

Rwandan Nurses Save Lives!

Rheumatic Heart Disease Conference ©



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TEAM HEART

Rwanda MoH & RBC

Teachers & Community Health Workers

Rwandan Children are getting Heart Disease!

- A disease of the heart valves called **Rheumatic Heart Disease** (RHD) is “endemic” in Rwanda.
- “Endemic” means there is a more people with the disease for a long period of time than other places in the world.
- It is believed that 40,000 Rwandan children currently have RHD
- RHD causes permanent damage to the heart muscle and can be fatal.
- The treatment for severe disease is replacing the heart valve (or valves) damaged by RHD.



Rwandan children who have survived RHD after having their heart valves replaced.

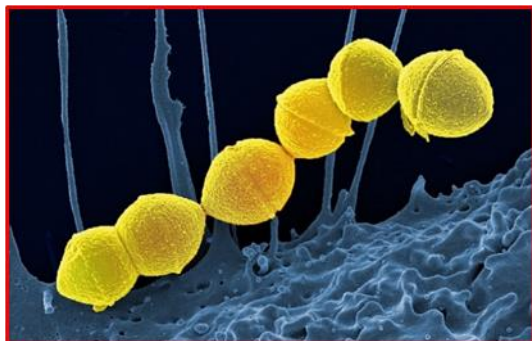
What would you see in a child who might have RHD?

- A child who is often tired
- A child who is often short of breath
- A child who cannot run and do sports like other children
- A child who coughs when they lay down
- A child whose ankles are swollen
- A child who is decreasing in school activities and grades

Can you remember that a child might fit these symptoms?

How does this disease get started?

- This heart disease is started from an **untreated Strep throat** or a skin infection called **impetigo!**
- Strep Throat is a sore throat caused by a bacteria called **Streptococcus pyogenes**.



- Streptococcus pyogenes is common in Rwanda and Sub-Sahara Africa
- The bacteria **lives only in human mouths and on human skin**.
- Streptococcus pyogenes is **endemic in Sub-Sahara Africa**. This means the bacteria is more common and in higher concentrations in the population when compared to the world.
- Up to 40% of sore throat infections in Rwanda are caused by the **bacteria** Streptococcus pyogenes.
- **Untreated Strep infections** can cause the body to respond by making inflammation in the connective tissues of joints, brain, and heart valves. **This is called an autoimmune response.**

“Autoimmune”

When the body’s immunity responds to a normal part of the body in an abnormal way, it is called an AUTOIMMUNE RESPONSE. The Strep bacteria has a protein that looks like our body’s connective tissues’ protein. In some people (especially in Africa and Asia), the body reacts to all connective tissue thinking it is killing the Strep bacteria. The long-lasting destruction is in the valves of our heart.

- Damage to the heart valves is permanent and gets worse over time. The damage causes the heart to fail- this is RHEUMATIC HEART DISEASE.

What is the age group of children at the greatest risk for Rheumatic heart Disease?

Strep infections that lead to RHD are most common in children ages 5 to 15 years.

Steps to develop Rheumatic Heart Disease (RHD).

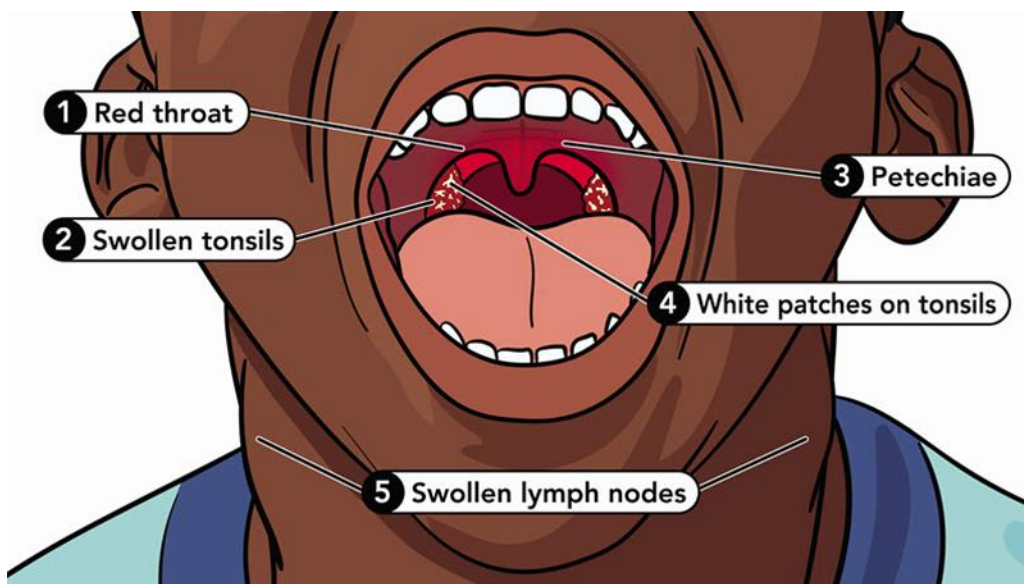
STEP 1. A person gets an infection from the *Streptococcus pyogenes* bacteria.

- There are 2 types of *Streptococcus pyogenes* infections:
 1. Skin= **Impetigo**: the most common finding is a clear, amber (honey-like) crust



2. Throat= **Strep Throat**: Swollen, painful tonsil, with pus and red, fever, NO cough, NO congestion. In Rwanda, Strep Throat is the most common Strep infection that causes RHD.





It is important to encourage all parents of children with fever and sore throats or skin infection to seek medical care. **Antibiotic treatment is required to prevent rheumatic heart disease.**

- Strep infections are very **contagious!** (The bacteria is easily passed from person to person)
- Strep **infections are transmitted** through shared towels, eating utensils, toys, door handles, common shared household items (plates, glasses, silverware) and the sharing of beds.
- Family and friends, schools and churches are common places for strep infections to be passed from person to person because there are lots of people and children playing, eating and drinking together.
- Increased people with Strep throat occurs in communities where there is less knowledge on the dangers of untreated Streptococcus pyogenes infections (Throat or skin), Acute Rheumatic Fever (ARF), and Rheumatic Heart Disease (RHD) and where there is less ability for good handwashing and housecleaning that can kill the strep bacteria.
- The Streptococcus pyogenes bacteria is easily killed with soapy water, or cleaning solutions (not just water). 10-20 second wash.
- **Bacterial infections require antibiotics to cure and to stop transmission to another person**

What are the SIGNS and SYMPTOMS children might have?

- Asking the child questions will help guide you to suspect a Strep bacteria throat (40% in Rwanda). The other causes of sore throat are from viruses. Virus infections do not need antibiotics.

Here are some questions you can ask:

Question	Clinical reasoning
When did the sore throat start?	Strep Throat has a FAST onset, viral illnesses come on slower
Is this a very bad sore throat?	Strep Throat is very painful
Do your eyes itch or water?	Virus- NOT seen in Strep throat
Do your ears hurt or feel full?	Virus- NOT common in Strep Throat
Do you have a runny nose?	Virus- NOT seen in Strep Throat
Do you feel like your face is full and with pressure?	Virus- NOT seen in Strep Throat
Do you have a cough?	Virus- NOT seen in Strep throat in children ages 5-15 years of age.
Do you have a fever?	Required for Strep infection diagnosis
Is your neck sore?	Swollen lymph node present and can be painful. However, a stiff neck (when a child does not want to move his/her head) can be a sign that the infection has spread to the brain and the child MUST be seen in a health center or hospital.
Does any other family member or friend have the same symptoms?	Strep infections are highly contagious.

How a nurse, or physician, diagnose Strep Throat:

REQUIRED CRITERIA for CLINICAL DIAGNOSIS

- Fever- Body temperature greater than 38.5°C,
- Swollen and tender lymph nodes under the jaw and neck
- Tonsillar white pus, redness, swelling, or petechiae (spots)
- Absence of cough/congestion (meaning NO Cough, NO runny nose, NO congestion)

STEP 2. A child who had strep throat who did not receive a full course of antibiotic

Then there is a high risk their body will develop autoimmune reaction to the streptococcus bacteria.

To PREVENT Rheumatic Heart Disease

Once a Strep throat has been diagnosed, antibiotic treatment must be started immediately. It is important to educate the parents and child that ALL medication prescribed must be taken until finished. **Penicillin is the preferred medication and treatment is 10 days of oral medication or 1 shot. Penicillin is a safe antibiotic and is used worldwide- your Health Centers have penicillin.**

STEP 3- the Autoimmune response occurs causing Acute Rheumatic Fever (ARF)

ARF can cause a wide range of symptoms that children can report. **The most important factor is a recent Streptococcus pyogenes sore throat or skin infection.** You see these children. You can now recognize the signs and identify children who may have ARF. Then you can encourage parents to take the child to the Health Center because unrecognized and untreated ARF can lead to irreversible and fatal Rheumatic Heart Disease.

100% of children will have a Fever!

60-80% of the children will complain of pain in a joint without any trauma. The joint gets better and then a different joint becomes inflamed, red, and painful. The most common joints are knee, ankles, wrists, and elbows. This can last from 2-8 weeks.



50-80% of children with ARF will complain of chest pain, or pressure in their chest. This occurs when a heart valve, or the heart muscle becomes inflamed from the auto immune reaction.

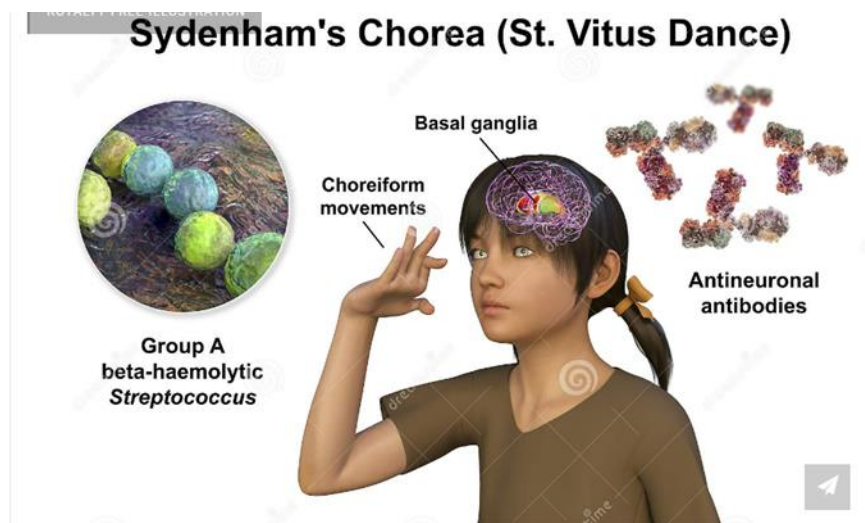
- Children can also report their **heart is beating fast** or “different beating of the heart”

- Children usually feel less pain if sitting upright or leaning forward and more pain when they lay down to sleep.
- Children will feel tired and ill when the heart is inflamed.
- They may be short of breath.

10 to 30% of children will have **inflamed brains!** Inflammation in the brain can create very unusual signs that are not associated with heart damage.

Your roles as Teachers and Community Health Workers are important! **You are the most important people to recognize abnormal and unusual behaviors of children** that could be from Acute Rheumatic Fever from an inflamed brain. Your knowledge about ARF and getting the child to be seen by a healthcare provider can save their lives.

You know these children... when behavior changes, and there was a Strep infection 1-4 weeks early, then think Acute Rheumatic Fever.



Sydenham's chorea, an autoimmune disease that results from Streptococcus infection, formation of anti-neuronal antibodies damaging brain basal ganglia that cause involuntary movements, 3D illustration

The Central Nervous System involvement is **called Sydenham chorea**. You can see a child with jerky, uncontrollable body movements

- It is a movement disorder characterized by chorea (involuntary brief, random, and irregular movements of the arms, fingers, legs and feet, trunk, and face)
 - Fingers can be held in odd positions
 - Face can go in and out of an uncontrollable grimace, or have a tic (repetitive movement like a twitch)
- These movements look like twitches and disappear during sleep.

- Children may display significant changes in behavior with laughing, crying, mood swings with emotional lability, and hypotonia. (Chowdhury, Koziatek, & Rajnik 2023).

0-6% of children with ARF will have unusual skin changes.

1. Nodules, or bumps seen/felt on the tendons of the knees and/or elbows. Children with nodules usually have severe inflammation of the heart.



2. A unique skin rash.



It is important to recognize these symptoms and encourage the parents to seek medical care. **ARF is the most common step missed by healthcare providers because the symptoms are unusual for children.**

You are the most important people in the community to recognize the symptoms and provide education to community members, parents, and students. You need to empower parents to take the child to the health center, or hospital, and ask for an evaluation for **Acute Rheumatic Fever (ARF)**

Treatment for ARF: Treatment is usually at a hospital. The child will need antibiotics and medications to treat the fever, pain, inflammation, and heart.

Important:

- Children who develop ARF must have the **proper antibiotic (Penicillin) every 3 WEEKS for 10 YEARS** (or age 21) to protect the heart from further damage!
- Almost ½ of those children in Sub-Sahara Africa who get ARF will have a repeat of Strep infection and ARF
- **60% of children who experience ARF will develop the fatal disease- RHD.** (Wallace & Bronze (Ed) 2021; CDC/Acute Rheumatic Fever; Sika-Paotonu D, Beaton A, Raghu A, et al., 2017)
- ARF is most common in children ages 5 to 15 years.

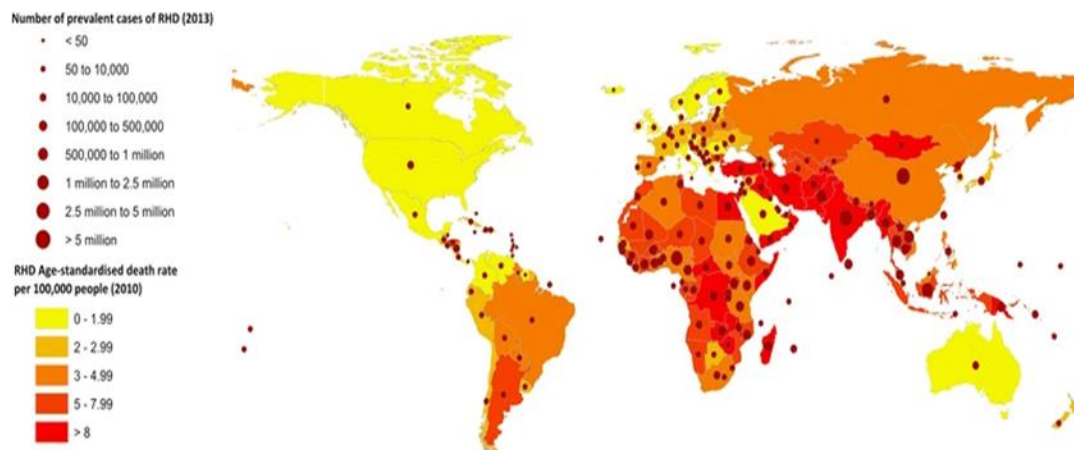
Why does a child need Penicillin (antibiotic) every 3 weeks for 10 YEARS once ARF is diagnosed?

ARF is an autoimmune response. The child's own immune system is responding to the child's connective tissue (heart valves). With every new Strep infection, the response is stronger creating more damage. The antibiotic (pills or shot) protects the child for about 3 weeks.

STEP 4. When ARF goes unrecognized and no antibiotics are given, then 60% of these children will develop Rheumatic Heart Disease (RHD)

RHEUMATIC HEART DISEASE. The body can recover from the inflammation in the joints and brain, but the **heart valves CANNOT recover.** Once heart valves are damaged, it is permanent and called Rheumatic Heart Disease.

- RHD is responsible for 250,000 deaths in young people worldwide each year, plus an additional 100,000 people older than 25. Over 15 million people have evidence of rheumatic heart disease (Dass & Kanmanthareddy, 2021).
- In Rwanda, the estimate is 40,000 children with RHD and **over 200 diagnosed every month.**



- **There is no cure for RHD.**
- Although RHD first occurs in childhood (ages 5-15 after ST and ARF), it is not uncommon to be diagnosed in the 20's and 30's when the valve damage is significant and symptoms impacting daily living.
- In Rwanda, the most common age to replace a heart valve is currently 25 years old (Team Heart 2023).
- **Young women** with RHD are often diagnosed for the first-time **during pregnancy** because the blood volume naturally increases during pregnancy to support the baby, but a damaged RHD heart cannot pump the increased blood properly. These women will have shortness or breath, be tired, fatigued, with swollen ankles.

Nurses with the ability to use a stethoscope can hear the abnormal sounds created by Rheumatic Heart Disease and diagnose RHD sooner.

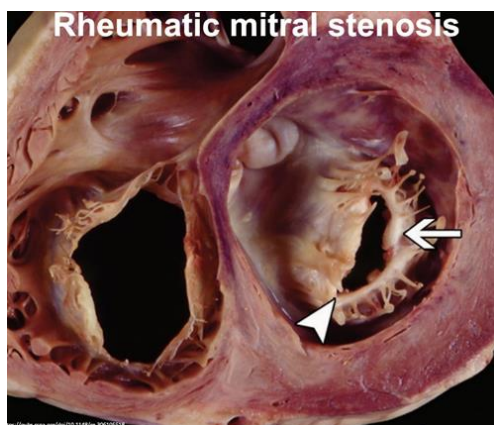
People who are more tired, fatigued, short of breath, have difficulty sleeping at night due to cough, or having to sit up to breath need a nurse or doctor to listen to their heart and lungs to check for murmurs (abnormal heart sounds).

You can help! You can encourage the person, or parents to take the person to your Health Clinic or Hospital and request that the nurse, or doctor, listen to their chest.



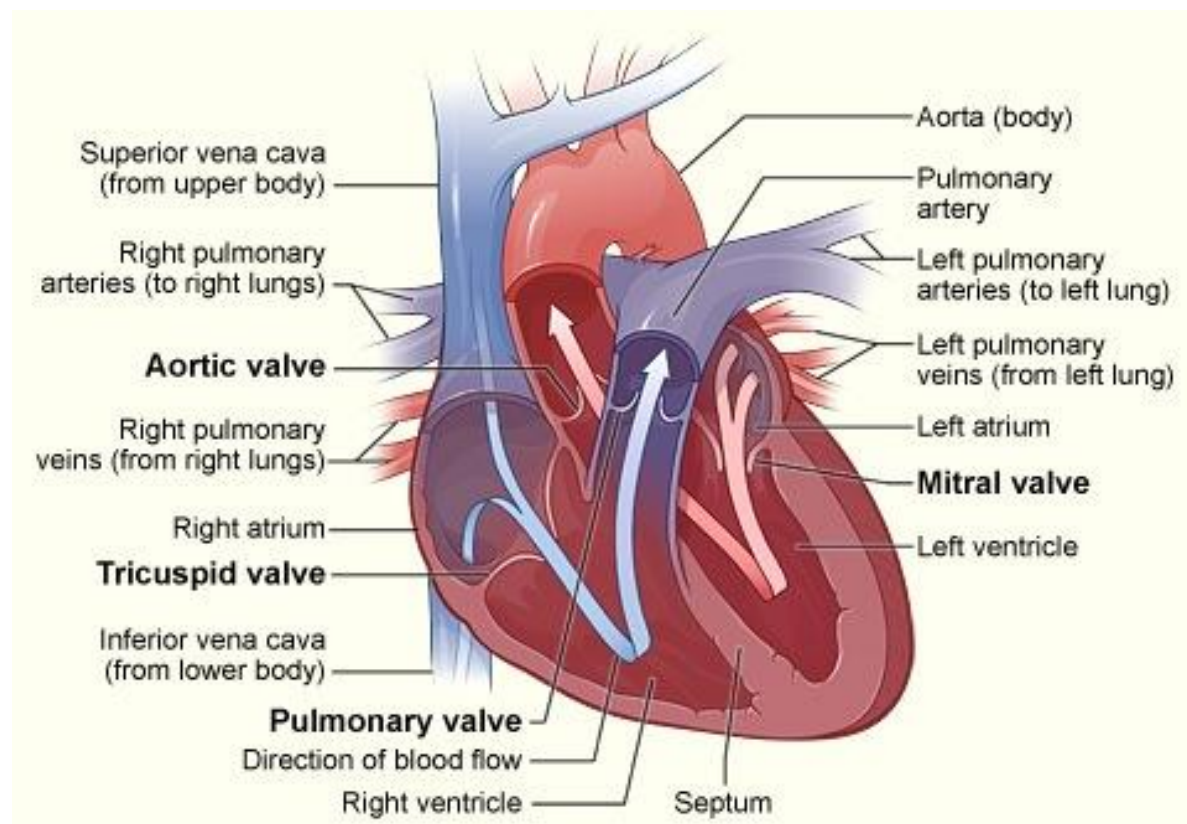
What happens to the heart valves in RHD?

- **Untreated strep throat, or impetigo, followed by acute rheumatic fever,** create increasing scar tissue of heart valves from the autoimmune inflammatory response to the Strep infection causes **Rheumatic Heart Disease.**
- The result of valve damage is the inability of blood to flow through the heart normally because the valves cannot open and close normally.

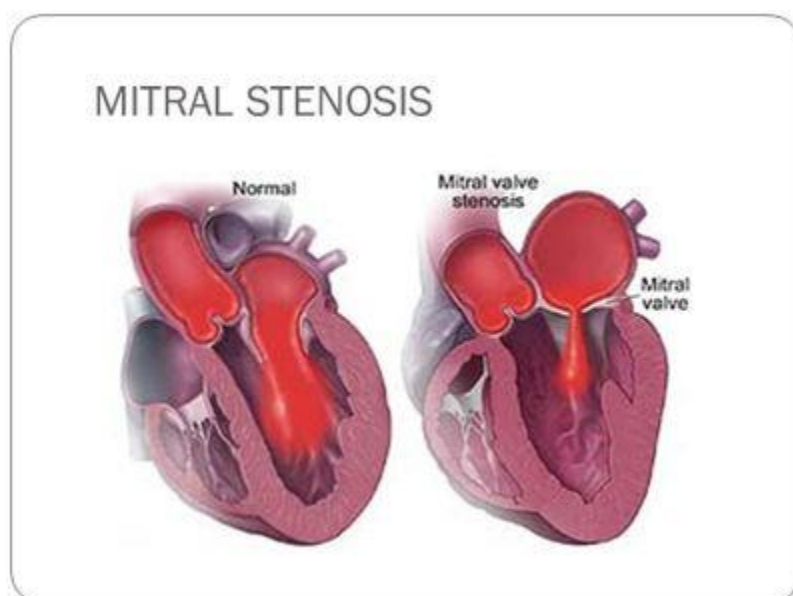


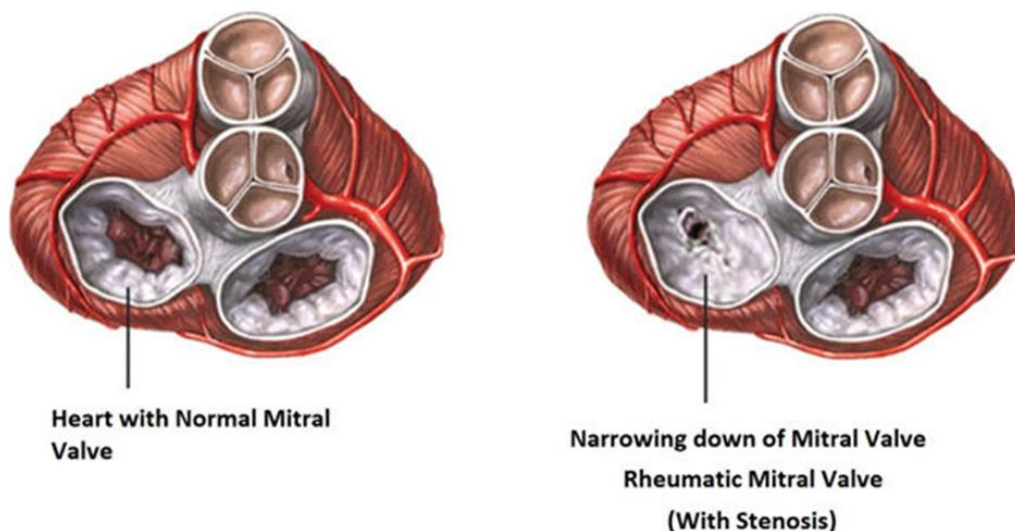
- RHD valve damage causes the valve to thicken, and the valve no longer can open and close normally. As the valve damage continues, the blood cannot be pumped as normal and will often have to go backwards to the lungs or liver.

How blood flows normally through a heart



How blood flows in Rheumatic heart Disease





The opening of the valve is reduced. This reduces the amount of blood that can be pumped through the scarred valve.

What are the signs & symptoms found in chronic RHD?

Remember that with many patients in Rwanda (currently about 200 children per month), the diagnosis of RHD is first made when they **present late in the disease process** with heart failure or a cardiac complication.

These children have trouble breathing when they walk up a hill, or carry items, or making a bed, playing sports. They are weak, tired, and often have swollen feet, or cough at nighttime.

The sooner cardiology is involved in their care, the better the outcomes and quality of life. You can help save lives by recognizing the symptoms then helping the parents seek medical care.

The symptoms you can recognize of RHD causing heart failure include the following:

- ❖ Breathlessness- Shortness of breath: Shortness of breath with movement, when first lying down and with awakening in the middle of the night to breathe or cough. These breathing problems develop when a failing heart cannot push the blood forward, so it goes backwards into the lungs.
- ❖ Tiredness and weakness- fatigue

- ❖ Feeling of increased heartbeats. Some children will feel their heart beating fast.
 - ❖ Swelling of the feet
 - ❖ Chest Pain or discomfort
 - ❖ Swelling of the abdomen- This is called ascites and occurs when the heart is failing, and the heart cannot receive all the blood. The blood goes backwards to the liver.
 - ❖ Stroke- the poor flow of blood allows for clots to be formed. When a blood clot travels to the brain, a stroke occurs.
- (Hunter et al., 2017; Baker et al., 2019)



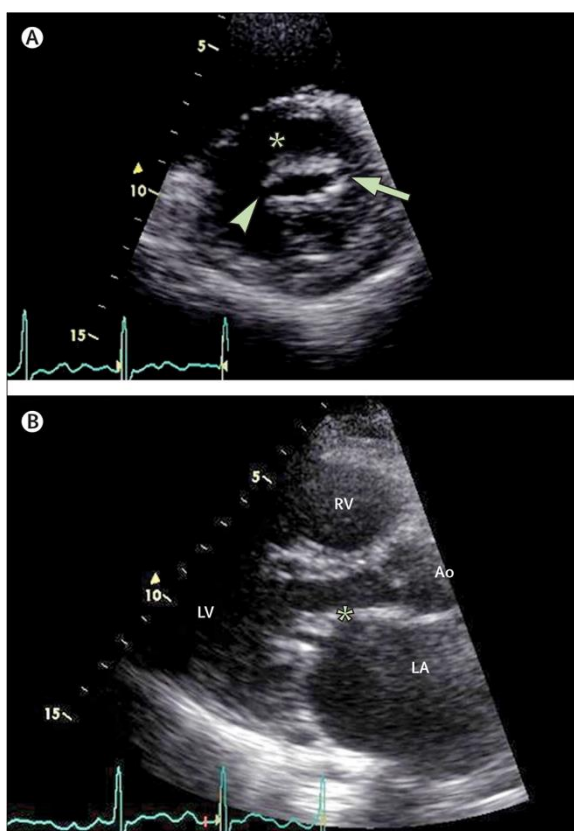
How is RHD diagnosed?

- First, **Rwandan nurses** are learning to identify strep infections and the risk of developing ARF and RHD. They are learning to use a **stethoscope to listen to a heart** as damaged valves sound different (called a “murmur”).

- **Next the patient is evaluated and treated at District hospitals by NCD nurses. There the child will receive an “Echocardiogram.”**

- An echocardiogram is an ultrasound where sound waves make a picture of the heart. There is no pain in this procedure. It is a picture of the heart, and the valves can be assessed on how well they open and close. Plus, the echo allows the physician and nurse to review of the size, shape, and movement of the heart is done to determine how healthy (or damaged) is the heart.

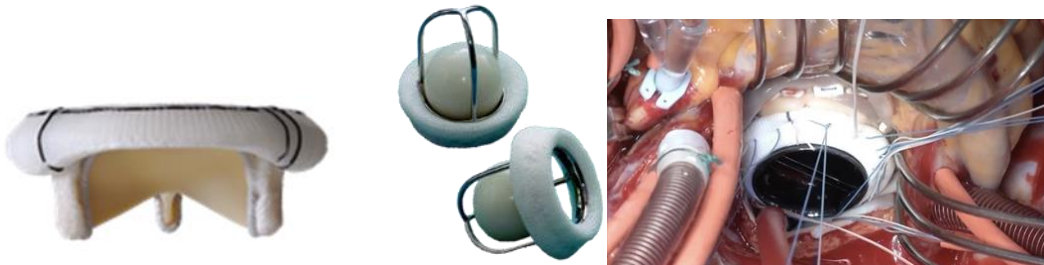
- **RHD is diagnosed through the echocardiogram.**





What happens after RHD is diagnosed?

- **There is no cure for RHD but there is treatment to slow the damage of the heart valves.**
- Nurses and doctors will provide medications to help treat the blood volume overload, the fast heart rate, and decrease the workload of the heart. The most important medication is **PENICILLIN antibiotic given every 3 weeks for at least 10 YEARS.**
- When the valve damage is very bad, then the child will need surgery to replace the valve.





How can teachers and Community Health Workers make a difference?

- Children need your help **in educating children** how to avoid strep throat and the importance of telling their parents when a sore throat develops.
- Children need your help to teach them about how contagious *Streptococcus pyogenes* infections are and what to do to stop transmission: wash hands, do not share food/drinks, do not use the same towel or toothbrush.
- Children need your help to **increase the awareness** of ST, ARF, and RHD in your community!
- Children need your help in recognizing the importance of treating a Strep sore throat with the **proper antibiotic**.
- Children need your help to **advocate** for them if the unusual symptoms of ARF occur, then the child needs to see a nurse or doctor trained in ST, ARF, and RHD.
- Children need your help to **encourage parents and nurses to seek an echocardiogram** if there are any symptoms of ARF.
- Children need your help in **recognizing that a fast heart rate** in a child with fever and recent Strep infection may have ARF and need to be seen by a NCD nurse and receive an echocardiogram.
- Children need your help to **encourage nurses to use their stethoscopes** to listen to hearts and lungs of their patients and to refer all abnormal sounds for an echocardiogram. Support your nurses.
- Children need your help **in recognizing the symptoms** of RHD: tired, short of breath, swollen ankles, chronic cough (especially at night), a need to decrease childhood activities (play and sports) because of being tired and breathing troubles.
- **Know that malnourished** children have higher rates of RHD and RHD may be causing the weight loss.

- **Know that the treatment** is ANTIBIOTICS (Penicillin) and once ARF develops the child needs Penicillin every 3 WEEKS for 10 YEARS.
- Know that oral Antibiotics are taken **2-3 times per days for 10 DAYS**. Not completing the penicillin increases the risk for ARF and RHD.
- Know that **ARF occurs 1-4 weeks after** Strep Throat or Impetigo.
- Know that **Streptococcus pyogenes lives in human skin and mouth**. It is highly contagious. Encourage **hand washing with soap**. Strep is killed by soapy water and cleaning agents, but NOT by plain water.

Teaching families about strep infections transferring from person to person:

- Sharing of beds when someone has a fever and sore throat
- Limited or lack of hand and dish washing resources- use soapy water and wash hands often
- Schools and church gatherings- when children sit and play together
- Sharing the same glass to drink
- Eating from the same plate, using the same fork
- A toy that an infected child has put into their mouth
- A doorknob that is used by all of the family/ school
- Sharing a towel for bathing or drying hands
- Kissing
- Touching impetigo and then touching something else that gets into a mouth.

Thank you for attending this education activity. We hope you learned something new that you can share with your community.

Rotary International believes that providing education to you, that you can help improve the health of your community by sharing your knowledge.

Working together we can decrease RHD in your community and all of Rwanda.

Thank you.