The Effects of Access to Pediatric Care and Insurance Coverage on Emergency Department Utilization

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ABSTRACT. Objective. To compare children who used the emergency department (ED) in a rural, border community with those who did not over a 1-year period to estimate the effects of access to pediatric care, insurance coverage, ethnicity, gender, age, and area of residence on ED utilization.

Design. Multivariate logit models are used to estimate the independent influence of demographic characteristics, insurance coverage, and access to pediatric care on ED utilization during 1999 by children 0 to 19 years of age.

Results. Controlling for age, gender, ethnicity, and area of residence, children who received care from a private practice pediatric group were 73% less likely to utilize the ED if insured and 93% less likely if uninsured to use the ED than children who had not visited a pediatrician. Uninsured children were nearly 4 times more likely to use the ED than insured children. Among insured children, those covered by Medicaid were 54% less likely to use the ED than children with private insurance. Compared with white, non-Hispanic children, Asian or Hispanic children were no more likely to use the ED. Insured Native American children were more than twice as likely as white, non-Hispanic children to utilize the ED.

Conclusions. Access to pediatric care is associated with a marked decrease in ED utilization regardless of insurance status. This decrease in ED utilization is especially large for uninsured children. Pediatrics 2004;113: 483–487; emergency care, health insurance, adolescence, uninsured children.

ABBREVIATIONS. ED, emergency department; AHCCCS, Arizona Health Care Cost Containment System; OR, odds ratio.

Approximately 60,000 children seek emergency care each day in the United States, and children 0 to 14 years old account for 22% of all emergency department (ED) visits.¹ It has been estimated that 15% to 61% of children’s ED visits are for nonurgent care.² Most studies focus on ED utilization in urban settings³–⁷ and rely on small survey samples and patients’ recollections of care.³⁵,⁶ We analyze data on ED utilization among 21,261 children (0–19 years of age) in a rural Arizona county (Yuma County) bordering California and Mexico. The data, from the Yuma County Community Health Data System, include information from insurer and provider records on all types of health care visits and insurance coverage.

METHODS

The data used for analysis are drawn from the Yuma County Community Health Data System 1999 records for 30,504 children. Each record, coded for confidentiality, includes all the information for the child that was contained in the records of the participating providers and programs. The data sources include Yuma Regional Medical Center, Yuma Regional Medical Center school-based clinics, Yuma County’s largest pediatric practice, the community health centers, Arizona’s Medicaid program (Arizona Health Care Cost Containment System [AHCCCS]), Western Arizona Area Health Education Center, Inc, health insurers for 2 major employers, and the Arizona Department of Health Services immunization data file.

Approximately 47,400 children 0 to 19 years of age lived in Yuma County in 1999, and 61% of the children are Hispanic, 32% are white, non-Hispanic, 4% are African American, 2% are Asian and Pacific Islander, and 2% are Native American (Table 1). A multivariate logit model is estimated on data for 21,261 children who received health care in Yuma County in 1999. The data are then separated into insured and uninsured children, and a model is estimated for each group to measure interactions between insurance coverage and the other determinants of utilization. The dependent variable is a binary variable equal to 1 if a child made an ED visit during 1999 and equal to 0 otherwise. The model includes health insurance coverage, age, ethnicity, gender, location, access to primary care, and a flag for ambulatory-care–sensitive conditions. The ambulatory-care–sensitive conditions, listed in Table 2, are conditions for which emergency care can be avoided by effective and timely ambulatory care.⁸–¹⁰ The ambulatory-care–sensitive conditions were reviewed by 1 of the authors (M.E.R.) and community pediatricians to confirm that these conditions do not generally require ED care.

Our results are not strictly comparable to previous studies because of our use of multivariate models and the rural setting for our analysis. The estimates from the model on all children are most closely comparable to those from previous studies. The separate estimates for insured and uninsured children are less comparable because they include full interactions between health insurance coverage and other influences on ED utilization.

RESULTS

Yuma County is a sparsely populated agricultural area of >5000 square miles on the Mexican border. Yuma County’s health care system is largely self-contained because the nearest cities are nearly 200 miles away. Emergency care is provided at the county’s only hospital, Yuma Regional Medical Center. Approximately 47,400 children 0 to 19 years of age lived in Yuma County in 1999, and 61% of the children are Hispanic, 32% are white, non-Hispanic, 4% are African American, 2% are Asian and Pacific Islander, and 2% are Native American (Table 1). The discussion in this section refers to the 21,261 children.
Approximately 8065 children used the ED, of whom 57% were treated for nontraumatic conditions (Fig 1).

### Access to Pediatric Care

We assessed the potential effects of pediatric care on ED use by the number of ED visits for ambulatory-care–sensitive conditions (Table 2) and whether children visited a pediatric practice or community health center during 1999. Pediatric practice visits produced very large reductions in the odds of ED utilization. Children who received care in a pediatric practice were 93% less likely to use the ED (odds ratio [OR]: 0.07; \( P < .001 \)) if uninsured and 73% less likely to use the ED (OR: 0.27; \( P < .001 \)) if insured.

Children who visited the ED were nearly 4 times more likely to have an ambulatory-care–sensitive condition than children without an ED visit. The odds were higher among uninsured children (OR: 5.77; \( P < .001 \)) than among insured children (OR: 3.70; \( P < .001 \)).

### Insurance Coverage

As shown in Table 3, a child could have >1 form of insurance during 1999. Uninsured children are defined as those with any gap in insurance coverage during 1999. Uninsured children were nearly 4 times more likely than children without an ED visit. The odds were higher among uninsured children (OR: 5.77; \( P < .001 \)) than among insured children (OR: 3.70; \( P < .001 \)).

### Ethnicity

Among insured children, there are no statistically significant differences between Asian, African American, or Hispanic children and white, non-Hispanic

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**TABLE 1.** Yuma County Children by Gender and Ethnic Group: 1999

<table>
<thead>
<tr>
<th></th>
<th>0–4 y</th>
<th>5–9 y</th>
<th>10–14 y</th>
<th>15–19 y</th>
<th>All Children</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>White</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic male</td>
<td>1922</td>
<td>15.4</td>
<td>2037</td>
<td>16.4</td>
<td>2003</td>
</tr>
<tr>
<td>Non-Hispanic female</td>
<td>1916</td>
<td>15.4</td>
<td>1885</td>
<td>15.2</td>
<td>1786</td>
</tr>
<tr>
<td>Hispanic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male (of any ethnic group)</td>
<td>3928</td>
<td>31.5</td>
<td>3791</td>
<td>30.5</td>
<td>3545</td>
</tr>
<tr>
<td>Female (of any ethnic group)</td>
<td>3868</td>
<td>31.0</td>
<td>3759</td>
<td>30.2</td>
<td>3351</td>
</tr>
<tr>
<td>African American</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>173</td>
<td>1.4</td>
<td>264</td>
<td>2.1</td>
<td>218</td>
</tr>
<tr>
<td>Female</td>
<td>208</td>
<td>1.7</td>
<td>255</td>
<td>2.1</td>
<td>210</td>
</tr>
<tr>
<td>American Indian and Alaska native</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>93</td>
<td>0.7</td>
<td>135</td>
<td>1.1</td>
<td>115</td>
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<tr>
<td>Female</td>
<td>101</td>
<td>0.8</td>
<td>94</td>
<td>0.8</td>
<td>117</td>
</tr>
<tr>
<td>Asian Pacific Islander</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>144</td>
<td>1.2</td>
<td>113</td>
<td>0.9</td>
<td>90</td>
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<tr>
<td>Female</td>
<td>108</td>
<td>0.9</td>
<td>94</td>
<td>0.8</td>
<td>111</td>
</tr>
<tr>
<td>Total</td>
<td>12 461</td>
<td>100</td>
<td>12 427</td>
<td>100</td>
<td>11 546</td>
</tr>
</tbody>
</table>


**TABLE 2.** Ambulatory-Care–Sensitive Conditions Included in Results

<table>
<thead>
<tr>
<th>Condition</th>
<th>International Classification of Diseases, Ninth Revision Code*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grand mal status and other epileptic convulsions (group A: age 0–5 y; group B: age &gt;5)</td>
<td>345, 780.3</td>
</tr>
<tr>
<td>Severe ears, nose, and throat infections (exclude otitis media with myringotomy and insertion of tube: 20.01)</td>
<td>382, 462, 463, 465, 472.1</td>
</tr>
<tr>
<td>Bacterial pneumonia (exclude cases with secondary diagnosis of sickle cell [282.6] and age &lt;2 mos)</td>
<td>481, 482.2, 482.3, 482.9, 483, 485, 486</td>
</tr>
<tr>
<td>Asthma</td>
<td>493</td>
</tr>
<tr>
<td>Gastroenteritis</td>
<td>558.9</td>
</tr>
<tr>
<td>Kidney/urinary infection</td>
<td>590, 599.0, 599.9</td>
</tr>
<tr>
<td>Dehydration-volume depletion</td>
<td>276.5</td>
</tr>
</tbody>
</table>

* Gadomski et al. 8

who used care, unless otherwise indicated. Approximately 8065 children used the ED, of whom 57% were treated for nontraumatic conditions (Fig 1).

**Fig 1.** Yuma County Health Data System pediatric population.
children. Insured Native American children, however, were more than twice as likely (OR: 2.23; \( P < .001 \)) as white, non-Hispanic children to visit the ED. Among uninsured children \( (N = 2157) \), the only statistically significant effect is for African American children who were \( \geq 3 \) times (OR: 3.35; \( P = .001 \)) more likely to use the ED than white, non-Hispanic children.

### Age

Compared with the 10- to 15-year age group, children in the 0- to 4-year age group are less likely to use the ED (OR: 0.80; \( P < .001 \)) and adolescents (15- to 19-year age group) are more likely (OR: 1.44; \( P < .001 \)) to receive ED care. There is no statistically significant difference between the 5- to 9-year-olds and 10- to 15-year-olds.

There are no significant age effects for uninsured children except for ages 0 to 4, who are 66% less likely (OR: 0.34; \( P = .001 \)) than children aged 10 to 15 years to use the ED. Among insured children, the 15- to 19-year-old age group is nearly 1.5 times more likely (OR: 1.45; \( P < .001 \)) to use the ED and the 0- to 4-year-old age group is 13% less likely to use the ED (OR: 0.87; \( P < .001 \)) than children aged 10 to 15 years. Children 5 to 9 years old were not significantly different from children 10 to 15 years old.

### Gender

Males are consistently more likely than females to use the ED regardless of insurance coverage. The ORs for uninsured and insured males are 1.44 and 1.27, respectively.

### Area of Residence

Approximately 77% of Yuma County’s children live in the city of Yuma, and the rest live in or near 8 smaller towns. The number of children in the smaller towns ranges from 340 (Dateland) to 5691 (San Luis). Compared with children who lived in the zip code area in which the ED is located, the probability of use of the ED is much higher within the city of Yuma than in rural areas and is at a minimum for children living in San Luis (see Fig 2). Although the absolute values differ, the progression of the OR is similar for both insured and uninsured children, which suggests that geographic proximity to the ED is an important predictor of ED utilization, independent of insurance status.

### DISCUSSION

Our study supports the belief that providing a pediatric medical home for a child decreases ED utilization. First, children who had an ambulatory-care-sensitive condition that could have been mani-
aged in an outpatient setting were >4 times as likely to use the ED than children without ambulatory-care–sensitive conditions. Thus, much of the ED care for children could have been either prevented or provided in a primary care setting. Second, we found that insured children who received care from a pediatric practice were 73% less likely to use the ED than children who did not receive such pediatric care in 1999. Among uninsured children, the decrease in ED utilization by children who had received care in a pediatric practice was even more dramatic: 93%.

The importance of a primary care provider in decreasing utilization has been suggested by the study by Halfon et al,3 which shows that children were more likely to use the ED if they received health care from a public clinic or neighborhood health center or lived in areas with fewer primary care providers. Another study by Hakim and Ronsaville11 also supports our findings. They found that compliance with early well-child care decreases ED utilization by children 7 months to 3 years old.

Halfon et al3 reported that insurance status did not affect the routine use of EDs for sick care. In contrast, our study found that uninsured children, all else being equal, were nearly 4 times as likely to use the ED than insured children. The study by Halfon et al is based on the 1988 National Health Interview Survey on Child Health. Other studies report either increased ED utilization2,5,7,12 or no difference in utilization3 for children insured by Medicaid. Our results may differ from previous studies, because children who are covered by AHCCCS (Arizona’s Medicaid program) are assigned a primary care provider who is expected to coordinate the child’s care. The use of primary care providers to coordinate care by AHCCCS has been in practice since 1983. Presumably, the methods of coordinating care are well developed and therefore could be one of the reasons for the relatively low use of EDs by AHCCCS-covered children. Thus, our results suggest that effects of the provision of Medicaid to uninsured children are enhanced greatly by the use of primary care providers to coordinate care.

Previous studies report that African American children were more likely to utilize EDs than white children.1–5 This finding occurs only among uninsured African American children in our results. The only other significant effect of ethnicity in our study was among insured Native American children. Our results are similar to the National Center for Health Statistics data, which also show that a higher proportion of Native American children use EDs relative to other ethnic groups. The National Center for Health Statistics data show that ~38% of Native American children had at least 1 ED visit (38.1%) in the previous 12 months when compared with white (20.0%), African American (20.0%), and Hispanic children (18.7%).7

Our results agree with previous findings that adolescents are more likely to utilize the ED than other age groups.13 Some researchers suggest that the differentially high utilization by adolescents reflects a lack of insurance. We find, instead, that both insured and uninsured adolescents were more likely to use the ED than other age groups. Other studies report relatively high ED utilization among 0- to 4-year-olds, but we found that children 0 to 4 years old are less likely than other age groups to use the ED. Although we did not assess the number of health supervision visits by age in our study, the recommended number of health supervision visits for adolescents is far less than for children 0 to 4 years old. The data from Hakim and Ronsaville11 suggest that increased number of health supervision visits decreases ED utilization. Perhaps adolescents who have not been receiving regular primary care are more likely to utilize the ED for care because they no longer view the pediatrician’s office as their medical home. Indeed, Wilson and Klein14 reported that adolescents who used the ED as their usual source of care were also less likely to have regular well visits than other adolescents.

Males in our study are more likely to utilize the ED than females. These findings are similar to other studies. The reasons for this increased ED utilization by boys are not clear. However, we do know that boys in Arizona are much more likely to suffer from unintentional injuries and gun-related injuries than girls.15 Perhaps the higher rate of unintentional injuries and gun-related injuries for boys is responsible for some of the increased ED utilization by boys in our study.

The location of an ED also affects utilization. Our results show a gradient of decreasing use with increases in distance from the zip code in which the Yuma Regional Medical Center ED is located. One interesting aspect of the zip code results is that the odds of use are low in the more-distant areas of Yuma County, where access to emergency care is very limited or nonexistent. We are not aware of other studies that examined this risk factor for ED utilization.

Our study may reflect risk factors for ED utilization more accurately than many of the previous studies because our results are based on a large, multiple-provider data set (Yuma County Community Health Data System), which permits the estimation of the independent effect of each influence, including both ED and primary care visits, on utilization, holding constant all other influences. In addition, many pre-
nous studies have been based on family surveys and thus relied on patient recall to assess ED utilization. Because our study is based on health data, we are unable to assess the influence of some social factors such as marital status, educational level, or income on ED utilization. However, none of these variables have consistently been associated with increased ED utilization.

CONCLUSIONS

Use of health care services is a multidimensional phenomenon. Family dynamics, economic factors, insurance status, and characteristics of the health care system and health care provider may affect health behaviors. This study, which used a large, community-wide database from multiple providers, shows that ED utilization is reduced greatly if children have received care from a pediatrician. Insured children who received care from a pediatrician during 1999 were 73% less likely to utilize the ED, and uninsured children who visited a pediatrician were 93% less likely to utilize the ED. Asian and Hispanic children were no more likely to use the ED than white, non-Hispanic children regardless of insurance coverage. However, insured Native American children were more than twice as likely as other ethnic groups to utilize the ED, and uninsured American children were >3 times as likely to have ED visits than white, non-Hispanic children.

Our results imply that appropriate controls for interactions between insurance coverage and other characteristics may eliminate some of the otherwise observed importance of ethnicity and other characteristics as determinants of ED utilization. The possibility deserves a test in a large urban area. Because our results are based on administrative and clinical records from a community-wide health system rather than surveys from a sample of patients, the accuracy and scope of the estimates are increased. The large data size permitted us to make estimates from a very large database for a very small geographic area with a contained region for medical care. Our results, therefore, may reflect risk factors for increased ED utilization more accurately than previous studies.

The primary function of EDs is to treat patients with serious illnesses or injuries. Unfortunately, many children today are using the ED as their usual source for all medical care. Children who utilize the ED also are less likely to receive appropriate health supervision and anticipatory guidance, because the ED provider can only address the immediate health concern and is unlikely to have the time, expertise, and access to medical records necessary to provide appropriate pediatric preventive health care. Our study shows that uninsured children and those who lack access to a pediatrician are much more likely to utilize the ED, which suggests that expansion in health insurance coverage must be accompanied by increased access to pediatric care if unnecessary reliance on ED care is to be reduced significantly.

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REFERENCES

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