

# Healthcare Resource Utilization and Costs of Care among Pediatric Patients with Thermal Burns Undergoing Inpatient Autografting in a US Managed Care Population

The economic burden of thermal burn patients who underwent inpatient autografting was substantial in the first year after admission for inpatient autografting

- The major cost driver during the first year was the cost of the index hospitalization with autografting.
- Burn-related healthcare resource utilization (HCRU) and cost reduced considerably in the second year post-index.

## Data Source/Population

- We identified 65 pediatric patients who underwent the first inpatient autografting for thermal burns from the HealthCore Integrated Research Database (HIRD®) between 01/01/2011 and 06/30/2016.
  - The HIRD® dataset consists of longitudinal pharmacy and medical-claims data associated with a large US commercial health plan of more than 45 million enrollees at the time of the study.
- Patient demographics, clinical characteristics, HCRU, and total costs were assessed at baseline, first-year, and second-year post index date.
  - The first admission date was assigned as the index date; 12-month pre- (baseline) and 24-month post-index-date continuous enrollment were required.

## Results

Table 1. Patient demographics

	Baseline	1st year
Age on index date (years), mean (SD)	7.2	5.19
Age categories, n (%)		
0-5	30	46.2%
6-17	35	53.8%
Male, n (%)	45	69.2%
Residence region, n (%)		
Northeast + Midwest	21	32.3%
South <sup>1</sup>	25	38.5%
West	19	29.2%
Plan type, n (%)		
Health Maintenance Organization, HMO	17	26.2%
Provider Preferred Organization, PPO	34	52.3%
Consumer Driven Health Products, CDHP	14	21.5%

<sup>1</sup> May include other regions (Armed Forces Americas, Armed Forces, Armed Forces Pacific, American Samoa, Federated States of Micronesia, Guam, Marshall Islands, Northern Mariana Islands, Northwest Territories, Nunavut, Puerto Rico, Palau, Virgin Islands, and Canadian provinces)

## Burn-Related Clinical Characteristics

- The majority of burn sites were in upper limbs (64.6%) and lower limbs (52.3%), followed by trunk (41.5%) and eye, face, head, and neck (24.6%).
- Over 80.0% of patients had third or deep third degree burns; 60% had total body surface area (TBSA) < 10% of any degree burn, and only a few patients (≤ 10) had TBSA ≥ 30%.

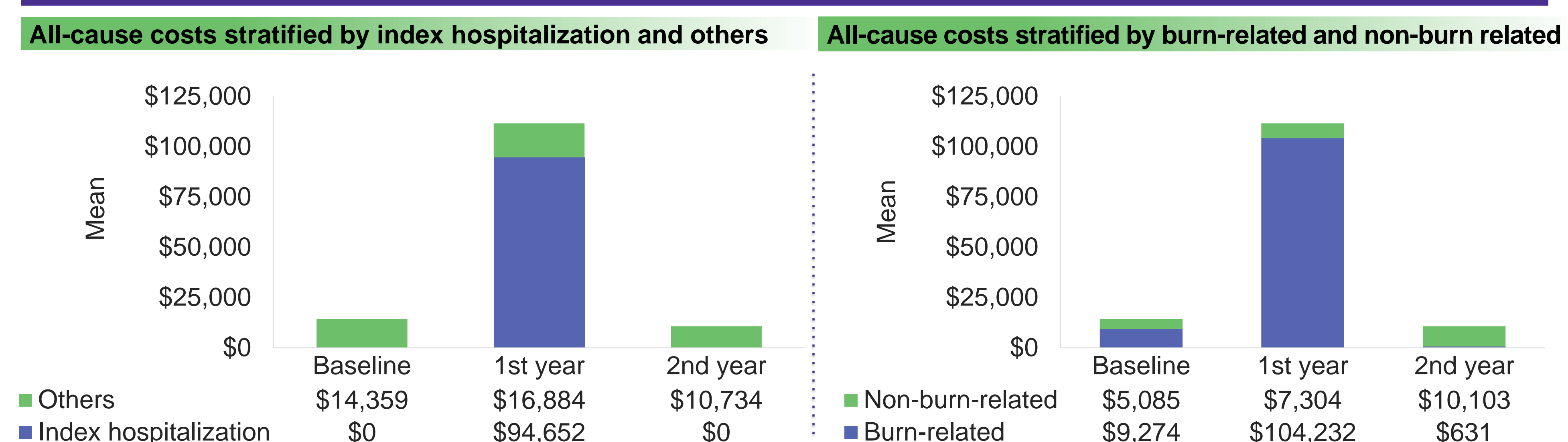
Table 2. Index hospitalization treatment patterns

	Baseline	1st year
Length of stay (days), mean (SD)	10.9	10.72
Burn injury care treatment, n (%)		
Debridement of wound, infection or burn	59	90.8%
Traction, splints, and other wound care	≤10	≤15.4%
Physical therapy <sup>1</sup>	41	63.1%
Occupational therapy <sup>1</sup>	35	53.8%
Psychotherapy	≤10	≤15.4%
Respiratory intubation and mechanical ventilation	≤10	≤15.4%
Medications of interest at discharge, n (%)		
Opioid analgesics	40	61.5%
Anxiolytics	≤10	≤15.4%
Antidepressants	≤10	≤15.4%
Antibiotics	≤10	≤15.4%
Gabapentin/Pregabalin	≤10	≤15.4%
Antihistamines <sup>2</sup>	≤10	≤15.4%
Naltrexone	0	0.0%
Hypnotics	0	0.0%

<sup>1</sup> Physical therapy and occupational therapy are identified by ICD, CPT, or revenue codes, which can be found in both inpatient and outpatient settings. <sup>2</sup> These medications are likely to be underestimated as they are also available over the counter.

- It is known that donor site availability and morbidity associated with skin harvest for autograft are major concerns among this vulnerable population.
- Given the substantial burden, innovations in burn care are needed to focus on improving clinical and economic outcomes among patients with thermal burns.

Figure 1. Total all-cause costs at baseline, first year, and second year



Costs were adjusted to 2017 dollars using 2017 medical care price index information provided by the Bureau of Labor Statistics.

Table 3. Healthcare resource utilization during baseline, first year, and second year

Healthcare Utilization	Baseline		First year		Second year	
	N	%	N	%	N	%
<b>All cause</b>						
≥1 medical services visit <sup>1</sup>						
Inpatient admission	15	23.1%	≤10	≤15.4%	≤10	≤15.4%
Emergency room visits	23	35.4%	12	18.5%	11	16.9%
Physician office visits	59	90.8%	65	100.0%	60	92.3%
<i>Number of visits, mean (SD)</i>	6.0	4.13	9.2	6.34	6.3	4.28
Other outpatient services	59	90.8%	65	100.0%	58	89.2%
≥1 pharmacy prescription fills	50	76.9%	61	93.8%	49	75.4%
<i>Number of prescription fills, mean (SD)</i>	7.0	14.09	7.4	11.45	6.7	9.83
<b>Burn-related</b>						
≥1 medical services visit <sup>1</sup>						
Inpatient admission	13	20.0%	≤10	≤15.4%	0	0.0%
Emergency room visits	≤10	≤15.4%	0	0.0%	0	0.0%
Physician office visits	20	30.8%	54	83.1%	19	29.2%
<i>Number of visits, mean (SD)</i>	2.2	1.9	5.0	4.76	2.0	1.1
Other outpatient services	17	26.2%	58	89.2%	19	29.2%
≥1 pharmacy prescription fills	40	61.5%	56	86.2%	40	61.5%
<i>Number of prescription fills, mean (SD)</i>	3.9	4.8	3.9	3.7	3.1	3.1
<b>Post-burn injury treatment<sup>1</sup></b>						
Any skin graft/skin substitute procedures	-	-	11	16.9%	≤10	≤15.4%
Debridement of wound, infection, or burn	-	-	35	53.8%	≤10	≤15.4%
Traction, splints, and other wound care	-	-	≤10	≤15.4%	≤10	≤15.4%
Laser treatment	-	-	≤10	≤15.4%	≤10	≤15.4%
Physical therapy <sup>2</sup>	-	-	39	60.0%	≤10	≤15.4%
Occupational therapy <sup>2</sup>	-	-	38	58.5%	11	16.9%
Psychotherapy	-	-	≤10	≤15.4%	≤10	≤15.4%
<b>Medication of interest</b>						
Opioid analgesics	-	-	44	67.7%	≤10	≤15.4%
Anxiolytics	-	-	12	18.5%	≤10	≤15.4%
Antidepressants	-	-	≤10	≤15.4%	≤10	≤15.4%
Antibiotics	-	-	32	49.2%	35	53.8%
Gabapentin/Pregabalin	-	-	≤10	≤15.4%	0	0.0%
Antihistamines <sup>3</sup>	-	-	≤10	≤15.4%	≤10	≤15.4%
Naltrexone	-	-	0	0.0%	0	0.0%
Hypnotics	-	-	≤10	≤15.4%	≤10	≤15.4%

<sup>1</sup> First year healthcare utilization excludes index hospitalization. <sup>2</sup> Physical therapy and occupational therapy are identified by international classification of disease, current procedural terminology, or revenue codes, which can be found in both inpatient and outpatient settings. <sup>3</sup> These medications are likely to be underestimated as they are also available over the counter. Note: Data refer to No. (%) unless indicated otherwise.

## Lessons Learned

- Although we identified % TBSA burned using ICD-9/10-CM diagnosis codes, we were not able to identify % TBSA grafted or % TBSA harvested using claims.
- HCRU and costs were estimated from the perspective of the healthcare system only; therefore, we underestimate any indirect costs from a societal perspective (e.g., quality of life, loss of productivity).

## Co-Authors and Affiliations

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