



**REGION 11
CHICAGO EMS SYSTEM
PROTOCOL**

Title: Burns – BLS/ALS

Section: Toxins and Environmental

Approved: EMS Medical Directors Consortium

Effective: July 10, 2024

BURNS – BLS/ALS

I. PATIENT CARE GOALS

Minimize tissue damage and patient morbidity from burns.

II. PATIENT PRESENTATION

A. Patient May Present With:

1. Airway – Stridor, hoarse voice
2. Mouth and Nares – Redness, blisters, soot, singed hairs
3. Breathing – Rapid, shallow, wheezes, rales
4. Skin – Estimate of Percentage Total Body Surface Area (TBSA) burned and depth of burn (partial vs. full thickness)
5. Associated Trauma – Blast, fall, assault

B. Inclusion Criteria

Patients sustaining thermal burns.

C. Exclusion Criteria

Electrical, chemical, and radiation burns (see Toxins and Environmental Section of the Region 11 EMS Protocols).

III. SCENE MANAGEMENT

A. Assure Crew Safety:

1. Power off
2. Electrical lines secure
3. Gas off
4. No secondary devices
5. Assess need for Hazmat response.



**REGION 11
CHICAGO EMS SYSTEM
PROTOCOL**

Title: Burns – BLS/ALS

Section: Toxins and Environmental

Approved: EMS Medical Directors Consortium

Effective: July 10, 2024

6. Proper personal protective equipment (PPE) may be required.

IV. PATIENT MANAGEMENT

A. Assessment

1. Consider circumstances of the event such as:
 - a. Related trauma in addition to the burns
 - b. Inhalation exposures such as carbon monoxide (CO) and cyanide (CN)
 - c. Pediatric or elder abuse or neglect (non-accidental burn trauma)
2. Follow ABCs (Airway, Breathing, Circulation) of resuscitation per the Adult or Pediatric Initial Assessment Protocol.
3. Assess for signs of **Inhalational Injury** of the upper and lower airway **including adequate oxygenation and ventilation or respiratory distress** and treat per the Airway Management Protocol.
 - a. Upper airway: stridor and hoarseness from mucosal edema
 - b. Lower airway: wheezing and rales from airway inflammation and edema
4. Consider spinal precautions per Spinal Care Protocol.
5. Estimate TBSA and depth of burn.
 - a. Use “Rule of Nines” (see Appendix).
 - b. ***First-degree/superficial burns (skin erythema only) are not included in TBSA calculations.***
6. Determine burn severity. Burns are classified according to depth of tissue injury and the depth of the burn largely determines the healing potential and need for surgical grafting.
 - a. **Superficial Thickness (First Degree Burns)**
 - i. Dry, red, easily blanching, sometimes painful
 - ii. Injury is superficial and limited to the top layer of the skin (epidermis)
 - iii. Example: Sunburn
 - iv. NOT counted in calculations of total burn surface area (TBSA)
 - b. **Partial Thickness (Second degree burns)**



REGION 11 CHICAGO EMS SYSTEM PROTOCOL	Title: Burns – BLS/ALS
	Section: Toxins and Environmental
	Approved: EMS Medical Directors Consortium
	Effective: July 10, 2024

- i. Skin may be red with blisters, wet and weepy, very painful with superficial injury
- ii. Skin may be dry and white, darker pink or red, less pain with deep injury
- iii. Injury to top layer of the skin (epidermis) and some of the lower layers (dermis)
- iv. Counted in calculations of total burn surface area (TBSA)

c. **Full Thickness (Third degree burns)**

- i. Dry, leathery texture
- ii. Variable color (white, brown, black)
- iii. Loss of pain sensation
- iv. Injury to all layers of the skin (epidermis and dermis)
- v. Counted in calculations of total burn surface area (TBSA)

d. **Deep (Fourth degree burns)**

- i. Injury that penetrate below the skin dermal layer and into the underlying soft tissues including fascia, muscle and/or bones
- ii. Counted in calculations of total burn surface area (TBSA)

7. Assess and monitor extremity perfusion for edema and adequate circulation.

8. Document pain scale.

B. Treatment and Interventions

1. Stop the burning.

- a. Remove wet clothing (if not stuck to the patient).
- b. Remove jewelry.
- c. Leave blisters intact.

2. Minimize burn wound contamination.

- a. Cover burns with a burn dressing or clean, dry sheet.
- b. Do not apply gels or ointments.

3. For ALS: Monitor pulse oximetry, ETCO₂ and cardiac monitor. Assess co-oximetry for Carbon Monoxide exposure.

4. Administer high flow supplemental oxygen for all burn patients rescued from an enclosed space.



**REGION 11
CHICAGO EMS SYSTEM
PROTOCOL**

Title: Burns – BLS/ALS

Section: Toxins and Environmental

Approved: EMS Medical Directors Consortium

Effective: July 10, 2024

5. For ALS: Establish IV access, avoid placement through burned skin.
6. For ALS: Consider early management of pain and nausea/vomiting.
7. For ALS: Initiate fluid resuscitation.
 - a. If the patient is in shock:
 - i. Consider other cause such as trauma or cyanide toxicity.
 - ii. Administer IV fluid.
 - b. If the patient is not in shock, begin initial fluid rates for the prehospital setting:
 - i. ≤ 5 years old: 125 ml normal saline per hour
 - ii. 6-12 years old: 250 ml normal saline per hour
 - iii. ≥ 13 years of age and older: 500 ml normal saline per hour
8. Prevent systemic heat loss and keep the patient warm.

C. Special Treatment Considerations

1. If blast mechanism, treat per Blast Injury Protocol.
2. Patients with significant **Inhalational Injury** may have respiratory distress with symptoms that rapidly progress to upper airway obstruction and respiratory failure. Apply high flow oxygen and follow Airway Management Protocol.
3. Have a high index of suspicion for cyanide poisoning in a patient with depressed GCS, respiratory difficulty, and cardiovascular collapse in the setting of an enclosed-space fire. In this circumstance, give the antidote (hydroxocobalamin), if available.
4. Particularly in enclosed-space fires, carbon monoxide toxicity is a consideration and pulse oximetry may not be accurate (see Carbon Monoxide/Smoke Inhalation Protocol).
5. For specific chemical exposures (cyanide, hydrofluoric acid, other acids, and alkali) see Topical Chemical Burn Protocol.
6. Consider decontamination and notify the receiving facility of potentially contaminated patient.



**REGION 11
CHICAGO EMS SYSTEM
PROTOCOL**

Title: Burns – BLS/ALS

Section: Toxins and Environmental

Approved: EMS Medical Directors Consortium

Effective: July 10, 2024

7. Burns that involve significant sloughing or loss of skin can result in uncontrolled heat loss. These patients should be monitored closely for the development of hypothermia and appropriate preventative measures should be taken.

D. Special Transport Considerations

A. Patients with the following criteria should preferentially be transported to a Burn Center:

1. Thermal Burns

- a. Full thickness burns
- b. Partial thickness burns with Total Body Surface Area (TBSA) 10% or more
- c. Partial or full thickness burn involving the face, hands, genitalia, feet, perineum, or over any joints
- d. Patients with burns and other comorbidities (including pre-existing medical condition)
- e. Circumferential burns

2. Inhalation injury

3. Pediatric burns (age less than 16 years old)

4. Chemical injuries

5. Electrical injuries

- a. High voltage (≥ 1000 V) electrical injuries
- b. Lightning injury

B. Patients with the following criteria should be transported to most appropriate Level 1 Trauma Center:

- a. Patients with burns and concomitant traumatic injuries

C. For situations where there concern for an impending loss of the airway or worsening clinical condition, transport patient to the closest Emergency Department. Contact Online Medical Control (OLMC) as needed for destination questions.

1. Refer to Burn Patient Destination Policy

V. NOTES/EDUCATIONAL PEARLS

- A. **Inhalational Injury**: defined as the aspiration and/or inhalation of superheated gasses, steam, hot liquids or noxious products of incomplete combustion (found in smoke). The



**REGION 11
CHICAGO EMS SYSTEM
PROTOCOL**

Title: Burns – BLS/ALS

Section: Toxins and Environmental

Approved: EMS Medical Directors Consortium

Effective: July 10, 2024

severity of injury is related to the temperature, duration, and composition of the inhaled agent(s). Inhalational injury can occur with or without a cutaneous burn. There are three types of Inhalation Injury:

- a. Systemic effects of carbon monoxide or cyanide exposure
 - b. Thermal inhalation injury of the upper airway
 - c. Chemical inhalation injury of the lower airway
- B. Onset of stridor and change in voice are sentinel signs of potentially significant inhalational injury, which may rapidly lead to airway obstruction or respiratory failure.
- C. If the patient is in shock within one hour of burn, it is not from the burn. Evaluate the patient carefully for associated trauma or cyanide toxicity.
- D. If the patient is not in shock, the fluid rates recommended above will adequately maintain patient's fluid volume.
- E. EMS should administer IV fluids for significant burns at the "initial fluid rate" based on patient age. Definitive calculation of hourly fluid rates (termed "adjusted fluid rates") occurs in the hospital.
- F. Pain management is critical in acute burns.
- G. End-tidal capnography (ETCO₂) monitoring may be particularly useful to monitor respiratory status in patients.
- H. TBSA is calculated only based on percent of second- and third-degree burns. First degree/superficial burns are not included in this calculation.
- I. It is sometimes difficult to determine the depth of burn injury early as the wound evolves.
- J. Burn depth determines the wound care required, the need for grafting, and the functional and cosmetic outcomes.

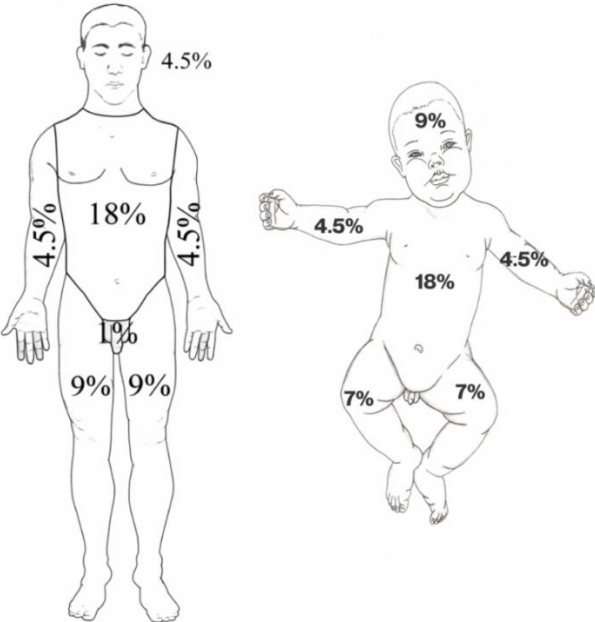


REGION 11 CHICAGO EMS SYSTEM PROTOCOL	Title: Burns – BLS/ALS
	Section: Toxins and Environmental
	Approved: EMS Medical Directors Consortium
	Effective: July 10, 2024

VI. APPENDIX

Percentage Total Body Surface Area (TBSA) – for second degree and deeper burns

“Rule of Nines” - In adults, distinct anatomic regions represent approximately 9%—or a multiple—of the Total Body Surface Area (TBSA). In the infant or child, the “Rule” deviates because of the large surface area of the child’s head and the smaller surface area of the lower extremities.



“Palmar Method” - The size of the patient’s hand—length of wrist crease to tip of longest finger and width of palm—represents approximately one percent of their total body surface area. Using this method is an easy way to determine the extent of irregularly scattered burns.



Reference: American Burn Association. (2023). *Advanced Burn Life Support*.