

# Medical Costs Attributable to Child Maltreatment

## A Systematic Review of Short- and Long-Term Effects

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**Context:** Child maltreatment is a serious and prevalent public health problem, which has been shown to be associated with numerous short- and long-term effects on mental and physical health. Few estimates of the medical costs of these effects have been published to date. To determine the range and quality of currently available estimates and identify the gaps and needs for future research, this article reviews research on medical costs of child maltreatment.

**Evidence acquisition:** Peer-reviewed literature on child maltreatment and medical costs was identified by searching major databases. Twelve articles on the medical costs of child maltreatment were identified.

**Evidence synthesis:** Eight studies describe short-term costs among children; four describe adult, long-term costs. Most studies used convenience samples, captured a partial share of the total costs, and did not follow best practices for econometric analysis of medical costs.

**Conclusions:** Child maltreatment is associated with substantial medical costs in childhood and adulthood, but estimates vary widely because of differences in research designs, types of cost data, and study quality. Econometric estimates of the annual medical costs in adulthood range from zero to about \$800. Per-episode estimates of child costs, based on mean comparisons, range from \$0 to >\$24,000.

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### Introduction

Child maltreatment is a serious and prevalent public health problem in the U.S., including all types of abuse and neglect among children aged <18 years. In Fiscal Year 2008 (FY08), 772,000 children were classified by child protective services authorities as being maltreated.<sup>1</sup> Of these, neglect was most common (71%), followed by physical abuse (16%); sexual abuse (9%); and other types. Further, 1630 children died from abuse and neglect, and child protective services caseworkers investigated more than 3.7 million children for potential abuse or neglect in FY08.<sup>1</sup> Although fatalities and confirmed cases have decreased in recent years,<sup>1</sup> child protective

services data likely underestimate the incidence of child maltreatment.<sup>2–5</sup> A nationally representative study<sup>6</sup> found that 10.2% of all U.S. children experienced some form of maltreatment in 2008.

Child maltreatment may cause substantial short- and long-term morbidity. Stress induced by maltreatment can cause permanent damage to the brain and hormonal systems, leading to premature aging and increased risk of disease.<sup>7–9</sup> Other impacts include injuries, trauma, chronic disease, and lifelong physical handicaps.<sup>10,11</sup> Mental health impacts include depression, post-traumatic stress disorder, anxiety, and reduced self-image.<sup>10,12,13</sup> Behavioral problems, including substance abuse, tobacco use, obesity, and risky sexual activity have been linked to maltreatment.<sup>14,15</sup>

These, in turn, may lead to increased long-term medical costs in adulthood. Further, child maltreatment is also associated with many non-health consequences such as reduced quality of life,<sup>16</sup> decreased educational attainment, lost wages, criminal activity, perpetration of future violence,<sup>12,14,17,18</sup> and increased mortality.<sup>19–22</sup>

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Although the health consequences of child maltreatment are well established, relatively few studies to date have estimated the associated healthcare costs, and there have been no systematic reviews of these costs. Corso and Lutzker<sup>23</sup> and Corso and Fertig<sup>24</sup> identified this gap and recommended that formal economic evaluation become part of expanded child maltreatment research. Only three<sup>19,22,25</sup> of eight estimates of medical costs reviewed by these authors were published in peer-reviewed journals. All focused on inpatient hospital charges and had several limitations, so few conclusions could be drawn about the magnitude and range of medical costs associated with child maltreatment.

The commentaries by Corso and Lutzker<sup>23</sup> and Corso and Fertig<sup>24</sup> are foundations for the present study. The objectives of this paper are to (1) systematically review the most recent peer-reviewed literature on the medical costs of child maltreatment; (2) provide the latest information about what is known about the health costs associated with child maltreatment; (3) assess the strengths and limitations of existing estimates; and (4) make recommendations about cost estimates for future studies.

Evidence Acquisition

This systematic review is based on three electronic databases broadly spanning medicine (PubMed/MEDLINE, 1947–present); social sciences (PsycINFO, 1967–present); and economics (EconLit, 1969–present). Each was searched using the keyword combinations in Table 1. Additionally, the online contents of the following journals were also reviewed: *Journal of Pediatrics* (1932–present);

*Archives of Pediatric & Adolescent Medicine* (1911–present); *Pediatrics* (1948–present); *Child Welfare* (2002–present); *Child Maltreatment* (1996–present); and *Child Abuse & Neglect* (1977–present). No restrictions were placed on date of publication.

Several inclusion and exclusion criteria were applied to identify relevant content. All studies must report on medical costs, expenditures, or charges, in dollars or ratios, and focus on child maltreatment or child abuse—defined as any type of physical, sexual, psychological, or emotional abuse or neglect committed against a child aged <18 years.<sup>26</sup> Child maltreatment was not limited to acts by a parent or caregiver as in the CDC’s *Uniform Definitions*,<sup>26</sup> because many studies did not ascertain the relationship to perpetrator, particularly claims-based research. Studies were excluded that exclusively considered self-inflicted injury, accidental injuries, or injury from assault among minors or that reported on utilization only. No exclusions to methods or study design were applied. The review was limited to peer-reviewed journals and excluded books, white papers, non-peer-reviewed publications, and unpublished studies.

Initial search and review activities were conducted in December 2010. The bibliographies of all articles in the eligibility stage were searched to identify any additional articles for inclusion. The resulting set of articles was assessed independently by all authors for relevance and final inclusion. After discussion and agreement on final article selection, key data for the results tables were abstracted. The principal summary measure was attributable medical costs. Analysis and drafting occurred during January–March 2011.

For ease of exposition, the term “medical costs” is used for the costs of both mental and physical health care. Regarding specific articles, the following terms are used: “charges” are the amount that a medical provider bills an individual or insurance company; “payments” refer to the amount actually paid for healthcare services; and “costs” refer to the dollar value of the resources used by a hospital or medical provider in the delivery of healthcare services. Costs are challenging to measure<sup>27</sup> and available infrequently, but they are tracked internally by some large integrated healthcare delivery systems.

After extracting data on each study, the strengths and weaknesses of each article were assessed in terms of its usefulness for assessing the total medical cost burden of child maltreatment. The following specific criteria were evaluated and reported in a quality table (Table 2).

Costing

- Inflation adjustment: If the study period is greater than 1 year, costs should be adjusted for comparability to a common year. (This commonly is done with the medical cost consumer price index, but other methods are acceptable.)
- Payment data: For assessing the medical cost burden of child maltreatment, and cost-of-illness studies in general,<sup>34</sup> payment data are preferred to charges or accounting costs. (Charges do not reflect the actual cost burden because payers usually reimburse at lower rates. Accounting costs reported by an institution may be greater or less than charges or payments, but they are institution-specific; they also generally do not reflect opportunity costs.)
- Annualized costs: Data for a 1-year period are preferred for comparability and completeness, since the medical cost burden of child maltreatment may not be limited to a specific episode.

Table 1. Database search terms

PubMed and EconLit search terms	Costs OR cost OR finance OR financial OR economics OR economic OR charges OR payments OR monetary AND Child maltreatment OR child abuse OR child injury OR child neglect OR abusive OR childhood abuse OR child psychological maltreatment OR childhood psychological maltreatment OR child psychological abuse OR childhood psychological abuse OR incest OR childhood neglect OR abusive head trauma OR shaken baby syndrome OR failure to thrive OR failure to provide OR failure to supervise OR child protective services OR child welfare OR child welfare services OR child intentional injuries
PsycINFO search terms	Costs OR cost OR finance OR financial OR economics OR economic OR charges OR payments OR monetary AND Child maltreatment OR child abuse OR child injury OR child neglect OR abusive OR childhood abuse

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