Temperature Regulation

1. **The purpose of temperature management on transport is to prevent potential complications that may result from hypothermia or fever. Measures may be required to warm a hypothermic patient or cool a febrile patient to prevent cardio-respiratory instability.**
2. **Hypothermia**
    a. **Hypothermia results from heat loss exceeding the body's ability to generate heat. Infants are pre-disposed to hypothermia due to decreased subcutaneous brown fat and high surface area. Infants' large head size in proportion to body size also pre-disposes them to hypothermia, because scalp vessels are not capable of significant vasoconstriction. Fifty percent of radiant heat loss occurs from the neck up. Low body temperature causes vasoconstriction, lactic acid production and hypoglycemia, which can lead to metabolic acidosis, and hypothermic coagulopathy. Rapid temperature changes also stress the heart leading to arrhythmias, fibrillation and arrest.**
    b. **Symptoms of hypothermia are rectal temperature less than 36 degrees C. or 96.8 F, cool skin, mottled coloring and low heart rate.**
3. **Fever**
    a. **Defined as rectal temperature greater than 100.5F in infants less than 3 months, or temperature greater than 101.5F in patients older than 3 months. Fever increases the metabolic rate and oxygen requirements. Each one degree C rise in temperature increases the BMR 12%.**
    b. **Rapidly rising temperatures may trigger febrile seizures, it can increase imflammatory response in endotoxic shock, and it can increase ICP in a patient with neurologic instability. There is little risk of serious complications until body temperature is greater than 106F. However, cooling measures should be implemented for temperature greater than 104F or for those patients in whom a fever may be potentially harmful including: neurologic instability, impaired coronary perfusion, endotoxic shock, or dehydration.**
4. **Transport Conditions**
    a. **Patients may be transported in weather conditions that are excessively cold or hot. These conditions may unduly influence the body temperature of the patient. Measures should be taken to keep the patient warm or cool as needed.**
5. **Supervision**
    a. **When possible, the primary physician should be contacted before the procedure. In all emergencies, the primary physician will be notified as soon as possible while advanced life support is being initiated.**

b. **Under all circumstances the Advanced Life support team will carry out urgent resuscitation according to the procedure.**
c. **In the event that an Advanced Life support policy or procedure is altered via a referring physician (verbal or written order) then the ALS nurse or therapist will inform the physician that he/she is not certified to carry out the altered plan and must either adhere to the procedure or relinquish responsibility to the physician.**

6. **Patient Conditions**
   a. **The ALS team is authorized to perform warming or cooling measures when:**
      i. **A child's temperature is less than 36 degrees Celsius or 96.8 degrees Fahrenheit.**
      ii. **A child is febrile with temperature greater than 104 degrees Fahrenheit, or for a child in whom a fever may be potentially harmful including: neurologic instability, impaired coronary perfusion, endotoxic shock, or dehydration.**
      iii. **A child is transported in weather conditions that may unduly influence the body temperature.**
7. **Procedure: Warming-**
   a. **Explain steps to patient and/or parent.**
   b. **Remove wet Linens.**
   c. **Turn on overhead warming lights if available. Use overhead warming lights while at referring facility. The overhead exam light in the ambulance is a warming light. If radiant warmer will be needed, call receiving unit before leaving referring facility.**
   d. **In ambulance, helicopter, or fixed wing plane the heater should be turned on to warm the environment. For infants less than 3 Kg normothermic environments should be approximately 86-91 degrees Fahrenheit.**
   e. **The disposable porta-warmer should be brought on transport if there is known hypothermia or if pt is an infant.**
   f. **Obtain Mylar blanket from CHET bag. Mylar blankets provide greater heat exchange by reflecting body temperature back to patient and effectively stopping heat loss. Covering Mylar with other blankets increases the effect of the Mylar blanket. Wrap Mylar blanket around patient. The posterior, lateral and top of head should be included inside the blanket, since 50% of radiant heat loss occurs from neck up. For significantly hypothermic patients or small infants, the disposable porta-warmer can be placed under the patient inside the blanket.**
   g. **For infants less than 5 kg consider need for isolette transport.**
   h. **Temperature should be obtained at least every 30 minutes.**
8. **Procedure: Cooling-**

a. **Explain steps to patient and/or parents.**
b. **Tylenol or Ibuprofen (requires MD order) should have been given prior to cooling measures.**
c. **Remove as much of clothing as possible. Cover with sheet or light blanket if necessary. Leave infant or toddler in diaper only.**
d. **Use air-conditioner in transport vehicles to lower environmental temperature to facilitate cooling.**
e. **For long transports sponge bathing may be necessary. Obtain basin, washcloths, towels and tepid water prior leaving referring facility for sponge bathing. In sponge bathing, tepid water is used to prevent too rapid a temperature decrease. Alcohol is contraindicated because it can be absorbed through the skin or inhaled through the fumes and may be lethal. Ice water and/or ice packs are not used, as this may cause too rapid a temperature decrease, and may lead to arrhythmias, fibrillation and arrest.**
f. **Place wet towel under patient, then additional wet towels or washcloths on patient paying attention to areas with large superficial blood vessels: the neck, the groin, and the axilla. Re-wet towels if they become dry or too warm. If during cooling patient demonstrates cyanosis of the lips excessive shivering s/s of shock discontinue notify MD after taking temperature.**
g. **Discontinue sponging after 20 minutes. Retake temperature 15 minutes after sponging completed.**
h. **Monitor temperature at least every 30 minutes during transport**

9. **Documentation**
   a. **Document patient assessment and need for cooling measures on transport record including temperature and vital signs.**
   b. **Document procedure on transport record including patients' response and any complications.**
   c. **Document vital signs every 15 minutes during procedure and after procedure. Document patient temperature 15 min after procedure.**