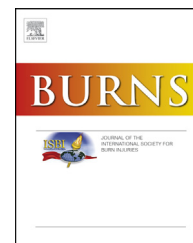


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# Burns in a major burns center in East China from 2005 to 2014: Incidence and outcome



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## ABSTRACT

**Objective:** Information about epidemiology on burns is rare in China. The aim of this article is to describe the pattern of burns in East China during a 10-year time period.

**Method:** A retrospective data analysis was performed on all hospitalized patients to the burn center at the Changhai hospital, one of major burn centers in East China, from 2005 to 2014.

**Results:** We included 3376 patients in this study. Among them, 48.1% were from 27 provinces out of Shanghai and nearly 90% were from East China. August saw the most admissions and November saw the fewest. Spring and summer separately dominated in number of female and male patients. Children aged 2–5 and working-age adult were the most commonly treated. Home was the commonest place of injury, followed by industrial-related places, outdoors, public buildings, and vehicles or roads. Scalds remained the primary reason, followed by fire, contact burns, electricity, and chemicals. The average %TBSA of male patients was  $14.2 \pm 21.3$ , significantly different from that of female patients ( $10.4 \pm 16.9$ ). Extremities were the most vulnerable body region burned, followed by the trunk, face and hands. The average hospital length of stay in male patients was  $25.4 \pm 72.4$  days, significantly different from that of females'  $19.9 \pm 27.6$  days. The total mortality was 1.8% and the lethal area burned resulting in 50% mortality was 96.5% TBSA.

**Conclusion:** Compared with published data, these result are encouraging, which demonstrate that burn care and treatment has made significant progress. Burn clinicians should bear not only the responsibility to treat and cure burns, but also the popularization of knowledge about burn precautions and emergency treatments.

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## 1. Introduction

According to the World Health Organization, injury has caused 5.1 million global deaths in 2012, and burns ranked sixth

among all causes, leading to 5.2% of deaths [1]. Because of its high mortality and morbidity, burns are severe enough to require the whole society's attention, especially in developing countries like China. Most burns can be prevented through

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wide popularization of precautions and qualified acute care [2], which need adequate information of the epidemiological characteristics [3].

Thanks to the great work of American Burn Association, the USA has established its nation-wide burn repository and publishes a report on burn epidemiology annually for research and instruction [4]. Unfortunately, databases like that have not come into reality for a few reasons in China. The good news is that a census of all burn units has been completed [5] and one more brick has been added to the final building of China Burn Repository.

As a major burn center, Changhai hospital offers terminal burn care service open to the whole country, especially to nearby provincial level districts like Shandong, Jiangsu, Anhui, Shanghai, Zhejiang, Jiangxi and Fujian, covering approximately 800,000 square kilometers and 400 million population [6]. We analyzed 10 years of data to show unique epidemiological characteristics of burns in these areas for the first time and the expected benefits for burn prevention in this area.

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## 2. Material and methods

### 2.1. Patients

A retrospective data analysis was performed on all hospitalized patients to the burn center at the Changhai Hospital affiliated to the Second Military Medical University between 2005 and 2014.

In total, 4336 patients were admitted to the burn center through the emergency or clinic department in the period. Patients diagnosed with burn including thermal burns, electrical burns, chemical burns, radiation injury were included. Patients suffering from scars after burning for plastic surgeries and other injuries not associated with burns as well as patients with incomplete data records were excluded from this study. A total of 3376 patients met the conditions of the study.

### 2.2. Setting

The burn center, including the burn ward and the burn intensive care unit (BICU) with 67 beds in total, is one of major specialized burn centers in East China, offering terminal treatment service for all significantly burned military personnel and civilians.

### 2.3. Data collection

Clinical data on all patients admitted to the burn center were collected by resident surgeons and confirmed by attending surgeons. The data included in this study were collected through burn patients' medical records. Basic data included: gender, age, place of residence, year of admission, month of admission, and length of hospital stay (LOS). Burns-related data included: place of occurrence, etiology, burn size, burned parts of the body, inhalation injury, and mortality. This study was approved by the Changhai hospital medical ethical board.

### 2.4. Statistical analysis

Statistical significance was set at 5% and data were analyzed using IBM SPSS version 20.0 for Windows. All continuous variables were presented as Means  $\pm$  SD, and frequencies of categorical variables were in the form of percentages. Continuous variables were analyzed with the t-test or one-way analysis of variance. Categorical variables were analyzed with the chi-square test.

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## 3. Results

### 3.1. Residence distribution

As many as 1752 (51.90%) patients were from Shanghai where the burns center was located, while 1624 (48.10%) patients were from other 27 out of 34 provinces in China from 2005 to 2014, accounting for almost half of all admissions. Patients from East China, including Shandong, Jiangsu, Anhui, Shanghai, Zhejiang, Jiangxi, Fujian, totally accounted for 88.89% of all 3376 patients (See Fig. 1).

### 3.2. Month of admission

Of the whole year, August (358, 10.60%) had the most admissions and November (223, 6.61%) had the fewest. In terms of seasons, summer (June, July, and August) became the most vulnerable season for patients with 983 (29.12%) cases and autumn (September, October, and November) was the least with 718 (21.27%) admissions. However, in opposition to the whole patient group, spring (335, 29.23%) saw the most female patients and winter (445, 19.96%) saw the fewest male patients. Female admissions decreased from March (125, 10.91%) to November (57, 4.97%), touching the bottom, then increased dramatically to January (110, 9.60%). Male patients' admission pattern modeled more like the general patients', with a fluctuant increasing trend from February (130, 5.83%) to a peak in August (261, 11.70%), a huge drop from August to October (158, 7.09%), and a leveling out from October to February (130, 5.83%) (See Fig. 2).

### 3.3. Age

Age ranged from 0 to 92, and the mean age was  $33.5 \pm 22.0$  years. There was no statistical difference between female ( $34.1 \pm 24.7$ ) and male ( $33.2 \pm 20.5$ ) patients' average ages. The age distribution patterns of female, male and the whole patients appeared to be similar. Three significant peaks existed: 2–4.9 years old group (320, 9.47%), 20–29.9 years old group (556, 16.47%), and 40–49.9 years old group (595, 17.62%). Children under one-year-old (24, 0.71%), or between 5 and 8 years old (75, 2.22%) and elderly people between 70 and 80 years old (123, 3.64%) or over 80-year-old (84, 2.49%) were the least likely to be burned compared to the work age (from 20 to 60 years old) population (2083, 61.70%) and children between 1 and 5 years old (561, 16.62%). Male patients outnumbered female patients in all age groups except for over 70 years old groups. Male patients' age distribution changed more significantly than female patients' (See Fig. 3).

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