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Penicillin significantly reduces rheumatic heart disease progression in children

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Research at a Glance

- An international study has found a regular antibiotic treatment significantly reduced the risk of underlying rheumatic heart disease progression in Ugandan children and adolescents
- The trial showed 0.8 per cent of participants who received regular injections of penicillin for two years progressed to serious rheumatic heart disease, compared to 8.3 per cent who received no treatment
- It is estimated that 13 children with latent rheumatic heart disease would need to be treated with antibiotics to prevent one case of disease progression two years later
- The researchers stated the findings showed early screening would help to prevent serious rheumatic heart disease progression and death in young children

A regular, affordable antibiotic treatment significantly reduced the risk of underlying rheumatic heart disease progression in children and adolescents, according to a new study.

The research led by the [Murdoch Children's Research Institute \(MCRI\)](#), [Cincinnati Children's Hospital Medical Center](#), [Uganda Heart Institute](#) and the [Children's National Hospital](#) in Washington also showed that early screening was critical in preventing serious rheumatic heart disease progression and death in young children.

Rheumatic heart disease affects 40.5 million people globally and causes at least 306,000 deaths every year. The chronic disease is caused by damage to the valves of the heart, following a case of Strep throat. It's considered a disease of poverty and disadvantage yet Australia has some of the highest rates in the world. The disease disproportionately affects Indigenous Australians with about 3-5 per cent living in remote and rural areas having the condition and children aged between five and 14 years most likely to get rheumatic fever.

Cincinnati Children's Hospital Medical Center [Associate Professor Andrea Beaton](#) said that until this study, it was unknown if antibiotics were effective at preventing the progression of latent rheumatic heart disease.

"The trial is the first contemporary randomized controlled trial in rheumatic heart disease. The results are incredibly important on their own, but also demonstrate that high-quality clinical trials are feasible to address this neglected cardiovascular disease," she said.

The trial involved 818 Ugandan children aged 5-17 years with latent rheumatic heart disease. The participants either received four-weekly injections of penicillin for two years, or no treatment. All underwent echocardiography screening, where ultrasound waves produce images of the heart, at the start and end of the trial.

The findings from the screenings, published in the [New England Journal of Medicine](#), reported just three (0.8 per cent) participants who received penicillin experienced latent rheumatic heart disease progression, compared to 33 (8.3 per cent) who didn't receive the treatment.

MCRI's [Dr Daniel Engelman](#) said the results showed a significant reduction in disease development and was more

substantial than what was predicated.

“The results suggest that for every 13 children with latent disease who receive treatment for two years, one child will be prevented from developing more severe disease. As a preventative strategy for a severe, chronic disease, this is a very important finding,” he said.

MCRI [Professor Andrew Steer](#) said screening for latent rheumatic heart disease was critical to stop progression because heart valve damage was largely untreatable.

“Children with latent rheumatic heart disease have no symptoms and we cannot detect the mild heart valve changes clinically,” he said.

“Currently, most patients are diagnosed when the disease is advanced, and complications have already developed. This late diagnosis is associated with a high death rate at a young age, in part due to the missed opportunity to benefit from preventative antibiotic treatment. If patients can be identified early, there is an opportunity for intervention and improved health outcomes.”

Uganda Heart Institute [Dr Emmy Okello](#) said the Ugandan government should strengthen programs that promote screening of rheumatic heart disease and the availability of penicillin.

In 2018 Uganda supported the World Health Organization’s resolution to make the condition a global priority.

“Our study found a cheap and easily available penicillin can prevent progression of latent rheumatic heart disease into more severe, irreversible valve damage that is commonly seen in our hospitals with little or no access to valve surgery,” Dr Okello said.

Researchers from the University of Cincinnati School of Medicine, Makerere University; Uganda, The Royal Children’s Hospital, Telethon Kids Institute, Virginia Tech Carilion School of Medicine, Université de Paris, Instituto Nacional de Saude; Mozambique, Universidade Federal de Minas Gerais; Brazil, Emory University School of Medicine; Atlanta, Starship Children’s Hospital; Auckland, Geisel School of Medicine; New Hampshire, Red Cross Children’s Hospital; South Africa and All India Institute of Medical Sciences also contributed to the study.

Publication: Andrea Beaton, Emmy Okello, Joselyn Rwebembera, Anneke Grobler, Daniel Engelman, Juliet Alepere, Lesley Canales, Jonathan Carapetis, Alyssa DeWyer, Peter Lwabi, Mariana Mirabel, Ana Olga Mocumbi, Meghna Murali, Miriam Nakitto, Emma Ndagire, Maria Carmo P. Nunes, Isaac Otim Omara, Rachel Sarnacki, Amy Scheel, Nigel Wilson, Meghan Zimmerman, Liesl Zühlke, Ganesan Karthikeyan, Craig A. Sable and Andrew C. Steer. ‘Secondary Antibiotic Prophylaxis for Latent Rheumatic Heart Disease,’ *New England Journal of Medicine*.

Available for interview:

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About MCRI

The Murdoch Children’s Research Institute (MCRI) is the largest child health research institute in Australia



committed to making discoveries and developing treatments to improve child and adolescent health in Australia and around the world. They are pioneering new treatments, trialling better vaccines and improving ways of diagnosing and helping sick babies, children and adolescents. It is one of the only research institutes in Australia to offer genetic testing to find answers for families of children with previously undiagnosed conditions.

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