

## JTTS CLINICAL PRACTICE GUIDELINES FOR BURN CARE

### Background

The large number of burn casualties treated by coalition forces in the Iraq theatre has prompted a reevaluation of the optimal treatment plan. Many lessons have been learned and relearned during the last 3 years of treating casualties during this war. These patients are very labor intensive and consume significant personnel and class VIII (medical logistic supply materials) resources. Despite the best efforts of providers at every echelon of care, the mortality for burn casualties who cannot be evacuated out of the theater of operations is significantly higher than that experienced in US facilities (Table 1). Experience among US treatment facilities in the past 3-4 years reveals no survivors among host nation casualties sustaining full thickness burns to 50% or greater total body surface area (TBSA). The spread of infection in large open wards is a real concern, which can threaten the outcome of non-burn patients. Furthermore the average burn patient in Accredited Burn Centers in the US stays 1-2 days for every % burn. The factors have prompted a reevaluation of the optimal treatment plan based on severity of injury, treatment facility capabilities and potential for evacuation. The following recommendations are provided to assist the physician in making patient management decisions unique to the deployment environment. Chapter 28 of the 2004 edition of the Emergency War Surgery Handbook is an excellent general reference for burn care.

In every case, use of the JTTS Burn Resuscitation Flow Sheet and Protocol is highly recommended, especially if the patient may transfer to another facility.

### **1. Coalition Casualties that can be Evacuated Out of Country**

- 1) Protect airway early, utilizing large size ETT, especially if inhalation injury noted on bronchoscopy.
- 2) Initiate resuscitation using a standard burn formula (1-2 cc/kg/%BSA—see Burn Resusc Flow Sheet) and avoid boluses if possible, preferentially titrating up the rate of IVF to maintain adequate urine output as described below.
- 3) Monitor urine output closely and decrease or increase the LR infusion 20% / hour to keep urine output at 30-50 ml/hour
  - a. Over resuscitation is as harmful as under resuscitation; patients receiving in excess of 6 cc/kg/%BSA burn are susceptible to severe complications.
  - b. Hour to hour fluid management is critical - especially in the first 24 hours
  - c. Use of the Burn flow sheet to record fluids and urine is mandatory, see attached burn resuscitation flow sheets
- 4) Keep the patient warm
- 5) Debride in the OR with hibiclens, removing all blistered or sloughing skin (do not perform excision)
  - a. For burn patients using as large an ET tube as possible is strongly preferred, i.e. an 8 ET tube ensures ease of bronchoscopy and facilitates pulmonary suction, which are critical with inhalation injuries
- 6) Perform escharotomy and/or fasciotomies early if no palpable pulses and circumferential burns are present

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- 7) Wrap burns on scalp, trunk neck and extremities in 5% Sulfamylon solution, soaked dressings TID and as needed to keep dressings moist
  - a. There is less mess as opposed to Sulfamylon or Silvadene cream
  - b. Easier for receiving institution to clean and evaluate on arrival
- 8) Casualties with large burns and large resuscitations warrant measurement of abdominal compartment pressures. Pressures > than 25 warrant intervention.
- 9) Shave and debride face and scalp
- 10) Sulfamylon cream to ear burns BID
- 11) Bacitracin to face burns QID
- 12) If available consult ophthalmology for all patients with deep facial burns or corneal injury by Wood's lamp exam
  - a. Bacitracin ophthalmic ointment for the eye lids QID
  - b. Erythromycin ophthalmic ointment QID in the eyes
- 13) Change dressings every day until evacuated
- 14) The Army Burn Center at the USAISR web address and phone number are [burntrauma.consult@us.army.mil](mailto:burntrauma.consult@us.army.mil) and 210-222-2876

### **2. Host Nation Burn Casualties**

- 1) Triage casualties with full thickness burns of 50% or greater TBSA as expectant and provide adequate comfort measures
  - a. This requires careful and accurate calculation of burn size using a Lund and Browder chart (attachment)
- 2) Remember that inhalation injury, comorbidities, and extremes of age, in addition to the burn increases mortality, and these factors must be taken into consideration as treatment plans are initiated.
- 3) For patients with combined partial and full thickness burns to 50% TBSA or greater, with less than ½ of the burn being full thickness, the patient should be initially treated as above (section 1) and allow the partial thickness component to declare itself after two days. It is initially sometimes difficult to determine the full extent of the full thickness burn. After 48 hours reassess the percentage of full thickness burn.
- 4) Patients with an inhalation injury or older patients have an increased mortality, and these factors must be taken into consideration.
- 5) Less than 50% TBSA burn, attempts at early excision and grafting is recommend
- 6) Initial debridement and treatment as above in section 1.
- 7) As there is presently no allograft (cadaveric skin) or xenograft (Pig skin) available in Theater, extent of excision should be guided by amount of autograft donor skin available, meshing no wider than 3:1.
- 8) Consider using Negative Pressure Wound Dressing (NPWD) over fresh graft with intervening non-adherent layer (i.e. Dermanet, Silverlon) and leave in place for 3-5 days.
- 9) Following NPWD removal, use Sulfamylon moistened gauze dressing for next 5-7 days before transitioning to bacitracin
- 10) Initial excision should be only as much as you have donor skin to cover

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- a. Wounds should not be excised and left open. If patients arrive in this state, re-excise and VAC till granulation tissue is present.
  - b. Rarely need to mesh skin wider than 2-1.
- 11) Take the patient to the operating room for staged excisions and grafting of the full thickness burns with a goal of complete excision within one week of injury.
  - 12) Once grafts are healed, continue to keep patient clean using showers when available
  - 13) Early ambulation and physical therapy, with ROM of all affected joints is critical to the long term functioning of these casualties.
  - 14) Early and continuous nutrition is key to wound healing. Utilize nasoenteric feeding tube and supplement with high protein, low fat tube enteral feedings even when patient is able to eat. Utilize nutritionist whenever available. Supplement diet with daily multivitamin.
  - 15) Questions on burn care in theater can be answered by the surgeon on call at the 10<sup>th</sup> CSH, Ibn Sina, Baghdad, DSN 318-239-7664

### **3. Pitfalls**

- 1) Excising uninfected full thickness burns before having donor skin to cover the wound
- 2) Pseudomonas infections
  - a. High rate of graft loss
  - b. Ominous sign
  - c. Liberal use of Dakin's solution
  - d. Delay subsequent grafting until topical pseudomonas is well treated
- 3) Transition from aggressive care to comfort care
  - a. Difficult decision
  - b. Initial burn may appear survivable but graft loss, topical infections, or donor site conversion may convert a potentially survivable situation into a non-survivable injury
  - c. Be aware of this possibility and the need for potential change to an expectant category
  - d. Elicit opinions from your partners and nurses as this is a decision that should not be made solely by the treating physician
- 4) Consider inhalational injury in decision for treatment vs expectant category in relation to TBSA burn (i.e., 40% TBSA burn with inhalational injury will likely not do well as opposed to a 40% with no inhalational burn)
- 5) Go to the OR (not on ward or unit) for large dressing changes especially early on in the care
  - a. Better evaluation
  - b. Improved ability to clean wounds
  - c. Improved pain control
- 6) Initial burn may appear survivable but graft loss, topical infections, or donor site conversion may lead to transition from a potentially survivable situation into a non-survivable injury. Be aware of this possibility and the need for potential change to an expectant category.

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7) The decision to do less than everything possible should not be viewed as failure, but rather part of the reality of a combat zone. The attending physician should not be made to feel isolated with respect to making the decision to decrease the level of care. Seek the opinions of partners during the process. Utilize Chaplain and interpreters to counsel the patient's family as to the prognosis and plans.

### **4. Recommendations for Complicated Burn Care**

#### **Recommendations for the Difficult Fluid Resuscitation:**

At 12-18 hours post-burn, calculate the PROJECTED 24-hour resuscitation if fluid rates are kept constant. If the projected 24-hour resuscitation requirement exceeds **6 cc/kg/%TBSA** then the following steps are recommended.

1. Initiate 5% albumin early as described previously in the Emergency War Surgery Handbook.
2. Check bladder pressures every 4 hours.
3. If available, strongly consider the placement of a PA catheter to guide resuscitation with specific PCWP and SVO<sub>2</sub> goals. (Goal PCWP 10-12, SVO<sub>2</sub> 65-70%). If PA catheter placement is not practical then consider monitoring central venous pressures from a subclavian or IJ along with central venous O<sub>2</sub> saturations. (Goal CVP 8-10, ScvO<sub>2</sub> 60-65%)
  - a. If CVP or PCWP not at goal then increase fluid rate.
  - b. If CVP or PCWP at goal then consider vasopressin 0.04 Units/min to augment MAP (and thus UOP) or Dobutamine 5 mcg/kg/min (titrate until SvO<sub>2</sub> or ScvO<sub>2</sub> at goal). Max dose of Dobutamine is 20 mcg/kg/min.
  - c. If both CVP or PCWP and SvO<sub>2</sub> or ScvO<sub>2</sub> at GOAL then stop increasing fluids (EVEN if UOP<30). The patient should be considered hemodynamically optimized and the oliguria is likely a result of established renal insult. Some degree of renal failure should be tolerated and expected. **Continued increases in fluid administration despite optimal hemodynamic parameters will only result in "resuscitation morbidity", that is oftentimes more detrimental than renal failure.**
4. If the patient becomes hypotensive along with oliguria (UOP<30), then follow the **hypotension guidelines**.
5. Every attempt should be made in minimize fluid administration while maintaining organ perfusion. If UOP > 50, then decrease the fluid rate by 20%.

After 24 hours, LR infusion should be titrated down to maintenance levels and albumin continued until the 48 hour mark.

War burn patients have exhibited multi-system injury to include soft tissue injury secondary to blunt/penetrating injury/blast and inhalational injury which all affect resuscitation amounts and may result in marked increased fluid needs above and beyond standard burn resuscitation formulas. The air evacuation environment may also increase fluid requirements and wound edema.

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**Hypotension Guidelines:**

The optimal minimum blood pressure for burn patient must be individualized. Some patients will maintain adequate organ perfusion (and thus have adequate UOP) at MAPs lower than 70. True hypotension must be correlated with UOP. If a MAP (Generally < 55mmHg) is not adequate to maintain the UOP goal of at least 30 cc/hr then the following steps are recommended.

1. Start with Vasopressin 0.04 units/min drip (DO NOT TITRATE)
2. Monitor CVP (Goal 8-10).
3. If CVP not at goal then increase fluid rate.
4. If CVP at goal then add Levophed (norepinephrine) 2-20 mcg/min.
5. If additional pressors are needed, consider the placement of a PA catheter to guide resuscitation with specific PCWP and SVO2 goals. (Goal PCWP 10-12, SVO2 65-70%). These patients may be volume depleted but a missed injury should be suspected.
  - a. If PCWP not at goal then increase fluid rate.
  - b. If PCWP at goal then consider Dobutamine 5 mcg/kg/min (titrate until SvO2 at goal). Max dose of Dobutamine is 20 mcg/kg/min.
  - c. If hypotension persists, look for missed injury.
  - d. Consider adding epinephrine or neosynephrine as a last resort.
6. If the patient is exhibiting catecholamine-resistant shock, consider the following diagnoses.
  - a. Missed injury and on-going blood loss.
  - b. Acidemia. If pH <7.20 then adjust ventilator settings to optimize ventilation (Target PCO2 30-35). If despite optimal ventilation, patient is still has a pH <7.2, consider bicarb administration.
  - c. Adrenal insufficiency. Check a random cortisol and add start hydrocortisone 100 mg every 8 hours.
  - d. Hypocalcemia. Maintain Ionized Calcium > 1.1.

**Inhalational injury:**

Inhalation injury is further exacerbated by retained soot and chemicals. Remember, inhalation injury is mostly a chemical injury that will benefit from removing the chemical. Upon arrival, if patients are found to have visible soot in the airways, every attempt should be made to débride through bronchoscopic suction as much soot as possible. It must also be kept in mind that irrigation may actually make the injury worse by transporting injurious substances to new, uninjured parts of the lung, so irrigate judiciously. If a diagnosis of inhalation injury is made, use aerosolized heparin 5000 units every 4 hours. This should be mixed with albuterol as heparin can induce bronchospasm.

**Abdominal Compartment Syndrome:**

Massive fluid replacement (> 6 ml/kg/% burn) has led to abdominal compartment syndrome (increased bladder pressure, increased airway pressures, decreased urine output, hypotension) and extremity compartment syndromes (beyond standard escharotomy treatment). If the patient requires a decompressive laparotomy, this should

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be done with a full midline incision and NOT a small mini-laparotomy incision followed by a temporary abdominal closure. If abdominal wall skin is burned, Ioban dressing will not adhere to burnt skin. Traditional Bogotá bag or 3 l NS IV bag sewn to the skin should be used (keep loose).

### **Escharotomy / Fasciotomy**

The requirement for escharotomy or fasciotomy usually presents in the first few hours following injury. If the need for either procedure has not presented in the first 24 hours, then circulation is likely to remain adequate without surgical intervention. For this reason, it would be unusual for a patient to require a new escharotomy or fasciotomy by the time of arrival at an Level 4 facility.

More likely, on arrival a patient with previous escharotomy or fasciotomy performed in the field might require extension of the incision or placement of a second incision on the other side of an extremity to restore circulation. This can occur if significant volumes of intravenous fluid are given in transit between the time of initial escharotomy and patient arrival at a rear medical facility.

On arrival, distal circulation should be assessed in all extremities by palpation of the radial, dorsalis pedis and posterior tibial arteries. If a pulse is palpable in one or more arteries in each extremity, then escharotomy or fasciotomy is not presently indicated, and the patient may be serially monitored. Injured extremities should be elevated 30 at 45 degrees. Doppler ultrasound may be utilized in the absence of palpable pulses. Absent Doppler signals or pulses that are diminishing on serial exam 30 minutes to one hour apart should prompt consideration of escharotomy.

Escharotomy is normally performed when an extremity has circumferential full thickness burn. If the burn is superficial or not circumferential and pulses are absent, consider inadequate circulation from other causes such as hypovolemia, hypotension or occult traumatic injury.

Escharotomy incisions should extend the entire length of the full-thickness burn, and should be carried across joints when the burn extends across the joint. In the lower extremity, a mid lateral or mid axial incision is made with knife or electrocautery through dermis to the level of fat. It is not necessary to carry the incision to the level of fascia. Although full-thickness burn is insensate, the patient will often require intravenous narcotics and benzodiazepines during this procedure. Morphine, 2-5 mg and midazolam 1-2 mg may be given at 5-10 minute intervals as needed. On completion of midlateral or midmedial escharotomy, pulses are again checked. If circulation is restored, bleeding should be controlled with electrocautery and the extremity dressed and elevated at a 30 to 45 degree angle. Pulses should then be checked hourly for at least 12-24 hours. If circulation is not restored, perform a second incision on the opposite side of the extremity.

For upper extremities, place the hand in the anatomic position (palm facing forward) and make an incision in the midradial or mid ulnar line. Ulnar incisions should stay anterior

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(volar) of the elbow joint to avoid the ulnar nerve, which is superficial at the elbow. If pulses are not restored, a second incision may be necessary on the opposite side of the extremity. If both the hand and arm are burned, continue the incision across the mid ulnar or midradial wrist and onto the mid ulnar side of the hand or to the base of the thumb and then the thumb webspace.

Finger escharotomies are controversial. Before performing finger escharotomies, consider that there is little other than bone and tendon in the fingers and that fingers burned badly enough to require escharotomy frequently end up as amputations. If finger escharotomies are performed, avoid functional surfaces (radial surface of the index and ulnar surface of the little finger). Place the fingers in a clenched position and note the finger creases at DIP and PIP joints. Escharotomy incisions should be just dorsal to a line drawn between the tops of these creases.

If bilateral extremity incisions do not restore circulation, re-evaluate adequacy of overall circulation in the patient. A well-resuscitated adult burn patient should have a clear sensorium, a heart rate in the 110-130 beat per minute range and a urine output of 30 cc per hour or more.

In unusual cases, following escharotomy, fasciotomy may be necessary to restore circulation. This is more common in electrical injuries and in crush or other traumatic injuries. Leg fasciotomies should release all four compartments. Forearm fasciotomies should decompress all three compartments. The dorsal compartment may be accessed via a 3 inch longitudinal mid dorsal forearm incision. Dissect to the fascia, enter the fascia and then slide a Metzenbaum scissor distal to the level of the wrist and proximal to the upper forearm. The volar compartment is approached via a lazy-S curved incision from elbow to wrist. Straight incisions should be avoided on the volar surface as these may lead to later contractures. The volar incision is then utilized to also access the mobile compartment, which is the fascia overlying the brachioradialis muscle. If escharotomies have already been performed, it may be possible to access the dorsal, volar and mobile compartments by dissection between the dermis and fascia from the escharotomy site to the desired areas. Circulation should not be compromised by a desire to avoid additional incisions, however, as the burned tissue will end up being excised later during burn surgery. When performing an arm fasciotomy, some hand surgeons prefer to also decompress the median nerve at the carpal tunnel and / or the ulnar nerve at the Canal of Guyon.

Following escharotomy or fasciotomy, late bleeding may occur as pressure is decompressed and circulation restored. Examine the surgical site every few minutes for up to a half-hour for signs of new bleeding, which is usually easily controlled with electrocautery.

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US Burn Mortality in American Burn Association verified burn centers.

Age Group	0.1-9.9	10-19.9	20-29.9	30-39.9	40-49.9	50-59.9	60-69.9	70-79.9	80-89.9	≥90	Total
birth - 1.9	0.0%	0.2%	2.1%	4.5%	6.6%	10.9%	50.0%	42.1%	73.3%	60.0%	0.7%
Died/Total	1/6655	3/1926	8/389	7/157	5/76	5/46	12/24	8/19	11/15	3/5	63/9312
2 - 4.9	0.2%	0.1%	3.2%	5.7%	7.9%	12.5%	22.6%	31.3%	54.5%	76.2%	1.6%
Died/Total	7/3449	1/1086	11/341	9/159	6/76	6/48	7/31	10/32	12/22	16/21	85/5265
5 - 19.9	0.1%	0.2%	1.2%	3.3%	9.3%	9.9%	18.3%	30.9%	39.3%	55.9%	1.5%
Died/Total	11/7346	4/2441	10/838	13/400	20/216	15/151	19/104	21/68	24/61	38/68	175/11693
20 - 29.9	0.2%	0.8%	2.2%	3.7%	11.3%	17.0%	31.5%	42.3%	62.7%	77.6%	2.4%
Died/Total	11/5998	16/2065	16/720	12/324	24/212	23/135	28/89	22/52	32/51	52/67	236/9713
30 - 39.9	0.3%	0.7%	4.3%	7.7%	14.2%	26.5%	37.9%	52.7%	66.7%	82.9%	3.4%
Died/Total	18/6346	15/2287	35/811	33/426	33/233	41/155	36/95	49/93	46/69	58/70	364/10585
40 - 49.9	0.6%	1.4%	5.6%	14.9%	27.4%	36.6%	42.9%	58.8%	76.5%	85.5%	4.9%
Died/Total	31/5635	28/1957	41/738	55/368	61/223	53/145	45/105	40/68	39/51	65/76	458/9366
50 - 59.9	1.1%	3.0%	9.8%	22.7%	38.7%	56.3%	69.6%	81.6%	78.0%	84.4%	8.0%
Died/Total	36/3378	36/1198	50/510	58/255	55/142	63/112	39/56	40/49	32/41	54/64	463/5805
60 - 69.9	2.5%	8.6%	17.5%	36.0%	65.9%	72.4%	71.0%	88.6%	87.5%	76.1%	12.8%
Died/Total	45/1835	67/776	64/366	50/139	56/85	42/58	22/31	31/35	21/24	35/46	433/3395
≥70	7.2%	25.5%	52.7%	69.6%	80.1%	95.6%	94.6%	87.1%	91.9%	91.5%	27.6%
Died/Total	170/2348	281/1101	207/393	179/257	109/136	109/114	70/74	61/70	34/37	43/47	1263/4577
<b>Total</b>	<b>0.8%</b>	<b>3.0%</b>	<b>8.7%</b>	<b>16.7%</b>	<b>26.4%</b>	<b>37.0%</b>	<b>45.6%</b>	<b>58.0%</b>	<b>67.7%</b>	<b>78.4%</b>	<b>5.1%</b>
Died/Total	330/42990	451/14837	442/5106	416/2485	369/1399	357/964	278/609	282/486	251/371	364/464	3540/69711

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# JTTS Burn Resuscitation Flow Sheet Protocol

Purpose: The JTTS Burn Resuscitation flow sheet provides caregivers with a tool to track burn resuscitation over a 72-hour period. Conceptually the flow sheet creates a continuum between care providers during the resuscitation phase. This format allows providers to accurately trend intake and output, hemodynamics and vaso-active medications and enables optimal outcomes through precise patient management.

I. The JTTS Burn Resuscitation Flow Sheet will be initiated by the first MTF to treat the burn victim. This treatment facility will be listed in the “Initial Treatment Facility” block. Treatment provided by Echelon I/II will be considered in the initiation of the form.

II. Today’s date will be placed in the “Date” block of the flow sheet, in reference to the current date where the recorder is located (do not adjust this date based on patient origin or destination, only use the local date).

III. “Name” and “SSN” are patient identifiers, referencing the patient’s full name and social security number. This information is required on all three pages of the flow sheet in lieu of the pages being separated.

IV. Patient weight will be recorded in the “Pre-burn Est. Wt (kg)” block. The weight recorded in Theatre will be estimated based on the burn victim’s weight prior to injury, or the patient’s “dry weight”. If a patient presents at the MTF prior to initiating resuscitation and an accurate weight can be easily obtained without delaying care then providers are urged to record an accurate weight.

V. “% TBSA” refers to the burn wound area. Burn size will be determined at the MTF and providers will use this value in determining fluid resuscitation requirements. Subsequent MTF’s are required to “re-map” the patient at their facility considering that burn wound conversion may take place between MTF assessments and transfers.

VI. Burn Fluid Resuscitation Calculations: The ABLS guidelines will be used when determining fluid requirements for the first 24 hours post-burn. At 8-12 hours post-burn resuscitation efforts will be reevaluated, and fluid resuscitation needs will be recalculated. If fluid resuscitation needs exceed ABLS formula calculations than consider the guidelines established in the Emergency War Surgery Handbook and the addendum to the handbook, “Recommendations for Level IV Burn Care”.

- a. The values calculated by the Initial MTF for the first 24 hours, will be recorded on page 1 (the first 24 hours) located in the block labeled “Estimated fluid vol. pat. should receive.”
- b. The “fluid volume ACTUALLY received” during the first 24 hours of resuscitation will be placed in the block labeled as such on page 2. These values will reflect the actual volumes delivered, as recorded, during the first 24 hours on page 1.

- c. The 24 hour fluid volume totals recorded on pages 1 & 2 will be transcribed onto page 3 in the block labeled “fluid volume ACTUALLY received.” This will allow providers to see the totals for the first 48 hours as the patient enters into the last 24 hours of the 72-hour period.

VII. “Date and Time of Injury” will accurately reflect the local time and date where the patient was injured. This block SHOULD NOT reflect the time when the patient arrived at the MTF.

VIII. The treatment site and/or team column (“Tx Site/Team”), will correlate with the team of providers managing the patient during the specified hour on the flow sheet. This team may be CCATT, or it may reside at an MTF, in which case the name of that MTF would be represented in that block.

IX. “HR from burn” is defined as the number of hours after the burn occurred. If a patient does not arrive at an MTF until 3 hours after his burn occurred, then the MTF would not chart hourly values for hours 1-3. Charting would begin for the 4<sup>th</sup> hour post-burn. Pre-hospital fluid and urine values need to be determined by conferring with Echelon I & II care teams. These totals can be reflected in the total for the 3<sup>rd</sup> hour, this will account for the fluids and urine during this resuscitation period. (see Case study for examples)

X. “Local time” pertains to the time the care providers are utilizing, be it Baghdad Time, Berlin Time, ZULU, or CST. As with “date” do not adjust this time based on patient origin or destination, only use the local time.

XI. The “crystalloid and colloid” column reflects fluid volume only, not specific fluids delivered. Immediate care providers should refer to the critical care flow sheets to gain specific knowledge of fluids types and volumes. This flow sheet is only designed to track total volumes and UOP. Examples of Crystalloid solutions are ½ NS, Isotonic NS, D5W, LR and D5LR. Examples of Colloids are Albumin (5% or 25%), blood products and other volume expanders such as dextran, hespan, or hexend

XII. When documenting vaso-active agents, “Pressors”, the recorder should provide the dose of the drug, and the rate. If the patient is on vaso-active agents the patient may also have invasive pressure monitoring devices (Arterial lines, CVP, PA Catheter), in which case significant values should be recorded in the appropriate columns on the flow sheet.

XIII. For additional burn resuscitation guidelines refer to the Emergency War Surgery Handbook and the “Recommendations for Level IV Burn Care.”

# Burn Flow Sheet Documentation

JTTS Burn Resuscitation Flow Sheet						Page 1
Date:	[1]	Initial Treatment Facility:				[2]
Name	[3]	SSN	[4]	Pre-burn Est. Wt (kg)	[5]	%TBSA
				Estimated fluid vol. 1st 8 hrs	[6]	2nd 16th hrs
				pat. should Est. Total 24 hrs	[7]	[8]
					[9]	
Date & Time of Injury	[10]			BAMC/ISR Burn Team DSN 312-429-2876		

[1] **Date:** Today's Date

[2] **Initial Treatment Facility:** Where this form is initiated

[3] **Name:** Patient's Name

[4] **SSN:** Patient's social security number

[5] **Weight (Kg):** Estimated weight PRE-BURN. "dry weight"

[6] **% TBSA:** Area Burned

[7] **1<sup>st</sup> 8 hrs:** ½ total calculated fluids per burn resuscitation formula (ABLS), given over 1<sup>st</sup> 8 hrs post-burn.

[8] **2<sup>nd</sup> 16 hrs:** Remaining ½ of the calculated fluids over the next 16 hrs.

[9] **Estimated Total Fluids:** Total fluids calculated for the first 24 hrs post-burn injury.

[10] **Time of Injury:** Time the patient burned, **NOT** the time patient arrived at the facility.

[11] **Treatment (Tx) Site/Team:** Facility, CCATT or Care Team providing care at specified hour.

[12] **Hour from burn:** "1<sup>st</sup>" hour is the first hour post burn. For example: pat. Arrives@ MTF 3 hrs post-burn. MTF will start their charting for "4<sup>th</sup>" hour. IVF & UOP totals from echelon I & II care, prior to arrival at the MTF, should be placed in "3<sup>rd</sup>" hour row.

[13] **Local Time:** current time being used by recorder

[14a] **Crystalloid (ml):** Total crystalloid volume given over last hour (LR, D5W, NS, etc)(includes all drips, piggy backs, etc)

[14b] **Colloid (ml):** Total colloid volume given over the last hour (Albumin 5%-25%, blood products, Hespan, etc.) **Note when using Albumin:** With large resuscitations 5% Albumin should be started at the 12 hour mark and with normal resuscitations start at the 24 hour mark.

[15] **Total:** Total volume (crystalloid + colloid) for the hour

[16] **UOP:** Urine output for last hour

[17] **Base Deficit:** Acidemia indicator, lab value, if avail.

[18] **BP:** Systolic BP / Diastolic BP

[19] **MAP/CVP:** MAP and/or CVP if available.

[20] **Pressors:** Vasopressin, Levophed, etc., and rate/dose

[21] **12 hour total:** Total IVF & UOP for 1<sup>st</sup> 12 hours post-burn.

[22] **24 hour total:** Total IVF & UOP for 24 hours.

Tx Site/Team	HR from burn	Local Time	Crystalloid (ml)	Colloid	TOTAL	UOP	Base Deficit	BP	MAP (>55)	CVP	Pressors (Vasopressin 0.04)
	1st										
	2nd										
	3rd										
	4th										
	5th										
	6th										
	7th										
	8th										
	9th										
	10th										
	11th										
	12th										
	<b>Total Fluids 1st 12 hrs:</b>				[21]						
	13th										
	14th										
	15th										
	16th										
	17th										
	18th										
	19th										
	20th										
	21st										
	22nd										
	23rd										
	24th										
	<b>Total Fluids:</b>				[22]						

Pre-burn Est. Wt (kg)	%TBSA	Fluid Volume ACTUALLY received		
		1st 8 hrs	2nd 16th hrs	24 hr Total
		[a]	[b]	[c]

## Page 2 (24-48 hrs)

The guidelines for page 2 remain the same as for page 1, with the exception of the calculation table. On page 2 the values in [a] and [c] are the **actual** volumes delivered and recorded from page 1, blocks 21 & 22. [b] refers to the **actual** volume delivered from the 9<sup>th</sup> hour through the 24<sup>th</sup> hour. These values allow caregivers to re-calculate the ml/kg/% TBSA, and evaluate for over-resuscitation

Pre-burn Est. Wt (kg)	%TBSA	Fluid Volume ACTUALLY received		
		1st 24 hrs	2nd 24 hrs	48 hr Total
		[d]	[e]	[f]

## Page 3 (48-72 hrs)

The guidelines for page 3 remain the same as for pages 1 & 2, with the exception of the calculation table. On page 3 the values in [d] and [e] are the **actual** 24 hour fluid totals recorded from pages 1 & 2. [f] refers to the **total** volume delivered over the first 48 hrs ([d] + [e]). Once again, these values allow caregivers to re-calculate the ml/kg/% TBSA, and evaluate for over-resuscitation

# JTTS Burn Resuscitation Flow Sheet

Date:

Initial Treatment Facility:

Name	SSN	Pre-burn Est. Wt (kg)	%TBSA	Estimated fluid vol. pat. should receive		
				1st 8 hrs	2nd 16th hrs	Est. Total 24 hrs

**Date & Time of Injury**  BAMC/ISR Burn Team DSN 312-429-2876

Tx Site/ Team	HR from burn	Local Time	Crystalloid / Colloid	TOTAL	UOP	Base Deficit	BP	MAP (>55) / CVP	Pressors (Vasopressin 0.04 u/min)
	1st		/					/	
	2nd		/					/	
	3rd		/					/	
	4th		/					/	
	5th		/					/	
	6th		/					/	
	7th		/					/	
	8th		/					/	
<b>Total Fluids:</b>									
	9th		/					/	
	10th		/					/	
	11th		/					/	
	12th		/					/	
	13th		/					/	
	14th		/					/	
	15th		/					/	
	16th		/					/	
	17th		/					/	
	18th		/					/	
	19th		/					/	
	20th		/					/	
	21st		/					/	
	22nd		/					/	
	23rd		/					/	
	24th		/					/	

**Total Fluids:**

# JTTS Burn Resuscitation Flow Sheet

Date:

Name	SSN	Pre-burn Est.	Fluid Volume ACTUALLY received		
		Wt (kg)	%TBSA	1st 8 hrs	2nd 16th hrs
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Date & Time of Injury

BAMC/ISR Burn Team DSN 312-429-2876

Tx Site/ Team	HR from burn	Local Time	Crystalloid Colloid	TOTAL	UOP	Base Deficit	BP	MAP (>55)	CVP	Pressors (Vasopressin 0.04 u/min)
	25th									
	26th									
	27th									
	28th									
	29th									
	30th									
	31st									
	32nd									
	33rd									
	34th									
	35th									
	36th									
	37th									
	38th									
	39th									
	40th									
	41st									
	42nd									
	43rd									
	44th									
	45th									
	46th									
	47th									
	48th									

Total Fluids:

# JTTS Burn Resuscitation Flow Sheet

Date:

Name	SSN	Pre-burn Est.	Fluid Volume ACTUALLY received		
		Wt (kg)	%TBSA	1st 24 hrs	2nd 24 hrs
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Date & Time of Injury

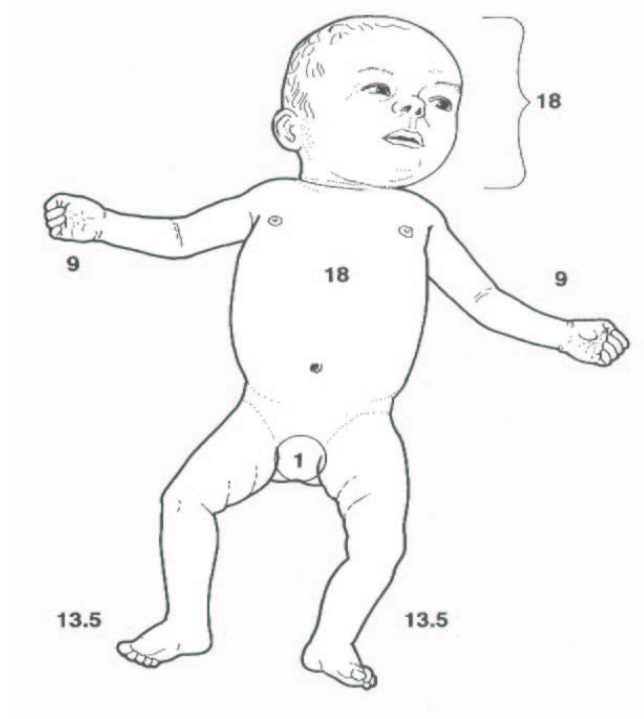
BAMC/ISR Burn Team DSN 312-429-2876

Tx Site/ Team	HR from burn	Local Time	Crystalloid / Colloid	TOTAL	UOP	Base Deficit	BP	MAP (>55)	CVP	Pressors (Vasopressin 0.04 u/min)
	49th									
	50th									
	51st									
	52nd									
	53rd									
	54th									
	55th									
	56th									
	57th									
	58th									
	59th									
	60th									
	61st									
	62nd									
	63rd									
	64th									
	65th									
	66th									
	67th									
	68th									
	69th									
	70th									
	71st									
	72nd									

Total Fluids:

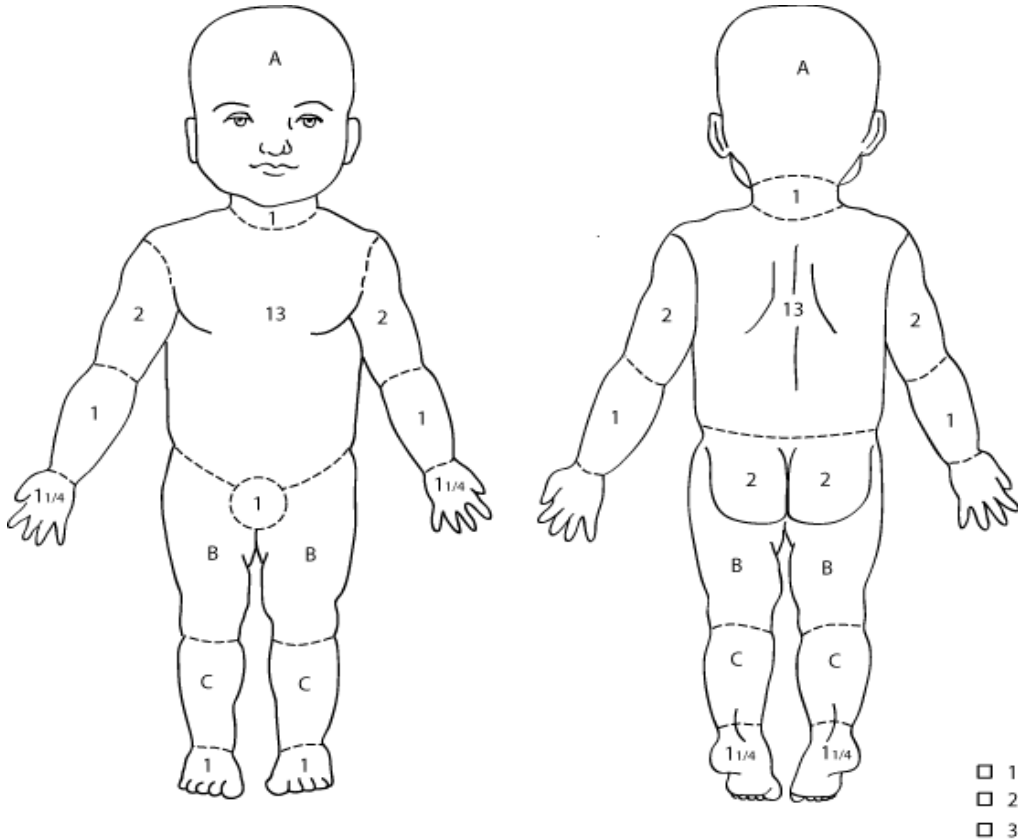
### BABY BURN ESTIMATE AND DIAGRAM

Total Area front/back (circumferenti	Birth to1				
	year	1st	2nd	3rd	TBSA
Head	19				0
Neck	2				0
Anterior trunk*	13				0
Posterior trunk	13				0
Right buttock	2.5				0
Left buttock	2.5				0
Genitalia	1				0
Right upper arm	4				0
Left upper arm	4				0
Right lower arm	3				0
Left lower arm	3				0
Right hand	2.5				0
Left hand	2.5				0
Right thigh	5.5				0
Left thigh	5.5				0
Right leg	5				0
Left leg	5				0
Right foot	3.5				0
Left foot	3.5				0



### CHILD BURN ESTIMATE AND DIAGRAM

Total Area front/back (circumferential)	1 to 4	5 to 9	10 to 14	15				
	years	years	years	years	1st	2nd	3rd	TBSA
Head	17	13	11	9				0
Neck	2	2	2	2				0
Anterior trunk*	13	13	13	13				0
Posterior trunk*	13	13	13	13				0
Right buttock	2.5	2.5	2.5	2.5				0
Left buttock	2.5	2.5	2.5	2.5				0
Genitalia	1	1	1	1				0
Right upper arm	4	4	4	4				0
Left upper arm	4	4	4	4				0
Right lower arm	3	3	3	3				0
Left lower arm	3	3	3	3				0
Right hand	2.5	2.5	2.5	2.5				0
Left hand	2.5	2.5	2.5	2.5				0
Right thigh	6.5	8	8.5	9				0
Left thigh	6.5	8	8.5	9				0
Right leg	5	5.5	6	6.5				0
Left leg	5	5.5	6	6.5				0
Right foot	3.5	3.5	3.5	3.5				0
Left foot	3.5	3.5	3.5	3.5				0



### BURN ESTIMATE AND DIAGRAM

Total Area front/back (circumferential)		one side-- anterior	one side-- posterior				
	Adult	adult	adult	1st	2nd	3rd	TBSA
Head	7	3.5	3.5				0
Neck	2	1	1				0
Anterior trunk*	13	13	0				0
Posterior trunk*	13	0	13				0
Right buttock	2.5	na	2.5				0
Left buttock	2.5	na	2.5				0
Genitalia	1	1	na				0
Right upper arm	4	2	2				0
Left upper arm	4	2	2				0
Right lower arm	3	1.5	1.5				0
Left lower arm	3	1.5	1.5				0
Right hand	2.5	1.25	1.25				0
Left hand	2.5	1.25	1.25				0
Right thigh	9.5	4.75	4.75				0
Left thigh	9.5	4.75	4.75				0
Right leg	7	3.5	3.5				0
Left leg	7	3.5	3.5				0
Right foot	3.5	1.75	1.75				0
Left foot	3.5	1.75	1.75				0
	100	48	52	0	0	0	0

Age: \_\_\_\_\_  
 Sex: \_\_\_\_\_  
 Weight: \_\_\_\_\_

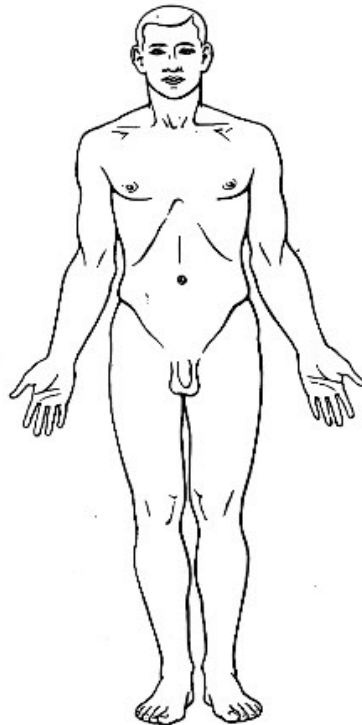


DIAGRAM A

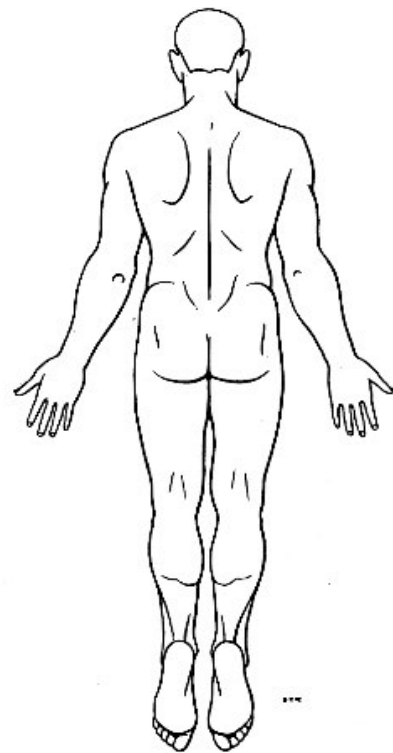
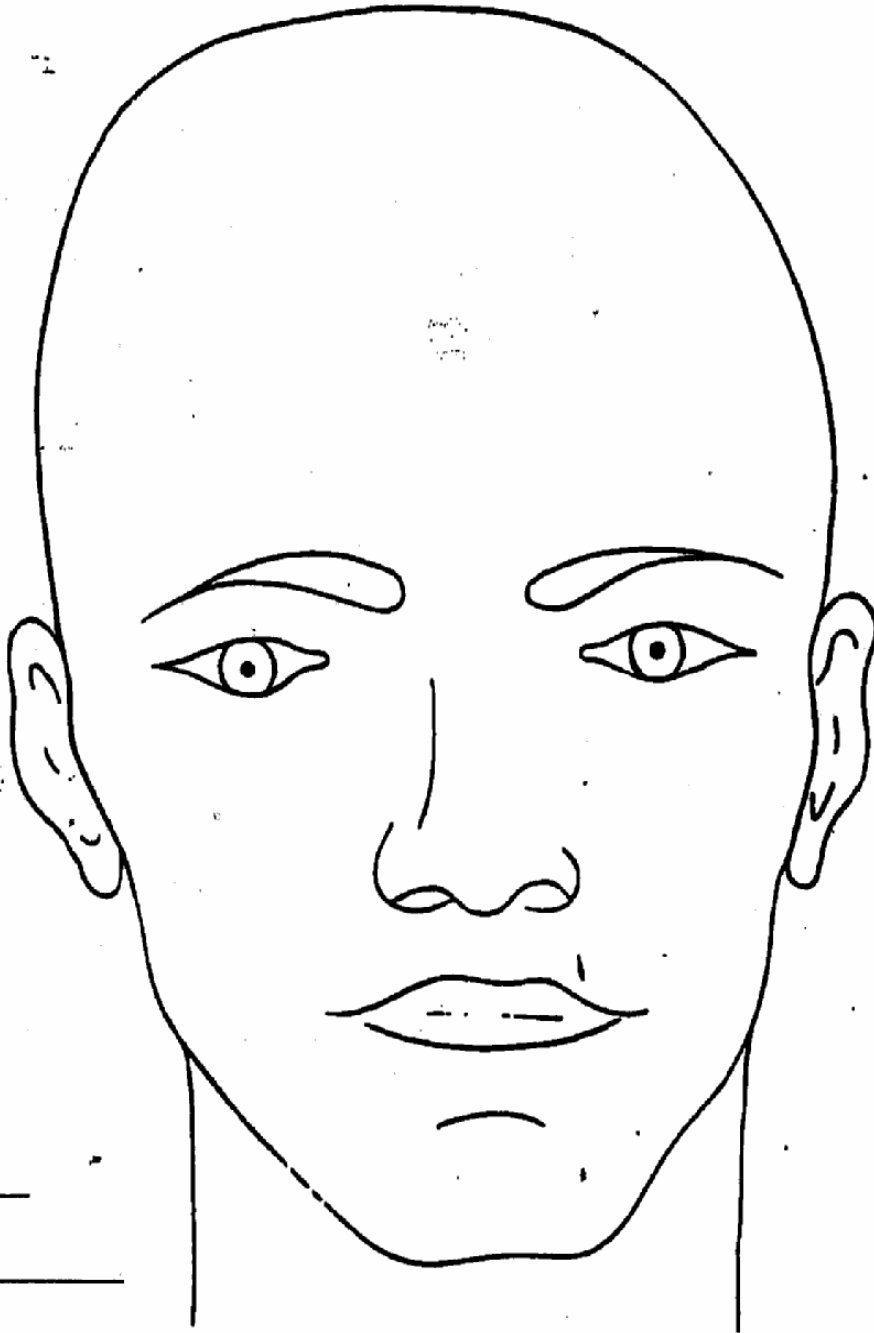


Figure 25 (17)

BURN DIAGRAM - HEAD



Date: \_\_\_\_\_

\_\_\_\_\_  
name



DIAGRAM 7

Figure 25 (2)

Date: \_\_\_\_\_  
2nd: \_\_\_\_\_  
3rd: \_\_\_\_\_  
Total: \_\_\_\_\_