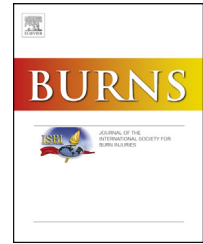


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Epidemiology and outcomes of pediatric burns over 35 years at Parkland Hospital[☆]



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ABSTRACT

Background: Since opening its doors in 1962, the Parkland Burn Center has played an important role in improving the care of burned children through basic and clinical research while also sponsoring community prevention programs. The aim of our study was to retrospectively analyze the characteristics and outcomes of pediatric burns at a single institution over 35 years.

Study design: The institutional burn database, which contains data from January 1974 until August 2010, was retrospectively reviewed. Patients older than 18 years of age were excluded. Patient age, cause of burn, total body surface area (TBSA), depth of burn, and patient outcomes were collected. Demographics were compared with regional census data.

Results: Over 35 years, 5748 pediatric patients were admitted with a thermal injury. Males comprised roughly two-thirds (66.2%) of admissions. Although the annual admission rate has risen, the incidence of pediatric burn admissions, particularly among Hispanic and African American children has declined. The most common causes of admission were scald (42%), flame (29%), and contact burns (10%). Both the median length of hospitalization and burn size have decreased over time ($r^2 = 0.75$ and 0.62 , respectively). Mortality was significantly correlated with inhalation injury, size of burn, and history of abuse. It was negatively correlated with year of admission.

Conclusions: Over 35 years in North Texas, the median burn size and incidence of pediatric burn admissions has decreased. Concomitantly, length of stay and mortality have also decreased.

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Under the guidance of Dr. Charles Baxter, the Parkland Burn Center in Dallas, Texas, opened in 1962 as the regional burn center for adults and children of North Texas. The Parkland Burn Center served as a proving ground for

Dr. Baxter's burn resuscitation formula and remains at the forefront of burn care today [1]. During his years leading the Parkland Burn Center, Dr. Gary Purdue established a database to collect patient demographics, details of each

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Abbreviations: TBSA, total body surface area; LOS, length of stay; CPS, Child Protective Services; IQR, interquartile range; OR, odds ratio; CI, confidence interval.

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injury, patient treatments, and outcomes. This database was retrospectively collected for data from 1974 until 1983 and then prospectively maintained from 1983 until 2010. This database presents an opportunity to evaluate the changing epidemiology and outcomes of pediatric burns in the North Texas region over a 35-year period.

1. Methods

Following Institutional Review Board approval, the Parkland Burn Center database was queried for all data points. During the study period, 17,125 patients were admitted to the Parkland Burn Center. For this investigation, only patients aged 18 or younger were included ($n = 5959$). The majority of analyses were performed on the subset of patients admitted for new thermal injuries including inhalation injury with or without cutaneous burn ($n = 5748$). This subset will be referred to as the “burn admissions.” The data collected included patient gender, age, race/ethnicity, Texas resident status, details regarding the mechanism of injury, percent total body surface area (TBSA) burn, physician documentation of inhalation injury, length of stay, referral to Texas Child Protective Services (CPS), details of discharge, and in-hospital as well as outpatient mortality. Admissions were divided into short stay (1–2 days) and standard stay (>2 days). Prior to analysis, any missing, inconsistent, and out-of-range data points were corrected from free text comments or the medical record where possible. Less than 1% of all data points were missing or unknown after 1978. Between 1974 and 1978, the cause of injury was missing in 25% of admissions and discharge status was missing in 12%. The in-state burn patients were compared to the North Texas population. Census and demographic information from 1990 to 2009 was obtained on-line from the Texas Department of State Health Services [2].

The incidence of burn admission was calculated as the number of events among patients identified as Texas residents

per 100,000 of the relevant population per year. Mortality analysis was performed on all burn admissions, with a second analysis on burn admissions with in-hospital mortality after 24 h of admission. The revised Baux score (rBaux) was used to model risk of mortality and compare outcomes over the 35 years ($rBaux = age + TBSA\% + 17 \times \text{inhalation injury}$) [3,4]. Statistical analysis was performed using Chi-square, ANOVA, linear regression, and multivariable logistic regression where appropriate. Microsoft Excel™ (2010), Systat SigmaPlot® (12.5), and SPSS PASW® Statistics (17) were used in this analysis.

2. Results

Between January 1974 and August 2010, 5959 patients aged 18 years or younger were admitted to the Parkland Burn Center. Over 96% ($n = 5748$) of admissions were due to a thermal injury. The majority of burned children (98.6%) resided in Texas ($n = 5668$). Based on this population, the incidence of burns in our catchment area peaked in 1979 and has steadily decreased since the 1980s ($r^2 = 0.51$); although we did note a smaller secondary peak in the 1990s (Fig. 1). The average size of burns has also been decreasing over time; the median and 75th percentile of burn size have significantly decreased over the 35 years ($r^2 = 0.41$ and 0.62 , respectively). Concomitantly, the overall median length of hospitalization has been decreasing over time ($r^2 = 0.75$) (Fig. 2). When the length of stay (LOS) was controlled for TBSA burn (excluding deaths), median LOS significantly decreased from 1.5 days per TBSA (0.9, 3.4 [IQR]) in 1976 to 0.5 days per TBSA (0.25, 1 [IQR]) in 2010 ($r^2 = 0.77$) (Fig. 3). The proportion of children who are managed during a short stay admission (1–2 days) increased from less than 10% of admissions in the 1970s to 50% of admissions in the 2000s ($r^2 = 0.79$) (Fig. 1).

The most common mechanisms of injury were scald (42%), flame (29%), and contact burns (10%). Between 1979 and 2010, there was no significant trend in the cause of all admissions to

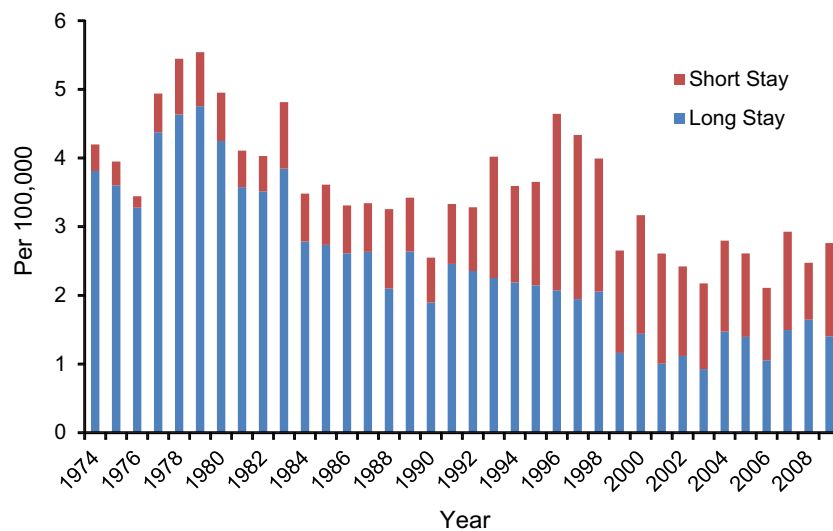


Fig. 1 – North Texas incidence of burn admissions per 100,000 over time. Short stay is defined as 1–2 days in the hospital. There was a decrease in burn admissions over time and an increase in short stays over time ($r^2 = 0.51$ and 0.79 , respectively).

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