

## Which adverse childhood experiences are most predictive of health care costs among adults?

**Answer:** The evidence identified through this review suggests that having more than one adverse childhood experience (ACE) is associated with higher health care costs when compared to having one or none. Collectively, the studies included in this review report costs for three of the 10 major ACEs: physical abuse, sexual abuse, and physical neglect. Given the variation in type of cost information reported, study design, and study publication date, it is difficult to make comparisons across studies.

### Policy context

AcademyHealth undertook this review from the perspective of a Medicaid policymaker seeking to identify which adverse childhood experiences (ACEs) are associated with higher health care costs among adults. ACEs are stressful or traumatic events, including abuse, neglect, and household disfunction.<sup>2</sup> Studies have linked ACEs to a range of adverse health outcomes in adulthood, such as depression, cardiovascular disease, and diabetes, among others.<sup>2,3</sup> Studies have also shown the relationship between ACEs and increased health care utilization among adults.<sup>4,5</sup> Despite this existing evidence base, few studies directly address health care costs among adults reporting ACEs.

### Supporting evidence

We identified one systematic review that examined medical costs in adults attributable to child maltreatment.<sup>6</sup> In this systematic review, the term “medical costs” is used to describe the costs of both mental and physical health care unless otherwise specified. Four studies captured within the review evaluated medical costs associated with child maltreatment in women (no studies included men):

- Two studies completed in a managed care setting reported cost information from a wide range of providers and types of services including ambulatory, inpatient, and mental health.
  - One study reported that annual medical costs were 36 percent higher for women who had experienced both physical and sexual abuse when compared to women with no history of abuse.<sup>7</sup>
  - The other study found marginally greater medical costs among women who had experienced any type of abuse as children and significantly higher costs for women reporting sexual abuse. However, when mental health services were excluded, costs for women reporting sexual abuse were found to be not significantly different from \$0.<sup>8</sup>
- Two studies reported more limited cost information based on services delivered in primary care settings only.
  - One study found nearly double the self-reported medical costs for women who experienced physical and sexual abuse as a child compared to women who did not experience such abuse.<sup>9</sup>
  - The other study found an increase in self-reported health care utilization and medical care costs over two years among women who experienced sexual abuse compared to women who were not abused.<sup>10</sup>

### Limitations

- Available studies focus only on women, and several examined high-income populations, thus reducing the relevance to the Medicaid population.
- The lack of large, longitudinal studies makes it difficult to track costs across longer spans of time (e.g., between childhood and adulthood).
- All studies focus on ACEs directly impacting a child (e.g., abuse, neglect), no studies examine ACEs related to a child’s environment (e.g., household substance abuse or household mental illness).
- This review does not include primary research studies published since the most recent systematic review.

*AcademyHealth conducted this rapid review over a **three-day** period using an established protocol that emphasizes timeliness, efficiency, and responsiveness to policymakers’ needs. It synthesizes peer-reviewed systematic reviews published within the last 10 years. A primary analyst undertook and revised the review. Two additional AcademyHealth analysts and an external expert provided input on the initial findings and draft report. Appendix 2 lists the search terms and databases used in this rapid review.*

## Appendix 1: Definition of Terms

**Adverse childhood experiences (ACEs)**—potentially traumatic events that can have negative, lasting effects on health and well-being. These experiences can include physical, emotional, or sexual abuse, parental divorce or the incarceration of a family member.<sup>2</sup>

## Appendix 2: Search Terms and Databases

**The following list shows the basic Boolean search term strategy used for the review. Searches were modified based on search functions within each database used.**

(Cost\* OR “health care cost\*” OR expenditure\* OR economic OR payment OR insurance OR charges) AND (“adverse childhood experience\*” OR trauma OR “child maltreatment” OR “child abuse”)

**Databases:** Health Systems Evidence, the Cochrane Library, EPPI-Centre Reviews, PubMed, Web of Science Core Collection, ProQuest Social Science Database, and EBSCO Social Sciences Full Text.

## Appendix 3: Included studies

Table 3a: Systematic reviews

Author and date	Focus of review	Methods	Relevant findings	Limitations and quality of the evidence as reported by the author	AMSTAR Quality Rating <sup>11</sup>
<a href="#">Brown, Fang, Florence, 2011</a> <sup>6</sup>	The attributable medical costs of child maltreatment.	<p>This review searched PubMed, EconLit, and PsycINFO exclusively for peer-reviewed literature. Individual review of relevant journals was also completed to capture additional results.</p> <p>Studies were excluded if they did not include medical costing information, focused only on self-inflicted injury or accidental injury, or injury from assault among minors. No exclusions for methods or study design were applied.</p>	<p>Twelve studies met inclusion criteria, with four articles reporting on medical costs for adult survivors of child maltreatment (see Table 3b). There was a wide range of reported costs among the studies.</p> <p>The highest adult estimate for total annual costs of maltreatment, including physical and sexual abuse, is \$800.90</p> <p>The lowest estimate is not statistically different from \$0, which excluded costs for mental health services.</p> <ul style="list-style-type: none"> <li>• The range of annual cost estimates (from \$0-\$800) is considerable, though the low estimate does not account for mental health costs or multiple provider settings.</li> <li>• The high and low cost estimates were developed using the same data set, though differing statistical methods and definitions of child maltreatment may account for this variation.</li> <li>• While all studies focused on adults used clear (if differing) definitions of child maltreatment and had adequate sample size, none used accepted econometric methods for estimating attributable costs.</li> </ul>	While no limitations of the systematic review were listed by the authors, limitations of the studies included for review were discussed (some are highlighted in Table 3b below).	<b>7/11</b>

**Table 3b: Relevant primary research studies included in the systematic review**

The following four studies were included in the Brown, Fang and Florence (2011)<sup>6</sup> systematic review described in Table 3a. They have been summarized below in order to provide additional detail beyond what is provided in Table 3a. The following terms are used in the studies to discuss medical costs: “charges” are the amount that a medical provider bills an individual or insurance company; “payments” refer to the amount actually paid for health care services; and “costs” refer to the dollar value of the resources used by a hospital or medical provider in the delivery of health care services.

Author and date	Study design	Study population	Relevant findings	Limitations in the study as reported by the author
<a href="#">Bonomi, Anderson, &amp; Rivara et al., 2008</a> <sup>7</sup>	Retrospective cohort	Random sample of 3,333 women enrolled in an integrated delivery system in Washington State.	<ul style="list-style-type: none"> <li>• Women with self-reported child abuse histories had significantly higher annual health care use when compared to women without comparable abuse histories.</li> <li>• The most drastic differences in health care use and costs were seen in women with both physical and sexual abuse as compared to women experience just one type or none at all.</li> <li>• Total adjusted annual health care costs were 36 percent higher for women who experienced both types of abuse, 22 percent higher among women who experienced physical abuse only, and 16 percent higher among women who experienced sexual abuse only.</li> </ul>	<ul style="list-style-type: none"> <li>• Self-reported abuse history may not be as reliable as other ways of tracking (e.g., via medical records), particularly given the sensitivity of the topic and potential for forgotten or underreported incidences.</li> <li>• Did not ask about emotional/psychological abuse.</li> <li>• Concerns regarding the generalizability of the study population, which was primarily employed and highly educated.</li> </ul>
<a href="#">Tang, Jamieson, &amp; Boyle et al., 2006</a> <sup>9</sup>	Secondary data analysis	9,953 women who responded to the Ontario Health Survey.	<ul style="list-style-type: none"> <li>• Women with a self-reported history of both physical and sexual abuse had nearly double the mean annual ambulatory self-reported health care costs (\$775) of women who experienced no such abuse (\$400 mean health care costs).</li> </ul>	<ul style="list-style-type: none"> <li>• Cross-sectional design limits the ability to study a possible causal connection between childhood maltreatment and health services costs.</li> <li>• Use of self-reported health services costs is less reliable than administrative data.</li> <li>• Inpatient health service use is excluded, thus potentially underreporting costs.</li> </ul>
<a href="#">Hulme, 2000</a> <sup>10</sup>	Retrospective case-control	Random sample of 86 abused and 296 non-abused women from a Midwest family practice clinic.	<ul style="list-style-type: none"> <li>• Women who experienced sexual abuse as a child visited the primary care clinic an average of 1.33 more times than women with no reported sexual abuse.</li> <li>• Women who experienced sexual abuse incurred an average of \$150 more in primary care charges over a two-year period compared with women who experienced no such abuse.</li> </ul>	<ul style="list-style-type: none"> <li>• Low response rate (30 percent).</li> <li>• Concerns regarding the generalizability of the study population, which was primarily employed and highly educated.</li> <li>• Survey for the study was developed by the author and has undergone limited validity and reliability studies.</li> </ul>
<a href="#">Walker, Unutzer, &amp; Rutter, et al., 1999</a> <sup>8</sup>	Retrospective cohort	Random sample of 1,175 women in a large integrated health care delivery system.	<ul style="list-style-type: none"> <li>• Women reporting any abuse or neglect had median annual health care costs that were \$97 greater than women who did not report maltreatment; however, when mental health costs</li> </ul>	<ul style="list-style-type: none"> <li>• Chronic disease treatment costs were removed, potentially leading to conservative cost estimates.</li> </ul>

Author and date	Study design	Study population	Relevant findings	Limitations in the study as reported by the author
			<p>were excluded, the difference was not statistically different than \$0.</p> <ul style="list-style-type: none"> <li>• Women reporting sexual abuse histories had significantly higher primary care and outpatient costs (\$245 greater) and more frequent emergency department visits than women without this history.</li> </ul>	<ul style="list-style-type: none"> <li>• Retrospective design does not allow for the establishment of causality.</li> <li>• Self-reported abuse history may not be as reliable as other ways of tracking (e.g., via medical records), particularly given the sensitivity of the topic and potential for forgotten or underreported incidences.</li> </ul>

## Endnotes

1. Substance Abuse and Mental Health Services Administration. Adverse childhood experiences. [Internet] Updated 3/7/2016. Retrieved from: <http://www.samhsa.gov/capt/practicing-effective-prevention/prevention-behavioral-health/adverse-childhood-experiences>
2. Felitti VJ, Anda RF, Nordenberg D, et al. Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. The adverse childhood experiences (ACE) study. *Am J Prev Med* 1998;14:245--58.
3. Brown DW, Anda RF, Henning T, et al. Adverse childhood experiences and the risk of premature mortality. *Am J Prev Med* 2009;37:389--96.
4. Chartier MJ, Walker JR, Naimark B. Separate and cumulative effects of adverse childhood experiences in predicting adult health and health care utilization. *Child Abuse Negl* 2010;34(6):454--64.
5. Anda, RF, Brown, DW, Felitti, VJ, Dube, SR, & Giles, WH. (2008). Adverse childhood experiences and prescription drug use in a cohort study of adult HMO patients. *BMC Public Health*, 8, 198.
6. Brown D, Fang X, Florence C. Medical costs attributable to child maltreatment a systematic review of short- and long-term effects; *Am J Prev Med* 2011; 41(6).
7. Bonomi AE, Anderson ML, Rivara FP, et al. Health care utilization and costs associated with childhood abuse. *J Gen Intern Med* 2008;23:294--9.
8. Walker EA, Unutzer J, Rutter C, et al. Costs of health care use by women HMO members with a history of childhood abuse and neglect. *Arch Gen Psychiatry* 1999;56:609--13.
9. Tang B, Jamieson E, Boyle M, Libby A, Gafni A, MacMillan H. The influence of child abuse on the pattern of expenditures in women's adult health service utilization in Ontario, Canada. *Soc Sci Med* 2006;63:1711--9.
10. Hulme PA. Symptomatology and health care utilization of women primary care patients who experienced childhood sexual abuse. *Child Abuse Negl* 2000;24:1471--84.
11. Systematic reviews were assessed for their quality using the AMSTAR quality appraisal tool, which rates overall quality on a scale of 0-11, with 8-11 being high quality, 4-7 being medium quality, and 0-3 low quality: [http://amstar.ca/Amstar\\_Checklist.php](http://amstar.ca/Amstar_Checklist.php)