

Project Interreg MACbioIDi2

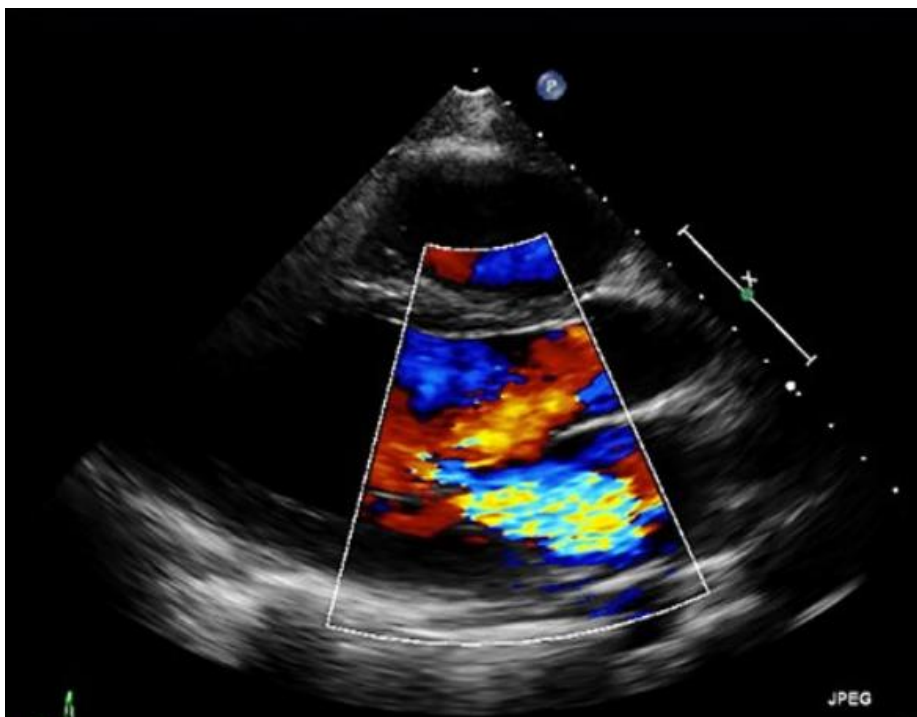
“Train the trainers” meeting

Las Palmas de Gran Canaria, 31st March 2022

Rheumatic heart disease

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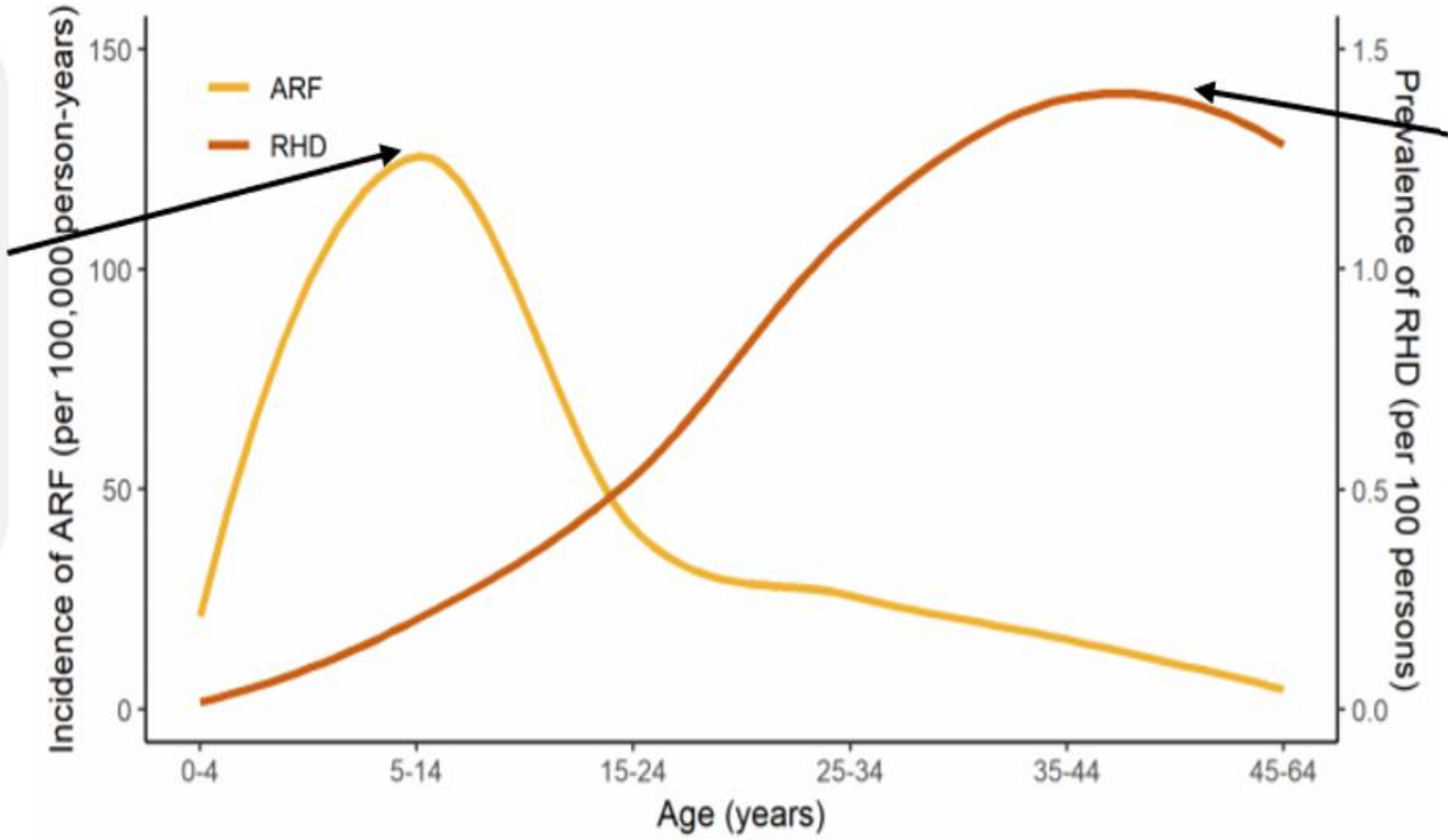
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From RF to RHD

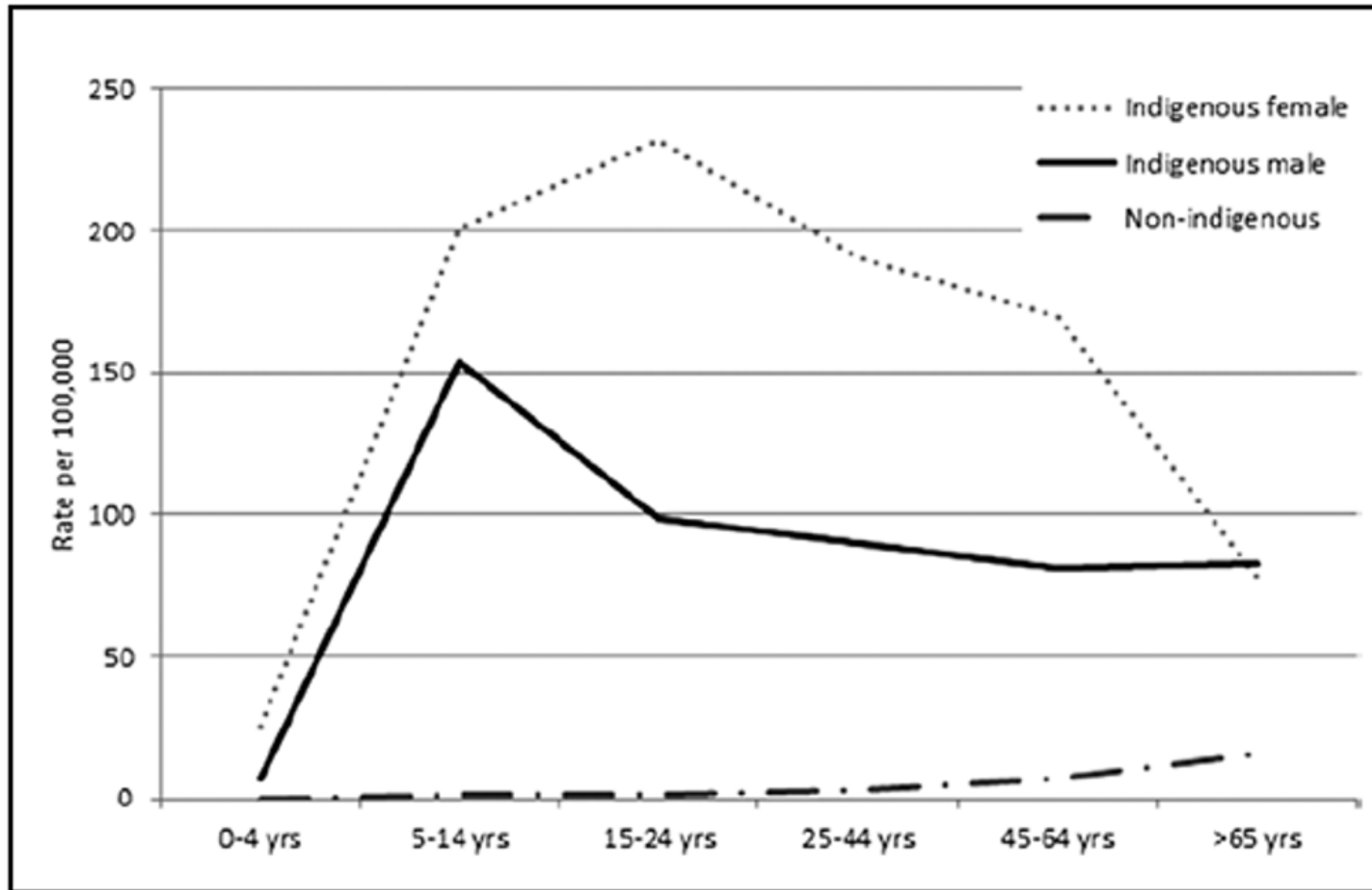
- Rheumatic fever (RF)
 - Caused by streptococcus A
 - Mainly affects children from 5 to 15 y.o.
 - Damages in several parts of the body, mainly the heart valves
- Rheumatic heart disease (RHD)
 - Affects ~33 million people in the world
 - A consequence of poverty
 - Virtually eradicated in high-income countries (except Australian aborigines)
 - 99% of cases occur in endemic countries
 - In each country, higher incidence in low-income groups
 - Causes more than 300,000 deaths every year
 - Many disabled people, some of them very young.

INTERPRETATION
A FIRST EPISODE of ARF (*incidence*) is most common in children aged 5-14 years, and gradually becomes less common as people get older.



INTERPRETATION
The number of people living with RHD (*prevalence*) steadily increases with age and then starts to decline from the age of 35 years as survival is reduced.

Source: Wyber R, Cannon J, Katzenellenbogen, J. The Cost of Inaction on Rheumatic Heart Disease: The predicted human and financial costs of rheumatic heart disease for Aboriginal and Torres Strait Islander people 2016-2031. The END RHD CRE, Telethon Kids Institute. Perth. 2018





Ref: Lawrence JG et al 2013 Acute rheumatic fever and rheumatic heart disease, Incidence and progression in the Northern Territory of Australia, 1997-2010 *Circulation* 128: 492-501

Higher impact on women

- Prevalence is higher in girls and women
- Latent disease usually manifests itself during pregnancy
 - Because of the higher effort required from the heart
 - Heart failure, arrhythmias, paroxysmal nocturnal dyspnea (PND), hypertension, thromboembolisms...
- Perinatal complications
 - More C-sections, maternal and neonatal deaths...
 - A study in Senegal: 17 maternal deaths in 46 women with RHD (34%) [Diao et al. 2011]



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CLINICAL RESEARCH

Pregnancy in women with heart disease in sub-Saharan Africa

La grossesse des femmes atteintes de cardiopathie en Afrique subsaharienne

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ESC

European Society
of Cardiology

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ESC GUIDELINES

2018 ESC Guidelines for the management of cardiovascular diseases during pregnancy

The Task Force for the Management of Cardiovascular Diseases during Pregnancy of the European Society of Cardiology (ESC)

Endorsed by: the International Society of Gender Medicine (IGM), the German Institute of Gender in Medicine (DGesGM), the European Society of Anaesthesiology (ESA), and the European Society of Gynecology (ESG)

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Addressing RHD

- Underfinanced disease
 - HIV/AIDS, malaria, and tuberculosis cause 3 times more deaths each
 - but each one receives between 500 and 1,000 times more funds.
- WHO's *Global Action Plan*
 - Signed in 2013 by all the 193 countries in WHO
 - The 25 × 25 < 25 goal: “a 25% reduction in premature deaths from RF and RHD among individuals aged <25 years by 2025”
- Four levels of prevention
 - primordial: better housing, less overcrowding
 - primary: early treatment of RF episodes
 - secondary: echocardiographic screening + antibiotic prophylaxis
 - tertiary: treating severe RHD, including valvular prostheses

Conditions for a screening programme

- The disease has a latent stage (asymptomatic)
 - There is a treatment for the disease in latent stage
 - There is a test for detecting the disease
 - The test is cost-effective. It depends on:
 - severity of the disease
 - efficacy of treatment in the latent stage
 - incidence of the disease
 - prolonged latent stage (slow progression)
 - accuracy of the test: sensitivity and specificity
 - cost of treatment, cost of test
- } prevalence of latent disease

RHD fulfills all these conditions

- Severe disease, endemic in many countries, slow progression...
- Reliable test: echocardiography
- Effective treatment: monthly penicillin injections
- Test and treatment are not expensive
- Several studies using Markov models have proved that screening children at schools is cost-effective in endemic countries
- Screening pregnant women (and those who will be pregnant) may also be cost-effective.

Two-phase screening

- First phase:
 - At schools
 - With a portable sonograph or a handheld probe
 - Done by **paramedical personnel** (nurses or technicians) with brief training or by cardiologists
- Second phase:
 - At a hospital
 - With a standard sonograph
 - Always done by cardiologists
- Proved in Australia, Brazil, Nepal, South Africa, Timor Leste, Uganda...

A.I. can assist them

Our project

Design

- Preliminary study
 - A pediatric cardiologist is examining children at a hospital in Madrid with a Philips Lumify probe
 - We are developing an A.I. program to analyze the images in real time
- Pilot study in Sierra Leone (July 2022)
 - The cardiologist will exam 200 children attending an NGO's camp
 - First phase: screening at the camp with the handheld probe
 - Second phase: suspicious cases will be examined at hospital
- Future
 - Wider study in several schools
 - Implementation of a penicillin prophylaxis programme.

Preparatory visit to Makeni, Sierra Leone, in Jan 2022.

Handheld probe
+ tablet



Portable
sonograph

Possibility of collaboration

- We offer:
 - A Spanish cardiologist may visit your country for two weeks, train your personnel for the first phase of screening (at schools), supervise it and do the second phase of screening (at a hospital)
 - Support for implementing a secondary-prophylaxis programme
 - in collaboration with experts from Australia and the USA.
 - In the future, your local personnel will be supported by an A.I. program that will analyze the echoes in real time and offer recommendations based on personal clinical data
- You need:
 - Nurses who will be responsible for the prophylaxis programme.

Thank you very much for your attention

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