# The Impending Elimination of Yaws

## *Treponema pallidum pertenue*

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## Abstract:

Yaws is a human disease found predominantly in tropical regions among children. The causative agent of Yaws, *Treponema pallidum pertenue*, is a spirochete bacteria closely related to syphilis - in fact, it is classified as the same species. Notably, unlike syphilis (a STD) Yaws is transmitted by skin-to-skin contact. The symptoms of Yaws are also not as severe as those of syphilis and include: the appearance of papillomatous lesions, arthralgia, malaise, and bone degradation. Of particular note, Yaws is easily treatable using a single dosage of antibiotic. As such, Yaws is actually rather close to being eliminated, putting it on the short list which includes only smallpox. The WHO estimates that the pathogen will no longer trouble mankind after 2020.

## Taxonomy:

- Domain: Bacteria
- Phylum: Spirochaetes
- Class: Spirochaetia
- Order: Spirochaetales
- Family: Spirochaetaceae
- Genus: *Treponema*
- Species: *pallidum*
- Sub-species: *pertenue*

## Pathology:

**Three Major Stages of Infection[1]:**

First Stage:

- Mother Yaw or Lesion appears at site of exposure, grows with time
- Commonly found on the legs and ankles
- Incubation period ranges from 10-90 days

Second Stage:

- After 3 weeks to 2 years, secondary lesions appear
- Joint pain and malaise are common
- Palms and soles may fissure making walking difficult

Third Stage:

- Develops after >5 years of untreated infection
- Destruction of skin and bone

## Pattern of Infection:

- The pathogen is spread by skin-to-skin contact; only among humans[1]
- The most common of the three endemic treponematoses (Yaws, Bejel and Pinta)
- Typically found in warm and humid climates(tropics) among poor children
  - 75% of infected are under age 15[WHO]
- Infection varies with changes in humidity[2]
- In 2013, a total of 58,915 Yaws infections were reported by the WHO
- From 2008-2012 >300,000 cases were reported to the WHO[2]

## Distribution (2012):

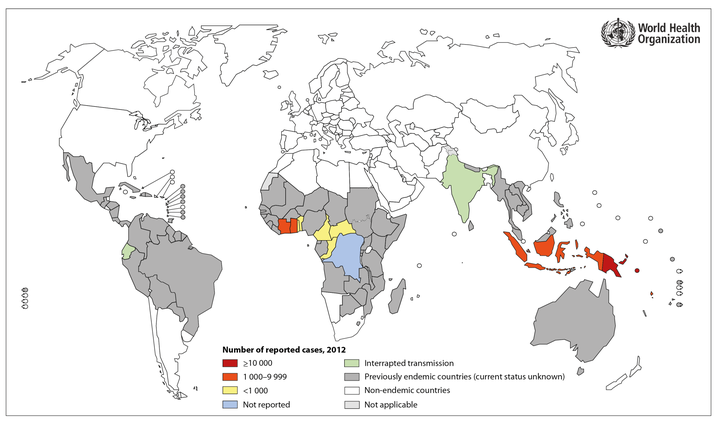


Fig 1: The WHO has provided the following map displaying the global distribution of Yaws in 2012. The disease has been eliminated from much of its historical range and is now confined to the region above and below the equator in both Africa and Asia/Oceania.

## A History of Yaws:

- *Homo erectus* skeletons dating back 1.6 Million Years show evidence of Yaws infection[3,4]
- Yaws was first identified by medicine
- How common is the disease on the host and are there large epidemics?
- Earliest reference to disease, and where it was first reported?

## Studying Yaws:

- Yaws cannot be grown in culture; it only survives in mammalian tissues
- The pathogen is easily killed by changes in environment (drying/heating)
- Replicates very slowly (30-33 hrs per division)
- Researchers typically grow the pathogen in rabbits and golden hamsters[1]
- Genetic analysis suggests that Yaws is the oldest of the treponemal diseases[1,4]

## Trends in Research:

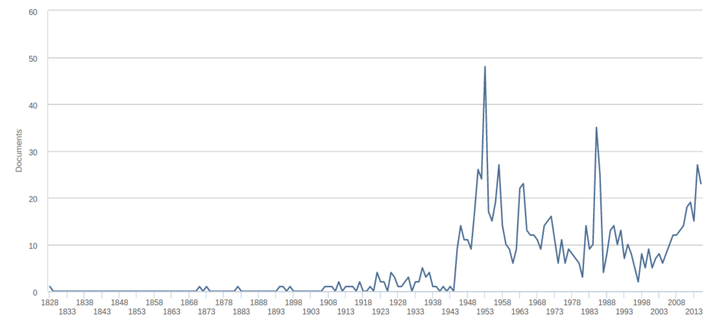


Fig 2: This is not a final figure. However, there is no clear trend in

## Elimination:

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## Barriers to Elimination:

- Reserviours of infection exist among young children;[2]
- Animal reserviours are present, however cross-species transmission is not evident at this time

## References:

1. Mitjà, O., Asiedu, K., & Mabey, D. (2013). Yaws. The Lancet, 381(9868), 763-773.
2. Kazadi, Walter M et al. "Epidemiology of yaws: an update." Clinical epidemiology 6 (2014): 119.
3. Rothschild, Bruce M, Israel Hershkovitz, and Christine Rothschild. "Origin of yaws in the Pleistocene." Nature 378.6555 (1995): 343.
4. On the Origin of the Treponematoses: A Phylogenetic Approach