BURDEN OF HOSPITAL-ACQUIRED PRESSURE INJURIES (HAPIS) AMONGST HIGH-RISK HOSPITALIZED PATIENTS: A REAL-WORLD ANALYSIS

POSTER #4117

Justin Gray, MS, MBA[1], Rafael Squitieri, MD[2], Linda Seaman, MSN, RN[2], Rachel Schwingler, MHA[2], Chaitanya Badwe, PhD[3], Pruthviraj Shivanna, BS[4], Chantal Branco, DNP, RN, BS, CCRN, NEA-BC[5]

[1]Northwestern Memorial Hospital, Chicago, IL, USA, [2]TurnCare, Palo Alto, CA, USA, [3]Definitive Healthcare, Framingham, MA, USA, [4]Definitive Healthcare, Bengaluru, Karnataka, India, [5]Lehigh Valley Health Network/Jefferson Health, Bethlehem, PA, USA.

INTRODUCTION

Hospital-acquired pressure injuries (HAPIs) remain a significant source of preventable harm in hospitalized patients and are associated with increased resource utilization, worse clinical outcomes, and substantial financial burden.[1,2] Critically ill populations, including those with limited mobility and mechanical ventilation (MV), are particularly vulnerable due to sustained pressure, impaired perfusion, and physiologic instability.[3,4]

Beyond localized tissue damage, HAPIs have been associated with systemic complications, including increased infection risk, prolonged hospitalization, and increased healthcare utilization.[5] In the context of value-based care, quantifying the real-world burden of HAPIs across clinical and economic outcomes is essential to support prevention strategies and improve patient outcomes.

This study addresses this gap by quantifying the real-world clinical and economic impact of HAPIs across key outcomes, including length of stay, readmissions, ventilator-associated pneumonia (VAP), and costs, using a large national claims dataset.

METHODS

This retrospective cohort analysis used 2023 data from the Definitive Healthcare Atlas All Payor Claims database. High-risk hospitalized patients were identified using diagnosis related groups (DRGs) commonly associated with elevated risk of pressure injury development.

Patients were stratified into two cohorts: those who developed a HAPI during hospitalization and those who did not.

Outcomes assessed over a 12-month follow up period included:

- Hospital and ICU length of stay (LOS)
- 30-day readmission rates
- Incidence of ventilator-associated pneumonia (VAP)
- Cost per admission and annual healthcare costs

Statistical comparisons between cohorts were conducted for all outcomes. Differences in LOS and cost were evaluated using ratios of means (RoMs) with standard errors estimated on the log scale. Relative risks (RR) were calculated for 30-day readmissions and VAP incidence. Statistical significance was assessed across all endpoints.

- 55%/45% of patients were female/male
- 23% aged 19-65, 48% aged 65-80, and 29% aged >80.
- Top 3 comorbidities were metabolic disorders, hypertensive diseases, and symptoms involving circulatory and respiratory systems.

RESULTS

A total of 168,067 high-risk patients were identified, of whom 4.8% developed a HAPI during hospitalization. DRGs with the highest HAPI rates included DRG 870 (septicemia w/ MV), DRG 239 (ECMO w/ MV), and DRG 871 (septicemia wo/ MV) (Figure 1).

Patients who developed HAPIs experienced consistently worse clinical and economic outcomes. Hospital LOS increased by more than 2 days, while ICU LOS nearly doubled among patients with HAPIs. Thirty-day readmissions were 1.4x higher, and VAP incidence was approximately 6x higher, indicating substantially greater infectious complications.

Healthcare costs were also markedly higher in the HAPI cohort, with admission and annual costs nearly doubling. Annual costs exceeded $100,000 more per patient, while ECMO patients experienced admission cost increases of more than $400,000. All differences were statistically significant.

HAPIS ARE ASSOCIATED WITH +2.1 DAYS IN HOSPITAL LOS, +5.82 DAYS IN ICU LOS, 1.4X READMISSIONS, 7X HIGHER VAP RISK, AND >$100K INCREASE IN ADMISSION COST

POSTER PRESENTED AT ISPOR SUMMIT, MAY 17-20, 2026, PHILADELPHIA, U.S.

Table 1. Comparison of Clinical and Economic Outcomes in Patients With and Without HAPIs.

Outcome	HAPI (n=8,080)	No HAPI (n=159,987)	Effect* (95% CI)	p-value
Length of hospital stay (days)	9.22	7.08	RoM = 1.3 (1.26-1.35)	<0.001
Length of ICU stay (days)	11.99	6.17	RoM = 1.94 (1.88-2.00)	<0.001
30-day readmission rate	47.70%	33.20%	RR = 1.43 (1.40-1.47)	<0.001
VAP rate	1.90%	0.30%	RR = 7.47 (6.22-8.97)	<0.001
Cost per admission	$222,488	$118,506	RoM = 1.88 (1.77-1.99)	<0.001
Cost per patient (1-year)	$234,439	$133,630	RoM = 1.75 (1.66-1.86)	<0.001

*MV = MECHANICAL VENTILATION, ROM = RATIO OF MEANS, RR = RELATIVE RISK

Table 2. DRG Level Outcomes in Patients With and Without HAPIs

	TRANSPLANT		ECMO		SEPTICEMIA		CARDIOLOGY**	
	HAPI	No HAPI	HAPI	No HAPI	HAPI	No HAPI	HAPI	No HAPI
Sample size	63	2,237	239	1,247	6,420	92,556	1,192	63,215
Hospital LOS	42.76	19.84	49.00	31.06	7.54	4.81	6.99	3.72
Difference (%)	22.92 (115%)		17.94 (58%)		2.73 (57%)		3.27 (88%)	
ICU LOS	43.79	19.72	49.00	30.84	9.40	4.50	8.98	3.26
Difference (%)	24.07 (122%)		18.16 (59%)		4.91 (109%)		5.72 (176%)	
30-Day Readmissions	44	1,146	178	782	3,087	31,010	616	24,942
Rate (%)	69.84%	51.23%	74.48%	62.71%	48.08%	33.50%	51.68%	39.46%
Relative Risk	1.4		1.2		1.4		1.3	
VAP Cases	10	43	49	195	8	29	77	147
Rate (%)	15.87%	1.92%	20.50%	15.64%	0.12%	0.03%	6.46%	0.23%
Relative Risk	8.3		1.3		4.0		27.8	
Cost / Admission ($)	1,611,709	1,380,113	2,110,317	1,671,977	162,307	108,469	127,951	68,368
Difference (%)	231,596 (17%)		438,340 (26%)		53,838 (50%)		59,583 (87%)	
Annual Cost / Pt ($)	1,611,709	1,388,345	2,110,317	1,684,045	171,135	115,858	130,955	78,046
Difference (%)	223,364 (16%)		426,273 (25%)		55,277 (48%)		52,909 (68%)	

**Heart Failure/ Cardiac Arrest

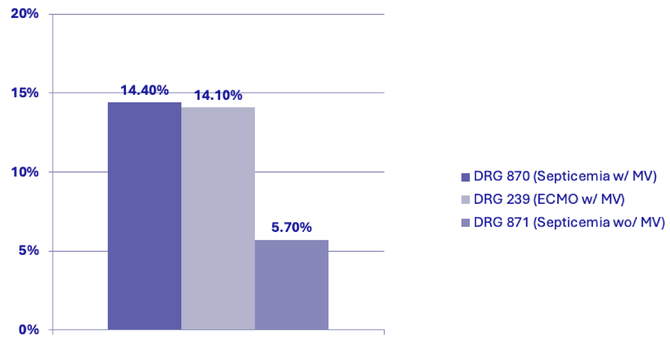

Figure 1. Included DRGs with highest HAPI rates.

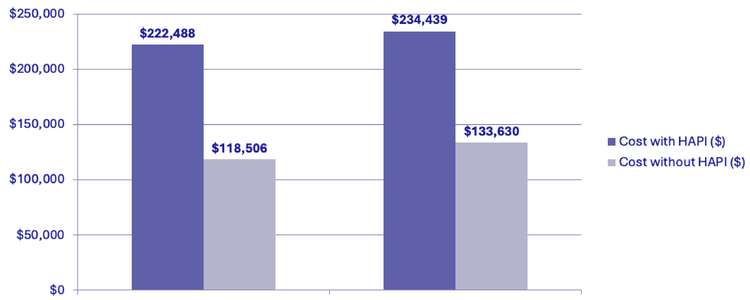

Figure 2. Total cost per hospital admission and cost per patient 1-year after index admission.

DISCUSSION

These findings are consistent with prior literature linking pressure injury development to immobility, impaired perfusion, and systemic inflammation in critically ill populations.[3–4,6] The observed increase in VAP risk further supports that HAPIs may reflect broader complications beyond localized skin injury and overall patient severity.[7]

Observed cost differences exceeding $100,000 per patient highlight the substantial economic burden of HAPI events and reinforce the importance of effective prevention strategies.[1,2,8]

Limitations: Observational analysis of unmatched cohorts; results may be influenced by residual confounding, though the large sample size supports statistical significance of findings.

CONCLUSION

Hospital-acquired pressure injuries are associated with significantly worse clinical outcomes, including increased length of stay, higher 30-day readmissions, elevated risk of VAP, and substantially higher healthcare costs.

These findings demonstrate the clinical and economic importance of HAPI prevention and highlight a meaningful opportunity to improve outcomes while reducing healthcare resource utilization. Importantly, they also underscore the need for novel strategies to prevent HAPIs among high-risk patients.

REFERENCES
1. Padula WV, Delarmente BA. The national cost of hospital acquired pressure injuries in the United States. Int Wound J.
2. Agency for Healthcare Research and Quality (AHRQ). Pressure injury prevention in hospitals.
3. Peirce SM, Skalak TC, Rodeheaver GT. Ischemia reperfusion injury in pressure ulcer formation. Wound Repair Regen.
4. Gefen A. The biomechanics of pressure injury development. J Tissue Viability.
5. Lyder CH. Pressure ulcers as a patient safety indicator. JAMA.
6. Brem H et al. High cost and morbidity of advanced pressure ulcers. Am J Surg.
7. National Pressure Injury Advisory Panel (NPIAP). Unavoidable pressure injury during COVID 19 pandemic.
8. Seaman L et al. Use of advanced support surfaces in critically ill patients during COVID 19. White paper.

CONTACT
Rachel Schwingler
TurnCare
Email: rschwingler@turncare.com
Website: https://www.turncare.com