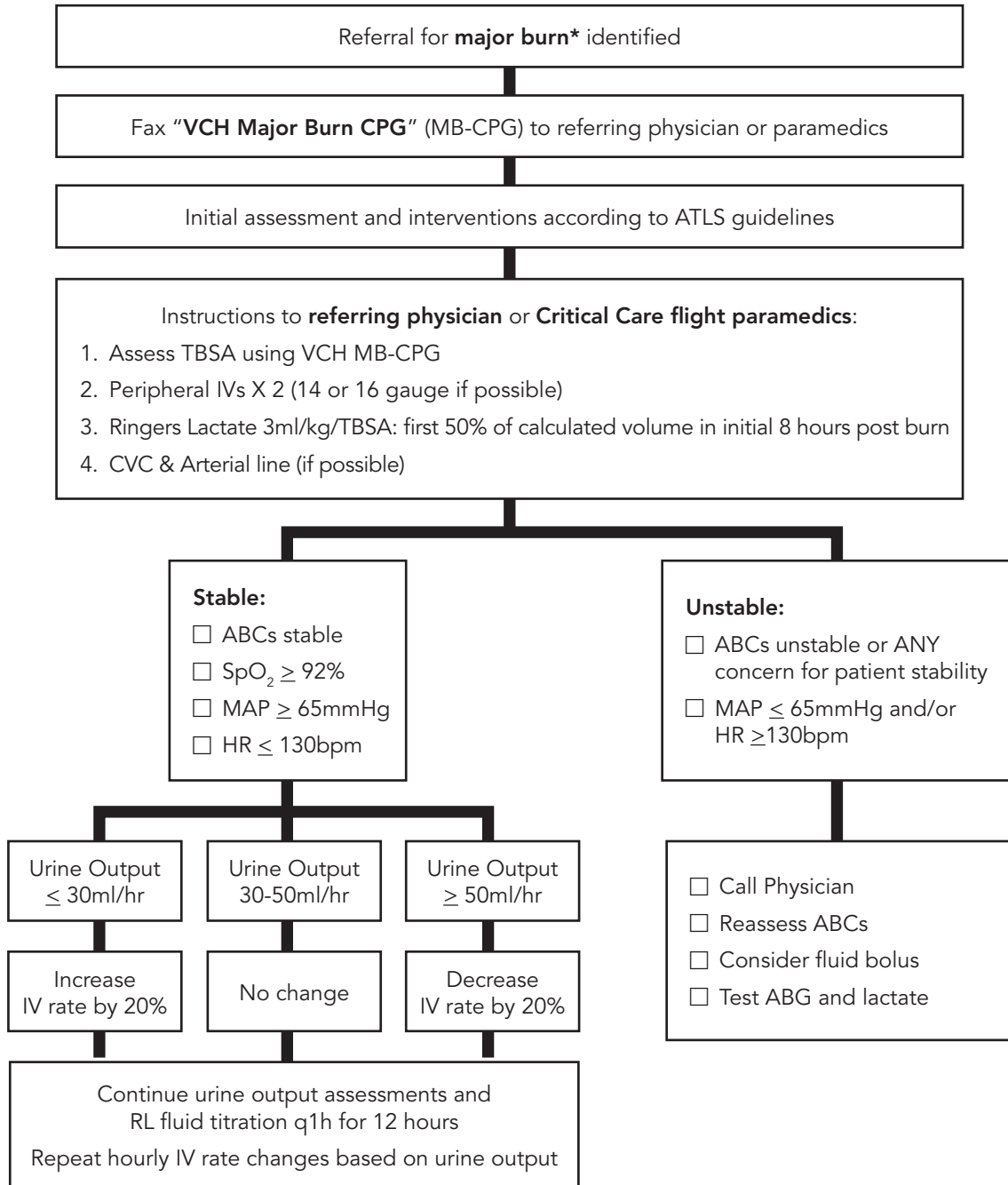


First 12 Hours Post Burn Adult Major Burns Clinical Practice Guidelines

Please note that this is a guideline only, not a substitute for clinical judgement.



*** Major Burn:**

- ≥ 20% TBSA partial and/or full thickness any age
- ≥10% TBSA partial and/or full thickness age ≤ 10 or ≥ 50
- Burns to hands, face, feet, genitalia, joints
- Full thickness burns ≥ 5% TBSA any age
- Electrical burns
- Chemical burns
- Inhalation injury
- Burns associated with major trauma

12 Hour Assessment Adult Major Burns Clinical Practice Guidelines

To be completed 12 hours post burn. Please note that this is a guideline only, not a substitute for clinical judgement.

Calculate total fluid given in first **12** hours (since time of burn):

Equals [A] _____ ml

Multiply **[A] x 2** for projected fluid administration in 24 hours:

Equals [B] _____ ml

Calculate projected fluid administration for 6ml/kg/TBSA:

Equals [C] _____ ml

If **[B]** is larger than **[C]**:

- Alert burn/ICU physician
- Consider albumin protocol*
- Check bladder pressures q4h
- If urine output > 50ml/hr, decrease IV fluid administration rate by 20% (measure q1h)

If **[B]** is less than **[C]**: continue resuscitation according to Major Burn CPG.

*Albumin protocol: Albumin 5% at 1/3 current rate plus RL at 2/3 current rate

ICU		Sol N. Gregory, MD David D. Sweet MD FRCP(C)
Monitoring	General Management	Initial Goals
<input type="checkbox"/> Intravascular arterial blood pressure	<input type="checkbox"/> HOB $\geq 30^\circ$	<input type="checkbox"/> Urine output minimum 30ml/h maximum 50ml/h
<input type="checkbox"/> CVC (preferably supradiaphragmatic)	<input type="checkbox"/> Gastric prophylaxis	<input type="checkbox"/> Temperature $\geq 37^\circ\text{C}$
<input type="checkbox"/> ScvO ₂ q3h X 24h then R/A	<input type="checkbox"/> DVT prophylaxis	<input type="checkbox"/> MAP $\geq 65\text{mmHg}$
<input type="checkbox"/> CVP as per ICU protocols	<input type="checkbox"/> Burn dressings as per Plastic Surgery	<input type="checkbox"/> ScvO ₂ $\geq 70\%$
<input type="checkbox"/> Lactate q3h X 24-72h	<input type="checkbox"/> Elevate all burned body parts when possible	<input type="checkbox"/> Lactate $\leq 4\text{mmol/L}$
<input type="checkbox"/> ABGs as per ICU protocols	<input type="checkbox"/> Start uninterrupted enteric feeds as early as possible (as per Dietitian) unless legitimate concern of splanchnic hypoperfusion or abdominal compartment syndrome	<input type="checkbox"/> Hgb $\geq 70\text{g/L}$
<input type="checkbox"/> Bladder pressures q6h from 12-72h post burn		<input type="checkbox"/> Plt ≥ 50 (<i>Actively bleeding or imminently going to OR</i>)
<input type="checkbox"/> Increase frequency if pressures $\geq 15\text{mmHg}$	<input type="checkbox"/> Fecal containment system for perineal burns as directed by ICU or Burn physician	<input type="checkbox"/> INR ≤ 1.5 (<i>Actively bleeding or imminently going to OR</i>)
<input type="checkbox"/> For facial burns or inhalational injury: - Consult Ophthalmology - Consider Bronchoscopy (<i>if suspicion of inhalational injury</i>)	<input type="checkbox"/> Attempt to minimize opioid infusion administration and utilize prn opioids as soon as feasible	
Initial Fluid Resuscitation		Recommendations for Hypotension
STEP 1	Calculate initial 24h resuscitation fluid requirements = (3ml of Ringers Lactate)(kg) (% TBSA from Plastics consult) / 24h. ½ of this IVF is administered in the first 8 hours (post burn) and the second ½ is delivered in the remaining 16 hours.	True hypotension MUST BE correlated with urine output.
STEP 2	Determine the administered pre-hospital IVF volume, subtract this from your above calculation, and adjust your treatment appropriately.	If MAP is consistently $\leq 65\text{mmHg}$ and there is evidence of poor end-organ perfusion (urine output $\leq 30\text{ml/hr}$, lactate $\geq 4\text{mmol/L}$, ScvO ₂ $\leq 70\%$) the following steps are recommended:
STEP 3	Monitor urine output hourly and decrease or increase the RL infusion by 20% to maintain urine output between 30-50ml/hr. Avoid boluses if possible. NOTE: Hour to hour fluid resuscitation is critical, particularly during first 24 hours. OVER-RESUSCITATION IS AS HARMFUL AS UNDER-RESUSCITATION.	I) Volume Status: If CVP $\leq 5\text{mmHg}$ or pulse pressure variation $\geq 15\text{mmHg}$ and patient is not breathing spontaneously, administer a fluid bolus of 0.5-1L RL in attempt to improve MAP (it is UNCOMMON to achieve CVP goals of 10-12mmHg in severe burn patients).
STEP 4	If urine output is $\leq 15\text{ml/hr}$ for two or more consecutive hours despite increasing fluid rate OR patient requires twice current calculated rate for more than two hours: CALL ICU FELLOW OR ATTENDING , flush urinary catheter, assess breath sounds and bladder pressure. Consider initiating 5% albumin infusion at 1/3 of current resuscitation rate and make up the remainder of rate with RL. Titrate rate as above based on urine output.	II) Vasopressors: If MAP is persistently $\leq 65\text{mmHg}$ initiate Levophed at 1-20 ug/min to maintain MAP $\geq 65\text{mmHg}$ (massive burn patients commonly require Levophed 1-5 ug/min due to extensive vasodilatory shock secondary to the massive systemic inflammatory response associated with severe burns).
STEP 5	At 12 hours post-burn, calculate the PROJECTED 24 hour resuscitation if fluid rates are kept constant. If the projected 24 hour resuscitation requirement exceeds 6ml/kg/% TBSA burn or 350ml/kg total, the following steps are recommended:	III) MAP Goal: If persistently requiring levophed (1-5ug/min) consider a MAP goal of $\geq 55\text{mmHg}$ as long as urine output $\geq 30\text{ml/hr}$, ScvO ₂ $\geq 70\%$ and lactate $\leq 4\text{mmol/L}$.
I) Initiate 5% albumin infusion at 1/3 of current resuscitation rate and make up the remainder of rate with RL. Titrate infusion to urine output as described above. After 24 hours post burn, titrate infusion down to maintenance and continue albumin until 48 hours post burn.		IV) Ca²⁺ and Cortisol (<i>discuss with ICU fellow/attending before initiation of treatment</i>) If patient exhibits catecholamine-resistant shock (defined as SBP $\leq 90\text{mmHg}$ after 1 hour of aggressive IVF and vasopressor administration), consider adrenal insufficiency (check a random cortisol and start hydrocortisone 100mg IV q8h) or hypocalcaemia (maintain ionized calcium $\geq 1.1\text{ mmol/L}$). (1-5)
II) Watch for signs of Intra-Abdominal Hypertension (bladder pressure $\geq 15\text{mmHg}$, increased airway pressures, decreased urine output, hypotension) and extremity compartment syndromes (absent doppler signal or pulses that are diminishing on serial exams q30-60 minutes should prompt consideration of escharotomy)		1. Azzopardi EA, McWilliams B, Iyer S, Whitaker IS. Fluid resuscitation in adults with severe burns at risk of secondary abdominal compartment syndrome—An evidence based systematic review. Burns. 2009 Nov 1;35(7):911-20. 2. Ennis JL, Chung KK, Renz EM, Barillo DJ, Albrecht MC, Jones JA, et al. Joint Theater Trauma System implementation of burn resuscitation guidelines improves outcomes in severely burned military casualties. J Trauma. 2008 Feb 1;64(2 Suppl):S146-51; discussion S51-2. 3. Latenser BA. Critical care of the burn patient: the first 48 hours. Critical Care Medicine. 2009 Oct 1;37(10):2819-26. 4. Saffle JIL. The phenomenon of "fluid creep" in acute burn resuscitation. J Burn Care Res. 2007 Jan 1;28(3):382-95. 5. Cartotto R, Zhou A. Fluid creep: the pendulum hasn't swung back yet! J Burn Care Res. 2010 Jan 1;31(4):551-8.

Patient Label

Resuscitation Flow Sheet Adult Major Burns Clinical Practice Guidelines

Date	Name	PHN
Injury Date + Time	Initial Treatment Facility	Initial Treatment Time

Pre-Burn Estimations		Estimated Fluid Volume Patient Should Receive		
Weight (kg)	% TBSA	1st 8hrs	2nd 16hrs	Est. Total 24hrs

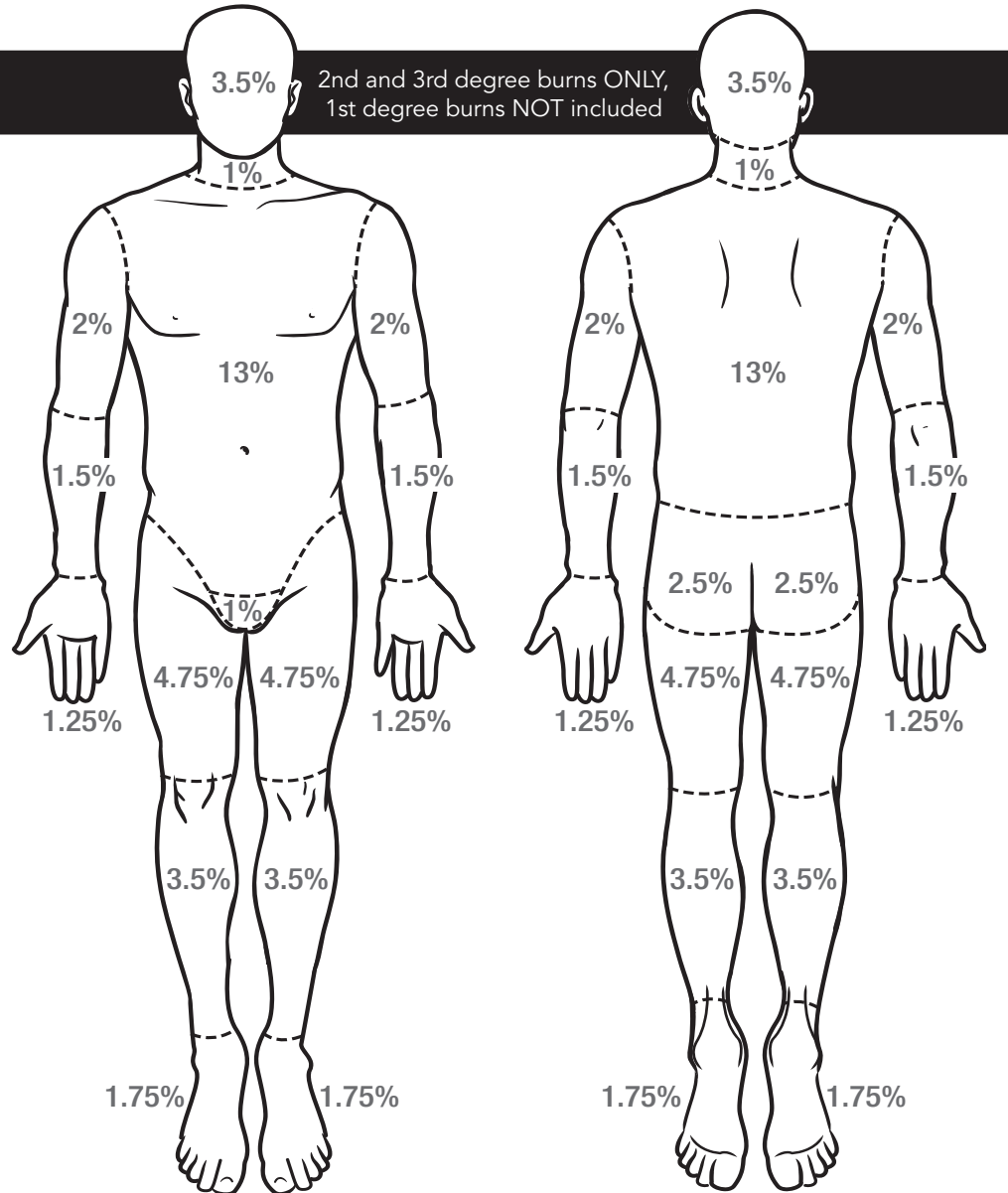
Tx Site/Team	After Burn	Local Time	Crystalloid	Colloid	TOTAL	Urine Output	Lactate	MAP
	1st hr							
	2nd hr							
	3rd hr							
	4th hr							
	5th hr							
	6th hr							
	7th hr							
	8th hr							
	9th hr							
	10th hr							
	11th hr							
	12th hr							
				Total Fluids:	Fluid Balance:			
	13th hr							
	14th hr							
	15th hr							
	16th hr							
	17th hr							
	18th hr							
	19th hr							
	20th hr							
	21st hr							
	22nd hr							
	23rd hr							
	24th hr							
				Total Fluids:	Fluid Balance:			

Patient Label

TBSA Burn Estimation Chart

Adult Major Burn Clinical Practice Guideline

Anatomical Subunit	Percent Total	Percent One Side		Injury Subtotal
		Anterior	Posterior	
Head	7	3.5	3.5	
Neck	2	1	1	
Anterior Trunk	13	13	0	
Posterior Trunk	13	0	13	
Right Buttock	2.5	0	2.5	
Left Buttock	2.5	0	2.5	
Genitalia	1	1	0	
Right Upper Arm	4	2	2	
Left Upper Arm	4	2	2	
Right Lower Arm	3	1.5	1.5	
Left Lower Arm	3	1.5	1.5	
Right Hand	2.5	1.25	1.25	
Left Hand	2.5	1.25	1.25	
Right Thigh	9.5	4.75	4.75	
Left Thigh	9.5	4.75	4.75	
Right Leg	7	3.5	3.5	
Left Leg	7	3.5	3.5	
Right Foot	3.5	1.75	1.75	
Left Foot	3.5	1.75	1.75	
Total	100%	48%	52%	



Physician/Paramedic Name _____ Physician/Paramedic Signature _____

FLUID CALCULATION (May underestimate fluid requirement if resuscitation is delayed)

Patient weight: _____ kg [A] 3ml x [A] x [B] = _____ [C]

% TBSA burned: _____ % [B] [C] ÷ 16 = _____ ml/h starting RL infusion rate

Complete this form and fax to: (604) 875-5829