

# SCIENTIFIC DECISION-MAKING

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## INTRODUCTION TO PERSONAL STORIES



# ABOUT THE PROJECT

Baylor  
College of  
Medicine

CENTER FOR  
EDUCATIONAL  
OUTREACH

The Scientific Decision-making curricular unit, produced as part of the project entitled AHRQ's Ischemic Heart Disease Products Translated for High School Populations, was funded by a grant (R18HS019248) from the Agency for Healthcare Research and Quality (AHRQ). The project's goal is to develop—and evaluate the effectiveness of—high school-level teaching materials focusing on evidence-based decision-making using examples related to cardiovascular health.

Activities described in this book are intended for middle or high school students under direct supervision of adults. The authors, Baylor College of Medicine and AHRQ cannot be held responsible for any accidents or injuries that may result from conduct of the activities, from not specifically following directions, or from ignoring cautions contained in the text. The opinions, findings and conclusions expressed in this publication are solely those of the authors and do not necessarily reflect the views of BCM or the sponsoring agency.

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## BioEd<sup>SM</sup>

BioEd<sup>SM</sup> Teacher Resources from the Center for Educational Outreach at Baylor College of Medicine.

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All persons depicted in photographs throughout this guide are models and their images are used strictly for illustrative purposes only. The images are not intended to represent the model, nor any person living or deceased.

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# INTRODUCTION TO PERSONAL STORIES

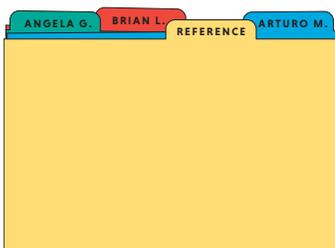
## Overview

Students are introduced to three fictitious characters, Arturo, Brian and Angela, who will be followed through the rest of the unit. Each character experiences a health crisis that could be related to cardiovascular disease.

Regardless of age, everyone can make better choices to improve quality of life. In the activity, "Decisions and Risk," students learned that the most frequent cause of death in the United States is heart disease, heart failure or heart attack. According to the Centers for Disease Control and Prevention, certain health conditions, such as high cholesterol, high blood pressure and diabetes, combined with unhealthy eating habits, obesity, lack of exercise and/or alcohol and tobacco use, can place people at higher risk for developing heart disease. Heart disease also can run in families, and genetic disorders, including one that causes high levels of "bad" cholesterol (low density lipoprotein, or LDL cholesterol), contribute to elevated risks of heart disease and heart attack. So it can be very helpful to know family history and to seek treatment for conditions that are risk factors for heart disease or other serious illness.

In this activity, students will meet three characters who are experiencing health emergencies. One character, Arturo, has made a number of decisions that place him at risk for disease. Being overweight, not exercising and choosing a diet high in fat and refined carbohydrates all increase a person's likelihood of having high blood pressure, type 2 diabetes or clogged arteries. In turn, these conditions can precipitate a health crisis, such as a heart attack or a stroke. The second character, Brian, has chosen to smoke cigarettes. Smoking harms almost every organ in the body, and it is connected to about 1 of every 5 deaths in the US each year. It is the main preventable cause of death and illness. The third character, Angela, seems to be doing all the right things. She has just begun an exercise program and maintains an appropriate body weight. But something has happened to her, and it looks serious.

Only about one percent of the US population follows the seven habits and behaviors known to promote a healthy cardiovascular system. These habits are (1) not smoking; (2) being physically active; (3) maintaining normal blood pressure measurements (systolic blood pressure reading of 120 or less, and a diastolic blood pressure reading of 80 or less); (4) having a healthy weight; (5) maintaining normal blood glucose levels; (6) maintaining normal total cholesterol levels (200 or fewer milligrams of cholesterol per deciliter of blood); and (7) eating a healthy diet (low in saturated fats and refined flour and sugar; high in whole grains, fruits and vegetables).



## MATERIALS

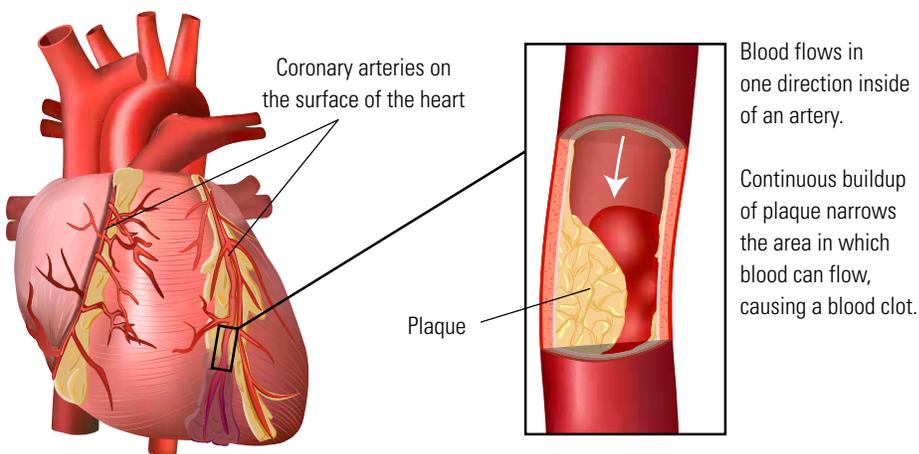
### Teacher (see Setup)

- For each group of students, you will assemble a three-ring binder containing four tabs, or create a set of four folders. Each tab or folder will hold installments of the personal stories of one of the fictitious characters, Arturo, Brian or Angela. The fourth tab or folder will hold reference materials added throughout the unit. This system will enable students to refer back to earlier installments or reference materials, as needed.

## What Is Coronary Artery Disease?

Coronary artery disease (CAD) develops when the arteries of the heart become damaged or diseased, usually due to a build-up of plaque. It often is precipitated by a condition, called atherosclerosis (Greek for hard paste), which begins with inflammation of, and damage to an artery's innermost layer (endothelium). The cause of the inflammation isn't known, but elevated cholesterol levels, high blood pressure and/or smoking may contribute to the initial damage. Inflammation in the artery attracts cholesterol and other substances, which build up just below the inner arterial wall. As we age, this buildup, called plaque, may become thick enough to cause significant blockage, resulting in a condition known as ischemia (reduction in blood flow through the vessel). Cardiac ischemia (or myocardial ischemia) is a reduced flow of blood and oxygen to the heart muscle. It can damage and weaken the heart muscle, or even cause total heart failure. Common symptoms include chest pressure or pain; arm, neck or jaw pain; cold sweat; nausea and vomiting. However, it also can be "silent," showing no symptoms at all.

## Plaque Build-up in a Coronary Artery



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- Interactive white board or video projector, and Internet access
- For each group of students, four copies of Part One of personal stories for Arturo, Brian and Angela
- Four copies of the "Table of Diagnostic Tests," pages for each group of students. (The table will be used again with the activity, "Team Diagnosis of Three Cases.")

### Per Team of Students

- Binder with one pre-labeled personal story tab (or set of three folders) for each character (Arturo, Brian and Angela), and a fourth tab or folder for reference materials (see description under Teacher Materials)

Each binder or set of folders should include four copies of Part One of the personal story for each character and four copies of the table. This will enable every student to have his/her own copy to read or follow along. Copies should be returned to the binder or folders at the end of class.

### SETUP

For each group of students, put together a three-ring binder containing four tabs, or a set of four folders. Each tabbed binder section (or folder) will hold the personal story of one fictitious character—Arturo, Brian or Angela. The fourth tab or folder will hold reference materials added as you move through the unit.

Make copies of the Part One personal story pages for the three characters (Arturo, Brian and Angela). Place the pages in the appropriate binder section (or folder) for each group. These sheets will remain in the binder or folders, so students can refer to them as they obtain more information about the cases.

Make four copies of the "Table of Diagnostic Tests" pages for each group of students.

To access the video entitled, Scientific Decision-making, Part One, go to the "Lessons and More" tab on the BioEd Online website. Click on Resource Collections, then Scientific Decision-making. Or go directly to <http://www.bioedonline.org/lessons-and-more/resource-collections/scientific-decision-making/>. If your school limits access to YouTube or Vimeo, download the video from BioEd Online prior to class.

Have students work in teams of four to decide on a course of action for each character.

## Related Activity

For further instruction on heart disease and heart attack, see the activity, "Coronary Artery Disease Model," in *Scientific Decision-making: Supplementary Activities on the Cardiovascular System*. It teaches students how inflammation and plaque build-up in arteries can lead to heart attack or stroke.

## My Family Health Portrait



Image courtesy of the Office of the Surgeon General and the National Human Genome Research Institute, National Institutes of Health (<https://familyhistory.hhs.gov/>).

## PROCEDURE

1. Tell students that they will be following the personal stories of three fictitious characters, Arturo, Brian and Angela. In this first session, they will learn some background about the characters and follow them through a health crisis. Students should be prepared to take notes about each person from the information presented in videos or handouts.
2. Ask students, *Do you know any of the warning signs of a heart attack?* List their ideas on the board. Possible answers include: chest pressure or pain; arm, neck or jaw pain; cold sweat; nausea; feeling of indigestion and vomiting. Mention that heart attacks may not cause any pain or other symptoms.
3. Distribute the binders or folders to each student group. Have one or more students read or act out each personal story. Alternately, show the video, Part One, Scientific Decision-making, and distribute the Part One stories for students to refer to during the follow-up discussion. The video may be found at <http://www.bioedonline.org/lessons-and-more/resource-collections/scientific-decision-making/>.
4. After watching the video or reading Part One of the personal stories, lead a class discussion of each character's health crisis. Ask, *What happened to Arturo/Brian/Angela? How serious is his/her condition? Do you think any of his/her health problems result from decisions he/she has made?*
5. Ask, *Which vital signs for each person are within the normal range?* Call students' attention to the Table of Diagnostic Tests, explaining that it provides information about common vital signs and laboratory tests used with patients. Have students review the table and locate the vital signs mentioned in each personal story.
6. Have all student groups write short summaries of each patient's current condition, being sure to include any vital signs that are not within the normal range.

## EXTENSIONS OR HOMEWORK

Family history plays an important role in determining a person's risk for certain health conditions, including high blood pressure and early age heart attacks. According to the Centers for Disease Control and Prevention, a tendency for heart disease can cluster in families, so family medical history can provide important information for identifying risk in individuals. Family histories also can highlight shared inherited or environmental factors (such as eating habits) that can lead to incidence of a given disease among multiple family members. Have students use the My Family Health Portrait from the US Surgeon General website (<https://familyhistory.hhs.gov/>), to create their own family health histories.

# PERSONAL STORY: ARTURO M.

## PART 1



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### VITAL SIGNS AND EKG RESULTS

Vital Sign	EMTs: 7:15 PM	ER-RN: 7:45 PM
 <b>Temperature</b>	<b>101.0 °F</b>	<b>102.0 °F</b>
 <b>Blood pressure (mm Hg)</b>	<b>145/100</b>	<b>142/95</b>
 <b>Pulse rate (beats per minute)</b>	<b>120 bpm</b>	<b>92 bpm</b>
 <b>Respiration rate (per minute)</b>	<b>28</b>	<b>20</b>
 <b>Oxygen saturation (pulse ox)</b>	<b>92%</b>	<b>95%</b>
 <b>Electrocardiogram (EKG)</b>	<b>Normal</b>	<b>Normal</b>

**Gender: Male**

**Age: 56**

**Race/ethnicity: Hispanic**

**Weight: 260 lbs**

**Height: 5 ft, 9 in.**

**Waist circumference: 47 in.**

**Tobacco use: No**

**Health insurance: Yes**

It's Super Bowl Sunday and the whole family has gathered to watch the game on Arturo's big new TV. The house is overflowing with hot wings, pizza, chips, dips and desserts. Unfortunately, the game starts poorly for Arturo's team, and he yells at his new TV. It is unusual to see him get so angry. At halftime, he heads to the kitchen for more food. After overloading yet another plate with hot wings, he returns to his chair, patting his chest and frowning.

At **6:45 PM**, Arturo complains to his wife, Patricia, that he feels nauseous. He holds his plate of hot wings in his lap and watches the game quietly. He doesn't even cheer when his team scores a touch down. He lifts his plate to get a drink, but loses grip and drops the food. When he bends down to clean up the mess, Arturo slips out of his chair, hits his head on the table, and falls to the floor, unconscious.

Patricia calls 911 and uses a towel to put pressure on Arturo's bleeding head injury. Emergency medical technicians

(EMTs) arrive within 20 minutes and begin first-responder intervention for Arturo, who regains consciousness. One EMT speaks with Patricia about what happened, while the other takes Arturo's vital signs (temperature, pulse rate, blood pressure and respiration rate). At **7:15 PM**, the EMTs treat Arturo's cut and attach electrocardiograph (EKG) wire leads to his chest to measure his heart's electrical activity. One EMT notices that Arturo's abdomen is tender. The ambulance leaves for the emergency room, and Patricia follows in her car.

When Arturo arrives at **7:35 PM**, the emergency room registered nurse (ER-RN) takes his vital signs and places an oxygen tube in each nostril. She notices that he is having a trouble taking breaths. She also clips a pulse oximeter to Arturo's finger and inserts an intravenous (IV) line in his right wrist vein. The nurse asks Arturo how he feels. He murmurs that his head hurts and his stomach aches. She records his SAMPLE information. (SAMPLE

stands for: **S**igns/symptoms reported by the patient, **A**llergies, **M**edications, **P**ast medical history, **L**ast oral intake, **E**vents leading to this episode of injury or illness.) When reviewing Arturo's family history, the ER-RN discovers nothing remarkable related to heart disease.

Arturo's EKG is continually monitored on a computer screen. An EKG paper graph is recorded at **7:45 PM**, and placed in Arturo's chart. The ER physician reviews the EKG and the information in Arturo's chart, performs a physical exam, speaks briefly with Arturo and orders diagnostic tests. A phlebotomy technician draws blood for the tests at **7:50 PM**. ■

# PERSONAL STORY: BRIAN L.

## PART 1



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### VITAL SIGNS AND EKG RESULTS

Vital Sign	EMTs: 12:55 PM	ER-RN: 1:15 PM
 <b>Temperature</b>	<b>98.6 °F</b>	<b>98.6 °F</b>
 <b>Blood pressure (mm Hg)</b>	<b>155/100</b>	<b>165/105</b>
 <b>Pulse rate (beats per minute)</b>	<b>122 regular</b>	<b>120 regular</b>
 <b>Respiration rate (per minute)</b>	<b>38 (shallow)</b>	<b>32 (shallow)</b>
 <b>Oxygen saturation (pulse ox)</b>	<b>85%</b>	<b>87%</b>
 <b>Electrocardiogram (EKG)</b>	<b>—</b>	<b>Irregular pattern</b>

**Gender: Male**

**Age: 40**

**Race/Ethnicity: White**

**Weight: 155 lbs**

**Height: 5 ft, 10 in.**

**Waist circumference: 32 in.**

**Tobacco use: Cigarettes, 1 pkg/day**

**Health insurance: Yes**

Brian is walking across campus to check the final exam grade in his accounting course. He has a job but he decided to go back to college. He's nervous because he needs a good grade in the course so that he can apply to a master's degree program in hospital administration. Sadly, his dog died last week and he was distracted from his studies. To make things worse, his girlfriend told him she wants to date other people. Before Brian reaches class, his mother calls to remind him about driving her to the doctor for cancer treatments next week. Brian feels the pressure of his responsibilities. At **12:35 PM**, he sits down to have a cigarette.

Brian's heart starts to race. His forehead and palms feel clammy and cold. He is nauseous and his fingers are tingling. The world seems to be speeding around him, and he struggles for each breath. There is a growing tightness in his chest. He stands up, but he feels like he's going to pass out. Brian clenches his chest and falls back down to the bench. Kaitlin, a fellow

student in his medical ethics class, asks if he is okay, but Brian doesn't respond. Kaitlin shouts out for help and calls 911 on her cell phone. Brian still is clutching his chest in pain and is breathing rapidly.

The EMTs arrive quickly. One EMT speaks with Kaitlin about the emergency. A second EMT speaks to Brian, trying to comfort him while taking his vital signs. The EMT attaches leads and records Brian's EKG. Slowly, Brian becomes more alert, but he remains pale. Noting Brian's rapid, shallow breathing, the second EMT places an oxygen mask over his nose and mouth to insure a good flow of oxygen to the lungs. Within minutes, Brian is on his way to the hospital.

At **1:15 PM**, the emergency room registered nurse (ER-RN) takes Brian's vital signs and places an oxygen tube in his nostrils. She clips a pulse oximeter to his finger while the admitting clerk attempts to obtain admission information from him. An intravenous (IV) line is started as the EKG technician hooks up the leads. A

second RN begins taking Brian's SAMPLE information. (SAMPLE stands for: **S**igns/symptoms reported by the patient, **A**llergies, **M**edications, **P**ast medical history, **L**ast oral intake, **E**vents leading to this episode of injury or illness.) The EKG is recorded at **1:20 PM**, and a printout of the EKG graph is placed in Brian's chart.

The emergency room physician enters at **1:20 PM**, and asks Brian if he knows where he is. Brian nods in the affirmative. The physician reviews the notes taken by the EMTs and ER-RN. He checks Brian's EKG recording and the EKG monitor, performs a physical exam, and orders blood tests. A phlebotomy technician arrives at **1:45 PM**, and draws blood from Brian. She brings his samples to the laboratory, where the clinical laboratory technician runs the tests. ■

# PERSONAL STORY: ANGELA G.

## PART 1

### VITAL SIGNS AND EKG RESULTS



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Vital Sign	EMTs: 9:30 AM	ER-RN: 9:45 AM
 <b>Temperature</b>	<b>98.6 °F</b>	<b>98.6 °F</b>
 <b>Blood pressure (mm Hg)</b>	<b>166/110</b>	<b>160/105</b>
 <b>Pulse rate (beats per minute)</b>	<b>118 bpm</b>	<b>100 bpm</b>
 <b>Respiration rate (per minute)</b>	<b>28</b>	<b>18</b>
 <b>Oxygen saturation (pulse ox)</b>	<b>96%</b>	<b>97%</b>
 <b>Electrocardiogram (EKG)</b>	<b>—</b>	<b>Normal</b>

**Gender: Female**

**Age: 35**

**Race/Ethnicity: African-American**

**Weight: 122 lbs**

**Height: 5 ft, 5 in.**

**Waist circumference: 27 in.**

**Tobacco use: No**

**Health Insurance: No**

Angela and her two girlfriends decided to begin the new year with a fitness program, and they're going to "break the ice" with a two-mile jog on this crisp January morning. Angela's running mates are more fit than she is. She hasn't had time to exercise because she spent the past few months looking for a job. But she recently was hired as a programmer, and starts next week.

Angela had indigestion last evening but is fine now. The group starts their jog at an easy pace, but about halfway into the run, the speed increases. Angela feels a sharp pain in her side, and indigestion. Figuring she's just out of shape, she finishes the run with her friends. But afterward, she's severely short of breath and lightheaded. Her heart is pounding and she has a headache.

Angela makes a quick exit and heads home. Her husband, William, notes that she looks pale and is breathing very heavily. When Angela does not respond, he becomes concerned that something

serious is wrong. William immediately calls 911. He encourages Angela to lie down, but that makes her feel nauseated and dizzy, so she fights to sit upright again. Her skin is cold and clammy, and she says she might faint. She also complains of a lower jaw ache.

The EMTs arrive at **9:25 AM**, and begin first-responder intervention. One EMT speaks with Angela and William to learn what happened. The second EMT takes Angela's vital signs and begins monitoring her heart with an EKG. Angela throws up while her vitals are being taken. The EMTs wait momentarily to ensure that she is stable, and then prepare her for transport to the hospital emergency room. William rides with her in the ambulance.

At **9:45 AM**, the emergency room registered nurse (ER-RN) takes Angela's vital signs and attaches an oxygen tube. The nurse clips a pulse oximeter to Angela's finger and inserts an intravenous (IV) line. A technician hooks up the EKG leads to obtain a reading, which

is complete at **10:00 AM**. A printout of the EKG is placed in Angela's chart. Meanwhile, her SAMPLE information is recorded. (SAMPLE stands for: **S**igns/symptoms reported by the patient, **A**llergies, **M**edications, **P**ast medical history, **L**ast oral intake, **E**vents leading to this episode of injury or illness.)

The emergency room physician enters at **9:50 AM**, and asks how Angela is doing. She still feels nauseous and has a headache. Then she vomits again. The physician reviews the notes taken by the EMTs and the ER-RN. The physician also checks Angela's EKG recording and the EKG monitor. She orders blood tests, including a pregnancy test, which is routine for women who may be exposed to x-rays. A phlebotomist arrives at **10:15 AM**, to collect blood samples. ■

# TABLE OF DIAGNOSTIC TESTS

REFERENCE: PAGE 1 OF 2

Terms/Tests	Interpretation of Values	Description
<b>CARDIAC ENZYMES</b>	Creatine phosphokinase (total and the CK-MB fraction) and troponin (T). See individual tests below for interpretation of values.	Blood analysis to determine values for the enzymes creatine phosphokinase (CK) and troponin (T). Rapid elevation in the blood of these two proteins within the first 24 hours of an event usually indicates an acute myocardial infarction (MI) or heart attack.
<b>Creatine Phosphokinase</b> (CK or CPK) <i>blood total</i>	Normal: 30 – 155 IU/L (total of MB, MM, and BB fractions)	An enzyme indicating cell damage and consisting of three fractions, CK-MB (0 – 6%), CK-MM (96 – 99%), and CK-BB (0 – 1%), which together make up the total creatine phosphokinase value. These enzymes are released from the cells and increase blood values in response to damage in the heart (MB), muscle (MM), or brain (BB).
<b>CK-MB</b> <i>blood</i>	Normal: 0 – 6% of the total CK CK-MB is elevated within the first 4 hours of heart damage and peaks in 18 hours. Values may double during the first 24 hours of an MI, then return to normal.	Creatine Phosphokinase-MB is a type of CK enzyme important in heart muscle contraction, showing rapid elevation in the blood within the first 24 hours of an acute myocardial infarction (MI) or heart attack. An increase in CK-MB indicates heart muscle damage and leakage of CK-MB to the blood.
<b>Troponin</b> (T) <i>blood</i>	Normal: 0 – 0.2 ng/mL T is elevated within 6 hours of heart damage, and peaks at 18 hours, with values doubling, then returning slowly to normal.	A muscle protein that is released in large quantities to the bloodstream during muscle damage. Troponin (T) is released to the blood when the heart muscle has been damaged, such as during a heart attack (MI).
<b>COMPLETE BLOOD COUNT (CBC)</b>	—	This blood measurement determines the average size and number of red blood cells, the number of white blood cells, platelet number (clotting), and the amount of hemoglobin in the blood.
<b>Red Blood Cells</b> (CBC: RBC)	<i>Males</i> Normal: 4.2 – 5.6 million per mL <i>Females</i> Normal: 3.8 – 5.1 million per mL	The number and quality of RBCs determines how much oxygen your body tissues receive. The RBCs contain hemoglobin, which is the carrier for oxygen. RBC counts below the normal range may indicate bleeding or a type of anemia. Counts above normal may indicate lung, kidney, or bone marrow disorders, or dehydration.
<b>White Blood Cells</b> (CBC: WBC)	Normal: 3,800 – 11,000 per mL	WBCs (leukocytes) help fight infections. There are several types of WBCs, but these are not distinguished on a CBC. Low WBC numbers may indicate bone marrow problems, liver or spleen disease, or radiation exposure. Above normal WBC counts may indicate leukemia, tissue damage (burns), inflammation, or body infections.
<b>Hemoglobin</b> (CBC: Hemoglobin)	<i>Males</i> Normal: 14 – 18 grams per dL <i>Females</i> Normal: 11 – 16 grams per dL	Hemoglobin is the protein in RBCs that carries oxygen. Low values may indicate anemia, bleeding, malnutrition, or overhydration. High values may indicate low blood oxygen levels, dehydration, or other disorders.
<b>COMPUTED TOMOGRAPHY (CT Scan)</b>	—	An imaging method that uses x-rays to create cross-sectional pictures of internal structures of the body, such as blood vessels. There is some exposure to doses of radiation during the CT (or CAT) scan process.
<b>ELECTRO-CARDIOGRAM (ECG or EKG)</b>	—	A graphical representation of the electrical activity of the heart to detect abnormalities. It is possible to identify if the heart muscle has been damaged in specific areas due to an acute myocardial infarction or heart attack.

Key: deciliter (dL), international unit (IU), liter (L), microliter (mcL), milliliter (mL), milliequivalent (mEq), nanogram (ng)

# TABLE OF DIAGNOSTIC TESTS

REFERENCE: PAGE 2 OF 2

TERMS/TESTS	Interpretation of Values	Description
<b>ELECTROLYTE:</b> <b>POTASSIUM [K]</b> <i>blood</i>	Critically Low (hypokalemia): $\leq 3.7$ mEq/L Normal: 3.7 – 5.2 mEq/L High (hyperkalemia): $> 5.2$ mEq/L	An electrolyte with the crucial job of helping the heart beat by triggering the heart to squeeze blood through the body. Heart muscles need the right potassium balance to contract in a coordinated fashion. If the K value is low, the heart may beat ineffectively or in an uncoordinated manner (arrhythmias and incomplete contractions).
<b>ELECTROLYTE:</b> <b>SODIUM [Na]</b> <i>blood</i>	Low (hyponatremia): $\leq 134$ mEq/L Normal: 135 – 145 mEq/L High (hypernatremia): $\geq 145$ mEq/L	This electrolyte helps keep the body's water balance (amount of fluid inside and outside of cells). Na also is important for nerves and muscles. Hyponatremia is a result of dehydration, water retention, or sodium loss.
<b>OXYGEN SATURATION</b> <i>blood</i>	Critically Low: $< 90\%$ Low: $< 95\%$ Normal: 95 – 100%  Measured with a pulse oximeter	A measure of oxygen level bound to hemoglobin in the red blood cells and circulating in the blood. When the level of circulating oxygen falls below normal, hypoxemia occurs and the person may experience shortness of breath, rapid breathing, dizziness, tachycardia, or even loss of consciousness. If the heart is not pumping effectively, or if there is poor loading of oxygen in the lungs, oxygen saturation falls.
<b>PHYSICAL EXAM (PE)</b>	—	Process in which the physician investigates the body for signs of disease. The main organs are visually inspected and palpated (use of hands to determine abnormalities), and listened to with a stethoscope. Poor reflexes indicate problems with the nervous system.
<b>PREGNANCY TEST</b>	Positive: Pregnant Negative: No pregnancy detected	A urine or blood sample is tested for the presence of human chorionic gonadotropin. This hormone is produced about six days after fertilization.
<b>VITAL SIGNS</b>	See individual vital sign measures below.	Assessment of basic body functions, including body temperature, pulse rate (heart rate), blood pressure, and respiratory rate (breaths per minute).
<b>Blood Pressure</b> <i>resting</i>	Normal: Systolic: $< 120$ mm Hg Diastolic: $< 80$ mm Hg  Prehypertension: Systolic: 120 – 139 mm Hg Diastolic: 80 – 89 mm Hg  High Blood Pressure: Systolic: 140 – $> 160$ mm Hg Diastolic: 90 – $> 100$ mm Hg	Vital sign measurement of the force exerted by the heart against the arterial walls when the heart contracts and relaxes. The upper number is the systolic pressure, which is a measurement of the blood pressure taken when the heart is contracting and forcing blood into the arteries. The lower number is the diastolic pressure, a measurement of pressure on the arteries when the heart is resting. A critically low blood pressure could indicate a failing heart or a response to low oxygen in the blood.
<b>Pulse Rate</b> <i>per minute</i>	Low (bradycardia): $< 60$ bpm Normal: 60 – 90 bpm High (tachycardia): $> 90$ bpm	Vital sign measurement of the pressure of the blood felt against the wall of an artery as the heart contracts or beats. It is used to determine the number of times the heart beats each minute. There are several areas where the pulse can be measured, the most common being the radial pulse taken on the thumb side of the wrist.
<b>Respiration Rate</b> <i>per minute</i>	Low (hypoventilation): $< 12$ Normal: 12 – 20 High (hyperventilation): $> 20$	Vital sign measuring the number of times per minute that the lungs take in air (inspiration) and expel the air (expiration). Hyperventilation can result from ineffective heart pumping or poor loading of oxygen in the lungs.
<b>Temperature</b> <i>body</i>	Low (hypothermia): $< 95$ °F Normal: 97.6 – 99.6 °F High (fever): $> 100.6$ °F	Vital sign measuring the balance between heat lost and heat produced by the body. In the United States, body temperature is measured in degrees Fahrenheit.

Key: deciliter (dL), international unit (IU), liter (L), microliter (mcL), milliliter (mL), milliequivalent (mEq), nanogram (ng)