**Region 4 Burn Surge Annex: Guidelines**

**for the Stabilization of Burn Patients**

**for 72 Hours until Transfer to a Burn Center**

**December 2020**

## Introduction

The Western Wisconsin Hospital Emergency Readiness Coalition provides these guidelines to hospitals for the stabilization of burn patients for 72 hours or more when immediate transfer to a Burn Center is not feasible. This is due to limited burn beds available in the region, state and in border state areas. An incident such as an explosion or fire could cause a surge of patients at a local hospital(s) with delays in transferring these patients to a Burn Center due to the unavailability of burn beds at the Burn Centers.

## Region 4 Hospital Plan to Manage a Surge of Burn Patients

Although burn patients should be transferred to the appropriate Burn Center as soon as possible, the extent of the incident and the availability of burn bed resources may be limited. Thus, hospitals in the vicinity of the incident may be called upon, at least initially, to stabilize and treat these patients, until the transfer to a Burn Center is possible.

## ASPR Benchmark for Trauma and Burn Care Surge Capacity

The U.S. Department of Health and Human Services, Assistant Secretary for Preparedness and Response (ASPR) set the goal that hospitals have the capability of providing trauma and burn care, at a minimum, to at least 50 severely injured adult and pediatric patients per million of population due to a mass casualty incident. The following burn treatment capacity is recommended in each of the seven Hospital Preparedness Regions, using the ASPR recommended target formula:

|  |  |  |
| --- | --- | --- |
| **Table One: Minimum Burn Bed Capacity** | | |
| **HERC REGION** | **Population** | **Burn Capacity** |
| **1** | 584,703 | 29 |
| **2** | 475,968 | 24 |
| **3** | 480,261 | 24 |
| **4** | 279,050 | 14 |
| **5** | 1,210,545 | 61 |
| **6** | 959,420 | 48 |
| **7** | 1,864,803 | 93 |
| **State** | **5,854,750** | 293 |

Although this ratio of 50 severely injured adult and pediatric patients per million of population provides a rational basis for planning purposes, the above numbers may be considered conservative, given the limited number of Burn Centers in the State of Wisconsin and in neighboring states:

**WHEPP Region 7:** Columbia/St. Mary’s Hospital, Milwaukee **WHEPP Region 7:** Children’s Hospital of Wisconsin, Milwaukee **WHEPP Region 5:** University of Wisconsin Hospitals, Madison **Minnesota:** Hennepin Medical Center, Minneapolis

**Minnesota:** Regions Hospital, St. Paul **Illinois:** Loyola University, Chicago **Illinois:** University of Chicago, Chicago **Iowa:** University of Iowa, Iowa City

**Michigan:** University of Michigan Health System, Ann Arbor

|  |  |
| --- | --- |
| **Burn Center Contact Information** | |
| Children’s Hospital of Wisconsin | Children’s Transport and Physician Referral Center. Transport hotline # 414-266-2470 |
| Columbia/St. Mary’s Burn Center | 414-585-BURN (2876) Milwaukee Metro |
| University of Wisconsin Burn Center | 800-323-8942 |
| Hennepin Connect | 612-873-4262; 800-424-4262 |
| Regions Hospital | 800-922-2876 |
| Loyola University Medical Center | 888-584-7888 |
| University of Chicago | 888-824-0200 |
| University of Iowa | 319-356-2496 |
| University of Michigan Health System | 734-936-5738 |

Pediatric burn patients, to the extent possible, should be transferred to the above listed Burn Centers. If this is not possible, pediatric burn patients with TBSA1 >15% and < 2 years and those children with TBSA >20% and > 2 years should be sent to a hospital with a Pediatric Intensive Care Unit. The following is the list of hospitals in Wisconsin that have a Pediatric Intensive Care Unit:

**WHEPP Region 2:** Ministry Saint Joseph’s Hospital, Marshfield

**WHEPP Region 3:** St. Vincent Hospital, Green Bay

**WHEPP Region 4:** Gundersen Health, La Crosse

**WHEPP Region 5:** St. Mary’s Hospital, Madison

**WHEPP Region 5:** University of Wisconsin Hospital, Madison

**WHEPP Region 7:** Children’s Hospital of Wisconsin, Milwaukee

## Burn Care Planning Assumptions

1. The ASPR National Hospital Preparedness Program target number of 50 severely injured adult and pediatric trauma and burn patients (286 beds are needed) will easily overwhelm the Burn Centers within the State and in our border states.
2. National burn bed capacity is limited. Current plans for transport of burn patients to out-of- state Burn Centers are likely to be inadequate for a large-scale trauma and burn incident.
3. Federal resources for transport, portable facilities, burn team support and medical equipment (such as ventilators) could take anywhere from 12 hours to 7 days to arrive, or not be available at all, depending upon demand for these resources in other areas of the country.

4. Federal resources from the Strategic National Stockpile or its Managed Inventory assets to

support state Burn Centers and other hospitals could take from 12 hours to arrive, once the

Governor has made this request and the request has been approved by the federal government.

1. Hospitals at Trauma Level I and II have the resources to stabilize and treat burn patients if unable to transfer to a Burn Center.
2. Hospitals at Level III and IV also should be capable of stabilizing burn patients, if necessary, in a surge incident, especially with consultation support from the Burn Centers. However, one or two patients with severe burns may overwhelm the resources of these hospitals.

1 TBSA means Total Body Surface Area.

1. Burn Centers have plans to manage a surge of burn patients by creating additional bed capacity to existing and available burn beds.
2. Treatment of burn patients is resource intensive. Treatment of burn patients may last for weeks after the incident.
3. Burn victims, as other patients, prefer to be treated locally.
4. Hospitals usually have the supply items necessary to care for burn victims.

### Burn Treatment for a Burn Surge Incident: Flowchart

The following flowchart describes the procedures that will be implemented at hospitals in the state of Wisconsin, based on the severity of the burns and the number of victims involved.

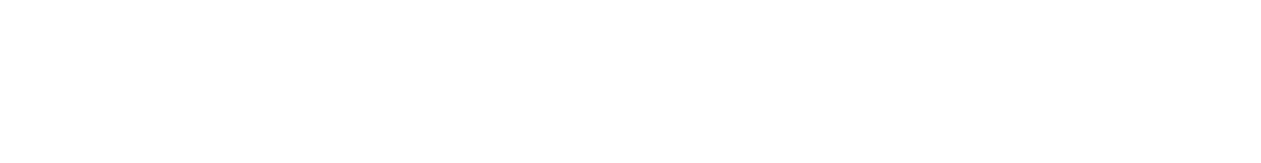
### Definitions

1. Base Hospital is defined as the hospital closest to the incident
2. Burn Center, for the purposes of this plan, include the following hospitals:
   1. University of Wisconsin Hospital, Madison
   2. Columbia/St. Mary’s Hospital, Milwaukee
   3. Children’s Hospital of Wisconsin
   4. Hennepin County Medical Center, Minneapolis, MN
   5. Regions Hospital, St. Paul, MN
   6. Loyola University Medical Center, Chicago, IL
   7. University of Chicago Burn Center, Chicago, IL
   8. University of Iowa, Iowa City, IA
   9. University of Michigan Health System, Ann Arbor, MI
3. Burn Incident is any incident that involves

* burn victims with severity of burns that cannot be managed by local hospital resources and/or
* the number of burn victims is such that this number of burn victims cannot be managed by transfer to the Burn Center(s).

***Note:*** *EMS should be familiar with local hospital resources and should be able to identify a burn incident, based on its knowledge of local hospital resources to manage a Burn Incident.*

1. Designated Hospital is the hospital that voluntarily agrees to manage the incident as requested by the Base Hospital
2. Hospital Coalition is the name for a group of hospitals, identified by the Base or Designated Hospital, as the hospitals initially contacted to assist in management of the incident. In all burn incidents, all state and border state Burn Centers, as identified in this plan, should also be alerted.
3. Medical Control is defined as the physician or designee who provides advice and direction to Emergency Medical Services who are providing medical care at the scene of an emergency or enroute to a health care facility.



**Wisconsin Hospitals**

**Burn Treatment Plan**

**Process Flow Chart – Burn Surge Incident**

**Management of Incident by Individual Hospital**

**Management of Incident by Hospital Coalition**

**Management of Incident by Burn Center Coalition**

Local EMS Establishes Field Incident Command Center (ICC) in Response to a Burn Incident

**BASE**/**DESIGNATED HOSPITAL** Liaison

Officer/Medical Control:

* Determines Regional Resource Availability via WITRAC or Telephone Call

**LEAD BURN CENTER** Accepts Patients from **BASE**/**DESIGNATED/COALITION HOSPITALS**

Representative of Each Coalition Hospital Provides Following Information to **BASE**/ **DESIGNATED HOSPITAL** Liaison Officer/ Medical Control via EMRESOURCE or Telephone Call:

* Capacity of Their Emergency Department (Using Triage Color Classifications) to Receive Patients

Can

EMS ICC Notifies **BASE HOSPITAL1**

EMS Transports Patients from **BASE**/ **DESIGNATED**/**COALITION HOSPITALS** to **LEAD BURN CENTER**

**BASE HOSPITAL**

Manage Incident?

**LEAD BURN CENTER** Contacts

**REGIONAL BURN CENTERS**

**LEAD BURN CENTER** Cares for Patients

No

Yes

Regional Partner Is Identified as

**DESIGNATED HOSPITAL2**

Can Regional Partner

Manage Incident?

Yes

No

**BASE HOSPITAL** Contacts Regional Partners

**BASE HOSPITAL** Opens ICS and Implements Emergency Burn Plan

**BASE**/**DESIGNATED HOSPITAL** Liaison

Officer/Medical Control:

* “Activates” Hospitals with Ability to Receive Burn Patients via EMRESOURCE or Telephone Call
* Notifies **COALITION HOSPITALS**

via EMRESOURCE or Telephone Call of Patients Being Transported to Their Facility (By Triage Color Classification)

* Notifies EMS ICC of Transport Decisions

EMS Transports Patients to **BASE**/ **DESIGNATED**/**COALITION HOSPITALS**

**BASE**/**DESIGNATED**/**COALITION**

**HOSPITALS** Care for Patients for Up to 72 Hours

Yes

**OTHER BURN CENTERS** “Triage”

Patients at **BASE**/**DESIGNATED/ COALITION HOSPITALS** and **LEAD BURN CENTER** 3

Can

**OTHER BURN**

**CENTERS** Accept Patients?

Yes

EMS Transports Patients from **BASE**/ **DESIGNATED/ACTIVATED HOSPITALS**

and **LEAD BURN CENTER** to Identified

**OTHER BURN CENTERS**

No

**OTHER BURN CENTERS** Care for Patients

**BASE**/**DESIGNATED HOSPITAL** Liaison

Officer/Medical Control Contacts **LEAD BURN CENTER**

**DESIGNATED HOSPITAL** Implements Emergency Burn Plan and Opens ICS

No

**BASE**/**DESIGNATED** Hospital Begins Receiving Patients.

If Necessary, **BASE**/**DESIGNATED HOSPITAL** Contacts Local Emergency Management to Request that EOC Be Opened.

**LEAD BURN CENTER** “Triages” Patients at **BASE**/**DESIGNATED/COALITION HOSPITALS**3

**LEAD BURN CENTER** Contacts **ABA** for Assistance in Identifying **OUT-OF-STATE BURN CENTERS** Capable of Receiving Patients

**BASE**/**DESIGNATED HOSPITAL**

Continues Management of Incident.

Can

**LEAD BURN CENTER**

Accept Patients?

**OUT-OF-STATE BURN CENTERS** Care

EMS Transports Patients from **BASE/ DESIGNATED/COALITION HOSPITALS,**

and **LEAD BURN CENTER** to Identified

**OUT-OF-STATE BURN CENTERS**

for Patients

**Notes**

1. **BASE HOSPITAL** is the hospital closest to an incident.
2. **DESIGNATED HOSPITAL** is the hospital that voluntarily chooses to manage an incident.
3. The triaging of patients is a dynamic process that repeats itself until all critical burn patients are being cared for in a certified burn center.

## Management of the Burn Incident by an Individual Hospital

1. The first agency on scene (EMS, fire, law enforcement) establishes the field Incident Command Center (ICC) in response to the Burn Incident (see definition). Based on the nature of the incident and the number of victims involved, the field Incident Commander may request the activation of the local Emergency Operations Center (EOC).
2. EMS follows State of Wisconsin Trauma Field Triage Guidelines. If the State of Wisconsin Trauma Field Triage Guidelines cannot be followed because of the nature of the burn incident, then EMS in the field should triage the burn victims by the triage colors of RED, YELLOW, GREEN, and BLACK, according to standard triage procedures.
3. The field Incident Commander is to notify the Base Hospital that a burn incident has occurred and give an estimate of the number of victims involved.
4. If Medical Control at the Base Hospital decides that the Base Hospital can manage the incident, then no further hospitals, other than the Burn Center, may need to be involved. The Base Hospital will activate, as necessary, its Emergency Operations Plan and Incident Command System, stabilize the burn victim(s), contact the appropriate Burn Center and then follow the instructions of the Burn Center for which patients should be transferred.

## Management of the Burn Incident by a Hospital Coalition

1. If Medical Control at the Base Hospital believes that it cannot manage the incident by itself, then the Base Hospital, through its Liaison Officer, should alert other hospitals through EMResource that it is in need of assistance to manage the incident. The alert to coalition hospitals should also involve state and border state Burn Centers, as identified in this plan, as appropriate.

***Note****: Use of EMResource does not preclude the use of other communication methods. EMResource, however, can reach many facilities at the same time, provide real time data and has other functions, such as Command Center, that could be used to manage the incident.*

1. If the Base Hospital cannot serve as the Designated Hospital (the hospital that manages the incident), then the Base Hospital should identify another hospital that can serve as the Designated Hospital.
2. The Designated Hospital should then, to the extent possible, communicate to the Liaison Officer at the field Incident Command Center
   1. the names of the hospitals in the coalition that are prepared to receive victims and
   2. the number of patients by triage designation that can be accepted by each hospital
   3. the names of the Burn Centers that have been notified.
3. The field Command Center (EMS Transportation Group Supervisor) should have only one hospital with which to communicate.
4. All hospitals in the coalition will activate, as necessary, its Emergency Operations Plan and Incident Command System.
   1. Upon activation of the Hospital Command Center, each hospital in the Coalition is to send an up-date through EMResource that it has been activated and is prepared to receive the burn victim(s).
   2. Each coalition hospital should also post on EMResource, under MCI Patient Capacity, the number of burn victims it can receive by color category: RED, YELLOW, GREEN, BLACK2. The number of triage-color patients that the hospitals can accept will assist Medical Control and EMS Transport Group Supervisor in the determination of destination hospitals.
   3. The coalition hospitals may contact the Burn Centers for treatment information. If digital images of burn wounds are sent to Burn Centers for consultation, the standard procedures for de-identifying information to be in compliance with HIPAA are to be followed.
5. Medical Control at the Base or Designated Hospital will, to the extent possible, assist the EMS Transport Group Supervisor3 in the triage of patients to the hospitals in the coalition.
   1. Medical Control will use his/her knowledge of the capabilities of coalition hospitals to manage the transport of RED, YELLOW, GREEN, BLACK burn patients to the appropriate coalition hospitals.
   2. Medical Control notifies each coalition hospital of the number and triage color of the burn victims it may receive.
   3. The Hospital Command Center of the coalition hospital will advise Medical Control of the Base or Designated Hospital of their capability to accept burn victims.

***Note****: These above procedures are based on those patients being transported from the field. The coalition hospital(s) may need to divert patients to other coalition hospitals based on the number of burn victims who self-present to the hospital.*

## Management of the Burn Incident by the “Lead” Burn Center

***Note: In this phase, it is assumed that all patients have been transported from the field to coalition hospitals and to Burn Centers.***

1. The Burn Center closest to the incident shall be considered the “lead” unless otherwise specified by a decision among the Burn Centers.
2. The coalition hospitals, to the extent that communications permit, shall work with the “Lead” Burn Center to help the triage and transport of burn victims to the appropriate Burn Centers from the coalition hospitals.
3. The “Lead” Burn Center will communicate with the other appropriate Burn Centers.
4. The “Lead” Burn Center will communicate with coalition hospitals and provide an estimate of the number of hours/days that the hospitals may need to care for treat the burn victims until transport and transfer to a Burn Center can be arranged.

2 BLACK refers to expectant – patients that may not survive.

3 It is recognized that field to hospital communications may not be possible in all areas. In these areas, EMS usually has a plan on how to get messages to their destination hospitals.

## Management of the Burn Incident by the “Lead” Burn Center in Collaboration with the American Burn Association

1. The “Lead” Burn Center will contact the American Burn Association if state and border state Burn Centers do not have the capacity to manage the number of burn victims, resulting from the incident.
2. The American Burn Association will provide directives to the “Lead” Burn Center about out-of- state burn bed availability and when these out-of-state Burn Centers can receive these burn victims.
3. The “Lead” Burn Center, in collaboration with the American Burn Association, will work with the coalition hospitals about the transport of burn victims, being cared for by the coalition hospitals, to out-of-state Burn Centers.

## Burn Training and Resources for EMS and First Responders

EMS and First Responders should have plans for the management of Mass Casualty Incidents. EMS and First responders are encouraged to use the following document on which to base their Mass Casualty Incident Response Plan: ***Wisconsin EMS Mass Casualty Incident Response Planning Guide4***.

The Burn Centers have proved guidelines for EMS regarding the initial management and transport of patients with burns. (See Appendix A: Consensus Guidelines for the Initial Management of Burns by EMS.)

* + EMS and First Responder Medical Directors are encouraged to use these “Guidelines” and include them in their operational protocols.
  + These “Guidelines” should be incorporated in the protocol books that are carried on each ambulance.
  + EMS and First Responders should carry the supplies on their ambulance as recommended by the “Guidelines”.

Hospital-associated EMS, Paramedics, and Advanced EMTs may take advantage of the Advanced

Burn Life Support course, ABLS Now©. (See Appendix C: Advance Burn Life Support Training.)

**Burn Training for Regional Hospitals**

The Wisconsin Department of Health Services for the fiscal year of 2020/2021is also has funding for training available for hospital personnel. The following individuals are recommended for this course:

1. There should be 24-hour nursing care for any burn patient. Nurses should have successfully

completed ABLS Now© from the American Burn Association. Multiple nurses should receive

this training, so at least one ABLS trained nurse is available on each shift.

2. There should be 24/7 physician consultation available. Physicians should have ABLS Now©

from the American Burn Association. It is recommended that at least one Emergency

Department physician and one General Surgeon receive this training.

4 This planning guide can be found at <http://www.dhs.wisconsin.gov/ems/Prevention_safety/prevention_index.htm>

Other Staff that care for burn patients may also take advantage of the ABLS Now© (e.g. Respiratory

Therapists, etc.) at the discretion of the hospital. (See Appendix C: Advance Burn Life Support

Training.)

**Appendix A: Consensus Guidelines for the Initial Management of Burns by EMS**

**These Consensus Guidelines is intended to be used by EMS**

**on a daily basis (also in disaster incidents) for ALL burn patients.**

**Signs & Symptoms:**

1st degree burns (superficial): Reddened skin that blanches with pressure

2nd degree burns (partial thickness): Moist, red, weeping surface, intact or broken blisters, painful

3rd degree burns (full thickness): Dry, pale, dark red, white, brown or charred skin, may be painless

Airway compromise: Wheezing, dyspnea, hoarseness, stridor

Inhalation injury: Facial burns, singed nares, carbonaceous sputum, enclosed space fire, altered LOC

**Obtain History of:**

• PMH/Meds/Allergies

• Recent illness or trauma

• History of event, mechanism of injury, other trauma (falls, loss of consciousness, etc), time of injury

• Electrical contact (AC/DC, amps, volts or lightning)

• Enclosed or open space exposure

• Type of chemical or toxic exposure

• Duration & concentration of exposure

• Presence of fire, smoke, or distinctive odors

***Notes:***

1. Guidelines for children apply for children under age 12 or < 36 kg (Broselow)
2. TBSA = Total burn surface area

**General Guidelines**

* + Stop the burning process (remove clothing)
  + Assess ABC’s (airway, breathing, circulation)
  + Establish IV access
  + Treat pain
  + Remove jewelry or other potentially constricting items
  + Look for other trauma
  + Keep environment warm
  + Frequent vital signs & assessment of peripheral pulses: *BP can be taken on burn extremities*
  + Electrical burns: EKG monitoring, look for contact wounds
  + Chemical burns: Copious irrigation with warm water. *Brush dry chemicals off prior to irrigation, certain chemicals require special considerations (e.g. hydrofluoric acid)*
  + Transport patients in clean, dry sheet (or burn sheet) – no ointments

***Consider transport to nearest burn center.***

**Airway Control/Inhalation Injury**

* + Titrate > 94%
  + Look for signs of inhalation injury.
    - Consider potential for inhalation injury in all victims of closed-space injury.
    - Consider potential for inhalation injury in all those who inhaled fumes or steam.
    - Carbon monoxide & cyanide are commonly present in closed-space fires.
  + Consider intubation.
    - Evidence of airway compromise
    - Significant decrease in mental status
    - Circumferential partial or full thickness chest burns
    - Extensive burns or facial burns

**Assessment of Injury**

* + Lund-Browder diagram preferred (or Rule of 9’s) for adults.
  + Lund-Browder diagram preferred for children. (*Patient’s* palm, including fingers = 1%, may also be used.)

**Fluid Resuscitation**

***Adults and children > 30 kg*:**

* Parkland formula: 2-4ml/kg/TBSA % with Lactated Ringers with burns  15% for partial or full thickness burns
* Normal saline is acceptable pre-hospital, but prefer use of LR (or balanced salt solution).

***Children < 30 kg:*** Parkland formula + maintenance fluids

* Parkland formula: 3-4ml/kg/TBSA % with Lactated Ringers with burns  15% for partial or full thickness burns
* Initial by EMS
  + 125 mL/hr < 5 yrs. of age
  + 250 mL/hr 6-13 years of age
  + 500 mL/hr adults > 14 years of age
* Once TBSA is calculated,
  + 2 mL/kg/%TBSA for > 14 years of age
  + 3mL/kg/%TBSA for < 14 years of age
* Fluid should be adjusted to maintain appropriate urine output:
  + Patients < 30kg
    - 1.0mL/Kg/hr
  + Patients > 30 kg
    - 0.5mL/kg/hr
* Add glucose for those less than 10kg: D5LR or D5LR at 4mL/kg (+ 20KCL once available) Do not adjust this fluid rate. Only discontinue when enteral feeding has started

**Pain control**

* + Narcotics as needed:
  + Call for ALS intercept if needed for pain control.
  + Consider anti-anxiety medications in addition to pain meds.

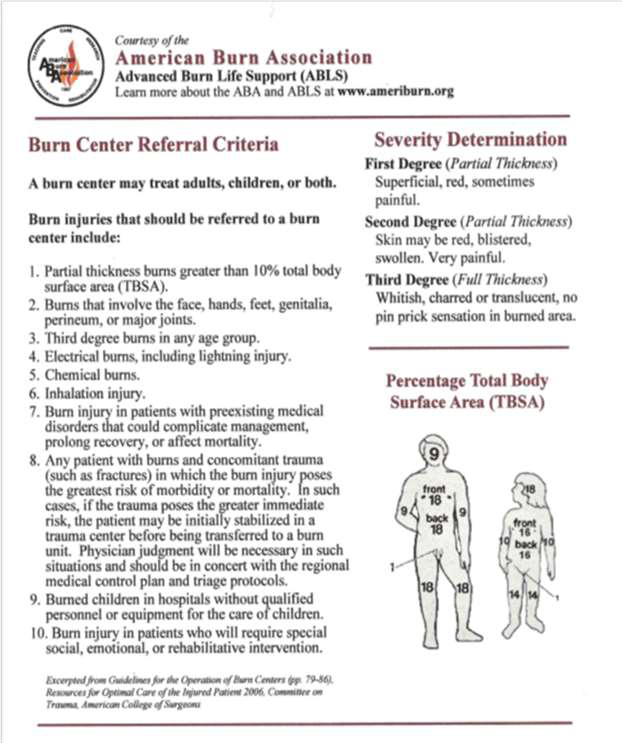
**Monitoring Resuscitation**

* + Adjustments to fluid rate will be dependent upon patient response.
  + Foley catheter: 15% TBSA or greater
  + Goal urine output:
    - Children < 30 kg: 1-2 ml/kg/hr
    - Children > 30 kg: 1 ml/kg/hr
    - Adults: 0.5 ml/kg/hr or 30-50 ml/hr

***The Parkland formula is a guideline: Both over and under resuscitation causes problems.***

***These Consensus Guidelines were developed by:***

* + Children’s Hospital of Wisconsin Burn Center (Milwaukee)
  + Columbia St. Mary’s Milwaukee Burn Center (Milwaukee)
  + Regions Hospital Burn Center (St. Paul, Minnesota)
  + University of Wisconsin Hospital & Clinics Burn Center (Madison)



**\*Included with permission from the American Burn Association.**

**Appendix B: Consensus Guidelines for the Initial Management of Burns by Hospitals**

**Hospitals are to use these Consensus Guidelines only in burn surge incidents.**

**Signs & Symptoms:**

1st degree burns (superficial): Reddened skin that blanches with pressure

2nd degree burns (partial thickness): Moist, red, weeping surface, intact or broken blisters, painful 3rd degree burns (full thickness): Dry, pale, dark red, white, brown or charred skin, may be painless

Airway compromise: Wheezing, dyspnea, hoarseness, stridor

Inhalation injury: Facial burns, singed nares, carbonaceous sputum, enclosed space fire, altered LOC

**Obtain History of:**

PMH/Meds/Allergies

Recent illness or trauma

History of event, mechanism of injury, other trauma (falls, loss of consciousness, etc), time of injury

• Electrical contact (AC/DC, amps, volts or lightning)

• Enclosed or open space exposure

• Type of chemical or toxic exposure

• Duration & concentration of exposure

• Presence of fire, smoke, or distinctive odors

***Notes:***

1. Guidelines for children apply for children under age 12 or < 36 kg (Broselow).
2. TBSA = Total burn surface area

**General Guidelines**

* + Stop the burning process (remove clothing).
  + Assess ABC’s (airway, breathing, circulation).
  + Establish IV access if admission is necessary.
  + Treat pain.
  + Remove jewelry or other potentially constricting items.
  + Look for other trauma.
  + Keep environment warm.
  + Frequent vital signs & assessment of peripheral pulses: *BP can be taken on burn extremities.*
  + Limit oral intake to ice chips sparingly.
  + Electrical burns: EKG monitoring, look for contact wounds. Consider rhabdomyolysis.
  + Chemical burns: Copious irrigation with warm water. *Brush dry chemicals off prior to irrigation. Certain chemicals require special considerations (e.g. hydrofluoric acid).*
  + Immunize against tetanus.
  + Refer to Burn Center based upon ABA Referral Criteria.
  + Transport patients in clean, dry sheet (or burn sheet) – no ointments.
  + Method of transport per collaborative agreement of sending/receiving facility.

**Airway Control/Inhalation Injury**

* + Titrate > 94%
  + Look for signs of inhalation injury.
    - Consider potential for inhalation injury in all victims of closed-space injury.
    - Consider potential for inhalation injury in all those who inhaled fumes or steam.
    - Carbon monoxide & cyanide are commonly present in closed-space fires.
  + Consider intubation.
    - Evidence of airway compromise
    - Significant decrease in mental status
    - Circumferential partial or full thickness chest burns
    - Extensive burns or facial burns
  + ABG’s & CO level if suspected inhalation injury

**Assessment of Injury**

* + Lund-Browder diagram is preferred (or Rule of 9’s) for adults.
  + Lund-Browder diagram is preferred for children. (*Patient’s* palm, including fingers = 1%, may also be used.)

**Fluid Resuscitation**

It is important to emphasize that the volume of fluid actually infused in practice is adjusted according to the individual patient’s urinary output and clinical response. Although being able to estimate and predict how the 24-hour burn resuscitation might unfold is highly valuable, the actual 24-hour total resuscitative volumes patients receive are highly variable due to patient variability in the response to injury.

***Adults and children > 30 kg*:**

* + Parkland formula: 2-4ml/kg/TBSA % with Lactated Ringers with burns  15% for partial or full thickness burns
  + Normal saline is acceptable pre-hospital, but use LR (or balanced salt solution) once at ED.

o *Half given in first 8 hours; the remainder during the next 16 hours.*

***Children < 30 kg:*** Parkland formula + maintenance fluids

* + - Parkland formula: 3-4ml/kg/TBSA % with Lactated Ringers with burns  15% for partial or full thickness burns
      * *Half given in first 8 hours; the remainder during the next 16 hours.*
    - Maintenance fluid with D5LR or D5/0.2 NaCL with 20 KCL/liter (discretion of receiving facility)
      * 4 ml/kg/hr or 100 ml/kg/day for first 10 kg, plus
      * 2 ml/kg/hr or 50 ml/kg/day for second 10 kg, plus
      * 1 ml/kg/hr or 20 ml/kg/day for all further kg
        + *Important to administer maintenance fluid with 5% dextrose-containing solutions, along with resuscitation due to limited glycogen stores in young children*

**Pain Control**

* + Narcotics as needed
  + Consider anti-anxiety medications in addition to pain medications.

**Monitoring Resuscitation**

* + Adjustments to fluid rate will be dependent upon patient response.
  + Foley catheter: 15% TBSA or greater
    - Goal urine output:
      * Children < 30 kg: 1-2 ml/kg/hr
      * Children > 30 kg: 1 ml/kg/hr
      * Adults: 0.5 ml/kg/hr or 30-50 ml/hr
    - The Parkland formula is a guideline: Both over and under resuscitation causes problems. The rate should be adjusted up or down by (10% or by 1/3) to keep the urine output within the above goal range.
    - Foley catheter is needed if Parkland formula is used.

**Treatment Priorities for Delayed Transfer to a Burn Center *(up to 24-48 hours)***

**Use treatment guidelines as above.** *Consult burn center with questions (physician, nursing or therapy).*

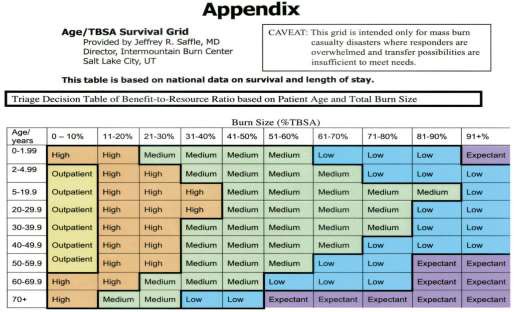
**Volume Resuscitation**

* + - Resuscitation formula is a starting point for predicting resuscitation needs.
    - Volume resuscitation needs to be modified based upon patient response to ensure organ perfusion, but prevent volume overload.
    - Monitor urine output according to guidelines, and adjust resuscitation as needed.
    - Consult with Burn Center regarding ongoing fluid resuscitation needs.
    - Circumferential burns
      * Assess circulation to extremities.
      * Consult with burn center physician about need for escharotomies.

**Wound Care**

* + - Wound care does not take precedence over life-threatening injuries or resuscitation.
    - Assure appropriate pain control and ability to maintain airway.
    - Gowns & gloves for all contact with wounds. Add a mask when wounds are open.
    - Debride loose epidermis and blisters > 2 cm.
    - Cleanse wounds with soap and warm water. Remove topical agents and provide gentle debridement.
    - Apply silver sulfadiazene, bacitracin or double antibiotic ointment (bacitracin/polymyxin) into gauze for burn dressings once or twice per day.
    - After wound cleansing, use only bacitracin or double antibiotic ointment (bacitracin/polymyxin) for facial burns.
    - No prophylactic antibiotics should be given.





**\*Included with permission from the American Burn Association.** *ABA Board of Trustees et al, Journal of Burn Care & Rehabilitation, March/April 2005; p. 106*

***These Consensus guidelines were developed by:***

* + - Children’s Hospital of Wisconsin Burn Center (Milwaukee)
    - Columbia St. Mary’s Milwaukee Burn Center (Milwaukee)
    - Regions Hospital Burn Center (St. Paul, Minnesota)
    - University of Wisconsin Hospital & Clinics Burn Center (Madison)

# Appendix C: Advanced Burn Life Support (ABLS) Training

Each hospital may designate those staff persons that are to take ABLS Now© from the American

Burn Association. Recommended participants at each hospital for this training are:

* + - Multiple Registered Nurses so that at least one ABLS trained nurse is available per shift
    - 1 Emergency Department physician
    - 1 General Surgeon
    - Other staff involved in the treatment of burn patients
    - EMS staff associated with the hospitals
    - Paramedics or Advanced-level EMTs

There is no maximum numberof staff that can be trained under this funding program.

ABLS Now© is designed to provide hospital staff treating burn victims with the ability to assess and stabilize patients with serious burns during the first critical hours following injury and to identify those patients requiring transfer to a burn center. The course is not designed to teach comprehensive burn care, but rather to provide information that will enable those who only rarely treat burn patients to provide the care needed by a burn patient in the first 24 hours after injury or, in a mass casualty incident, for up to 72 hours.

*Please contact your Regional Hospital Emergency Readiness Coalition Coordinator for information about this course.*

**Appendix D: American Burn Association Burn Center Referral Criteria**

The following categories of burns are appropriate for referral and transfer to a Burn Center:

1. Partial thickness burns greater than 10% total body surface area (TBSA).
2. Third-degree burns in any age group.
3. Electrical burns, including lightning injury.
4. Chemical burns.
5. Inhalation injury.
6. Burn injury in a patient with pre-existing medical disorders that could complicate management, prolong recovery or affect mortality
7. Any patients with burns and concomitant trauma (such as fractures) in which the burn injury poses the greatest risk of morbidity or mortality. In such cases, if the trauma poses the greater immediate risk, the patient may be initially stabilized in a trauma center before being transferred to a burn center. Physician judgment will be necessary in such situations and should be in concert with the regional medical control plan and triage protocols.
8. Burned children in hospitals without qualified personnel or equipment for the care of children.

**Note**: It is the recommendation of Children’s Hospital of Wisconsin that pediatric burn patients, who meet the above criteria be transferred to Children’s Hospital of Wisconsin or to the University of Wisconsin or to a state adult Burn Center, or if this is not possible to a hospital with a Pediatric Intensive Care Unit.

1. Burn injury in patients, who will require special social, emotional, or rehabilitative intervention.
2. Burns that involve the face, hands, feet, genitalia, perineum, or major joints.

**Appendix E: Summary of Treatment Algorithm for Burn Victims**

**Step 1: STOP the BURN and SECURE the SCENE**. Extinguish flames, cool scalds, flush chemicals, and complete decontamination to protect patient and health care providers from further injury.

**Step 2: COMPLETE a PRIMARY SURVEY.**

**Airway**: facial burns, facial swelling, singed nasal hair **Breathing**: wheezing, stridor, carbonaceous sputum **Circulation**: circumferential burns, diminished pulses

Do NOT intubate for facial burns alone; use standard indications for intubation.

**Step 3: COMPLETE A SECONDARY SURVEY. Evaluate carefully for non-burn injuries.** Most other injuries take priority over cutaneous burns. Use standard trauma management for other injuries: suture lacerations, splint fractures, etc. IVs placed through burns should be sutured in place. Be sure to rule out all other injuries. Patients who require immediate surgery should have burn resuscitation continued throughout. Burn wounds can be considered very clean for the first 12-24 hours following injury.

**Step 6: Triage Disposition:** These decisions should be made in consultation with Lead Burn Center.

**Step 5: BEGIN RESUSCITATION. Fluid resuscitation is the most important step in initial burn treatment.**

1. Formal fluid resuscitation is indicated for any patient with burns >10% TBSA and for patients with multiple traumas, inhalation injury or chemical or electrical burns.

Fluid Resuscitation

Initial by EMS

* 125 mL/hr < 5 yrs. of age
* 250 mL/hr 6-13 years of age
* 500 mL/hr adults > 14 years of age

Once TBSA is calculated,

* 2 mL/kg/%TBSA for > 14 years of age
* 3mL/kg/%TBSA for < 14 years of age

Fluid should be adjusted to maintain appropriate urine output:

* Patients < 30kg
  + 1.0mL/Kg/hr
* Patients > 30 kg
  + 0.5mL/kg/hr

Add glucose for those less than 10kg: D5LR or D5LR at 4mL/kg (+ 20KCL once available)

* Do not adjust this fluid rate. Only discontinue when enteral feeding has started

1. Place a foley catheter. Keep NPO. Consider NG tube.
2. Use IV narcotics for pain control.

**Step 4: DEBRIDE/DIAGRAM the BURNS**. **Debride all burn wounds and diagram/document extent and depth of burns.**

BE METICULOUS: Much depends on accurate burn assessment. Use the Lund and Browder Chart if

available; otherwise, use Rule of Nines. Remember that the patient’s palm (with fingers) is 1% of total body surface. Create a diagram of wounds; consider digital photos.

**Appendix: F: Initial Burn Assessment and Treatment guidelines**

