

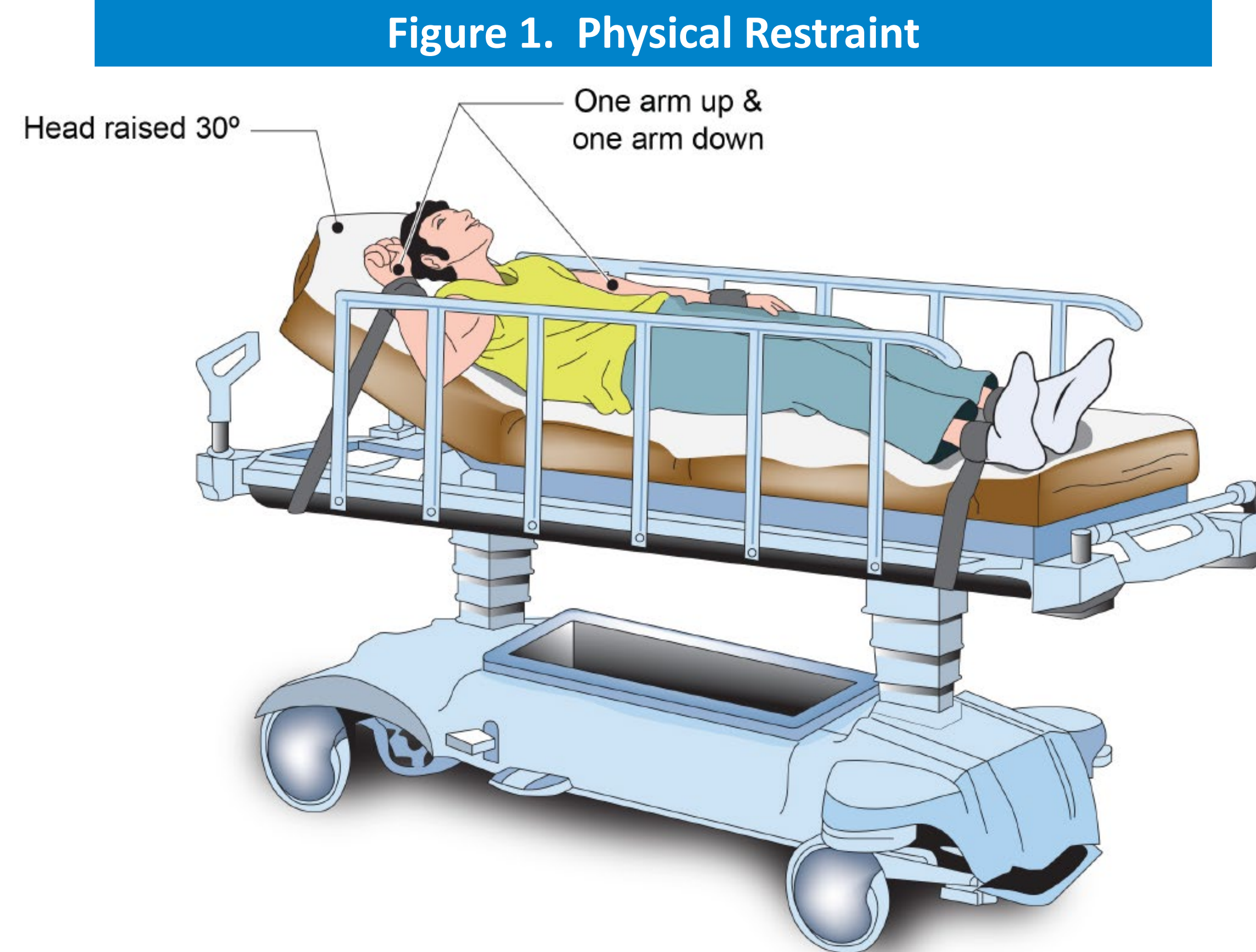
# Direct Medical Cost-Estimator Tool – Economic Burden of Physically Restrained Patients with Agitation and Bipolar Disorder in Emergency Departments



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## Introduction

- Agitation is common among patients with bipolar disorder (BPD) presenting to Emergency Departments (ED).
- Escalation of these acutely agitated patients with disruptive verbal and/or physical aggressive behaviors may result in physical restraint use (Fig 1).
- Physical restraint use in the ED while effective in immobilizing patients, can complicate effective patient therapeutic management and may result in increased direct medical costs.
- An interactive Excel tool was developed to estimate hospital direct medical costs when physically restraining patients with BPD in the ED.



## Objective

- Develop an interactive tool to estimate direct medical costs associated with physical restraint use on patients with agitation and BPD in the ED

## HCUP

Healthcare Cost and Utilization Project



## NEDS

Nationwide Emergency Department Sample

## Methods

- Data from the 2018 Healthcare Cost and Utilization Project (HCUP) Nationwide Emergency Department Sample (NEDS) were analyzed.
- Primary data from the HCUP analysis were combined with published data to create an editable Microsoft Excel tool to comprehensively estimate direct medical costs (Table 1).
- Key cost drivers were included in the analysis to determine per patient hospital direct medical costs.

## Results

- For each 100,000 patients presenting to the ED, an estimated 1,092 have agitation and BPD with 109 physically restrained (Table 2).
- Adjusted for inflation to 2021 US dollars, each 100,000 patients presenting to the ED incurred estimated direct medical costs of:
  - \$129,401 or \$1,185 per patient as:
    - \$29,353 – additional ED hours
      - 4.2 hours per patient
    - \$64,180 – excess inpatient admission
      - 8% higher admissions
    - \$10,115 – longer inpatient stays (1.45 longer inpatient stay)
    - \$25,754 – staff injuries
      - 22% of restraints causing injury
- Hospitals can input actual ED volume and update variables to estimate annual direct medical costs for physical restraint use in this patient population.

Table 1. Data Input Variables with Source References

Variable	2021 Value	Source
Annual ED Volume	100,000	Assumption
% Related to Bipolar Disorder	2.1%	HCUP NEDS/NIS
% related to agitation	52.0%	Boudreaux 2009
% requiring restraints	10.0%	Boudreaux 2009
Additional ED LOS	4.2 hours	Weiss 2012
Personnel costs per patient bed-hour*	\$64	Schreyer 2017
Additional % hospitalized	8.0%	Weiss 2012
Bipolar Disorder w Agitation Inpatient LOS	9.2 days	HCUP NEDS/NIS
Bipolar Disorder average inpatient cost*	\$7,311	HCUPnet 2018
Additional Inpatient LOS	1.45 days	Compton 2006
Daily psychiatric costs	\$795	Calculated
Proportion resulting in staff injuries	22.0%	Stewart 2009
Average cost per staff injury*	\$1,072	Speroni 2014

\*Input costs were adjusted to 2021 US dollars using the medical care component of the Consumer Price Index

Table 2. Cost Estimates Adjusted for Inflation

Intermediate Calculations	Yearly
<b>Epidemiology</b>	
ED Volume	100,000
BPD-related ED volume	2100
Agitation-related ED volume	1092
# agitation-related ED visits requiring restraint use	109
# excess hospitalization associated with restraint use	8.8
# staff with injury (assuming 1 injured staff per event)	24.0
<b>ED LOS</b>	
Total yearly additional ED hours	459
Total yearly additional personnel costs for increased ED LOS	\$29,353
<b>Hospitalization</b>	
Yearly excess hospitalization cost	\$64,180
Yearly excess cost due to increased inpatient LOS	\$10,115
Total yearly excess hospitalization cost	\$74,295
<b>Staff Injuries</b>	
Yearly cost of staff injury	\$25,754
<b>Total Costs</b>	
Annual Costs to Institution with ED volume of 100,000	\$129,401
Cost per BPD patient	\$62
Cost per agitated BPD patient	\$118
Cost per restrained BPD patient (with agitation)	\$1,185

## Key Points

- NEDS data from 2018 were combined with published data for this interactive tool.
- Hospitals can estimate annual direct medical costs related to ED physical restraint use on patients with agitation and BPD.
- Physically restraining patients escalating to aggression and violence results in higher hospital direct medical costs from:
  - Longer ED LOS
  - Higher number of inpatient admissions
  - Longer inpatient LOS
  - Increased staff injuries.
- \$1,185 per patient direct medical costs are incurred for these patients physically restrained in the ED.
- This cost-estimator tool can assist hospitals to assess the financial impact of physically restraining patients in the ED with agitation and BPD.
- Alternate treatment strategies should be considered to reduce patient escalation to violence in the ED and correlated increased financial burden.

