Temperature \( \geq 40^\circ C (104^\circ F) \)

**Initial Management**
1. ABCs (avoid succinylcholine for intubation)
2. Two large bore peripheral IVs
3. Place rectal or esophageal thermometer
4. Insert NG tube
5. 20-40 cc/kg NS fluid bolus if hypovolemic
6. EKG/Place on monitor

**Diagnostics**
1. CBC w/ Diff
2. EP1
3. Ca/Mg/Phos
4. LFTs
5. Coags
6. Lactate
7. Troponin
8. Total CK
9. TSH
10. Free T4
11. ASA
12. Tylenol
13. UA
14. UDS
15. UCx/BCx
16. CXR

**Initial Management**

- **Dysrhythmia?**
  - Yes: 1. ACLS
  - No: 2. CPQE Tachydysrhythmia Protocol

**H&P**

- **Exertional Heat Stroke?**
  - Yes: A (Continue Intervention on Page 4)
  - No: No

- **Classic Heat Stroke?**
  - Yes: B (Continue Intervention on Page 4)
  - No: No

- **Alternative Diagnosis**
  - Yes: C (Continue on Page 2)
  - No: No
Alternative Diagnosis

Neuroleptic Malignant Syndrome?
1. AMS
2. Rigidity (lead pipe)
3. Dysautonomia
4. Chronic use of antipsychotics/antiemetics
5. Develops over 1-3 days

Yes

Discontinue offending agent
Consider pharmacologic treatment
a. Dantrolene 2 mg/kg IV Q6-12 hrs (max 10 mg/kg/day)
b. Bromocriptine 2.5-10 mg PO/NG Q6-8 hrs (max 40 mg/day) (Contraindicated in Serotonin Syndrome)
c. Amantadine 100-200 mg PO/NG Q12 hrs

No

Discontinue offending agent
Consider pharmacologic treatment
a. Dantrolene 2 mg/kg IV Q6-12 hrs (max 10 mg/kg/day)

Serotonin Syndrome?
1. AMS
2. Tremor/Clonus
3. Myoclonus/Hyperreflexia (LE>UE)
4. Develops over 24 hours
5. Recent amphetamines/MDMA, SSRI, SNRIs, TCAs, MAOIs, triptans, buspirone, zofran, bupropion, tramadol, levodopa, fentanyl, dextromethorphan, linezolid

Yes

Discontinue offending agent
Cyproheptadine 12 mg PO/NG then 2 mg Q2 hrs (maintenance 8 mg Q6 hrs)
Bromocriptine/dantrolene contraindicated

No

Discontinue offending agent
Cyproheptadine 12 mg PO/NG then 2 mg Q2 hrs (maintenance 8 mg Q6 hrs)
Bromocriptine/dantrolene contraindicated

Malignant Hyperthermia?
1. Recent succinylcholine/sevoflurane/isoflurane (0-24 hrs)
2. Elevated ETCO2
3. Sinus tachycardia
4. Muscle rigidity (esp. masseter muscle)

Yes

Discontinue offending agent
Dantrolene 2 mg/kg IV, then 1 mg/kg IV Q5 min (max 10 mg/kg/day)
Increase RR/TV to blow off excess CO2
Call 1-800-MH-HYPER

No

Discontinue offending agent
Dantrolene 2 mg/kg IV, then 1 mg/kg IV Q5 min (max 10 mg/kg/day)
Increase RR/TV to blow off excess CO2
Call 1-800-MH-HYPER

Sepsis/Meningitis/Brain Abscess/Encephalitis?
1. SIRS
2. Source of infection
3. Meningismus

Yes

CPQE Sepsis Protocol
Tylenol 975 mg PO/PR/NG
Early broad-spectrum antibiotics

No

CPQE Sepsis Protocol
Tylenol 975 mg PO/PR/NG
Early broad-spectrum antibiotics

D (Continue on Page 3)

Revised 4-28-2016
Drug Overdose/Withdrawal?
1. History of drug/alcohol abuse
2. Prior suicide attempts
3. Suspected ingestion
4. Sympathomimetic toxidrome
5. Anticholinergic toxidrome
6. Alcohol/Benzodiazepine withdrawal
7. Chronic salicylate use

Yes
1. Drug and Poison Information Center 1-800-222-1222
2. CPQE Ingestion Protocol
3. CPQE Salicylate Protocol
4. CPQE Alcohol Withdrawal Protocol

No
Thyroid Storm?
1. History of hyperthyroidism
2. Anorexia/Weight loss
3. Goiter
4. Fatigue/Weakness
5. Tachycardia/A-fib
6. AMS/Anxiety
7. Diaphoresis

Yes
1. CPQE Thyroid Storm Protocol
2. Endocrine consult

No

Status Epilepticus?
1. History of seizures
2. Actively seizing
3. Suspect non-convulsive status

Yes
1. Thiamine 100 mg IV and 50 ml of D50 IV
2. Ativan 2 mg IV Q2 min
3. Alternative agents:
   a. Midazolam 10 mg IM
   b. Diazepam 20 mg PR
4. NSICU Status Epilepticus Protocol (see below)
5. Neurology consult

No

Hypothalamic Stroke / Cerebral Hemorrhage?
1. Elevated NIHSS
2. Sudden Onset
3. Severe Headache
4. AMS

Yes
1. CT and or LP
2. CPQE Acute Stroke Protocol
3. Stroke Team/Neurosurgery Consult

No
**Ice Water Immersion**

1. Water tub in G046E (decon room, key next to B-Pod HUC)
2. Ice over entire surface of water
3. Remove clothes and immerse
4. Arm(s) out for IV access
5. Towel under arms to hold head above water
6. Constant circulation of water
7. Midazolam 2.5-10 mg IV or Fentanyl 50-100 mcg IV for shivering
8. Consider intubation/paralysis if not tolerating
9. Recommended labs:
   - BMP, LFT, Total CK, Mag, Phosphorus, UA, PT/INR and if physician feels appropriate, trending q 2-4h BMP and Total CK if necessary

**Evaporative Cooling**

1. Remove clothes
2. Fans on high speed
3. Constant room temperature water mist
4. Midazolam 2.5-10 mg IV or Fentanyl 50-100 mcg IV for shivering

**Exertional Heat Stroke**

1. Continue evaporative cooling
2. Consider cooling blanket and ice packs
3. Consider gastric, peritoneal, bladder lavage with cold NS
4. Consider cold NS IV infusion
5. Consider IV cooling catheter

**Classic Heat Stroke**

1. Discontinue active cooling
2. Maintain normotension (IVF, pressors, esmolol)
3. Correct electrolytes
4. Empiric broad-spectrum antibiotics
5. Consider central line placement
6. Consider bicarb for rhabdo/acidosis
7. Consider blood products for coagulopathy/DIC
8. Consider Head CT and/or LP
9. Refer to Disposition From ED Criteria on page 5

**Alternative Diagnosis**

1. Goal Reached?
   - 38.6°C (101.5°F) in 60 min.
   - Yes
   - No

   Further Management

   1. Continue evaporative cooling
   2. Consider cooling blanket and ice packs
   3. Consider gastric, peritoneal, bladder lavage with cold NS
   4. Consider cold NS IV infusion
   5. Consider IV cooling catheter

   - A
   - B
   - E
Discharge from ED

Discharge to Home
- Normothermic without requiring cooling measures (ice bath or evaporative cooling) while at UCMC with normal mental status and vital signs
- Tolerating oral liquids and medication
- During period while at UCMC ED, Cr <1.5x baseline, Total CK downtrending or < 5,000 and no evidence of liver dysfunction and normal PO4.
- Physician discretion based on only mild laboratory abnormality and clinical improvement while in ED.

Admit to Obs
- Presentation is consistent with isolated heat related illness with mild dehydration and need for continued fluid hydration and sequential laboratory evaluation to evaluate for rhabdomyolysis, hepatic injury, acute kidney injury (BMP, Hepatic Function Panel, Total CK, PT/INR, UA)
- Vital signs stable with SBP > 90, HR < 115, normothermic and normal mental status (GCS 15)
- Laboratory analysis with evidence of moderate dehydration or mild rhabdomyolysis with Cr < 2x baseline/normal upper limit, Total CK < 20,000, LFTs < 500 with normal coagulation parameters
- Anticipated observation stay greater than 8 hours and less than 23 hours
- Heat illness requiring cooling measures (ice bath, evaporative cooling) while at UCMC ED and currently normothermic, but requiring continued temperature monitoring

Admit to Inpatient
- Unstable vital signs, altered mental status, hyperthermia requiring prolonged or multiple cooling measures while in UCMC ED
- Clinical picture consistent with continued Heat Stroke with AMS, seizure
- Cr > 2x upper limits of normal despite fluid resuscitation, uptrending total CK > 20,000, LFTs uptrending or > 1000 or abnormal coagulation indicating acute liver injury