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Hospital Stays Related to Child Maltreatment, 2005

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Introduction

In 2005 alone, an estimated 899,000 children were victims of physical abuse, sexual abuse, emotional abuse, or neglect—a rate of more than 12 victims per 1,000 children.[1] Maltreatment has devastating effects on the health of the abused children, as well as on the community. Injuries to children range from cuts and bruises, to broken bones and head trauma. They also include psychological disturbances ranging from anxiety to post-traumatic stress disorder. In 2005, it is estimated that 1,460 children died as a result of maltreatment.[1] It is estimated that the immediate health care and legal needs associated with child maltreatment cost approximately $24 billion annually, and long-term economic consequences exceed $69 billion each year.[2]

This Statistical Brief presents data from the Healthcare Cost and Utilization Project (HCUP) on hospital stays related to child maltreatment in the U.S. in 2005. Child maltreatment includes both acts of abuse and acts of neglect perpetrated by a parent or caregiver. Utilization and resource use for pediatric hospitalizations related to maltreatment are compared to stays unrelated to maltreatment.[3] Patient and payer characteristics of child maltreatment-related hospitalizations are also described. Finally, the most common diagnoses associated with maltreatment-related pediatric hospitalizations are identified. All differences between estimates noted in the text are statistically significant at the 0.05 level or better.

Findings

In 2005, there were an estimated 6,700 hospitalizations associated with child maltreatment in U.S. community hospitals (table 1). These stays totaled $98.7 million in hospital costs—about four

[1] *Child Maltreatment 2005*. U.S. Department of Health and Human Services, Administration on Children, Youth and Families. Washington, D.C.; U.S. Government Printing Office; 2007. http://www.acf.hhs.gov/programs/cb/pubs/cm05/cm05.pdf (Accessed March 5, 2008).

[2] Fromm S. *Total Estimated Cost of Child Abuse and Neglect in the United States: Statistical Evidence.* Chicago (IL): Prevent Child Abuse America (PCAA); 2001. http://member.preventchildabuse.org/site/DocServer/cost_analysis.pdf?docID=144 (Accessed March 18, 2008).

[3] Newborn records were excluded from this analysis.

Highlights

- In 2005, there were an estimated 6,700 maltreatment-related pediatric hospitalizations in the United States—over 40 percent of these involved child physical abuse.
- The rate of in-hospital deaths among children hospitalized with maltreatment-related diagnoses was more than seven times the in-hospital death rate for stays unrelated to maltreatment (3.6 percent versus 0.5 percent).
- All in-hospital deaths related to maltreatment occurred in infants and children younger than five years old.
- Children under five comprise 27.1 percent of the U.S. population under 18 years old, but they accounted for 79.4 percent of maltreatment-related pediatric hospitalizations.
- About 36 percent of hospitalizations related to maltreatment occurred among children living in the poorest communities even though the pediatric population is evenly distributed across communities of all income levels. Only 13.7 percent occurred among children living in the wealthiest communities.
- Almost three out of four maltreatment-related pediatric hospitalizations (70.6 percent) were billed to Medicaid compared to 45.6 percent of hospitalizations unrelated to maltreatment.
- Intracranial injuries, superficial injuries, retinal hemorrhage, epilepsy/convulsions, and fractures of the lower limb were commonly associated with maltreatment-related stays among younger children. Mental health diagnoses such as mood disorder, anxiety disorder, and attention deficit disorder were more prominent among older children.

percent of the total national hospital costs associated with the care of children younger than 18 years old. These figures do not include visits to the emergency department where the child was treated and discharged rather than admitted to the hospital. In addition, the actual number of hospitalizations related to child maltreatment and their associated costs may be underestimated due to stigma or fear associated with reporting such incidents on the hospital record.

Table 2 lists the most common codes noted on hospital records that indicate that the child suffered some type of maltreatment prior to admission. Among all pediatric stays related to maltreatment, child physical abuse was noted in 41.4 percent of the records. Approximately one in ten maltreatment-related stays was related to shaken infant syndrome (13.4 percent), child neglect (12.9 percent), or child sexual abuse (8.1 percent). While the perpetrator of the maltreatment was unspecified in about one-fourth (25.2 percent) of all maltreatment-related stays, the father/stepfather/caregiver's boyfriend or the mother/stepmother/caregiver's girlfriend was identified as the perpetrator in 16.0 percent and 11.0 percent, respectively, of these stays.

General characteristics of hospital stays related to child maltreatment

Table 1 further describes the hospital utilization and costs associated with maltreatment-related pediatric stays compared to stays unrelated to maltreatment. In 2005, pediatric hospitalizations associated with maltreatment were, on average, 75 percent more costly than stays unrelated to maltreatment ($14,800 versus $8,500). The higher cost of maltreatment-related stays was due to longer hospitalization. On average, stays related to child maltreatment were 7.9 days—more than three days longer than stays unrelated to maltreatment (4.5 days).

In 2005, approximately 240 hospitalizations related to maltreatment resulted in death. The rate of in-hospital deaths among children hospitalized with maltreatment-related diagnoses was more than seven times the in-hospital death rate for stays unrelated to maltreatment (3.6 percent versus 0.5 percent). Moreover, infants and children under five years old accounted for all of the deaths related to maltreatment (data not shown). Although children 0 to 4 years old accounted for almost 70 percent of in-hospital deaths among stays unrelated to maltreatment, 30 percent of deaths were evenly distributed across the older three age groups. Maltreatment-related stays also originated in the emergency department at a higher rate than pediatric stays unrelated to maltreatment (60.1 percent versus 43.9 percent).

Hospital stays related to child maltreatment, by patient characteristics

Like pediatric stays unrelated to maltreatment, maltreatment-related hospitalizations occurred more often in males overall (55.0 percent) (table 1). While males accounted for more than half of maltreatment-related stays among children under nine years old, females accounted for greater than 80 percent of stays associated with maltreatment among older adolescents (data not shown).

Figure 1 shows that, based on population, children aged 0 to 4 years old accounted for a disproportionate percentage of maltreatment-related hospital stays compared to older children. In 2005, four out of five maltreatment-related hospitalizations (79.4 percent) occurred among children younger than five years old, while this age group made up only 51.1 percent of pediatric hospitalizations unrelated to maltreatment and 27.1 percent of the U.S. population under 18. In contrast, children aged 5 to 14 years old accounted for 15.6 percent of stays associated with maltreatment but represented more than half of the youth population. Only 5.0 percent of maltreatment-related stays occurred among teenagers aged 15 to 17 years old, but this group was 17.4 percent of the youth population and accounted for 18.5 percent of pediatric stays unrelated to maltreatment.

Although the pediatric population is evenly distributed across communities of all income levels, figure 2 illustrates that children living in poorer communities were disproportionately more likely than those living in wealthy communities to be hospitalized with maltreatment-related diagnoses. In fact, the distribution of maltreatment-related hospitalizations was inversely related to wealth: more than one-third (35.8 percent) of hospitalizations related to maltreatment occurred among children living in the poorest communities, while only 13.7 percent occurred among children living in the wealthiest communities. While this relationship persisted with pediatric stays unrelated to maltreatment, the magnitude of difference between the poorest (29.8 percent) and wealthiest communities (21.9 percent) was much less. Stays unrelated to maltreatment were also more congruent with the community-level income distribution.

Hospital stays related to child maltreatment, by primary payer

Figure 3 shows that Medicaid, the public payer for low-income individuals, was billed for almost three out of four maltreatment-related pediatric stays (70.6 percent) compared to its responsibility for 45.6 percent

of pediatric stays unrelated to maltreatment. The reverse was true with private insurance, which was billed for 20.3 percent of stays related to maltreatment but for 45.9 percent of stays unrelated to child maltreatment. The percentage of pediatric stays that were uninsured or billed to other insurance programs, such as TRICARE and other government programs, was consistent whether or not the stays were related to maltreatment. Of the maltreatment-related stays, 4.7 percent were uninsured, and 4.5 percent were billed to other insurance programs compared to 4.1 and 4.4 percent of stays unrelated to maltreatment, respectively.

Common diagnoses associated with hospital stays related to child maltreatment
Excluding codes indicating maltreatment, table 3 lists the most common conditions and injuries associated with pediatric hospitalizations related to maltreatment. Among children younger than five years old, more than a third (35.9 percent) were diagnosed with an intracranial injury. For about a quarter (26.4 percent) of maltreatment-related stays in this youngest age group, superficial injury (e.g. contusions) was noted. Other infants and children in this age group were commonly diagnosed with retinal hemorrhage (bleeding behind the eye) (21.4 percent), epilepsy and/or convulsions (19.9 percent), and fracture of the lower limb (18.3).

Among 5 to 9 year olds, superficial injury (23.7 percent) was most commonly associated with hospitalizations related to maltreatment. Attention deficit disorder was the second most common diagnosis in this age group (20.4 percent), and mood disorders (16.4 percent) and anxiety disorders (14.5 percent) were also commonly associated with maltreatment-related stays in this age group. Fluid and electrolyte disorders were diagnosed in 14.5 percent of these stays.

Among youths aged 10 to 14 and 15 to 17, mood disorders (37.4 and 47.9 percent, respectively) and anxiety disorders (30.5 and 30.9 percent, respectively) were the most common conditions associated with maltreatment-related stays. Attention deficit disorders (28.8 percent), asthma (14.0 percent), and superficial injury (10.7 percent) were commonly noted among children aged 10 to 14 years. Adolescents aged 15 to 17 years with maltreatment-related hospitalizations were commonly diagnosed with complications of pregnancy (15.5 percent), substance-related disorders (13.7 percent), and personality disorders (13.7 percent).

Data Source

The estimates in this Statistical Brief are based upon data from the HCUP 2005 Nationwide Inpatient Sample (NIS). Population distributions presented in figures 1 and 2 were derived from 2005 Claritas data.

Definitions

Diagnoses, ICD-9-CM, E-codes, and Clinical Classifications Software (CCS)
The principal diagnosis is that condition established after study to be chiefly responsible for the patient's admission to the hospital. Secondary diagnoses are concomitant conditions that coexist at the time of admission or that develop during the stay.

ICD-9-CM is the International Classification of Diseases, Ninth Revision, Clinical Modification, which assigns numeric codes to diagnoses. There are about 12,000 ICD-9-CM diagnosis codes.

The External Cause of Injury Codes (commonly referred to as E-codes) supplement the ICD-9-CM diagnosis codes. These codes designate the cause of injury. Multiple E-codes may be present on a single hospital record.

CCS categorizes ICD-9-CM diagnoses into 260 clinically meaningful categories.[4] This "clinical grouper" makes it easier to quickly understand patterns of diagnoses and procedures.

Case Definition
The ICD-9-CM codes defining maltreatment include diagnoses and E-codes in the following range:

– 995.5-995.59: Child maltreatment syndrome

[4] HCUP CCS. Healthcare Cost and Utilization Project (HCUP). August 2006. U.S. Agency for Healthcare Research and Quality, Rockville, MD. www.hcup-us.ahrq.gov/toolssoftware/ccs/ccs.jsp

– 995.80-995.85: Adult (15+ year olds) maltreatment, unspecified; adult physical abuse; adult emotional/psychological abuse; adult sexual abuse; adult neglect (nutritional); other adult abuse and neglect
– V71.81: Observation and evaluation for abuse and neglect
– E967.0–E967.9: Child and battering/maltreatment; perpetrator codes
– E968.4: Criminal neglect

It is important to note that these codes may be underutilized if there is stigma or fear associated with reporting violent behavior on the hospital record.

Types of hospitals included in HCUP
HCUP is based on data from community hospitals, defined as short-term, non-Federal, general and other hospitals, excluding hospital units of other institutions (e.g., prisons). HCUP data include OB-GYN, ENT, orthopedic, cancer, pediatric, public, and academic medical hospitals. They exclude long-term care, rehabilitation, psychiatric, and alcoholism and chemical dependency hospitals, but these types of discharges are included if they are from community hospitals.

Unit of analysis
The unit of analysis is the hospital discharge (i.e., the hospital stay), not a person or patient. This means that a person who is admitted to the hospital multiple times in one year will be counted each time as a separate "discharge" from the hospital.

Costs and charges
Total hospital charges were converted to costs using HCUP Cost-to-Charge Ratios based on hospital accounting reports from the Centers for Medicare and Medicaid Services (CMS).[5] Costs will tend to reflect the actual costs of production, while charges represent what the hospital billed for the case. For each hospital, a hospital-wide cost-to-charge ratio is used because detailed charges are not available across all HCUP States. Hospital charges reflect the amount the hospital charged for the entire hospital stay and does not include professional (physician) fees. For the purposes of this Statistical Brief, costs are reported to the nearest hundreds.

Median community-level income
Median community-level income is the median household income of the patient's ZIP Code of residence. The cut-offs for the quartile designation is determined using ZIP Code demographic data obtained from Claritas. The income quartile value is missing for homeless and foreign patients.

Payer
Payer is the expected primary payer for the hospital stay. To make coding uniform across all HCUP data sources, payer combines detailed categories into more general groups:

– Medicare includes fee-for-service and managed care Medicare patients.
– Medicaid includes fee-for-service and managed care Medicaid patients. Patients covered by the State Children's Health Insurance Program (SCHIP) may be included here. Because most state data do not identify SCHIP patients specifically, it is not possible to present this information separately.
– Private insurance includes Blue Cross, commercial carriers, and private HMOs and PPOs.
– Other includes Worker's Compensation, TRICARE/CHAMPUS, CHAMPVA, Title V, and other government programs.
– Uninsured includes an insurance status of "self-pay" and "no charge."

When more than one payer is listed for a hospital discharge, the first-listed payer is used.

Admission source
Admission source indicates where the patient was located prior to admission to the hospital. Emergency admission indicates the patient was admitted to the hospital through the emergency department.

Discharge status
Discharge status indicates the disposition of the patient at discharge from the hospital, and includes the following six categories: routine (to home), transfer to another short-term hospital, other transfers

[5] HCUP Cost-to-Charge Ratio Files (CCR). Healthcare Cost and Utilization Project (HCUP). 2001–2003. U.S. Agency for Healthcare Research and Quality, Rockville, MD.

(including skilled nursing facility, intermediate care, and another type of facility such as a nursing home), home health care, against medical advice (AMA), or died in the hospital.

About HCUP

HCUP is a family of powerful health care databases, software tools, and products for advancing research. Sponsored by the Agency for Healthcare Research and Quality (AHRQ), HCUP includes the largest all-payer encounter-level collection of longitudinal health care data (inpatient, ambulatory surgery, and emergency department) in the United States, beginning in 1988. HCUP is a Federal-State-Industry Partnership that brings together the data collection efforts of many organizations—such as State data organizations, hospital associations, private data organizations, and the Federal government—to create a national information resource.

HCUP would not be possible without the contributions of the following data collection Partners from across the United States:

Arizona Department of Health Services
Arkansas Department of Health & Human Services
California Office of Statewide Health Planning & Development
Colorado Hospital Association
Connecticut Integrated Health Information (Chime, Inc.)
Florida Agency for Health Care Administration
Georgia Hospital Association
Hawaii Health Information Corporation
Illinois Health Care Cost Containment Council and Department of Public Health
Indiana Hospital & Health Association
Iowa Hospital Association
Kansas Hospital Association
Kentucky Cabinet for Health and Family Services
Maryland Health Services Cost Review Commission
Massachusetts Division of Health Care Finance and Policy
Michigan Health & Hospital Association
Minnesota Hospital Association
Missouri Hospital Industry Data Institute
Nebraska Hospital Association
Nevada Division of Health Care Financing and Policy, Department of Health and Human Services
New Hampshire Department of Health & Human Services
New Jersey Department of Health & Senior Services
New York State Department of Health
North Carolina Department of Health and Human Services
Ohio Hospital Association
Oklahoma Health Care Information Center for Health Statistics
Oregon Association of Hospitals and Health Systems
Rhode Island Department of Health
South Carolina State Budget & Control Board
South Dakota Association of Healthcare Organizations
Tennessee Hospital Association
Texas Department of State Health Services
Utah Department of Health
Vermont Association of Hospitals and Health Systems
Virginia Health Information
Washington State Department of Health
West Virginia Health Care Authority
Wisconsin Department of Health & Family Services

About the NIS

The HCUP Nationwide Inpatient Sample (NIS) is a nationwide database of hospital inpatient stays. The NIS is nationally representative of all community hospitals (i.e., short-term, non-Federal, non-rehabilitation hospitals). The NIS is a sample of hospitals and includes all patients from each hospital, regardless of payer. It is drawn from a sampling frame that contains hospitals comprising 88 percent of all discharges

in the United States. The vast size of the NIS allows the study of topics at both the national and regional levels for specific subgroups of patients. In addition, NIS data are standardized across years to facilitate ease of use.

About HCUPnet

HCUPnet is an online query system that offers instant access to the largest set of all-payer health care databases that are publicly available. HCUPnet has an easy step-by-step query system, allowing for tables and graphs to be generated on national and regional statistics, as well as trends for community hospitals in the U.S. HCUPnet generates statistics using data from HCUP's Nationwide Inpatient Sample (NIS), the Kids' Inpatient Database (KID), the State Inpatient Databases (SID) and the State Emergency Department Databases (SEDD).

For More Information

For more information about HCUP, visit www.hcup-us.ahrq.gov.

For additional HCUP statistics, visit HCUPnet, our interactive query system, at www.hcup.ahrq.gov.

For information on other hospitalizations in the U.S., download *HCUP Facts and Figures: Statistics on Hospital-based Care in the United States in 2005*, located at http://www.hcup-us.ahrq.gov/reports.jsp.

For a detailed description of HCUP, more information on the design of the NIS, and methods to calculate estimates, please refer to the following publications:

Steiner, C., Elixhauser, A., Schnaier, J. The Healthcare Cost and Utilization Project: An Overview. *Effective Clinical Practice* 5(3):143–51, 2002.

Design of the HCUP Nationwide Inpatient Sample, 2005. Online. June 13, 2007. U.S. Agency for Healthcare Research and Quality. http://www.hcup-us.ahrq.gov/db/nation/nis/reports/NIS_2005_Design_Report.pdf

Houchens, R., Elixhauser, A. *Final Report on Calculating Nationwide Inpatient Sample (NIS) Variances, 2001*. HCUP Methods Series Report #2003-2. Online. June 2005 (revised June 6, 2005). U.S. Agency for Healthcare Research and Quality. http://www.hcup-us.ahrq.gov/reports/CalculatingNISVariances200106092005.pdf

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AHRQ welcomes questions and comments from readers of this publication who are interested in obtaining more information about access, cost, use, financing, and quality of health care in the United States. We also invite you to tell us how you are using this Statistical Brief and other HCUP data and tools, and to share suggestions on how HCUP products might be enhanced to further meet your needs. Please e-mail us at hcup@ahrq.gov or send a letter to the address below:

Irene Fraser, Ph.D., Director
Center for Delivery, Organization, and Markets
Agency for Healthcare Research and Quality
540 Gaither Road
Rockville, MD 20850

Table 1. Maltreatment-related hospitalizations compared to all other hospitalizations among children and adolescents under the age of 18 years, 2005*

	Maltreatment-related stays	Stays unrelated to maltreatment
Number of hospital stays	6,700	2,816,000
Mean length of stay, days	7.9	4.5
Aggregate costs	$98.7 million	$23.5 billion
Mean hospital cost	$14,800	$8,500
Mean hospital cost per day	$1,900	$1,900
Percentage admitted through the emergency department	60.1%	43.9%
Percentage died in the hospital	3.6%	0.5%
Percentage of stays for males	55.0%	51.5%

*Based on all-listed diagnoses. Hospital stays for newborns have been excluded.
Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2005.

Table 2. Top ten maltreatment conditions noted on hospital stays for children and adolescents under the age of 18 years, 2005*

All-listed diagnosis	Number of hospital stays (percentage of maltreatment-related stays)**
Child physical abuse	2,770 (41.4%)
Abuse by unspecified person	1,690 (25.2%)
Abuse by father/stepfather/caregiver's boyfriend	1,070 (16.0%)
Shaken infant syndrome	900 (13.4%)
Child neglect	870 (12.9%)
Abuse by mother/stepmother/ caregiver's girlfriend	740 (11.0%)
Child sexual abuse	540 (8.1%)
Abuse by other specified person	380 (5.6%)
Observation and evaluation of abuse and neglect	370 (5.5%)
Other child abuse	300 (4.5%)

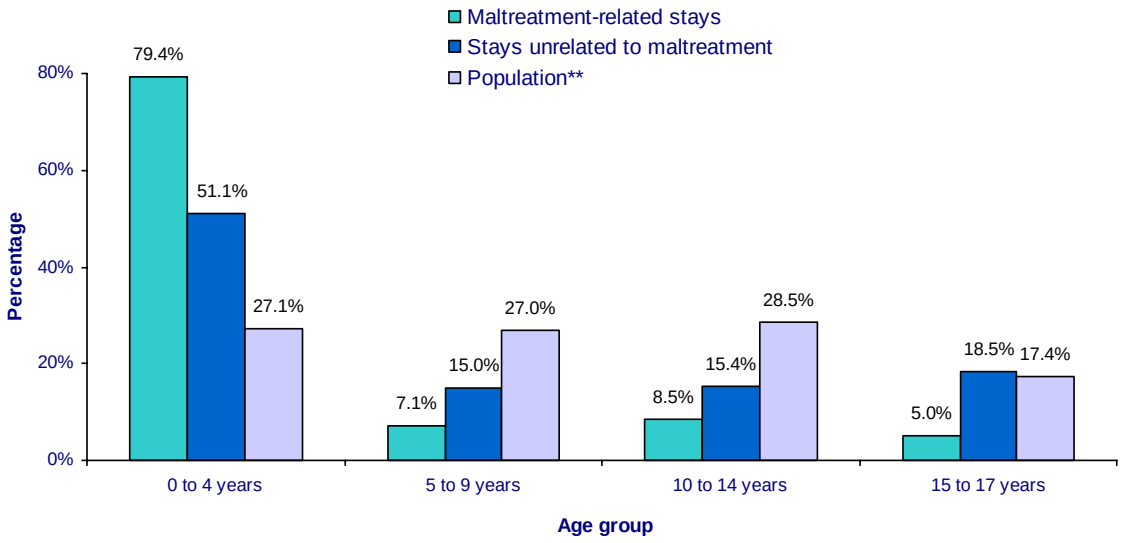
* Maltreatment conditions are based on all-listed diagnoses and external cause of injury codes. The percentages do not sum to 100 percent, because each record can have more than one maltreatment-related condition noted. Hospital stays for newborns have been excluded.
**The number of hospital stays has been rounded to the nearest ten.
Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2005.

Table 3. Top five conditions and/or injuries associated with maltreatment-related hospitalizations among children and adolescents under the age of 18 years, by age group, 2005*

All-listed diagnosis	Age Group							
	0 to 4 years		5 to 9 years		10 to 14 years		15 to 17 years	
	Rank (R), Number of hospital stays (N), (percentage of age-specific stays)							
	R	N (%)	R	N (%)	R	N (%)	R	N (%)
Intracranial injury	1	1,910 (35.9%)						
Superficial injury, contusion	2	1,410 (26.4%)	1	110 (23.7%)	5	60 (10.7%)		
Retinal hemorrhage (bleeding behind the eye)	3	1,140 (21.4%)						
Epilepsy, convulsions	4	1,060 (19.9%)						
Fracture of lower limb	5	980 (18.3%)						
Attention deficit/conduct/disruptive behavior disorders			2	100 (20.4%)	3	160 (28.8%)		
Mood disorders			3	80 (16.4%)	1	210 (37.4%)	1	160 (47.9%)
Fluid and electrolyte disorders			4	70 (14.5%)				
Anxiety disorders			5	70 (14.5%)	2	170 (30.5%)	2	100 (30.9%)
Asthma					4	80 (14.0%)		
Other complications of pregnancy							3	50 (15.5%)
Substance-related disorders							4	50 (13.7%)
Personality disorders							5	50 (13.7%)

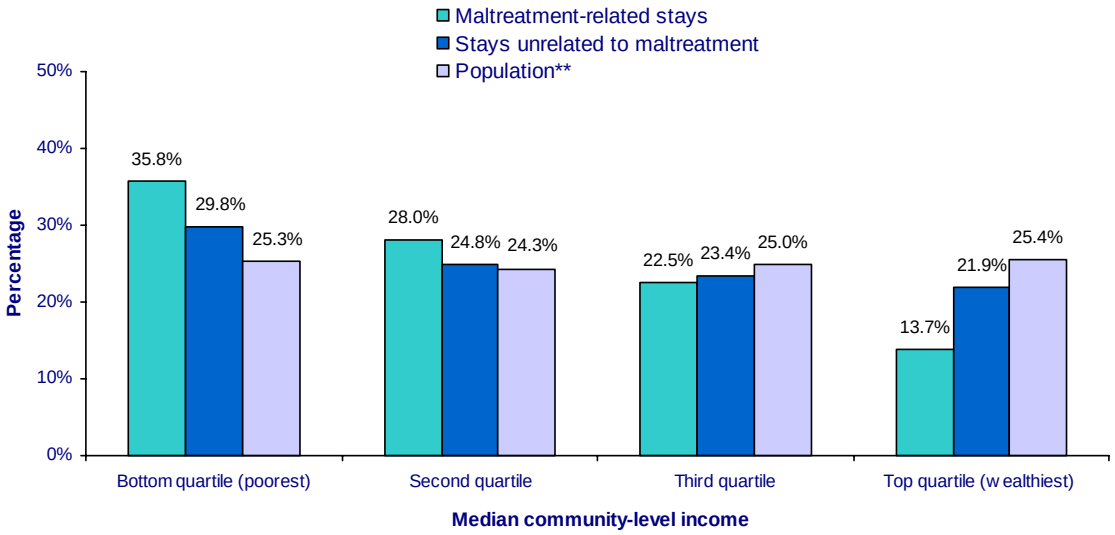
* Based on all-listed diagnoses, excluding those related to the case definition. Hospital stays for newborns have been excluded.
**The number of hospital stays has been rounded to the nearest ten.
Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2005.

Figure 1. Distribution of child maltreatment-related hospitalizations, by age, 2005*



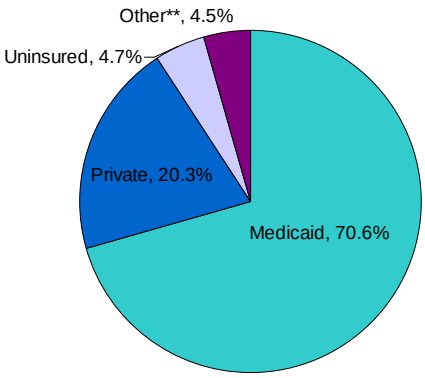
*Based on all-listed diagnoses for children and adolescents under the age of 18 (excluding newborns).
**Population based on 2005 Claritas data for children younger than 18 years old.
Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample (NIS), 2005.

Figure 2. Distribution of child maltreatment-related hospitalizations, by median community-level income, 2005*

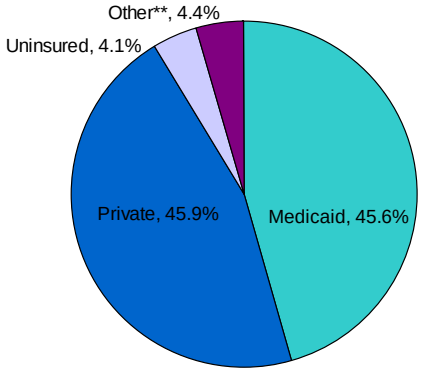


*Based on all-listed diagnoses for children and adolescents under the age of 18 (excluding newborns).
**Population based on 2005 Claritas data for children younger than 18 years old.
Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample (NIS), 2005

Figure 3. Distribution of expected primary payer for maltreatment-related hospitalizations and stays unrelated to maltreatment, 2005*



Maltreatment-related stays



Stays unrelated to maltreatment

*Based on all-listed diagnoses for children and adolescents under the age of 18 (excluding newborns).

**Note: Other includes Medicare, Worker's Compensation, TRICARE/CHAMPUS, CHAMPVA, Title V, and other government programs.

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2005.