Normal Vital Signs

**Blood Pressure:**
Adults: defined with 2 measurements on 2 different dates at least 2 weeks apart
- Normal BP: <120/<80 mmHg
- PreHTN: 120-139/80-89 mmHg
- HTN Stage I: 140-159/90-99 mmHg
- HTN Stage II: >160/>100 mmHg

Children:
- Birth (12 Hr, <1000g): 39-59/16-36 mmHg
- Birth (12 hr, 3 kg): 50-70/25-45 mmHg
- Neonate (96hr): 60-90/20-60 mmHg
- Infant (6 mo): 87-105/53-66 mmHg
- Toddler (2 yr): 95-105/53-66 mmHg
- School Age (7yr): 97-112/57-71 mmHg
- Adolescent (15yr): 112-128/66-80 mmHg

**Heart Rate:**
Adults:
- Female: 55-95 bpm
- Male: 50-90 bpm

Children:
- Neonate: 100-180 bpm awake  80-160 bpm asleep
- Infant (6mo): 100-160 bpm awake  75-160 bpm asleep
- Toddler: 80-110 bpm awake  60-90 bpm asleep
- Preschooler: 70-110 bpm awake  60-90 bpm asleep
- School-aged child: 65-110 bpm awake  60-90 bpm asleep
- Adolescent: 60-90 bpm awake  50-90 bpm asleep

**Respiration Rate:**
Adults:
- 12-18 breaths per minute

Children:
- Infants: 30-60 breaths per minute
- Toddlers: 24-40
- Preschoolers: 22-34
- School-aged children: 18-30
- Adolescents: 12-16
Emergency Procedures

1. Stroke & TIA
   Signs/Symptoms:
   • Sudden numbness or weakness of the face, arm or leg, especially on one side of the body
   • Sudden confusion, trouble speaking or understanding
   • Sudden trouble seeing in one or both eyes
   • Sudden trouble walking, dizziness, loss of balance or coordination
   • Sudden severe headache with no known cause
   • Give 3 commands: “Smile … raise arms over head … say a simple sentence”

   Response:
   • Immediately call 911 or the emergency medical services (EMS) team so an ambulance (ideally with advanced life support) can be sent.
   • Check the time so you’ll know when the first symptoms appeared. Immediate action can decrease the risk of loss of function/disability and sensation. Medical tx within 3-6 hrs can help prevent the most severe consequences of stroke. Evaluation within 60 minutes is ideal.
   • Not all warning signs occur in every stroke. Don’t ignore signs of stroke, even if they go away.
   • Monitor vital signs: blood pressure (B), HR, RR, and keep the patient calm and comfortable until help arrives.

   **Symptoms of TIA begin suddenly and are similar to those of stroke, but leave no residual damage. By definition, symptoms of TIA resolve within 24 hours, but typically they last less than five minutes. Because the symptoms of TIA cannot be distinguished from those of acute stroke, these symptoms must be aggressively treated as soon as possible.

2. Hypoxemia
   (Decreased O₂)
   Signs/Symptoms:
   • Shortness of breath &/or dyspnea
   • Cyanosis
   • Tachycardia
   • Tachypnea
   • Fatigue
   • Mental Status Changes: confusion, agitation, memory loss, depression
   • Poor nighttime sleep &/or morning headaches

   Response:
   • Stop activity & have patient sit & rest
   • Provide supplemental oxygen (if prescribed)
   • Instruct patient in deep breathing techniques
   • Record PulseOx sats
   • Check & record other vital signs (including lung auscultation)
3. Decreased BP/Hypotension  
(Systolic pressure below 100 mmHg)

Causes:
- (may be normal for a healthy person)
- Orthostatic hypotension following rapid supine to stand
- Poor venous return (brought on by prolonged standing)
- Dehydration
- Postprandial hypotension (after meal in older adults)
- ↓ blood volume (external or internal blood loss)
- ↓ cardiac output
- Valsalva maneuver
- Pregnancy (usually not acute)
- Medications
- Heart problem (bradycardia, ischemia, heart failure, valve malfunction)
- Endocrine problems (thyroid dysfunction, diabetes)
- Severe infection (septic shock)
- Allergic reaction
- Nutritional deficiencies (B-12 and folic acid)
- Neuraly mediated (long time standing)
- Shock
- Stress/trauma

Signs/Symptoms:
- Dizziness or light-headedness
- Loss of consciousness, syncope (fainting)
- Diaphoresis (excessive perspiration)
- Nausea
- Blurred vision
- Lack of concentration
- Fatigue
- Depression
- Thirst
- Rapid/shallow breathing

Response:
- Hydrate (drink water)
- Lie down, to get blood back to heart. May also elevate legs.
  - In CHF, full supine position is contraindicated as it causes orthopnea (SOB), so instead put in a semi-fowlers position, with head of bed elevated 30d (like a recliner).
  - After symptoms subside, the patient may slowly return to sitting, pause, then progress to standing, as tolerated.
  - If standing, contract calf muscles (toe curls, heel rises) to help pump blood back to heart.
4. Increased BP/Hypertension

**Signs/Symptoms:** Usually none, but for dangerously high levels, check for headache, blurred vision, confusion, ear noise or buzzing

**Response:**
1. Always check vitals before doing activity. Terminate exercise if SBP is > 220 mmHg and/or if DBP > 110 mmHg. OR if BP or HR go ↓ in response to exercise.
   * dropping BP or HR is more dangerous than an excessive rise.*

2. If patient is having no additional symptoms such as angina, diaphoresis, pallor, nausea, confusion, ataxia, or dizziness continue to monitor BP every 5 minutes until SBP returns to within 10-20 mmHg of pre-exercise and notify the PCP. Do not re-initiate exercise unless approved by the physician.

   **If these symptoms are present the following should be done:**
   - Call 911 if angina is not relieved with Nitroglycerine (under the tongue) or the above symptoms are persistent and BP does not decrease appropriately.
   - Or --
   - If the patient has significant report of symptoms that is relieved with rest, monitor vitals every 5 minutes until BP reaches 10-20 mmHG of pre-exercise values and call PCP.

5. Hyperglycemia & Hypoglycemia

**a) Hyperglycemia**

**Treatment:** Insulin should be given in a hospital.

(Children: 0.25 – 0.5 units/kg. Adults: 10% - 20% of total daily dose.)

**b) Hypoglycemia**

**Treatment:** When a patient has severe hypoglycemia and becomes unconscious it should be treated with an emergency glucagon “gun” kit (requires a prescription). After injecting glucagon, follow with food once the person regains consciousness and is able to swallow.

<table>
<thead>
<tr>
<th>Causes</th>
<th>Onset</th>
<th>Blood Sugar</th>
<th>Symptoms</th>
<th>What Can You Do?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hyperglycemia/Ketoacidosis</strong></td>
<td>Too much food, too little insulin, illness or stress</td>
<td>Gradual, may progress to diabetic coma</td>
<td>Above 300 mg/dL, or above 250 mg/dL with ketones present</td>
<td>Test blood sugar every 15 min. Drink lots of water. Try a trial of light exercise to see if blood sugar will lower. Call doctor if persistently high.</td>
</tr>
<tr>
<td><strong>Hypoglycemia/insulin shock</strong></td>
<td>Too little food, too much insulin or diabetes medicine, or extra exercise</td>
<td>Sudden, may progress to unconscious -nesss, shock</td>
<td>Below 70</td>
<td>Drink half a cup of OJ or milk OR eat several hard candies, test blood sugar (if symptoms don’t stop, call doctor). Within 30 min. after symptoms go away eat a light snack (half a peanut butter or meat sandwich).</td>
</tr>
</tbody>
</table>
Treating a conscious diabetic patient:
- If the patient is conscious and coherent, have them check their blood sugar level.
- If the person is behaving oddly and is suffering from hypoglycemia but is still conscious and capable of swallowing then feed them sugar (fruit, orange juice, glucose, or white sugar dissolved in juice or water). If not dial 911 and keep trying.
- If the person has difficulty swallowing, try rubbing a small amount of sugar or glucose gel on their gums.
- If suffering from hyperglycemia, do not feed the patient. Push water while conscious and get the patient to medical treatment promptly.

Treating an unconscious diabetic patient:
- If the person is unconscious dial 911 and put the patient in the recovery position. Monitor vital signs.
- If the patient is unconscious and having seizures dial 911 and follow the first aid protocol for seizures (remove anything on which the patient could injure themselves and put in the recovery position once the seizure is over)

*** NOTE: Since it may be hard to tell if the person is suffering from hypoglycemia or hyperglycemia (a glucometer may not be available), you can safely give the person a small amount of sugar to see if it helps. This will not cause harm to the person suffering from hyperglycemia ****

Exercising a Patient with Diabetes
- Check blood sugar before, during, after exercise
  - Before: ideal blood sugar level is 120-160
  - Before: if < 100, eat a snack
- Snack before, during, after, ie, every 30 minutes
  - Snack: 20-30g of carb, e.g. 6 oz. of OJ is 20g
- Continue to watch for hypoglycemia 4-6-12h post exercise
- Don’t start exercise, OR stop exercise if:
  - < 80 → give a snack, wait 10 min, then begin
  - > 250 (with ketones)
  - > 300

** Autonomic neuropathy can mask the person’s perception of hypoglycemia
6. Grand Mal (Generalized) Seizure

**Signs**
- Loss of consciousness, falling down, loss of bowel or bladder control, and rhythmic convulsions.
- Muscle contractions and rigidity
- Falls, Rapid pulse, Pallor, Dilated pupils
- Biting the tongue, Frothing at the mouth
- Eyes rolling back in the head

**Immediate Recovery**
- Gradual awakening to consciousness
- Confusion
- Long sleep (after a brief awakening)

**Full Recovery**
- Fully awake, Normal mental stage (in some people)
- Tiredness, Depressed mood

**What to do:**
- Protect the person from injury (remove harmful objects from nearby)
- Cushion their head
- Aid breathing by gently placing them in the recovery position one the seizure has finished.
- Be calmly reassuring
- Stay with the person until recovery is complete

**DON’T**
- Restrain the person
- Put anything in the person’s mouth
- Try to move the person unless they are in danger
- Give the person anything to eat or drink until they are fully recovered
- Attempt to bring them round

**Call an AMBULANCE if...**
- You know it is the person’s first seizure
- The seizure continues for more than 5 minutes
- One seizure follows another without the person regaining consciousness between
- The person is injured during the seizure
- You believe the person needs urgent medical attention

**Details to Record**
- Date and Time. How long it lasted
- What body parts are affected
- Type of movement and other symptoms
- Possible causes. Behavior after the seizure. Vital signs when stabilized

*There are many types of seizures and some have mild symptoms. Seizures fall into two main groups.
- **Focal** seizures, also called partial seizures, happen in just one part of the brain.
- **Generalized** seizures are a result of abnormal activity on both sides of the brain.
Most seizures last from 30 seconds to 2 minutes and do not cause lasting harm. However, it is a medical emergency if
seizures last longer than 5 minutes or if a person has many seizures and does not wake up between them.
Seizures can have many causes, including medicines, high fevers, head injuries and certain diseases. People who have
recurring seizures due to a brain disorder have epilepsy. *[^4] [http://www.nlm.nih.gov/medlineplus/seizures.html]*