DESCRIPTION/OVERVIEW
This is a nurse-driven and physician referenced guideline for the acute resuscitation of the adult burn patient weighing more than 30kg and burn greater than 20% TBSA.

REFERENCES

AREAS OF RESPONSIBILITY
Medical and Nursing staff caring for the burn patients weighing more than 30kg and burn greater than 20% TBSA.

GUIDELINE PROCEDURES
For Patients > 30kg and >20% TBSA

<table>
<thead>
<tr>
<th>Time, Date, &amp; Type of Injury</th>
<th>Admission Weight(kg)</th>
<th>%TBSA</th>
<th>Total LR for 24 hours</th>
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</table>

Calculation for Resuscitation:

1. Ascertain the type of burn injury:
   - Thermal and Chemical burn injury **without** suspected inhalation injury:
     i. $2\text{cc} \times \text{admit weight(kg)} \times \% \text{TBSA} \ 2^{\text{nd}} \text{ and } 3^{\text{rd}} \text{ degree burns} = \text{LR fluid total for 24 hrs}$
   - Thermal or Chemical burn injury **with** suspected inhalation injury:
i. 3cc x admit weight(kg) x % TBSA 2nd and 3rd degree burns = LR fluid total for 24 hrs

- High Voltage Electrical, with evidence of deep tissue injury or hemochromogens in the urine, without regard to the presence of an inhalational injury:
  i. 4cc x admit weight(kg) x % TBSA 2nd and 3rd degree burns = LR fluid total for 24 hrs

2. Divide fluid total in half.

3. Give first half of fluid in first 8 hours and second half of fluid in remaining 16 hours post injury (*note: hourage is determined from the onset of injury NOT the arrival time to hospital).

4. **Take the first 8 hr fluid goal and divide by 8 to get hourly rate for IVF.** Remember to incorporate the pre-hospital and ER fluid administration into the first 8 hr calculation. (Example: If the patient received 2L crystalloid in the ER prior to arrival to the unit, subtract 2L from the 8 hour total, divide the remaining by 8 to get your hourly rate.)

5. LR maintenance fluid:
   - 4cc/hr for the first 10kg of body weight
   - 2cc/hr for the second 10kg of body weight
   - 1cc/hr for the remaining body weight
   - **Maintenance rate=_______ cc/hr**
     - Run maintenance fluid at set rate during resuscitation. This is **independent from resuscitation fluids.**

6. Urine output goal: 0.5-1cc x weight (kg) = cc/hr
   - **UOP goal: ________ cc/hr**

7. Titrate fluids hourly based on Urine output.
   - If the UOP < goal, increase IVF rate by 20%.
   - If UOP continues to be below goal in the next hour, increase IVF by 20% and notify Burn Attending.
   - If UOP > than 1-2cc/kg/hr for 2 consecutive hours: decrease IVF rate by 10% but do not drop below calculated maintenance rate.

8. If unable to meet UOP goal after 2 hours add: Albumin 5% gtt for 18hrs (0.3cc x weight (kg) x %TBSA/18 = cc/hr (not titrated))
   - **Albumin 5% gtt rate (not titrated): ________ cc/hr**
9. If Albumin does not help after 2 hours add FFP (1 unit over 1 hour) monitor Hct 1 hour post infusion and q4 hours thereafter until resuscitation complete.

10. When the patient is able to maintain UOP and had completed their 24 hour fluid goal and time goal, then fluid can be changed to D5 1/2 NS.

11. Vitamin C infusion ordered for burns > 30%TBSA. **Used only until patient reaches the end of the resuscitation time or 18hrs of Vitamin C infusion**, whichever is sooner.

   - \( \frac{(66 \times \text{weight (kg)})}{25} = \text{cc/hr (do not titrate)} \)
   - **This amount is in addition to the maintenance fluid rate. (Vit. C alters accu-check reads, USE LAB DRAWS while the patient is receiving Vit C).**

12. Labs:

   - Admission:
     - Type & Cross
     - CBC
     - Full set of labs (including Chem 7, LFTs, Mg, Phos, Ionized Ca, Lactate, Coags)
     - ABG if intubated
     - HCG (if Female)
     - Carboxyhemoglobin if inhalation injury is suspected
     - Urine Myoglobin, CK, if electrical injury is suspected

   - During resuscitation initial 48 hours:
     - CBC q6hr, Hct & Hgb q6 hour (drawing one q 3 hours)
     - Glucose q1hr
     - Chem 7, lactate, Ionized Ca, Mg, Phos: q6hr
     - ABG if intubated q6hr

   - Routine Labs after resuscitation:
     - Q3 days: Type & Screen
     - Complete every Monday and Thursday:
       - Prealbumin, Amalyse, Lipase, LFTs, Cortisol, CBC, TSH, CRP, Chem 7, Mag, Phos, PT/PTT, Copper, Zinc, Selenium.
Example:
100kg patient with 30% TBSA without a suspected inhalation injury:

\[2 \text{cc} \times 30(\%\text{TBSA}) \times 100\text{kg} = 6\text{L resuscitation fluid}\]
- half in first 8 hours : 3L
  - 3000\text{cc} / 8\text{hr} = 375\text{cc} per hour LR
- half over following 16hrs: 3L
  - 3000\text{cc} / 16\text{hr} = 187.5\text{cc} per hour LR

Maintenance rate calculation:
4cc/hr for the first 10kg of body weight = 4cc/hr \times 10kg = 40cc/hr
2cc/hr for the second 10kg of body weight = 2cc/hr \times 10kg = 20cc/hr
1cc/hr for the remaining body weight = 1cc/hr \times 80kg = 80cc/hr

**Maintenance rate total = 140cc/hr** (at no point in the resus does the IVF rate drop below this)

When you add the Resus + Maintenance = 515cc/hr (goal for the first 8 hours)
  - This may be increased or decreased based on the UOP goal of 0.5-1cc/hr
  - But, do not drop rate below the Total Maintenance = 140cc/hr

The Vitamin C is a separate calculation that is used for 18 hours or resuscitation is over.
RESOURCES/TRAINING
Training for nursing and medical staff to be done by Unit Based Educators, Charge Nurses, and Attending Physicians in the Trauma, Surgical, and Burn Intensive Care Unit.

<table>
<thead>
<tr>
<th>Resource/Dept</th>
<th>Contact Information</th>
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<tbody>
<tr>
<td>Crystal Sanchez, RN, MSN-TSBICU</td>
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<tr>
<td>Elizabeth Melton, ACNP, MSN-TSBICU</td>
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<td>Jon Marinaro, MD-TSBICU</td>
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<td>Beth Jones, RN, MSN-TSBICU</td>
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<td>Lauren Dyer, RN, BSN-TSBICU</td>
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DOCUMENT APPROVAL & TRACKING

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ATTACHMENTS
1. Adult Burn Resuscitation Flowsheet
2. Adult Burn Resuscitation Care Map
**Adult Burn Resuscitation Protocol Flowsheet**

For Patients > 30kg and >20% TBSA

<table>
<thead>
<tr>
<th>Fluid Calculation Used (Circle one)</th>
<th>2cc x kg x TBSA</th>
<th>3cc x kg x TBSA</th>
<th>4cc x kg x TBSA</th>
<th>Estimated Fluid Volume Patient Should Receive</th>
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<tbody>
<tr>
<td>Name</td>
<td>Weight(kg)</td>
<td>%TBSA</td>
<td>1st 8 hours</td>
<td>2nd 16 hours</td>
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Maintenance Fluid Rate: ________ cc/hr     Calculated Urine output goal: ________ cc/hr

Total IVF Pre-hospital and ER: _______
(Site: PH= Pre-hospital; ER= Emergency Room; ICU= Burn Unit)

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<tr>
<th>Site</th>
<th>Hour</th>
<th>Time</th>
<th>Crsyt/Colloid</th>
<th>Total</th>
<th>UOP</th>
<th>BP</th>
<th>MAP</th>
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<th>Pressors (Y/N)</th>
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8 Hour Goal: ________
8 Hour Actual: ________
+Overage/-Shortage: ________

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16 Hour Goal: ________
16 Hour Actual: ________
24 Hour Goal: ________
24 Hour Actual: ________
24 Hour +Overage/-Shortage: ________
**Adult Burn Patients >30kgs >20% TBSA**

**Thermal & Chemical**

- Suspected Inhalation Injury?
  - No
  - Resuscitation Formula: 2cc x kg x %TBSA
  - Divide total resuscitation fluid by 2
  - Give 1st half over 8 hours
  - Monitor UOP hourly
    - if UOP is >1-2cc/kg/hr x 2 hours, decrease resuscitation fluid by 10%

- Yes
  - Resuscitation Formula: 3cc x kg x %TBSA
  - Give 2nd half over following 16 hours
  - Titrate resuscitation fluid based on urine output!

**Considerations:**
- Bronchoscopy
- Inhaled Heparin and Mycomyst

**Electrical**

- Resuscitation Formula: 4cc x kg x %TBSA
- Considerations:
  - Place DHT (postpyloric) ASAP for nutrition and medication administration.
  - Assess need for escharotomy if circumferential burns are present or fluid requirements are trending up.

- UOP: 0.5-1cc/kg/hr?
  - Yes
  - Increase resuscitation rate by 20%
  - Recalculate TBSA
  - Start 5% Albumin
  - Start Vitamin C
  - Contact Attending

- No
  - UOP: 0.5-1cc/kg/hr?
    - Yes
    - Increase resuscitation rate by 20%
    - Contact Attending
    - Monitor UOP hourly
    - If UOP is >1-2cc/kg/hr x 2 hours, decrease resuscitation fluid by 10%
    - Recalculate TBSA
    - Start 5% Albumin
    - Start Vitamin C
    - Contact Attending
  - No
    - Increase resuscitation rate by 20%