

# Yaws: Eradication by 2020 - A Possible Failure?

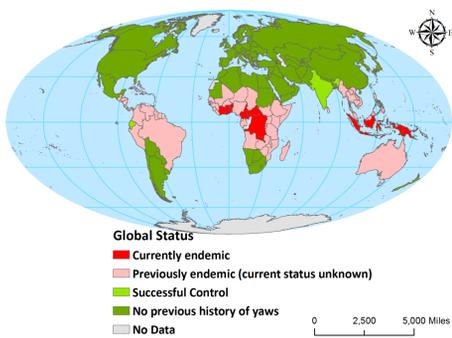
## Non Human Primates Role in the Global Eradication of a Neglected Tropical Disease

### Yaws: An Introduction

The year 2012 saw the relaunch of an old campaign, led by the World Health Organization (WHO) to eradicate the neglected tropical disease known as 'Yaws.' Yaws, historically found in humid tropical regions, is an infectious multi stage disease caused by the Organism *Treponema pallidum pretenu* (*T. pretenu*), a bacterium almost identical to the organism which causes syphilis. Transmission occurs through skin-to-skin contact of a nonsexual nature and is often found in children who spread the disease agent during play. The WHO has classified yaws as one of 17 neglected tropical disease and known to disproportionately affect economically disadvantaged populations and rural communities.

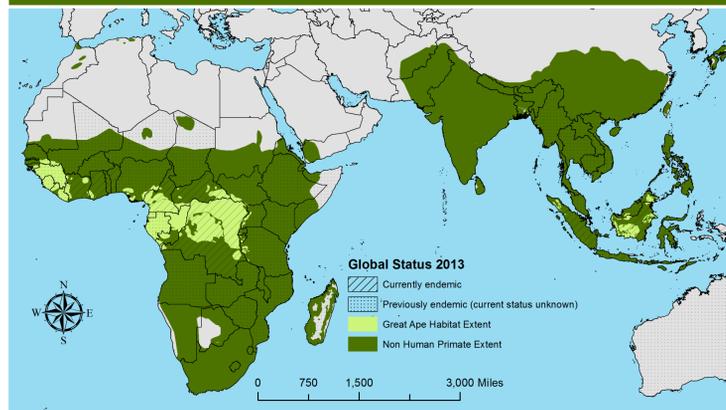
The median time from inoculation and the appearance of a primary yaws lesion is about 21 days, though it has been known to take as long as 90 days. In humans, the primary yaws lesion usually appears in the skin of the leg and ankle sometimes presenting on the arm, hand, or buttocks. In baboon's the lesions have been associated with the skin of the buttocks, genital and inguinal areas; suspicion of facial lesions have been described in Gorillas. After about 3 to 6 months, the primary yaws will resolve but if not treated with appropriate antibiotic medications the disease agent will proceed to enter its second and intermediate stage via hematogenous and lymphatic dissemination. The secondary stage of yaws is characterized by scaling of the skin and plaques of the palms which often present with arthralgia and malaise. If yet still untreated the disease will progress to its third and chronic stage of relapsing illness displayed as dactylitis, deformities of long bones in the extremities and irreversibly damaging ulceration of the palate and nasopharynx.

Yaws was the first disease targeted for eradication by the world health council and the United Nations Children's fund in the 1950's resulting in a 95% decrease globally. The current WHO strategy towards the goal of global yaws eradication was formulated in 2012 and is biased on recent studies which provide some support or the use of oral azithromycin instead of the long-standing standard of intramuscular injections of long-lasting penicillin. The use of oral antibiotics provides an advantage towards mass administration of endemic areas and allows for a decrease in the need for highly trained personal capable of performing injections.



This map shows the historical and current global distribution of yaws. It also highlights the recent and successful campaigns in India and Ecuador.

### Non Human Primates

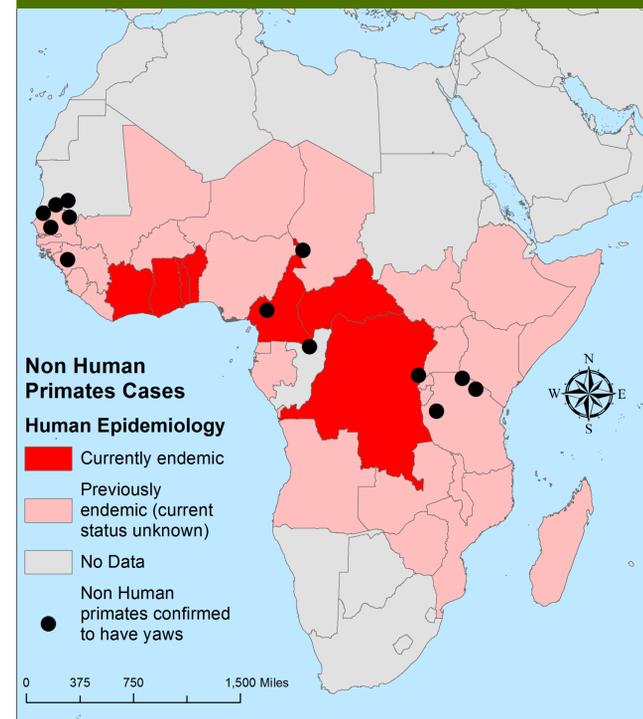


### Discussion

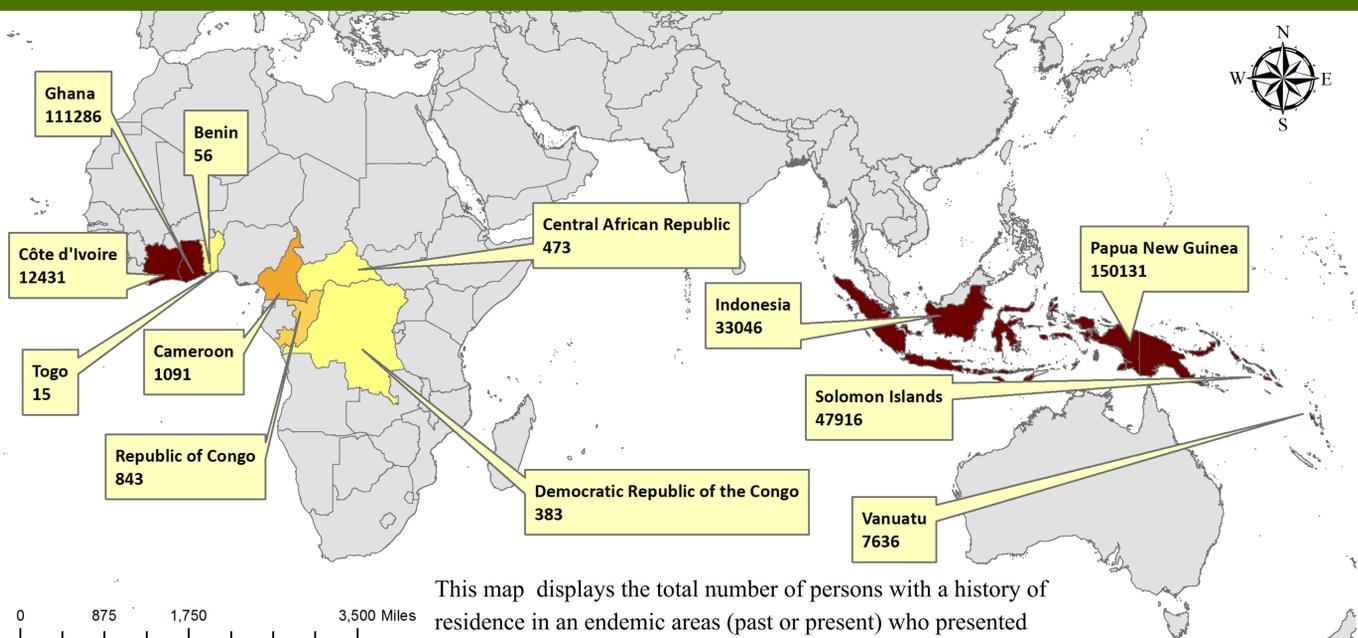
Though the goal of global eradication of yaws by 2020 is admirable, it is also impractical; there are many factors which will likely cause the current campaign to fail. As of 2016 an appropriate dosage of azithromycin for the treatment of yaws is not firmly established. There is also a lack of global epidemiological information with most cases reported to the WHO by the various health departments from each country. The lack of baseline numbers paired with no long-term plans for active surveillance leaves one starching their head. There is also the possibility of resistance to azithromycin which has occurred in the treatment of syphilis which is extremely closely related to yaws and thus servers as a strong predictor of the eventuality. Recent publications have confirmed longstanding suspicions flies might act as a vector for the spread of yaws.

Lastly and most importantly one of the standards for slating a disease agent for eradication is lack of a nonhuman animal reservoir. This has been completely over looked or simply ignored. Reports of yaws like lesions have been reported for over a decade in various great ape populations and reports of serologically and PCR confirmed yaws have been published.

### Cases in Non Human Primates

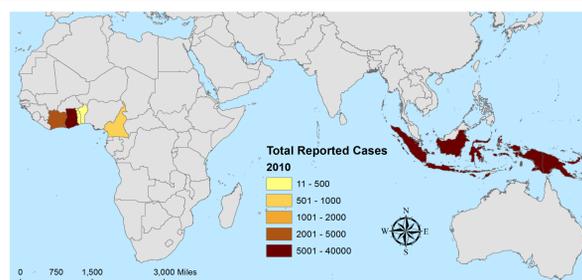
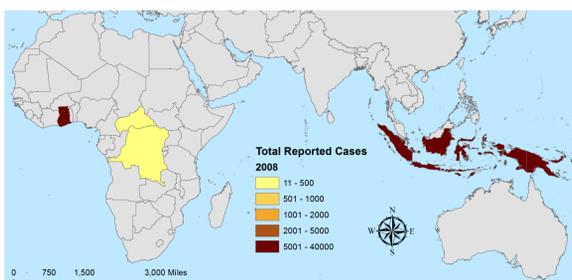


### Total Number of Cases Reported to the World Health Organization 2008-2013



This map displays the total number of persons with a history of residence in an endemic areas (past or present) who presented with clinically active (visible) yaws.

### Selected Yaws Cases by Year as Reported to the World Health Organization



### Map Methods

Data was downloaded from the World Health Organization into Excel where it was cleaned and organized for joining into Esri ArcMap 10.3. The information was then projected and reclassified into strata as displayed on the various maps. Information was also downloaded from International Union for Conservation of Nature (IUCN) and was used to create the nonhuman primate habitat extents. Cases of yaws in nonhuman primates were georeferenced from a recent publication in "The Scientist."

### Acknowledgements

An extremely special thanks goes to Carolyn Talmadge whose patience, knowledge and expertise where all tested to their limits during the course of this project. I would also like to thank to my mentor, Dr. Christopher Whitter for turning me on to the topic and Dr. Alison Robins who has been an unshakeable pillar of support. Of course a special shout out goes to the MCM '17ers whom I hope to work with and in support of for the rest of our lives.

### Data Sources & Cartographer Info

Cartographer information: Adam Krantz  
 Date Produced: 15 December 2016  
 Course: GIS for Conservation Medicine MCM 591  
 Projection: Mollweide, Mercator and Robinson  
 Data was taken from the International Union for Conservation of Nature (IUCN), the World Health Organization official website at <http://www.who.int/yaws/en/> and map points were extracted from the map in the article "Syphilis: Then and Now | The Scientist Magazine." 2016. *The Scientist*. Accessed December 16. <http://www.the-scientist.com.ezproxy.library.tufts.edu/?articles.view/articleNo/38985/title/Syphilis--Then-and->