Brief communication

Medical expenditures of children in the United States with fetal alcohol syndrome

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ABSTRACT

This paper calculates the medical expenditures for pediatric Medicaid enrollees with fetal alcohol syndrome (FAS), those with and those without reported intellectual disability (ID). The pediatric portion of the MarketScan® Medicaid Multi-State databases for the years 2003–2005 was used. Children with FAS were identified based on International Classification of Diseases, Ninth Revision, Clinical Modification codes. Children without FAS formed the comparison group. Annual mean, median, and 95th percentile total expenditures were calculated for those continuously enrolled during 2005. Children with FAS incurred annual mean medical expenditures that were nine times as high as those of children without FAS during 2005 ($16,782 vs. $1,859). ID more commonly was listed as a medical diagnosis among children with FAS than among children in the comparison group (12% vs. 0.5%), and mean expenditures of children with FAS and ID were 2.8 times those of children with FAS but without reported ID. Children with FAS incurred higher medical expenditures compared with children without FAS. A subset of children with FAS who had ID sufficiently serious to be recorded in medical records increased those expenditures still further. Our estimate of mean expenditures for children with FAS was several times higher than previous estimates in the United States.

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1. Introduction

Fetal alcohol syndrome (FAS) is the severe end of a spectrum of fetal alcohol syndrome disorders (FASDs) caused by prenatal exposure to alcohol. FAS is characterized by growth retardation, facial characteristics and central nervous system abnormalities, including intellectual disability (ID) for some affected individuals (Stade et al., 2006). Passive population prevalences of FAS estimates vary widely, from 1 to 30 per 10,000 children (Hymbaugh et al., 2002). FAS typically is underdiagnosed. Active in-school studies have suggested a higher prevalence of 49 per 10,000 in some populations (May et al., 2009).

This paper for the first time calculates medical expenditures incurred by Medicaid-enrolled children in multiple states with medically recognized FAS. Information on medical expenditures associated with FAS can be used to raise awareness of its economic implication and provide a basis for the assessment of prevention and management strategies.

Abbreviations: CDC, Centers for Disease Control and Prevention; FAS, fetal alcohol syndrome; FAED, fetal alcohol syndrome disorder; ID, intellectual disability; ICD-9-CM, International Classification of Diseases, Ninth Revision, Clinical Modification.

* The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

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2. Methods

2.1. Data source

The pediatric portion of the MarketScan® Medicaid Multi-State Database for the years 2003–2005 was used. These data sets, from eight unidentified states, contain claims with individual level information on medical use and payments for health care services. Data were extracted with the DataProbe® system (Thomson Reuters Healthcare Inc.) and analyzed with SAS 9.2 (SAS Institute Inc., Cary, NC).

2.2. Case ascertainment

Children with FAS were identified as those with an International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) code of 760.711 recorded in one inpatient admission or two outpatient encounters >30 days apart from 2003–2005. Children who did not meet these criteria formed the comparison group. The administrative prevalence of FAS was calculated at this stage. Children with medically recognized ID were identified with the ICD-9-CM codes of 317-319 recorded in any claim.

1 The ICD-9-CM code of 760.71 includes children with a clinical diagnosis of FAS, as well as children with prenatal exposure to alcohol without the full clinical evaluation and diagnosis of FAS.
2.3. Health care expenditures

Annual total expenditures per child were calculated for children with valid data who were enrolled at least 330 days during 2005, a cutoff which was intended to reflect near-continuous coverage while allowing for brief interruptions in coverage. Among all children who had any claims during 2005, the final sample comprised 91% of children with FAS and 66% of children without FAS; the difference reflects greater discontinuation of coverage among children who did not have a chronic condition (Mvundura et al., 2009). Health care expenditures were calculated as the sum of payments made in 2005 to health service providers for inpatient admissions, outpatient encounters, and drugs. Outpatient encounters included both emergency and routine care and any behavioral or supportive therapies that were reimbursed by Medicaid.

The difference between the mean expenditures for children with FAS and those without FAS was a rough proxy of the attributable expenditures of the disease. This was based on the idea that all children would have incurred medical expenditures for routine care, such as well-child visits or immunizations, as well as emergency care. Thus, expenditures above these routine costs could be used as an approximate measure of the expenditures due to FAS through this payment source.

For comparison purposes, other estimates were converted into 2005 U.S. dollars using the Consumer Price Index for medical care (Bureau of Labor Statistics, Consumer Price Index, United States Department of Labor, 2009). Foreign currencies were first converted to U.S. dollars using the purchasing power parity rate at the time of the publication (Organisation for Economic Co-operation and Development (OECD), 2010).

3. Results

There were 2,256,234 children younger than 17 years of age enrolled in the MarketScan Multi-State Medicaid database during 2005. Among them, 372 children had prenatal alcohol exposure or FAS, yielding an administrative prevalence of 1.6 per 10,000 enrollees.

A child with FAS incurred mean expenditures totaling $16,782, 9.0 times higher than expenditures for a child in the comparison group $1859 (Table 1). The top 5% of children with FAS in terms of expenditures incurred 40% of total costs. Among children with FAS, 12% had a record of ID in the claims data, whereas just 0.5% of children in the comparison group had a record of ID. A child with recorded FAS and ID incurred mean expenditures totaling $38,873, 2.8 times higher than those of a child with FAS without ID (Table 2). Mean expenditures for a child with recorded ID who did not have FAS were $24,222, about 14 times higher than for a child in the comparison group without ID. Although smaller in relative terms, the additive contribution of ID to medical expenditures in absolute terms was similar for children with and those without FAS, approximately $22,000.

<table>
<thead>
<tr>
<th>Condition (sample size)</th>
<th>Type of service</th>
<th>Mean</th>
<th>Median</th>
<th>95th percentile</th>
</tr>
</thead>
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<tr>
<td>Fetal alcohol syndrome (339)</td>
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<td>24701</td>
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<tr>
<td></td>
<td>Drug</td>
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<td>1151</td>
<td>10651</td>
</tr>
<tr>
<td></td>
<td>Outpatient</td>
<td>8670</td>
<td>4010</td>
<td>32014</td>
</tr>
<tr>
<td></td>
<td>Total</td>
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<td>6770</td>
<td>67829</td>
</tr>
<tr>
<td>Comparison group (1 485 349)</td>
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<td>0</td>
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<tr>
<td></td>
<td>Drug</td>
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<td>60</td>
<td>1533</td>
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<tr>
<td></td>
<td>Outpatient</td>
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<td>353</td>
<td>3684</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>1859</td>
<td>518</td>
<td>6043</td>
</tr>
</tbody>
</table>

4. Discussion

Previously published estimates of the population prevalence of FAS among children 10 years of age or younger based on surveillance data were 1.6 per 10,000 in metropolitan Atlanta (Hymbaugh et al., 2002) and 2.1 and 9.0 per 10,000 in two counties in New York State (Druschel and Fox, 2007). This study’s estimated prevalence of 1.6 per 10,000 was similar to the first two estimates. This likely reflected typical levels of medical diagnosis of FAS, although this was an underascertainment of the true prevalence of FAS as suggested by school prevalence studies (May et al., 2009). The prevalence of ID among all children, 0.5%, is low relative to the prevalence identified through active surveillance (Yeargin-Allsopp and Boyle, 2002), probably because ID is most commonly diagnosed in the schools rather than the health care system.

Children with FAS incurred annual total expenditures 9 times those of children without FAS ($16,782 vs. $1859), a difference of roughly $15,000. The additive contribution of ID to average medical expenditures was similar for children with FAS and those without FAS (about $22,000). Although the apparent effect of ID on medical expenditures was the same whether children had FAS or not, these costs cannot be generalized to the larger number of children with ID who do not have a medical diagnosis for that condition.

Previous FAS medical cost studies have been limited to individual jurisdictions. Using a North Dakota database of private and public insurance claims, Klug and Burd (2003) reported that 45 children 1 through 21 years of age with FAS (ICD-9-CM code 760.71) incurred individual total annual mean medical expenditures for inpatient and outpatient care of $3915 (adjusted for inflation). The present study’s individual mean expenditures for total hospitalization and outpatient care, $13,934, were 3.7 times the estimate in the North Dakota study. Variability in treatment by time and location, eligibility requirements, covered services, and reimbursement rates might have affected total expenditures. The fact that the present study was based on data from multiple states might have made these results more robust than those based on a single state’s data. A study from Ontario, Canada, that used survey data calculated the annual medical cost of FASDs among children to be U.S. $3726 individually (Stade et al., 2006), similar to that of the North Dakota study. However, the Ontario survey sample included children with milder forms of FASDs, and the expenditures for children with FAS likely were higher.

The present findings can be compared with estimated expenditures for Medicaid-enrolled children with other disorders. Other studies using the same methodology and the same database calculated the mean medical expenditures during 2005 to be $11,075 for a child with sickle cell disease (Mvundura et al., 2009) and $10,709 for a child with an ASD (Amendah et al., in press).

Children with FAS in the public health system have incurred high medical expenditures, as evidenced by findings from this study. FAS represents the most severe part of the spectrum of sequelae caused by prenatal exposure to alcohol. Taking into account the underascertainment of FAS and the fact that other FASDs could not be included systematically in this study, the numbers cited reflected a fraction of...
the total effect of prenatal alcohol exposure on medical costs. Furthermore, medical expenditures are estimated to comprise only a small portion of the total economic effect of FASDs (Klug and Burd, 2003; Stade et al., 2006). The high burden of medical expenditures reinforces the need for sustained prevention efforts using evidence-based strategies such as screening and brief interventions, Project CHOICES for preconceptional women, and the Parent and Child Assistance Program (P-CAP) for women at very high risk of having an alcohol exposed pregnancy.

Conflict of interest statement

Nothing declared.

References


