

# Unplanned healthcare utilization by children with spina bifida: rates and risks factors associated with Emergency Department use between 2016-2020

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## Introduction

Children with Spina Bifida (SB) represent a special healthcare needs population requiring life-long multidisciplinary care. There is a dearth of studies specifically investigating ED use by children with SB, however those published have demonstrated that a child with SB is seen in the ED every 2-3 days and more than a quarter of families will have at least one ED visit a year.<sup>1,2</sup> Factors driving ED use among SB patients are likely multidimensional, including both clinical and patient specific reasons.

## Objective

We aimed to describe patterns of ED use (EDU) among children with SB and to identify clinical and non-clinical factors associated with the degree of EDU in these patients.

## Methods

Patients under 21 years old with SB at a single institution were identified using billing data cross-referenced with the ED patient database. Baseline patient and clinical characteristics were collected by chart review. Patients were dichotomized into high and low EDU categories based on average annual EDU calculated as the total ED visits per year from 2016-2020 (or per time followed, if shorter). High EDU was defined as  $\geq 2$  visits/year based on literature precedent. The unadjusted association of patient and clinical factors with EDU was determined.

## Tables

**Table 1. Patient characteristics associated with the degree of ED use among children with Spina Bifida between 2016 – 2020.**

	All Patients n = 399	High EDU n = 29	Low EDU n = 370	p-value
<b>Median age at first visit</b>	5.8	2.7	5.9	
<b>Max age at first visit</b>	18.2	15.5	18.2	
<b>Sex</b>				
Male	212 / 53%	11 / 38%	201 / 54%	.0884
Female	187 / 47%	18 / 62%	169 / 46%	
<b>Ethnicity</b>				
Non-Hispanic	277 / 69%	17 / 59%	260 / 70%	.1820
Hispanic	121 / 30%	12 / 41%	109 / 29%	
<b>Primary Language</b>				
English	276 / 69%	17 / 59%	259 / 70%	.2155
Spanish	113 / 28%	11 / 38%	102 / 28%	
Other	10 / 3%	1 / 3%	9 / 2%	
<b>Insurance</b>				
Private	120 / 30%	2 / 7%	118 / 32%	.0012
Public	252 / 63%	24 / 83%	228 / 62%	
Government	11 / 3%	3 / 10%	8 / 2%	
Other	16 / 4%	0 / 0%	16 / 4%	
<b>COI</b>				
Low/Very Low	141 / 35%	9 / 31%	132 / 36%	.1411
Moderate	92 / 23%	11 / 38%	81 / 22%	
High/Very High	164 / 41%	9 / 31%	155 / 42%	

**Table 2. Clinical characteristics associated with the degree of ED use among children with Spina Bifida between 2016 – 2020.**

	All Patients n = 399	High EDU n = 29	Low EDU n = 370	p-value
<b>Type of Spina Bifida</b>				
Open	309 / 77%	22 / 76%	287 / 78%	.7060
Closed	84 / 21%	7 / 24%	77 / 21%	
Unknown	6 / 2%	0 / 0%	6 / 2%	
<b>Mobility Status</b>				
Non-ambulatory	71 / 18%	9 / 31%	62 / 17%	.0235
Ambulatory	289 / 72%	15 / 52%	274 / 74%	
Unknown	39 / 10%	5 / 17%	34 / 9%	
<b>History of VP Shunt</b>				
Yes	163 / 41%	16 / 55%	147 / 40%	.1322
No	226 / 57%	13 / 45%	213 / 58%	
Unknown	10 / 3%	0 / 0%	10 / 3%	

## References

- Riddle, S., Meinen-Derr, J., Tabangin, M., Woodward, J. & Wiley, S. Emergency department utilization among pediatric spina bifida patients. *J Pediatric Rehabilitation Medicine* **12**, 375–381 (2019).
- Cooper, J., Chisolm, D. & McLeod, D. J. Sociodemographic Characteristics, Health Literacy, and Care Compliance in Families With Spina Bifida. *Global Pediatric Heal* **4**, 2333794X17745765 (2017).

## Results

Among the 399 eligible patients, 53% were male, 30% identified as Hispanic, and 63% were publicly insured. The median age at first ED visit was 3 years old for high EDU patients compared to 6 years old for low ED users. Open lesions predominated (77%). 64% of patients were community ambulators, and 40% used a wheeled mobility device. Only 6 patients required respiratory adjuncts (1.6%). During the study period, 854 ED visits occurred with an average of 2 total visits per patient. There was a maximum number of visits of 33. 20 patients (5%) had 10 or more total visits. 7% of patients averaged  $\geq 2$  annual ED visits, with 6 patients averaging  $>5$  annual ED visits. Among high EDU, 55% of patients had a VP shunt compared to 45% with no shunt. There was a significant difference in EDU between ambulatory and non-ambulatory patients, with non-ambulators making up 31% of patients with high EDU vs. 17% of those with low EDU. Insurance status was also significant with 83% of patients with high EDU receiving public insurance compared to 62% of patient with low EDU. There was no significant difference between high EDU and low EDU in childhood opportunity index, primary language, or ethnicity.

## Conclusion

In this cohort of Spina Bifida patients, low EDU is more common than high EDU. Only a small proportion of children had recurrent ED visits, but nearly half of those that did had very high rates of return to the ED. High EDU was associated with ambulatory limitations and public insurance.