Study identifies how to improve WHO eradication strategy for skin disease

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Alyssa Barry. Credit: Walter and Eliza Hall Institute

An international research collaboration published in *The Lancet* has found crucial evidence that could help to improve the current World Health Organization (WHO) strategy to eradicate yaws—a chronic

disfiguring and debilitating infectious disease affecting the skin, bones and joints.

Despite efforts the elimination of yaws in a high-endemic community in Papua New Guinea (PNG) is yet to be achieved. The research identifies relapsing, untreated infections and the emergence of antibiotic resistance as contributing to ongoing yaws infection in the community. Researchers from Spain, PNG, US, Australia, and international colleagues led the study.

Yaws is caused by *Treponema pallidum*, a subspecies of the bacterium that causes syphilis. It is spread by direct contact through minor injuries such as cuts and scratches on the skin and afflicts mostly children. It initially causes painful skin lesions but, if left untreated, can lead to chronic deformities and disability.

Yaws is an ideal candidate for eradication because it is only found in humans and is easily treated by antibiotic treatment.

WHO's current strategy to eradicate yaws by 2020 involves a single round of mass treatment with the inexpensive antibiotic azithromycin, followed by targeted treatment programs every 3-6 months to identify and treat all symptomatic cases and their contacts.

Australian infectious diseases geneticist and study contributor Associate Professor Alyssa Barry from the Walter and Eliza Hall Institute said the research suggested adapting the WHO approach in three key areas to speed up yaws eradication efforts.

"The findings point to a need for multiple rounds of mass drug administration in order to capture those not present during the first round," Associate Professor Barry said.

"Research also showed a much bigger geographical area should be targeted for the mass treatment, in order to protect against the migration of infection in people from surrounding communities. Finally, there is a clear need for ongoing monitoring to prevent the spread of drug-resistant strains, following world-first evidence of antibiotic resistance in yaws bacteria," she said.

Dr Oriol Mitjá from the International SOS Lihir Medical Centre, PNG, and the Barcelona Institute for Global Health, Spain, said the findings suggested a single round of mass treatment with azithromycin was insufficient to eradicate yaws.

"Our findings highlight the importance of treating every person in a community to be sure of targeting all latent infections. Doing multiple rounds of mass treatment may be necessary to eliminate yaws," Dr Mitjá said.

Associate Professor Barry said the forensic precision of modern genetic and genomic analysis was an essential tool in the fight towards infectious disease control and elimination.

"DNA-based tests following the WHO's mass drug administration showed a reduction in yaws strain diversity and a decrease in transmission of the disease. This is a sound indication that the mass treatment of azithromycin is an effective option.

"Further testing detected new strains that were not local but imported by visitors to the island. These data supported the recommendation for multiple rounds of mass drug administration and that efforts to eradicate yaws should target a broader geographic area," she said.

The study is a wonderful demonstration of how basic research can be translated to have a significant influence on global disease eradication

policy and programs, said Associate Professor Barry.

"It's great to see the PNG study's findings could have an impact on the global eradication of yaws," she said.

Provided by Walter and Eliza Hall Institute