indicators that have been previously associated with increased rates of various types of child maltreatment.

METHODS

STUDY POPULATION

This study is a continuation of a prior study of children younger than 5 years old residing within a 74-county catchment area who were diagnosed with unequivocal AHT by the child protection teams (CPTs) at 4 level 1 pediatric trauma centers: Children’s Hospital of Pittsburgh of UPMC, Seattle Children’s Hospital/Harborview Medical Center, Cincinnati Children’s Hospital, and Nationwide Children’s Hospital.¹⁸ The catchment area included 23 counties in western Pennsylvania, 6 counties in Washington, and 45 counties in Ohio and northern Kentucky. The catchment areas were selected because they had the following: 1) a single regional pediatric level 1 trauma center; 2) an established CPT with stable personnel during the study period; and 3) a local institutional review board that allowed collection of study subjects’ county of residence.¹⁸ The hospitals selected to participate in the study all had CPTs with at least one child abuse pediatrician who was at the site for the duration of the entire study. These criteria maximized the possibility that all children in the catchment regions were evaluated at the participating hospital, minimized the possibility that any change in the AHT rate was related to a change in the definition of AHT, and allowed for data analysis.¹⁸ The institutional review boards at the participating hospitals approved this study.

As described by Berger and colleagues,¹⁸ data for the initial sample of 422 subjects residing in the 74-county catchment area and diagnosed with unequivocal AHT by the hospital CPTs were collected from January 2004 to June 2009 by a retrospective medical record review performed at the 4 pediatric hospitals serving the 3 regions. The current analysis includes prospectively collected data for an additional sample of children residing in the same 74-county catchment area who were diagnosed with unequivocal AHT by the CPTs at the same 4 hospitals from July 2009 through December 2012. To optimize ascertainment, data were also collected from the Pennsylvania child abuse registry and from colleagues at 2 nonparticipating pediatric hospitals (Dayton Children’s Hospital in Ohio and Mary Bridge Hospital in Washington) located close to one of the participating hospitals.

AHT RATES

Quarterly AHT rates were calculated using the county-level population estimates of residents younger than 5 years old. All population data were obtained from the US Census Bureau; the population data for 2004 to 2010 were provided by the Intercensal Population Estimate, while the 2011 and 2012 population data were obtained from the Annual County Resident Population Estimates.^{24,25}

MACROECONOMIC INDICATORS

County-level employment growth data for the period of 2004 to 2012 were obtained from the US Census Bureau.²⁴ We specifically chose the employment growth rate over the unemployment rate because of the lack of finding of an association between the unemployment rate and AHT

rate during the period before the recession and the recession rate in the previously published parent study and recognized limitations in unemployment data.¹⁸ County-level mortgage foreclosure and 90-day mortgage delinquency data for the same period were obtained from CoreLogic, a real estate data and analytics company that collects property address-level data from public records at county recorder's offices, tax assessors, sheriff's offices, courthouse filings, newspaper filings, proprietary sources, and selected vendors for the number of new and outstanding unique notices of default, as well as for notices of trustee sales (McLean, Va). CoreLogic's coverage includes over 140 million properties and 99% of the US population.²⁶

County-level data on income inequality, as measured by the Gini coefficient, were obtained from the US Census Bureau's American Community Survey using the 2010 three-year estimates.²⁷ Gini coefficient values for a county can range from 0 to 1, with a value of 0 indicating perfect equality of income among members of the county and a value of 1 indicating perfect income inequality in the county.⁸ County-level data for 2010 were obtained from US Census Bureau's 2010 census data for the following potential confounders: population density, median income, percentage of population who were African American, male, high school graduates, and having a bachelor's degree.²⁸ The percentage of families in the county who lived in poverty or had a female head of household was also obtained from US Census Bureau's 2010 census data.²⁸

We defined the time periods on the basis of the dates for the great recession, December 1, 2007 through June 30, 2009, determined by the National Bureau of Economic Research.¹³ The 3 time periods were defined as follows: before the recession (2004 quarter [Q] 1 to 2007 Q3), during the recession (2007 Q4 to 2009 Q2), and after the recession (2009 Q3 to 2012 Q4).

STATISTICAL ANALYSIS

For each of the 3 time periods, we summarized the quarterly AHT rate per 100,000 child-years in each of the 3 regions as well as in the overall 74-county catchment area. Using the county quarter as the unit of observation, we assessed differences in the AHT rates per 100,000 child-years across the time periods by means of zero-inflated Poisson regression models, in which the number of AHT events was the outcome and child population was the offset.²⁹ We chose the zero-inflated model because the observed distribution of AHT counts was positively skewed, with a large number of county-quarters with zero AHT events. The zero-inflated Poisson model specified a regression structure for the probability of having a nonzero count in a particular county quarter, which we assumed was constant across region and time. The model also specified a regression structure for the nonzero counts in each county-quarter, in which we included time period and adjusted for region. We then tested for an interaction between region (Pennsylvania, Washington, and Ohio/Kentucky) and time period.

Next, we examined the association of the macroeconomic indicators with AHT rate using zero-inflated Poisson regression models. Macroeconomic variables were modeled as continuous variables. The model adjusted for region and for temporal trends using a quadratic specification for calendar time. In sensitivity analyses, we explored the lagged association between macroeconomic indicators and AHT rates, in which the indicator from the previous quarter was used as the independent variable, which allowed the effects of the macroeconomic indicators on AHT rates to not be immediate. Results from the regression models are presented as incidence rate ratios, a relative difference measure comparing the incidence rates of AHT events during different time periods.

Finally, the association between income inequality as measured by the county-level Gini coefficient for 2010 and the county-level AHT rate for 2010 was examined using zero-inflated Poisson regression models, accounting for effects of region (Pennsylvania, Washington, and Ohio/Kentucky) with and without adjusting for the following potential county-level confounders: population density, median income, percentage black, percentage male, percentage high school graduates, percentage with bachelor's degree, percentage poverty, and percentage female head of household.

Robust standard errors were utilized in all models to account for correlation arising from repeated measures within counties over time. All hypothesis tests were 2 sided. We considered the comparison of AHT rates across time periods as the primary analysis, for which $P < .05$ was used to indicate statistical significance. All analyses were completed using Stata 12 software (StataCorp, College Station, Tex).

RESULTS

STUDY POPULATION

During the 9-year study period, 712 children younger than 5 years old in the 3 regions were diagnosed with AHT. Median age of victims was 4.9 months, with range of 0.7 to 59.8 months (Table 1). Seventy percent of this group was younger than 12 months old. Sixty percent of the 700 subjects of known sex were boys. The majority of the children (65%) were non-Hispanic white, 15% were black, 5% were Hispanic, and 14% were of other or unknown race and ethnicity. Among the 701 children for whom mortality data were available, 15% (106) died. There was no difference in the sex, race, or insurance status of the children with AHT across the 3 recession time periods. The median age of AHT victims was higher after the recession than during and before the recession (Table 1).

AHT RATES BEFORE, DURING, AND AFTER THE RECESSION

Before the recession, the mean rate of AHT was 9.8 per 100,000 child-years for the overall 74-county catchment area and ranged from 4.8 in the Washington region to 8.5 in the western Pennsylvania region and 11.1 per 100,000 child-years in the Ohio/Kentucky region (Fig. 1, Table 2).

Table 1. AHT Case Characteristics Across Time Periods

Characteristic*	Study Period				P†
	All (2004 Q1–2012 Q4) (n = 712)	Before Recession (2004 Q1–2007 Q3) (n = 236)	During Recession (2007 Q4 – 2009 Q2) (n = 187)	After Recession (2009 Q3–2012 Q4) (n = 289)	
Age, mo, median (IQR)	4.9 (2.7–11.5)	4.9 (2.4–10.8)	4.4 (2.3–10.4)	5.3 (3.2–13.0)	.045
Insurance, n (%)					.34
Private	92 (12.9)	32 (13.6)	23 (12.3)	37 (12.8)	
Public	533 (74.9)	172 (72.9)	148 (79.1)	213 (73.7)	
Self-pay	37 (5.2)	18 (7.6)	6 (3.2)	13 (4.5)	
Other	2 (0.3)	0 (0.0)	1 (0.5)	1 (0.4)	
Unknown	48 (6.7)	14 (5.9)	9 (4.8)	25 (8.7)	
Race, n (%)					.24
Non-Hispanic white	464 (65.2)	159 (67.4)	117 (62.6)	188 (65.1)	
Black	106 (14.9)	41 (17.4)	29 (15.5)	36 (12.5)	
Hispanic	39 (5.5)	9 (3.8)	9 (4.8)	21 (7.3)	
Other/unknown	103 (14.5)	27 (11.4)	32 (17.1)	44 (15.2)	
Male gender, n (%)	421 (60.1)	140 (59.3)	102 (55.1)	179 (64.2)	.14
Died, n (%)	106 (14.9)	38 (16.1)	31 (16.8)	37 (13.2)	.51

AHT indicates abusive head trauma; and Q, quarter.

*Data were not available for age in 2 cases, gender in 12 cases, and mortality in 11 cases. The data for the periods before and during the recession differ slightly from previously published data because of a slight difference in how the recession period was defined.¹⁸

†For categorical variables, a chi-square test was used (Fisher's exact test was used if there were fewer than 10 cases in a cell). The median age is presented, and the nonparametric Kruskal-Wallis test was used to test for equality of median age distribution across the time periods because age was not normally distributed.

The overall rate of AHT peaked at 15.6 per 100,000 child-years during the recession, with rates in the 3 regions ranging from 10.6 in the Washington region and 13.8 in the Ohio/Kentucky region to 20.5 per 100,000 child-years in the western Pennsylvania region. After the recession, the rate of AHT per 100,000 child years for the overall 74-county catchment area decreased to 12.8 and ranged from

a 5.9 in the Washington region to 13.0 in the Ohio/Kentucky region and 14.2 in the western Pennsylvania region. Testing of the association between AHT rate and the recession period by means of a zero-inflated Poisson regression model, using the county quarter as the unit of observation with adjustment for region, demonstrated that the AHT rates in the period after the recession were higher than during the

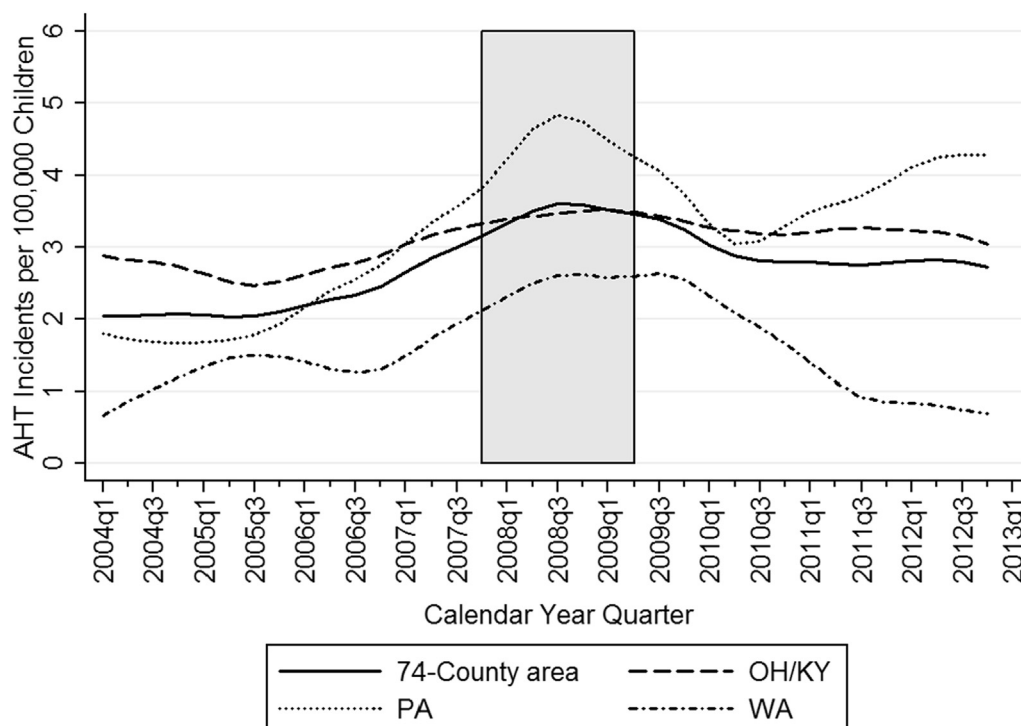


Figure 1. Quarterly abusive head trauma (AHT) rates before, during, and after the great recession, 2007–2009. Quarterly (Q) AHT rates were calculated using county-level population estimates of residents younger than 5 years old. Gray shaded areas indicate recession period from 2007 Q4 through 2009 Q2.

Table 2. Mean Quarterly AHT Rate in Children Younger than 5 Years Old

Region	AHT Rate, Mean (95% CI)*		
	Before Recession	During Recession	After Recession
Entire 74 county	9.8 (9.2–10.3)	15.6 (14.6–16.6)	12.8 (11.9–13.7)
23 county western Pennsylvania	8.5 (7.8–9.1)	20.5 (18.5–22.5)	14.2 (13.5–14.8)
6 county Washington	4.8 (4.3–5.3)	10.6 (9.6–11.7)	5.9 (5.2–6.6)
45-county Ohio/Kentucky	11.1 (10.8–11.5)	13.8 (12.7–15.0)	13.0 (12.7–13.3)

AHT indicates abusive head trauma; CI, confidence interval; and Q, quarter.

*Mean quarterly AHT rate per 100,000 child-years (95% CI) for the time periods before (2004 Q1–2007 Q3), during (2007 Q4–2009 Q2), and after (2009 Q3–2012 Q4) the recession. Reported rates for the time periods before and during recession differ slightly from previously reported rates because updated population estimates were used and because of a slight difference in how the recession period was defined.¹⁸

period before the recession but lower than during the recession (Table 3). Repeating the analysis and checking for an interaction between recession period and region demonstrated that the association between the AHT rate and the recession periods differed among the regions with the greatest effect of the recession observed in the western Pennsylvania region ($P < .001$) (Table 3).

ASSOCIATION BETWEEN MACROECONOMIC INDICATORS AND AHT RATES WITHIN COUNTIES

The quarterly county-level foreclosure rate and 90-day delinquency rate increased in all 3 regions during and after the recession, while employment growth rate decreased during the recession and then increased again after the recession (Figs. 2 to 4). There was no association between the quarterly county-level foreclosure rate, the 90-day delinquency rate, or the county-level employment growth and the AHT rate in the models adjusting for temporal trend and region (Table 4). Similar results were obtained when the economic indicators were lagged by 1 quarter.

ASSOCIATION BETWEEN INCOME INEQUALITY AND AHT RATES WITHIN COUNTIES

In the unadjusted analysis accounting for effect of region but no other potential confounders, there was no association between the county-level Gini coefficient and AHT rate ($P = .32$). After accounting for potential confounders, including county-level measures of poverty, education level, race, sex, and proportion of households with female heads, there was no association between quarterly AHT rate and quarterly level of the Gini coefficient ($P = .22$).

DISCUSSION

This study revealed that after peaking during the great recession, rates of AHT among children younger than 5 years old living in a 74-county area decreased slightly after the recession but did not return to levels before the recession. This pattern was observed in the 74-county area as a whole as well as in each of the 3 subregions—western Pennsylvania, Washington and Ohio/northern Kentucky. These results add to a small but growing body of literature suggesting that in at least some regions of the country, severe forms of physical abuse such as AHT increased during the great recession and have not yet returned to the pre-recession baseline.

Although the findings of this study support an association between the recent recession and the rate of AHT, a relationship between rates of AHT and specific economic measures was not established. There are several possible explanations for this lack of an association. First, the fact that AHT is rare compared with other forms of abuse likely limited our power to detect an association with changes in the economy. Another possible explanation is that the economic indicators we chose may not have adequately measured the economic stress experienced by families during the recession. A recent study found that increases in high-frequency spanking during the recession were associated with decreases in the Consumer Sentiment Index but not unemployment or foreclosure rates; these data suggest that the Consumer Sentiment Index may be a better measure of the economic stress experienced by families.³⁰ Another possibility is that changes in risk factors for abuse, other than economic stress, were responsible for the change in AHT rates during the recession.

Table 3. Relationship Between Recession Period and AHT Rates*

Region	Recession Versus Before Recession		After Recession Versus Before Recession		After Recession Versus Recession	
	IRR	P	IRR	P	IRR	P
Entire 74 county	1.68 (1.41–2.00)	<.001	1.31 (1.09–1.56)	.004	0.78 (0.65–0.92)	.005
23 county western Pennsylvania	2.42 (1.65–3.56)	<.001	1.68 (1.22–2.30)	.001	0.69 (0.56–0.86)	.001
6 county Washington	2.22 (1.94–2.54)	<.001	1.24 (0.58–2.62)	.58	0.56 (0.24–1.29)	.17
45 county Ohio/Kentucky	1.24 (0.99–1.56)	0.06	1.17 (0.95–1.43)	.14	0.94 (0.75–1.17)	.57

AHT indicates abusive head trauma; IRR, incidence rate ratio; and CI, confidence interval.

*IRR with 95% CI from zero-inflated Poisson regression models are presented for time periods before (2004 Q1–2007 Q3), during (2007 Q4–2009 Q2), and after (2009 Q3–2012 Q4) the recession. Initial model provided estimates for the entire 74-county area adjusting for effects of region. Estimates for individual regions were generated by including an interaction term between region and recession period in the model ($P < .001$ for interaction term). County-level child population size was used as the offset in each model.

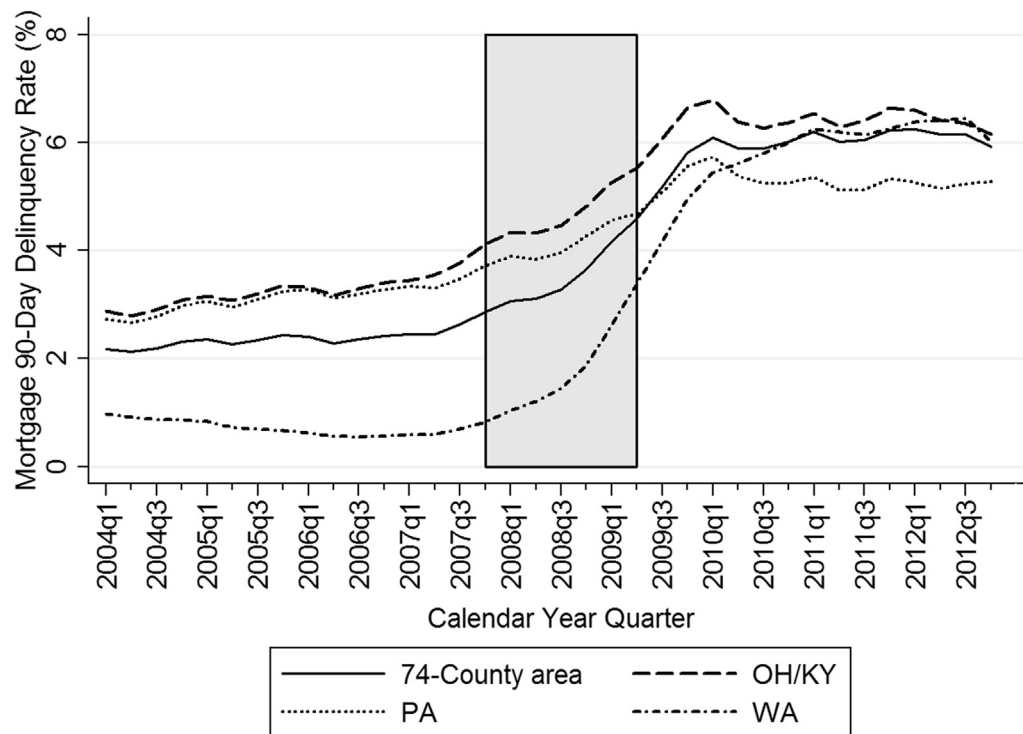


Figure 2. Mortgage 90-day delinquency rates during periods before, during, and after the recession, 2007–2009. Gray shaded areas indicate recession period from 2007 quarter [Q] 4 through 2009 Q2.

Our finding of a recession-related increase in AHT is supported by 2 prior publications: a single-institution study of AHT incidence and a national sample of emergency department data.^{19,20} In contrast to our findings, data from child protective services (CPS) agencies have

shown that rates of reports of child maltreatment to CPS did not increase during the recession and may have even decreased in some states.^{31,32} One possible explanation for these seemingly contradictory results is that the trends in severe abusive injuries, such as AHT, may

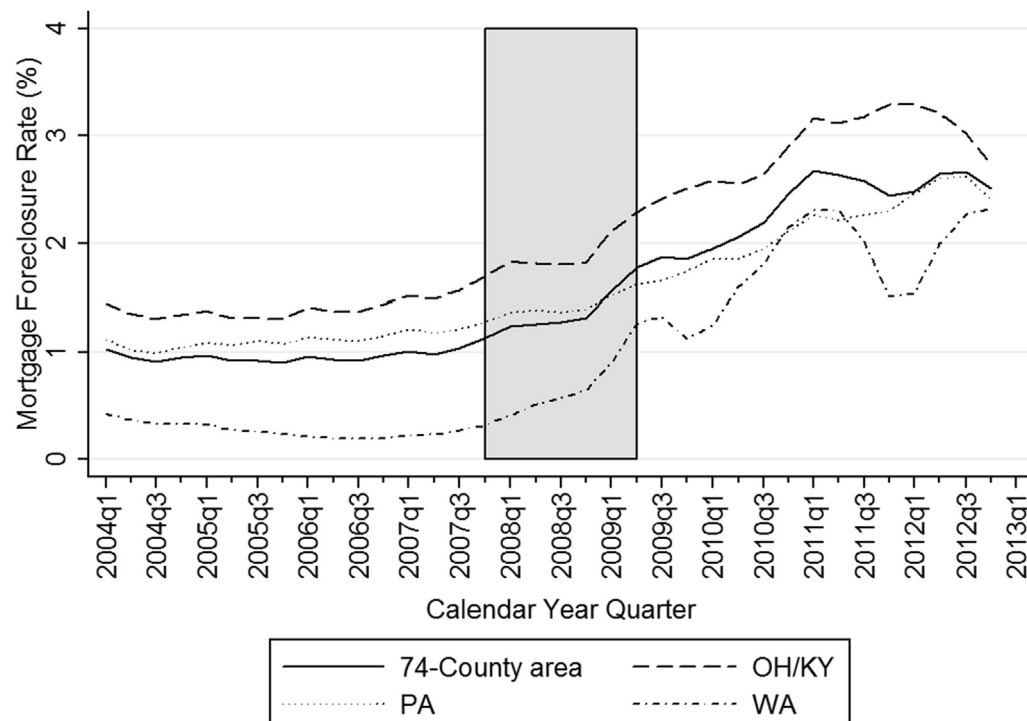


Figure 3. Mortgage foreclosure rate during periods before, during, and after the recession, 2007–2009. Gray shaded areas indicate recession period from 2007 quarter [Q] 4 through 2009 Q2.

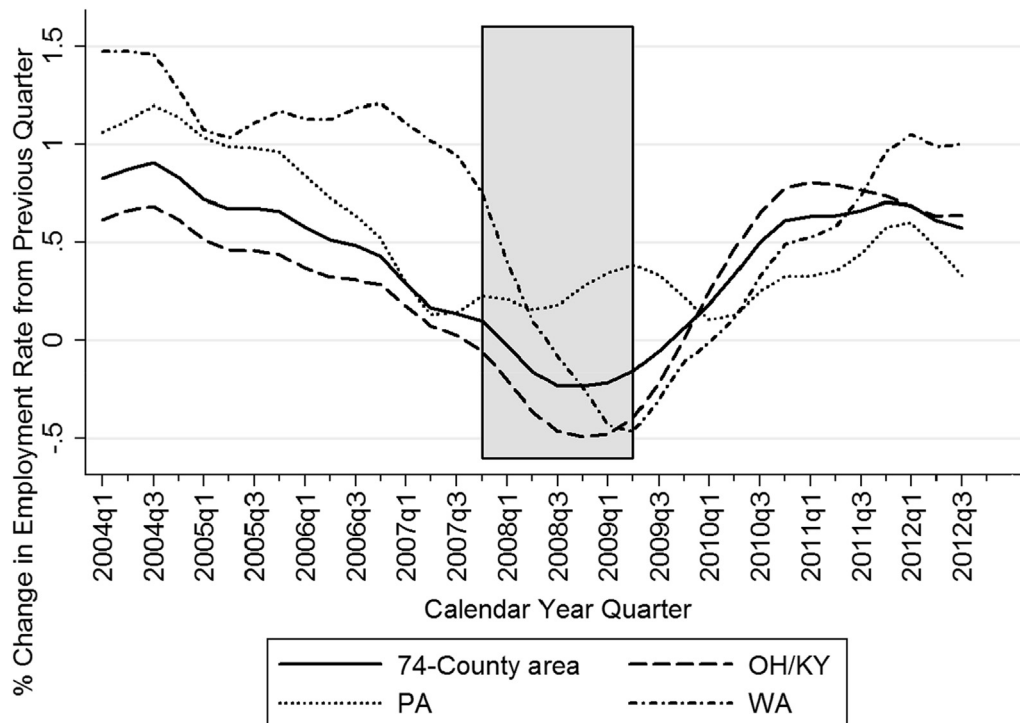


Figure 4. Employment growth rate during periods before, during, and after the recession, 2007–2009. Gray shaded areas indicate recession period from 2007 quarter [Q] 4 through 2009 Q2.

differ from trends in overall physical abuse. Cases of AHT represent only a small fraction of cases of physical abuse investigated and substantiated by CPS agencies; the association of economic factors with AHT may differ from the association of those factors with less severe forms of abuse. Another possible explanation is that changes in CPS practices, including increasing use of differential response or a noninvestigational pathway for cases assessed as low or moderate risk³³ as well as changes

Table 4. Relationship Between Economic Indicators and County AHT Rates

Economic Indicator	% Change in AHT Rate for Each 1% Increase in Economic Indicator (95% CI)*	P
90-Day mortgage delinquency rate		
Current quarter	−1.6% (−11.1, +8.9)	.76
Previous quarter	−2.8% (−12.5, +7.9)	.59
Foreclosure rate		
Current quarter	+1.5% (−16.6, +23.4)	.89
Previous quarter	+0.6% (−18.2, +23.8)	.96
Employment growth rate		
Current quarter	−1.6% (−4.7, +1.5)	.30
Previous quarter	−1.5% (−4.8, 1.9)	.39

AHT indicates abusive head trauma; and CI, confidence interval.

*Zero-inflated Poisson regression, adjusted for temporal trends and regional differences, was performed to examine the association between the economic indicator rates during the current quarter and the previous quarter with rates of AHT during that quarter. Time and time-square were included in the model as continuous variables based on quarter of AHT diagnosis. Robust standard errors clustered at the county level were used in construction of 95% CI for estimated coefficients. County-level child population size was used as the offset in each model.

in substantiation and data reporting, may have contributed to an overall decrease in rates of substantiated abuse³⁴ that masked the effect of the recession on actual abuse rates.²² Our finding of a recession-related rise in AHT rates also differs from the results of a study by Shanahan and colleagues³⁵ that used the Centers for Disease Control International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM)-based definition of AHT to evaluate the rate of AHT nationally and in the state of North Carolina over time. The authors found no association with the economy at a national level and a wide variation over time in the rate of AHT in North Carolina, but without an association with the economy. The difference between our findings and those of Shanahan and colleagues may be due to the differences in methods for identification of AHT cases and differences in study population. Shanahan used ICD-9-CM codes within the Kids' Inpatient Database (KID) to define AHT cases for the analysis of national trends, while we used direct case ascertainment. Direct case ascertainment is the criterion standard for case identification,³⁶ although it is time intensive and unlikely to be feasible or cost-effective on a large scale. KID samples data from hospital discharges rather than individual patients and could have duplicate admissions for the same subject. In addition, the data in KID are dependent on accurate coding. Two studies evaluated the accuracy of ICD-9 codes in child physical abuse and found sensitivities in the 75% to 90% range.^{37,38} Furthermore, KID data are not reported every year and skipped 2008, the year that the AHT rate peaked in our study population.

There are several limitations to this study. First, the study did not include a nationally representative sample, and the

trends observed in the 3 regions may not reflect trends in other regions of the country. Second, sites with a perceived increase in AHT rates during the recession may have been more likely to volunteer to participate in the study than sites without changes in AHT rates. Although the study was triggered by a perceived increase in AHT in Pittsburgh, the selection of other sites was based on whether hospitals met the a priori criteria for the parent study. Third, as there were no set criteria for the diagnosis of AHT, it is possible that differences in definitions of AHT across sites existed, limiting our ability to compare rates of AHT across sites. We only included cases considered to be unequivocal AHT in order to minimize differences in definitions across sites. Also, because there was stability in the CPT teams, we would expect any differences in AHT definitions to remain stable over time. Finally, it is possible that AHT cases were missed over time and that missed cases were not a random event. Because our study was hospital based, children who died before presenting to a hospital would have been missed. On the basis of the cross-check that was done with the 2 nearby hospitals and the Pennsylvania state child abuse registry, we are confident that most eligible children were included and that the few cases that were not included were nondifferential misclassifications across regions and over time. We would not expect the change from retrospective to prospective case identification during the study period to affect the number of cases; if any change occurred, prospective ascertainment would result in greater ascertainment of AHT cases after the recession, unlike the lower rates we observed. All sites kept logs of all cases of AHT throughout the entire study period.

CONCLUSIONS

Our results showed that in 3 regions of the country, rates of AHT declined slightly after the great recession ended but have remained above the levels before the recession. These results add to a growing body of literature demonstrating the negative impact of the recession on child safety. Future research should focus on identifying families at increased risk for child maltreatment during times of economic hardship and improve interventions to mitigate that risk.

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