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American College of Surgeons
Health Policy Research Institute

Burn care: Are there sufficient providers and facilities?

Shiara M. Ortiz-Pujols, MD; Kristie Thompson; George F. Sheldon, MD, FACS;
Erin P. Fraher, PhD, MPP; Thomas C. Ricketts, PhD, MPH; and Bruce A. Cairns, MD, FACS

November 2011
Issue 9

Quick Facts

Approximately 450,000 burn injuries receive medical treatment each year, and roughly 3,500 people die in fire-related accidents each year.

Of the 5,795 total registered hospitals in the U.S., there are only 123 burn centers today, down from 180 in 1976.

Only 40 percent of all burn injuries are treated in a burn center.

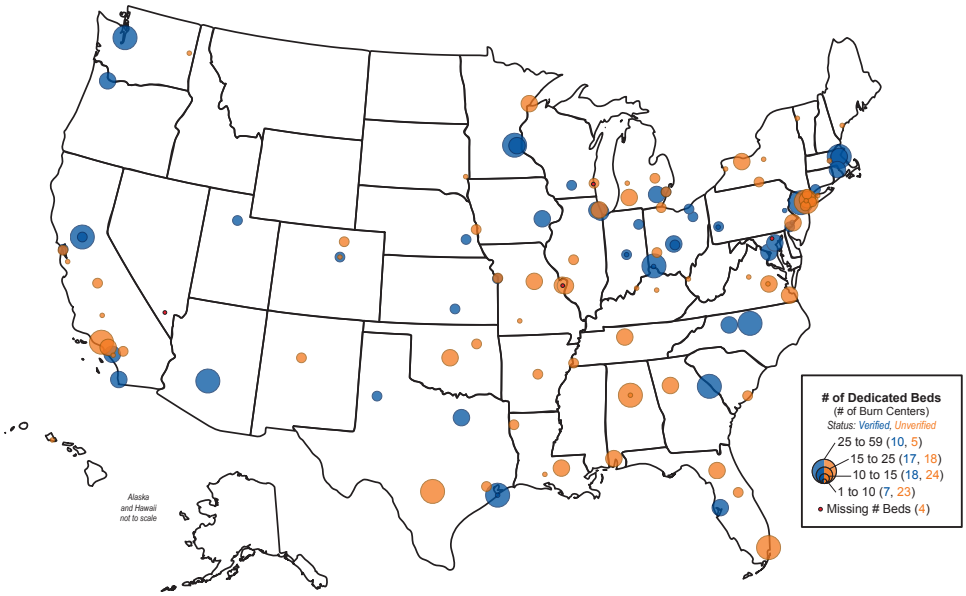
Mission Statement

The mission of the ACS Health Policy Research Institute is to improve our understanding of surgical patient care from a policy perspective in order to educate the public, federal and state governments, health care consumers, and the policy community to enable advocacy for superior, efficient, and compassionate surgical patient care. The goal of the Institute is to create a data driven, knowledge based program for examining issues related to surgical services, the surgical workforce, and public policies affecting surgery.

Fire is the fifth leading cause of unintentional injury and the third leading cause of fatal home injury in the U.S. Approximately 450,000 burn injuries receive medical treatment each year, and roughly 3,500 people die in fire-related accidents each year.[1] Burn center care, similar to medical services delivered at trauma centers, has been associated with improved survival, decreased hospital costs, and shorter lengths of hospital stay.[2, 3]

Burn centers are staffed by highly trained health professionals of various disciplines who work together to ensure the best surgical, therapeutic, functional, and psychosocial recovery for burn victims, as well as for patients with severe skin disorders. Advances in critical care, skin substitutes, reconstructive surgery, and therapy are now making it possible for patients to survive burn injuries that previously may have been fatal. Of concern to health care professionals are the following issues: there has been a steady decrease in number of burn centers over the last several decades; most burn victims are not treated in burn centers; burn discharges have remained constant since 1993; and there may be a shortage of burn surgeons in the U.S. As a first step in addressing some of these issues, this article briefly describes the number and distribution of burn centers in the U.S., and provides an explanation of the verification and referral process for burn centers.

Figure 1: Distribution of verified and unverified burn centers, 2011



Source: American Burn Association, 2010.
Notes: Burn centers are mapped to the ZIP code centroid, and include ABA/ACS verified and unverified burn centers. Four burn centers were missing number of designated burn beds.
Produced by: American College of Surgeons Health Policy Research Institute, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.

Distribution of burn centers

Of the 5,795 total registered hospitals in the U.S.,[4] there are only 123 burn centers today, down from 180 burn centers in 1976.[5] Of these burn centers, 60 are verified by the American College of Surgeons (ACS) and the American Burn Association verification criteria, and 63 are non-verified burn centers.[6] (See Figure 1, page 1.) Only 37 burn centers in the U.S. are verified to care for both adult and pediatric burn patients. For a facility to be recognized as a verified burn center, it must demonstrate competence in all aspects of patient care, from the pre-hospital setting through post-discharge rehabilitation. Centers also must have dedicated burn staff, treat a minimum number of patients per year, and maintain involvement in burn-related research.[7,8] More than 80 percent of the U.S. population lives within two hours (by ground transport) of a verified burn center.[9] Most burn patients can safely be transported via ground to a specialized burn center for their care. For those patients who may to be too unstable to travel long distances, referring facilities can work with the burn center to stabilize the patient and prepare them for a safe transfer.

To help health providers in non-burn facilities appropriately refer patients who are most likely to benefit from the multidisciplinary care offered at specialized burn centers, the ACS Committee on Trauma and the American Burn Association jointly developed burn injury referral criteria (See Table 1, page 2.)[10] Despite these criteria, only 40 percent of all burn injuries are treated in a burn center.[11] Of the burn patients seen in burn centers, more than 75 percent are treated at non-verified burn centers.[12]

Burn care teams

Burn care is dependent on an integrated, multidisciplinary team of highly trained health professionals working together in both the acute inpatient and long-term outpatient settings. (See Figure 2, above.) Burn care can be highly complex, necessitating the participation of a variety of professionals who are familiar with the unique needs of burn patients. Surgical care is just one part of the overall treatment of a burn patient, as physical and occupational therapy, nutrition, pain control, and aftercare are also key components of the long-term recovery of these patients.

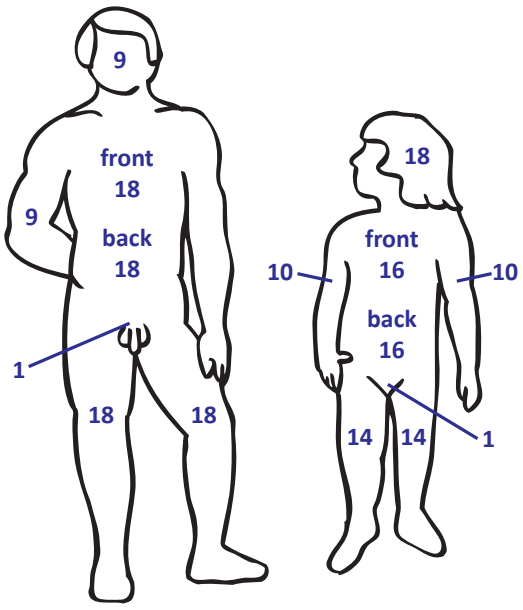
Table 1: American Burn Association referral criteria to a burn center

A burn center may treat adults, children, or both.

Burn injuries that should be referred to a burn center include the following:

1. Partial thickness burns greater than 10% total body surface area (TBSA)
2. Burns that involve the face, hands, feet, genitalia, perineum, or major joints
3. Third degree burns in any age group
4. Electrical burns, including lightning injury
5. Chemical burns
6. Inhalation injury
7. Burn injuries in patients with preexisting medical disorders that could complicate management, prolong recovery, or affect mortality
8. Any patients with burns and concomitant trauma (such as fractures) in which the burn injury poses the greatest risk of mortality and morbidity
9. Burned children in hospitals without qualified personnel or equipment for the care of children
10. Burn injury in patients who will require special social, emotional, or rehabilitative intervention

Percentage TBSA:

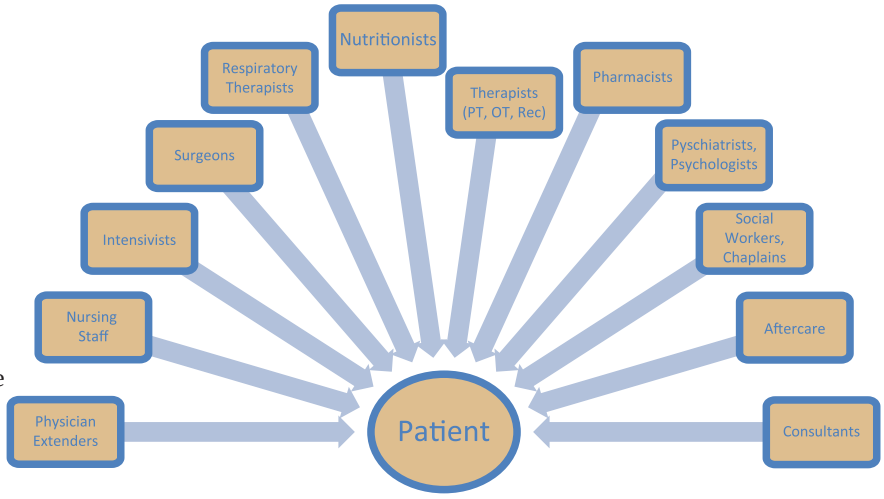


Severity Determination:

- **First degree** (partial thickness) – Superficial, red, and sometimes painful
- **Second degree** (Partial thickness) – Skin may be red, blistered, swollen. Very painful.
- **Third degree** (full thickness) – Whitish, charred or translucent, no pin prick sensation in burned area.

Looming shortage of burn surgeons

Figure 2: Burn team



Burn surgeons seem to be in short supply. The results of a survey of burn centers conducted by Faucher and colleagues, published in 2004, showed that the majority of burn centers needed, or will need, a burn surgeon in the next five years.[13] This same survey showed that of the 152 burn surgeons trained in the preceding 10 years, only 40 percent of those were currently practicing at the time of the survey, demonstrating a noticeable attrition of recent burn surgeon trainees.[13] A follow-up survey, published in 2011,[14] showed improvement in attrition rates, but also a marked decrease in the total number of new burn surgeon trainees over the past 10 years (152 in 2004 versus 21 new surgeons in 2011, as reported by surveyed burn centers).[14]

The training pathways for burn surgery vary. As such, total training time for a burn surgeon varies too, ranging from seven to 11 years. The American Board of Medical Specialties (ABMS) does not have a burn surgeon certification, so surgeons with certain training and practice may designate themselves as burn surgeons. Burn surgeons may have completed an ABMS general surgery (five years) or plastic surgery residency (5 +/- 3 years). Today, most surgeons who choose to pursue burn surgery will do a one-year non-Accreditation for Graduate Medical Education (ACGME) accredited burn fellowship in addition to an ACGME-accredited, surgical critical care fellowship. Many surgeons also will have spent some time doing research in addition to their clinical training. However, some trauma and plastic surgeons did no additional burn-specific training, but may perform burn surgery as part of their practice.

Burn admissions remain constant

Although the incidence of burns has decreased over the years, the number of burn admissions has remained relatively constant over time, with nearly 50 percent of all burn injuries occurring in the southeastern U.S., where there have been several burn center closings in recent years.[15,16] In addition to a steady number of burn admissions, burn centers also provide care for patients with extensive skin conditions, disorders, and infections, many of whom are critically ill. Studies have shown that patients with exfoliative skin disorders, such as toxic epidermal necrolysis, have better outcomes and decreased mortality when cared for in burn centers versus general hospitals.[17]

Policy implications

Fewer burn care centers and potentially fewer burn care surgeons, compounded by the need to reduce health care spending, make ensuring appropriate burn care an increasingly difficult task. More rigorous workforce analysis is needed to predict the current and future number of burn surgeons and the implications for access to care. More research also is needed on the cost and quality of patient care in verified versus non-verified burn centers and the possible implications the regionalization of U.S. burn centers may have for access to burn care. As the trauma model has evolved, studies have shown the regionalized system improved patient access and care quality and lowered costs.[18,19] Understanding the number and geographic distribution of burn centers is a first step toward determining whether regionalizing burn care might share similar benefits.

Data and methodology

This analysis is based on data from the joint verification program of the ABA and the ACS. Burn centers are mapped to the ZIP code centroid, and include both ABA/ACS-verified burn centers and unverified burn centers. (Four burn centers

were missing number of designated burn beds.) In addition, we examined burn injuries (International Classification of Diseases-9 codes: 940-949) using discharge data from the Nationwide Inpatient Sample, the Healthcare Cost and Utilization Project, and the Agency for Healthcare Research and Quality. International Classification of Diseases-10 codes will be addressed in future analysis.

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725 Martin Luther King Jr. Blvd. • CB# 7590 • Chapel Hill, NC 27599-7590

Phone: 919/966-9425 • FAX: 919/966-5764 • Email: acs-hpri@facs.org

Suggested citation: Ortiz-Pujols SM, Thompson K, Sheldon GF, et al. "Burn care: Are there sufficient providers and facilities?" Chapel Hill, North Carolina. American College of Surgeons Health Policy Research Institute, November 2011.