

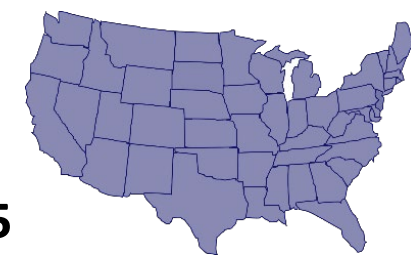
# Direct Medical Cost-Estimator Tool – Economic Burden of Physically Restraining Patients with Agitation and Schizophrenia in Emergency Departments

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## BACKGROUND

Agitation is a common and debilitating condition for patients with schizophrenia.<sup>1</sup> Acute agitation is challenging for patients and staff, complicate care, and may escalate to situations with risk of harm to patients and others<sup>2</sup>

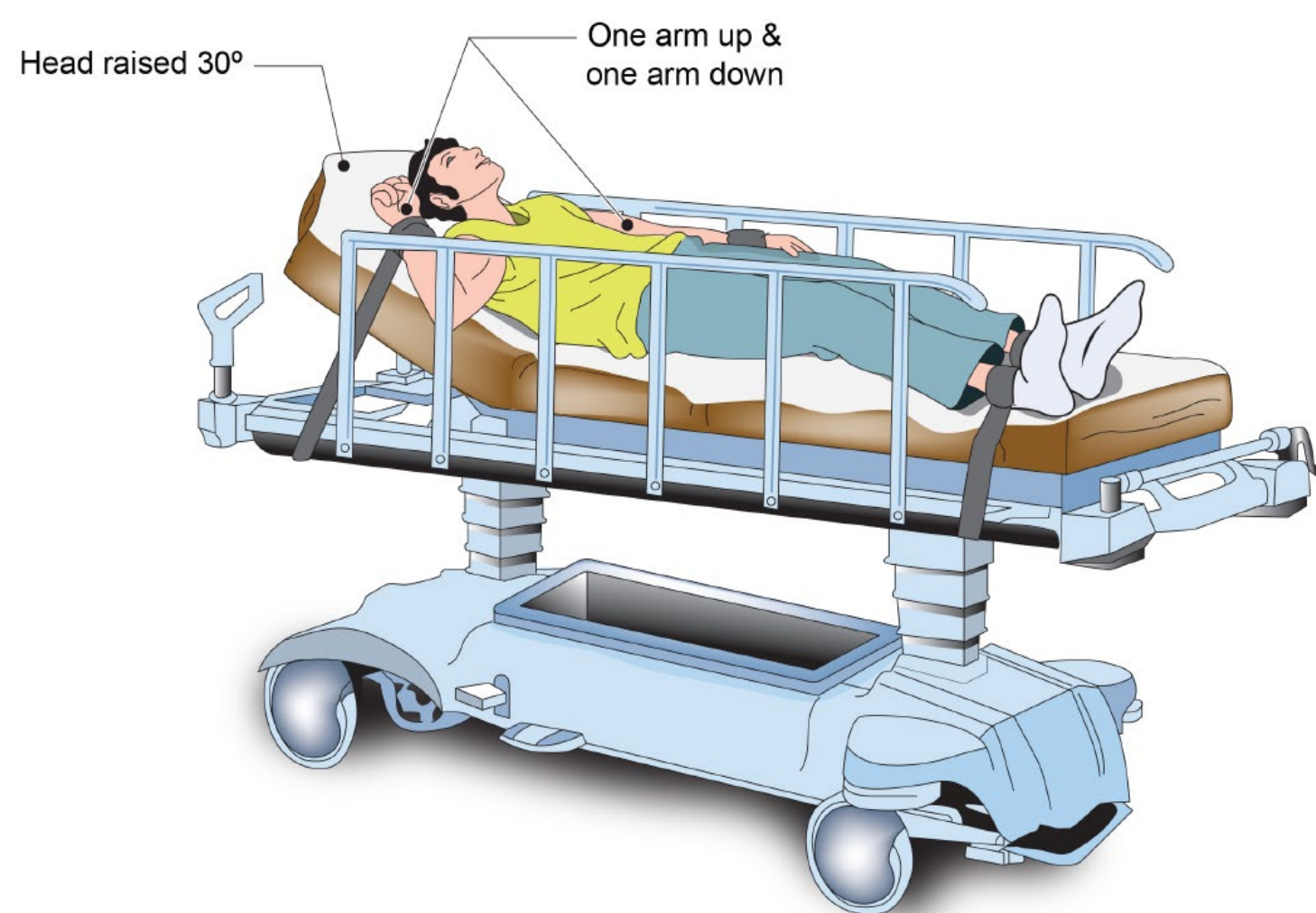


Estimated 2.65 million patients in the US live with schizophrenia<sup>3</sup>

Patients with schizophrenia experiencing episodes of acute agitation<sup>4</sup> **25%**

## OBJECTIVE

To develop an interactive tool to estimate direct medical costs associated with physical restraint use on patients with agitation and schizophrenia in the Emergency Department (ED)



Physical restraints are used in 1% – 1.4% of total ED encounters and primarily on agitated patients become aggressive<sup>5,6</sup>

## METHOD

Primary data variables from the 2018 HCUP-NEDS analysis were combined with a wide range of existing published data to create a dynamic Microsoft Excel® tool to comprehensively estimate direct medical costs after physical restraint use, including, ED, hospital inpatient, and ED staff injuries.

**HCUP**

Healthcare Cost and Utilization Project



**NEDS**

Nationwide Emergency Department Sample

### Data Input Variables with Source References

Variable	2021 Value	Source	Notes
Annual ED Volume	100,000	Assumption	
% Related to Schizophrenia	1.6%	HCUP NEDS/NIS (BioXcel Analysis)	
% Related to Agitation	52%	Boudreaux 2009	
% Requiring Restraints	10%	Boudreaux 2009	
Additional ED LOS	4.2 hours	Weiss 2012	
Personnel Costs per patient bed-hour <sup>1</sup>	\$64	Schreyer 2017 (\$58.20 adjusted to 2021)	
Additional % Hospitalized	8%	Weiss 2012	
Schizophrenia with agitation inpatient LOS (mean) <sup>2</sup>	12.3 days	HCUP NEDS/NIS (BioXcel Analysis)	
Schizophrenia average inpatient cost <sup>1</sup>	\$10,543	HCUP net 2018 (MBD001; \$9,729 adjusted to 2021)	
Additional inpatient length of stay associated with restraint use	1.45 days	Compton 2006	
Daily psychiatric costs	\$857	Calculated (see calculation)	
Proportion resulting in staff injuries	22%	Stewart 2009	Average of 12%, 17%, 19% and 40%
Average cost per staff injury <sup>1</sup>	\$1,072	Speroni 2014 (\$88.26 adjusted to 2021)	28.3% of 106 nurses treated

<sup>1</sup>Input costs have been adjusted to 2021 US dollars using the medical care component of the consumer price index (see tab "BLS data series")

<sup>2</sup>Sensitivity analysis performed against schizophrenia LOS = 8.5 days

### Cost Estimate Summary per 100,000 ED Visits

Cost Categories	Original as Referenced	Adjusted for Inflation
ED Length of Stay	\$20,337	\$22,472
Hospitalization	\$69,381	\$78,832
Staff Injuries	\$16,259	\$19,620
Total to Institution	\$105,977	\$120,925
Total per Target Patient	\$1,274	\$1,453

### Cost Estimates Adjusted for Inflation

Intermediate Calculations	
Epidemiology	Yearly
ED Volume	100,000
Schizophrenia-related ED volume	1600
Agitation- related ED volume	832
# agitation-related ED volume requiring restraint use	83
# excess hospitalization associated with restraint use	6.7
# staff with injury (assuming 1 injured staff/event)	18.3
<b>ED Length of Stay</b>	
Total yearly additional ED hours	349.4
Total yearly additional personnel; costs associated with increased ED LOS	\$22,472
<b>Hospitalization</b>	
Yearly excess hospitalization cost	\$70,519
Yearly excess cost due to increased inpatient LOS	\$8,313
Total yearly excess hospitalization cost	\$78,832
<b>Staff Injuries</b>	
Yearly cost of staff injury	\$19,620
<b>Total Costs (Adjusted to 2021)</b>	
Annual costs to institution with ED volume of 100,000	\$120,925
Cost per schizophrenia patient	\$76
Cost per agitated schizophrenia patient	\$145
Cost per restrained schizophrenia patient (with agitation)	\$1,453

## RESULTS

- 832 have agitation + schizophrenia with 83 patients physically restrained and 18.3 staff injured

**Adjusting for inflation to 2021 US dollars, each 100,000 patients presenting to the ED incurred an estimated:**

- Institution annual direct medical costs of \$120,925 or \$1,453 per patient with agitation + schizophrenia physically restrained in the ED

**This total includes annual:**

- Increased ED Length of Stay costs of \$22,472
- Excess admission hospitalization costs of \$78,832
- \$19,620 from ED staff injuries

## CONCLUSIONS

➤ NEDS data from 2018 were combined with published data to create an interactive tool for hospitals to estimate annual direct medical costs related to ED physical restraint use on patients with agitation and schizophrenia.

➤ Physically restraining patients who have escalated from agitation to aggression and violence results in significantly higher total hospital direct medical costs from longer ED LOS, higher number of and longer hospital inpatient admissions, and staff injuries.

➤ Using this tool, hospitals can input actual ED volume and update variables to estimate annual direct medical costs for physical restraint use in this patient population.