Arrhythmia

What is it?

Arrhythmia means an abnormal heartbeat rhythm. A steady heartbeat depends on the electrical system of the heart. Like any other electrical system, when there is an interruption of any kind, function will be affected. This is critical with the human heart because we depend on the heart to support blood supply to all body parts.

The human heart beats more than 100,000 times a day, and every single beat requires an electrical impulse. The electrical system of the heart is complex and powerful. It stimulates the chambers of the heart (the atria and ventricles) to work together to pump blood effectively. The pace for heartbeat starts with the electrical impulse that begins in the sinoatrial (SA) node in the right atrium and spreads through the walls of the atria, causing them to contract and send blood into the ventricles.

The atrioventricular (AV) node, found between the atria and ventricles, actually regulates and slows the impulse before the impulse goes to the ventricles. That slight delay allows the atria to contract before the ventricles do, so that blood can flow properly in to the chambers of the heart. When this process is working and “in sync;” the heart rhythm is normal. Another structure in the heart - the His-Purkinje Network (also called the bundle of His) - sends the impulse throughout the muscular walls of the ventricles and causes them to contract.

The speed of the heartbeat is called the heart rate and the pattern of the heartbeat is the rhythm. A normal heart
rhythm at rest is called **normal sinus rhythm**. A heart rate between 60 and 100 beats per minute is considered normal for most individuals. Athletes with advanced cardiovascular fitness may normally have heart rates below 60 beats per minute.

When there is a change in the rate or pattern of the heartbeat, it is known as an **arrhythmia**. If the heart beats too fast (over 100 beats per minute) it is called **tachycardia**. If it beats too slowly (under 60 beats per minute) it is called **bradycardia**. Regardless of the heart rate, if the heart beat is **irregular** or **erratic** rather than steady, it is also considered to be an arrhythmia.

Any of these problems can cause the heart to pump in a less effective manner and can negatively affect your health. Depending on the degree of the problem, it can be life threatening. On the other hand, some arrhythmias are very common, not serious, and most of us experience them at some time.

**Types of Arrhythmias**

There are many different types of arrhythmias that can affect your health. They are categorized according to the location and effect of the electrical conduction problem. The outlook for patients with arrhythmias depends on the type and severity of the problem. In most cases even serious arrhythmias can be treated successfully. The following paragraphs explain four main types of arrhythmias.
Premature (extra) beats:
This is the most common type of arrhythmia, usually harmless and may not cause symptoms. In healthy individuals, it usually does not require treatment.

Premature atrial contractions (PACs):
This is a very common type of arrhythmia, and almost everyone experiences PACs. They occur when the atrial beat occurs earlier than normal and briefly interrupts the heart rhythm. They are more likely to occur with alcohol, tobacco, and caffeine use. Lack of sleep and stress also contribute to having PACs. Usually PACs do not cause symptoms, but some people may have a sense of “skipped beats.” These are usually harmless and do not require medication or other special treatment, unless they occur very frequently and lifestyle changes do not help.

Premature ventricular contractions (PVCs):
These heartbeats occur earlier than normal and interrupt the heart rhythm briefly. They begin from an abnormal impulse in the ventricle. They are very common and occur in people with and without heart disease. Most of us experience them occasionally, but those with heart disease are more likely to have them more often. Caffeine, alcohol, tobacco, and stress can make PVCs worse. People tend to experience PVCs as “skipped beats” followed by a “thump.” This type of arrhythmia is usually harmless and generally does not require treatment unless the symptoms are frequent and bothersome.
Supraventricular arrhythmias:
This type of arrhythmia is considered to be tachycardia (very fast heart rates that start in the AV node). Types include atrial fibrillation (AF), atrial flutter, supraventricular tachycardia (SVT) and its sub-types: paroxysmal supraventricular tachycardia (PSVT) and Wolff-Parkinson – White (WPW) syndrome.

Atrial fibrillation:
This arrhythmia is the most common type of serious arrhythmia. It produces many tiny waves of electrical impulses that cause the atria to beat in an erratic manner. Instead of producing a strong heartbeat, the walls of the atria fibrillate or quiver. In AF, electrical signals may travel through the atria at a rate of more than 300 beats per minute. When this happens, the impulse does not travel as it should to properly stimulate the ventricles, so the resulting heartbeat is irregular and may also be rapid. Usually a person experiences this problem as palpitations, but also may feel dizzy, fatigued, or short of breath. Fainting and chest pain may also be present. This condition can cause an increased risk of stroke because the blood flow is impaired and clots may form. Treatment is needed to prevent serious health problems.

Atrial flutter:
This arrhythmia is similar to AF. It is caused by an abnormal, extra pathway and causes the atria to beat too fast. It differs from AF in that the heartbeat is typically regular rather than erratic. It occurs more frequently within the first week after heart surgery, and it may convert to atrial fibrillation.

According to research, over 5 million people are treated for atrial fibrillation each year.

Don’t be left in the dark-
Know your options.

-Judson Colley, M.D.
**Supraventricular tachycardia (SVT):**
This is an arrhythmia that is characterized by a series of very rapid heartbeats that begin in the atria or AV node. An episode of SVT often starts suddenly and stops just as quickly. It usually lasts from less than a minute to several hours. It may happen often or infrequently and may cause symptoms such as the sense of a “racing heart,” dizziness, shortness of breath, or chest pain. Even so, this type of arrhythmia is generally not life threatening.

**Paroxysmal Supraventricular Tachycardia (PSVT):**
A type of SVT, this is a very fast heart rate that begins and ends suddenly. It is caused by problems with the electrical conduction between the atria and ventricles. It is usually not dangerous and tends to happen more frequently in young people, especially during heavy physical exertion.

**Wolff-Parkinson-White (WPW) syndrome:**
This type of PSVT causes an abnormally rapid heart rhythm and is caused by abnormal tissue in the heart that connects the atria and ventricles. This pathway causes the impulse to travel through the extra pathway as well as the normal route. It creates a circular impulse pattern that can create a dangerously high heart rate.

**Long QT interval:**
The QT interval on an EKG represents the time it takes for the heart muscle to contract and recover or for the electrical impulse to discharge and then recharge. If this time is longer than it should be, the risk for a life-threatening form of ventricular tachycardia is increased.

**Ventricular arrhythmias:**
These arrhythmias begin in the ventricles (the heart’s lower chambers) rather than the atria. They include ventricular tachycardia and ventricular fibrillation.

**Ventricular Tachycardia (V-tach):**
This type of problem occurs when there is more than one extra electrical pathway in the ventricles, usually occurring when the heart has become damaged in some way by a heart attack, disease, or other cause. This causes a rapid rhythm that can be life threatening because it doesn’t allow the ventricle enough time to fill with blood between heartbeats. So, the end result is an inefficient pumping action.
If the episode is brief, it causes only mild symptoms, but if it is sustained (longer than 30 seconds) it can cause more pronounced symptoms such as dizziness, fainting, shortness of breath, or chest pain. This problem can advance to the more serious ventricular fibrillation and cardiac arrest if not medically treated.

**Ventricular Fibrillation:**
This life-threatening arrhythmia happens when many different places within the ventricles fire electrical impulses rapidly and in a disorganized way, causing ventricles to quiver and stop pumping blood. This leads quickly to **cardiac arrest** (the heart stops) and death, unless emergency treatment (CPR and/or defibrillation) is given immediately.

**Bradyarrhythmias:**
These arrhythmias are heart rhythms that are too slow (typically less than 60 beats per minute, except in athletes who may have normal slow heart rates). The two common types of arrhythmias that cause an abnormally slow heartbeat are as follows:

**Sick sinus syndrome (sinus node dysfunction):**
The SA node usually serves as a natural pacemaker for the heart. When it does not function well, it may not send electrical signals often enough, it may send too many signals at once, or it may just skip some signals. Either way, the result is that the heart beats too slowly (**sinus brachycardia**) or it may pause too long between beats (**sinus pause**) or it may even go back and forth between beating too fast and beating too slow (**bradycardia-tachycardia syndrome**). This problem is more common with aging and can be caused by heart disease and some medications. Symptoms may include dizziness, fainting spells and palpitations.

**Heart block:**
This problem is a result of electrical impulses being delayed or stopped in their normal pathway through the heart. Second-degree heart block is when only some impulses reach the ventricles, while complete (or third-degree) heart block results when impulses are completely blocked and do not reach the ventricles at all. Second-degree heart block causes an abnormally slow heartbeat or skipped heartbeats. Complete heart block causes a slow and unpredictable heartbeat with symptoms that may include light-headedness, fainting spells, confusion and fatigue.
Who is at Risk?

As mentioned above, those with coronary artery disease, heart valve disease, or a weakened heart (from any cause, including infections, chemotherapy, or surgery) are more prone to arrhythmias. Having any of the following may also cause a greater risk of arrhythmia:

- High blood pressure
- Former heart attack
- Overactive thyroid gland
- Congenital abnormalities of the heart (those present at birth)
- Erectile dysfunction in men (sexual function impaired from lack of blood flow)
- Electrolyte imbalances (such as potassium or sodium)

However, it is also possible to have an arrhythmia without any of the problems listed above. You can have a perfectly normal heart and still experience arrhythmia. Sometimes caffeine, alcohol, tobacco, and stress can bring on arrhythmias.
What are the Symptoms?

An arrhythmia may have **no symptoms** or symptoms that are **very clear**. When symptoms do occur, they may include:

- A slow or irregular heartbeat
- Feeling pauses between heartbeats
- Palpitations: a sensation of skipped heart beats, thumping, fluttering pulse, or “flip flops”
- Pounding in the chest
- Dizziness or light-headedness
- Fainting or a near-fainting/swooning sensation
- Chest discomfort or pain
- Feeling weak or very tired
- Shortness of breath
- Sweating
- Anxiety
- Sudden weight gain or swelling in feet

Cardiac arrhythmias can cause symptoms which impact the quality of a patient's life.

- Judson Colley, M.D.
How is arrhythmia diagnosed?

Doctors with expertise in diagnosing arrhythmias include cardiologists and more specifically electrophysiologists (cardiologists who have further specialized in the study of arrhythmias). An arrhythmia may be first diagnosed by your primary care doctor or another healthcare provider. You may have been referred to Jackson Heart Clinic for further diagnosis of the arrhythmia and for treatment as needed. The process of diagnosis includes:

A thorough medical history:
You can help by:

- Carefully explaining your symptoms and when they occur.
- Listing all of your medications (prescription and non-prescription, including any supplements).
- Sharing whether or not you use alcohol, tobacco, or drugs (like cocaine).
- Sharing your family’s medical history. Has anyone in your family had a history of arrhythmias, heart disease, high blood pressure, or sudden death?
- Informing your cardiologist about extreme stress or anger that you are experiencing.
Physical examination:
Your cardiologist will listen carefully to the rate and rhythm of your heart, checking for murmurs (extra or unusual sounds during the heartbeat). Your pulse will also be checked to establish the heart rate. Your feet, ankles, and legs may also be checked for swelling that might indicate heart problems.

Electrocardiogram (EKG):
A test that records the heart’s electrical activity for a short period of time via electrodes applied to your body. It is the most common and simplest way to diagnose arrhythmias. It shows the heart rate and rhythm.
Holter monitors and event monitors:
These are for arrhythmias that come and go. A Holter monitor (that you wear) records the electrical activity of the heart for 24 hours or longer. An event monitor is similar but only records when you have symptoms and you push a button to begin and end the recording. After you wear these monitors for the recommended length of time, you return the device so the recording can be interpreted by the cardiologist.

Implantable loop recorder:
This is a device that can be implanted under the skin in the chest area and can be used for 12 months or longer to find out why a person is having arrhythmias or fainting spells that happen infrequently. It requires minor surgery to put the device in place.

Stress test:
This is an electrocardiogram (EKG) that is done while you exercise because some heart problems are easier to diagnose when your heart is working hard. If you are unable to exercise, you may be given drugs that cause your heart to beat hard and fast. Some add-ons to the stress test may include nuclear scanning and positron emission tomography (PET) scanning. These tests allow detailed images of your heart, in addition to the EKG.

Echocardiogram (echo):
This test involves the use of sound waves that create a moving image of your heart. It gives information about the size and shape of heart structures. It tells the cardiologist how well the heart is working and identifies areas of the heart that are not working normally. This test may also be done after a stress test. There are also variations of echocardiograms that may be ordered for more specific information. For instance a transesophageal echocardiogram (TEE) may be required to give additional information. This test takes pictures of the heart through the esophagus.

Tilt table testing:
This test may be used to find the cause of fainting spells. As a patient lies on a table, it is tilted to find out if the change in position causes dizziness and fainting. As the test is being done, heart rate, EKG readings, and blood pressure are monitored. Sometimes medication may be given to see how symptoms are affected.
**Electrophysiology study (EPS):**
This test is used for serious arrhythmias and involves passing a thin, flexible wire through a vein in your upper thigh or arm to your heart, where electrical signals are recorded. The cardiologist can electrically stimulate different areas of your heart to see what is triggering an arrhythmia. The cardiologist can also determine whether or not particular medications will be effective in stopping the problem.

**Catheter ablation:**
This procedure may be done during EPS or as a different procedure. It is used to destroy a problematic area of the heart that is causing an arrhythmia. Catheter ablation often involves an energy source that produces heat to destroy very specific areas of heart tissue. This procedure is done when other types of treatment are not successful. Medical studies have shown that an ablation works well and is safe.

“Medications sometime offer less than ideal results. For some patients, a catheter ablation is a better option for the cure of arrhythmias.”
-Judson Colley, M.D.

**Coronary angiography:**
This procedure uses dye and special X-ray imaging to view the inside of the arteries around your heart through cardiac catheterization (putting a thin, flexible tube into a blood vessel in your upper thigh, arm or neck and threading it into your bloodstream). When dye is released into the catheter, it shows the flow of blood through the heart and blood vessels, giving important diagnostic information to your cardiologist about blockages that might cause a heart attack.
What are the Treatments?

Treatment for arrhythmias depends on the type and level of severity. Some arrhythmias do not require treatment at all, while others require treatment to save your life. Treatment may include one or more of the following lifestyle changes, medications, or medical procedures.

**Lifestyle changes:**
Avoid activities, such as smoking and the use of tobacco in any form, limit alcohol intake, limit or stop using caffeine (such as coffee, tea, and soft drinks), that seem to bring on symptoms. Some people are more sensitive to caffeine than others. Do not use over-the-counter products that contain caffeine, and avoid stimulants that may be found in cold or cough remedies. Some herbal remedies may also cause arrhythmias. Consult a pharmacist or your cardiologist if in doubt about whether or not you should use a particular product.

Follow a healthy diet and exercise by walking 20 to 30 minutes at least three to four times a week. If you have not exercised for a long time, ask your cardiologist before beginning a new exercise program.

If you are experiencing severe stress or anger it can affect your heart. Try to create more quiet time for yourself, try relaxation techniques, meditation or prayer. For some individuals, support from family and friends or a therapist really helps. If you need assistance with this, your cardiologist can guide you to resources.

**Medication:**
Often, antiarrhythmic medications will be used to return the heart rhythm to normal and to prevent a recurrence of the problem. The medications will work to correct the electrical signals within the heart. Other drugs reduce the number of atrial impulses, thus slowing the heart rate. Some of the common types of medications used include beta blockers, calcium channel clockers and digoxin. Those who have atrial fibrillation may also be prescribed blood thinners. Although very effective, many antiarrhythmic drugs have side effects that may include fatigue, nausea, dizziness and headache. Sometimes, they may even cause dangerous (or a different type of) arrhythmia. Medication is not viable to treat slow heart rates.
Catheter Ablation:
This procedure is used to ablate (destroy) very specific abnormal electrical pathways in the heart (that cause abnormal heart rhythms). Ablation occurs when the cardiologist inserts a catheter with electrodes into the heart near the abnormal pathway. Radio-frequency energy is then passed through the catheter into the area. The tip of the catheter heats up and destroys the small area that is causing problems. It is a relatively low-risk procedure with huge benefits and works especially well when the abnormality is in the atrial area of the heart.

Pacemaker:
A cardiac pacemaker is a small device that is inserted under the muscle of the chest with wires that run directly into the heart. It serves to literally pace the heart and stimulate heartbeats with an electrical impulse. It is especially helpful for people whose hearts are beating too slowly. Pacemakers are smart and programmed to sense when the pulse rate is too slow, then delivering an electrical stimulus as needed to stimulate the heart to beat.

Implantable cardioverter defibrillator (ICDs):
Similar to a pacemaker, this device is inserted under the muscle of the chest and is prescribed for those whose heart beats abnormally fast. It continuously monitors the heart’s rate, and when the rate is out of control, it delivers an impulse, or tiny shock, to force the heart back into a normal rhythm. ICDs are especially important for those who have had a cardiac arrest or who have a serious problem that could lead to cardiac arrest.

Electrical cardioversion:
This is a procedure to stop an arrhythmia. An electrical shock is given to the heart through the chest wall, which causes the heart cells to fire impulses all at once, thereby allowing a normal rate to return. After this treatment, an arrhythmia may return, so medication or other treatments may be prescribed to prevent additional episodes.

Heart surgery:
Cardiologists may recommend heart surgery in some cases to treat arrhythmias that are caused by another heart issue (such as a heart valve that needs repair or by-pass surgery to correct a blockage).
When should I call my cardiologist?

Knowing when to call your cardiologist might be life saving! Call your cardiologist’s office, if you experience any of the following:

- High blood pressure
- Symptoms that are worse or if you develop new symptoms that you have not had before
- Your heart rate is higher or lower than normal (typically under 60 or over 100 beats per minute)
- You have a sudden weight gain (several pounds within a day or two)
- If you experience chest pain
- Extreme shortness of breath
- Extreme weakness
- Unusual feelings of anxiety

**In an emergency situation do not delay going to the nearest emergency room for treatment.**
Living successfully with an arrhythmia requires excellent communication between you and your cardiologist and the staff at Jackson Heart Clinic. Working as a team, a plan of treatment can be developed that will reduce your discomfort about the arrhythmia and help you live the healthiest life possible. Even those with serious arrhythmias can be successfully treated. For the best possible care remember these points:

- Keep your follow-up appointments.
- Make sure to update your medication list/history with your cardiologist when there are changes.
- Take medications as prescribed and communicate any negative side effects or concerns right away.
- Call your cardiologist if symptoms are worse or if you have new symptoms.
- If you are taking blood thinners, make sure that routine blood tests are done at the recommended times.
- Avoid activities that you know cause or aggravate your symptoms.
- If you are dizzy or feel faint, lie down and do not try to drive.
- Learn how to take your pulse, note changes and share information with your cardiologist.
- Involve your family and have everyone trained in CPR, in case you need it.

In Summary

This brochure has provided thorough information about the types of arrhythmias, diagnosis, and treatment. Although having an arrhythmia can be serious and even life threatening, most can be treated successfully so that symptoms are manageable. With your new knowledge of the problem, you can work with your cardiologist and the staff at Jackson Heart Clinic to develop a plan that works best for you and your unique needs. It is our goal for you to have the highest possible level of cardiovascular health!
Explore these resources to learn more information about heart rhythm problems. Many of the web resources include video clips and audio.

**American Heart Association (Local)**
4830 McWillie Circle
Jackson, MS 39206
Phone: (601) 321-1200
Fax: (601) 321-1201

**American Heart Association (National)**
Customer Service
1-800-AHA-USA-1
1-800-242-8721
http://www.heart.org/HEARTORG/Conditions/Arrhythmia/Arrhythmia_UCM_002013_SubHomePage.jsp

**Center for Disease Control (CDC)**
Division for Heart Disease and Stroke Prevention
For atrial fibrillation fact sheet:
http://www.cdc.gov/dhdp/data_statistics/fact_sheets/docs/fs_atrial_fibrillation.pdf
For General information: cdcinfo@cdc.gov
CDC/NCCDPHP/DHDSP
4770 Buford Hwy, NE
Mail Stop F-72
Atlanta, GA 30341-3717
Call: 800-CDC-INFO
Fax: 770-488-8151

**National Institutes of Health**
National Heart, Lung, and Blood Institute, National Institutes of Health – NHLBI.
At this website you will find links to information about cardiac arrhythmias, including video clips that explain the electrical conduction system of the heart. You can also write or call for a hard copy of the information.
Health Information Center
Attention: Website
P.O. Box 30105
Bethesda, MD 20824-0105
301-592-8573 (Voice, Information Center)
301-592-8563 (FAX, Information Center)

**Web-based Resources:**

**WebMD**
Heart Disease and Abnormal Heart Rhythm
This site offers basic information about arrhythmia and many links to related topics
http://www.webmd.com/heart-disease/guide/heart-disease-abnormal-heart-rhythm

**American College of Cardiology: Cardio Smart**
www.cardiosmart.org
for information related specifically to arrhythmia:
https://www.cardiosmart.org/Search?query=arrhythmia

**Cleveland Clinic**
The Cleveland Clinic website offers much general and specific information about heart failure.
http://my.clevelandclinic.org/heart/disorders/electric/arrhythmia.aspx

**Sudden Arrhythmia Death Syndrome Information**
Sudden Death Arrhythmia Syndrome Foundation
540 Arapeen Drive, Suite 207,
Salt Lake City, UT 84108
Phone: 800.786.7723
http://www.sads.org/
References & Patient Resources:

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For atrial fibrillation fact sheet:
http://www.cdc.gov/dhdsp/data_statistics/fact_sheets/docs/fs_atrial_fibrillation.pdf
For General information: cdcinfo@cdc.gov

**National Institutes of Health**
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301-592-8573 (Voice, Information Center) 301-592-8563 (FAX, Information Center)

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- **American College of Cardiology: Cardio Smart**
  www.cardiosmart.org
  for information related specifically to arrhythmia:
  https://www.cardiosmart.org/Search?query=arrhythmia

- **Cleveland Clinic**
  The Cleveland Clinic website offers much general and specific information about heart failure.
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  540 Arapeen Drive, Suite 207,
  Salt Lake City, UT 84108
  Phone: 800.786.7723
  http://www.sads.org/

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