ERADICATION OF YAWS

Procedures for verification and certification of interruption of transmission

World Health Organization

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Preface

In 2012, the Director-General of the World Health Organization (WHO) launched a roadmap for accelerating work to overcome neglected tropical diseases at a partners' meeting in London, United Kingdom, with a target set for the eradication of yaws by 2020. A publication in the Lancet that year on the efficacy of a single dose of azithromycin for the treatment of yaws was a major advance in the history of the disease and has renewed interest in its eradication. In 2013, the Sixty-sixth World Health Assembly adopted resolution WHA66.12 on neglected tropical diseases in support of WHO's roadmap. In this resolution, yaws is targeted for eradication by 2020.

In response to these developments, the WHO Department of Control of Neglected Tropical Diseases organized a consultation (Morges, Switzerland, 5–7 March 2012) to prepare a strategy for yaws eradication as the basis for national eradication plans. In light of the new development, the International Task Force for Disease Eradication at its 20th meeting (Atlanta, USA, 27 November 2012) reviewed the current global status of yaws and endorsed the new eradication strategy.

At a consultative meeting of experts (Geneva, 20–22 March 2013), two documents were developed to guide the yaws eradication process: a guide for programme managers on the eradication of yaws; and procedures for verification and certification of interruption of yaws transmission.

Some 43 participants from 17 countries deliberated in depth to finalize both documents. Participants included national yaws focal points in endemic countries, experts on yaws, and regional and selected WHO country staff responsible for yaws eradication within the portfolio of the neglected tropical diseases programme. Since then, these documents have undergone extensive review taking into consideration accumulated experiences gained during the pilot implementation of the Morges Strategy in a number of countries.

This document is intended to guide international verification teams and yaws eradication programme managers in verifying interruption of transmission of the disease.

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Dr Chandrakant Revankar, Public Health Medical Consultant for Neglected Tropical Diseases, and **Dr Kingsley Asiedu**, Medical Officer, Yaws Eradication, WHO Department of Control of Neglected Tropical Diseases, coordinated the production of this document.

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Abbreviations

DPP	dual path platform (treponemal and non-treponemal) test
IEC	information, education, communication
PCR	polymerase chain reaction
POC	point-of-care
RPR	rapid plasma reagin test
TCT	total community treatment
TPHA	*Treponema pallidum* haemagglutination assay
TPPA	*Treponema pallidum* particle agglutination assay
TTT	total targeted treatment
WHO	World Health Organization

1. Background

The endemic treponematoses, which comprise yaws, bejel and pinta, are a group of chronic bacterial infections closely related to those that cause syphilis; they are not sexually transmitted *(1)*. The causative agent of yaws is *Treponema pallidum* spp. *pertenue*, that of bejel (sometimes referred to as endemic syphilis) is *T. pallidum* spp. *endemicum*, and that of pinta is *T. carateum*.

Yaws, the most prevalent of these three diseases, mainly occurs in poor rural communities in warm, humid and tropical forest areas of Africa, Asia, Latin America and the Pacific, typically in countries with a mean annual temperature of 27 °C, an average annual rainfall of 1300 mm and altitude not greater than 6000 ft (1800 metres) *(2, 3)*. Figure 1 shows the global distribution of yaws *(4)* and Figure 2 the number of cases reported for the period 2008–2015.

During the eight-year period 2008–2015, a total of nearly 462 000 cases of yaws were reported to WHO from 12 endemic countries. Children aged under 15 years constitute more than 75% of the reported cases (peak reported incidence occurs in children aged 6–10 years). Males and females are equally affected. These populations, who often live in poor socioeconomic conditions (e.g. overcrowding, poor personal hygiene, inadequate clothing), are frequently isolated and live at the "end of the road" where access to health care and other social amenities is limited *(3)*.

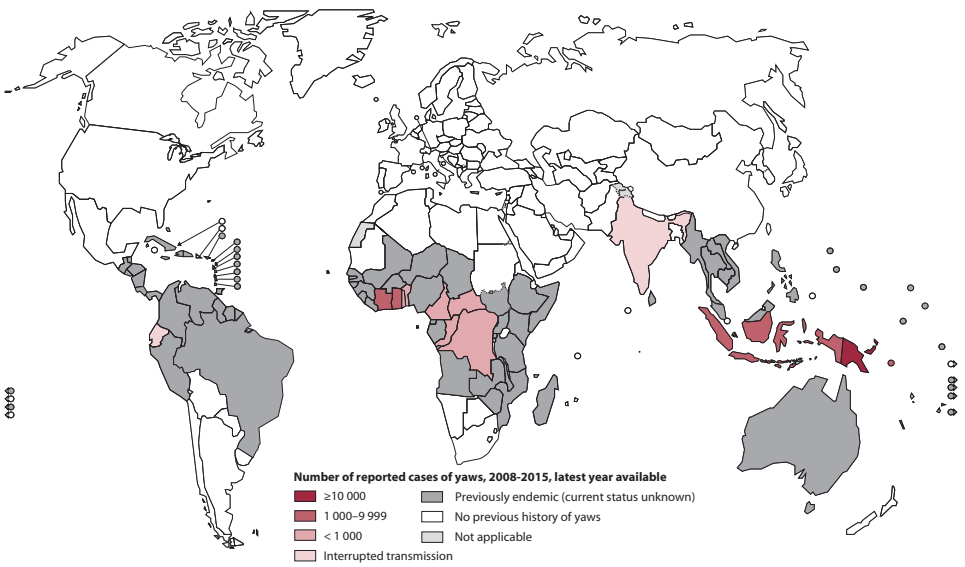

Figure 1. Distribution of yaws, worldwide, 2008–2015 (Source: reference *4*)

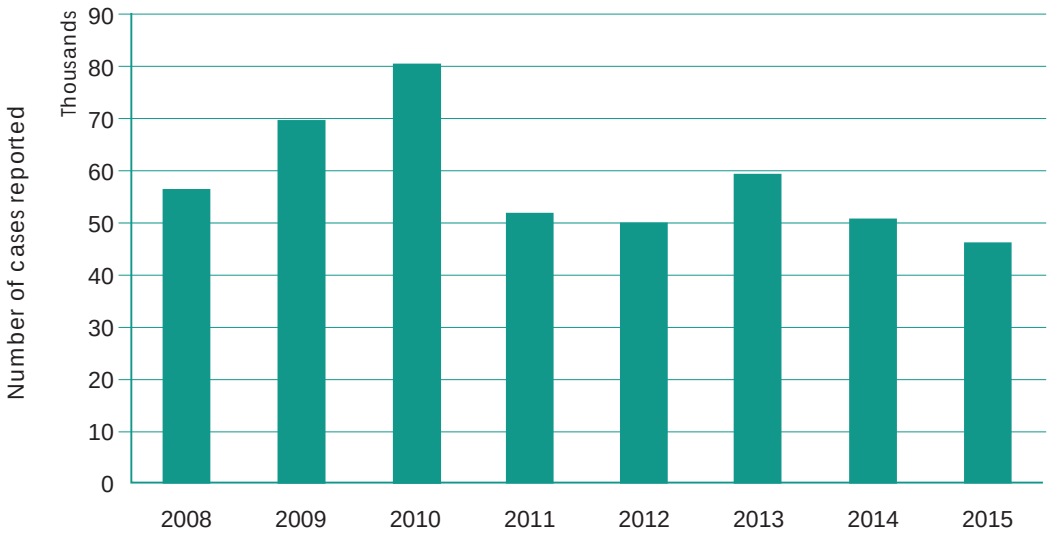

Figure 2. Number of yaws cases reported, worldwide, 2008–2015

Yaws is transmitted by direct (person-to-person), non-sexual contact of the skin with the fluid from an early infective lesion to an uninfected individual through minor abrasions. Transmission commonly occurs from child to child. However, parents occasionnally acquire the infection from their children. The initial clinical presentation of yaws (papillomatous and ulcerative skin lesions) is highly infectious and presents after an incubation period of 9–90 days (average, 21 days). The clinical classification of the disease is presented in Annex 1 (Table A1). If not detected and treated early, the disease can progress to cause painful, sometimes disfiguring lesions of the skin, cartilage and bones. In about 10% of chronic, untreated cases, permanent disability and associated stigmatization may result *(3)*.

Non-treponemal and treponemal serological testing remains the mainstay for diagnosis of yaws and the other endemic treponematoses but it cannot differentiate between these diseases and syphilis. Recently, molecular techniques have been developed to differentiate between the treponemal diseases but they require specimens to be taken from active early skin lesions.

Between 1952 and 1964, WHO and the United Nations International Children's Fund supported endemic countries to implement a mass treatment strategy using a single intramuscular dose of long-acting penicillin to yaws cases and their contacts. About 50 million people were treated during these campaigns and, by the end of 1964, the burden of yaws disease had been reduced by more than 95%, from 50 million to 2.5 million *(5)*. The disease resurged, however, and it remains a public health problem in some countries owing to inadequate surveillance and control measures that have resulted from competing health priorities.

Recent studies have indicated that a single dose of oral azithromycin (30 mg/kg) is as effective as a single intramuscular dose of long-acting penicillin for treatment of yaws. WHO recommends the use of either regimen, but azithromycin is preferred because it is easy to administer in large-scale treatment of populations *(5)*.

The criteria for eradication of yaws from a public health perspective were set by a WHO Expert Committee on Venereal Infections and Treponematoses in 1960 *(6)*. The WHO yaws eradication strategy relies on mass treatment of affected populations with oral azithromycin and enhanced community-based surveillance (the Morges Strategy, *5*). The WHO roadmap on neglected tropical diseases published in 2012 targets the global eradication of yaws by 2020 *(7)*. In 2013, the Sixty-sixth World Health Assembly adopted resolution WHA66.12 in support of the targets outlined in the roadmap.

In October 2015, an International Verification Team constituted by WHO visited India to assess the claim that transmission of yaws had been interrupted. On the basis of their report, in May 2016, WHO officially certified India as the first country free of yaws *(8)*.

2. Purpose of this document

This document describes the standard procedures required to verify and certify interruption of yaws transmission. It is intended for use by:

- international verification teams;
- national yaws eradication programmes; and
- WHO (headquarters, regional and country offices).

3. Definitions

3.1 Technical definitions

The terms elimination and eradication were defined in 2012 by the WHO Strategic and Technical Advisory Group for Neglected Tropical Diseases *(9)* and referred to in the 2016 *Generic framework for control, elimination and eradication of neglected tropical diseases (10)*. These definitions are:

Elimination of transmission (also referred to as interruption of transmission) is defined as "*reduction to zero of the incidence of infection caused by a specific pathogen in a defined geographic area with a minimal risk of reintroduction, as a result of deliberate efforts; continued actions to prevent re-establishment of transmission may be required*".

Eradication of a disease is defined as the "*permanent reduction to zero of the worldwide incidence of infection caused by a specific pathogen, as a result of deliberate efforts; with no more risk of reintroduction*".

3.2 Operational definitions

The Morges Strategy provides operational definitions to be followed by yaws eradication programmes during the pre-elimination phase (Annex 1).

4. Criteria for interruption of yaws transmission

Two criteria for the eradication of diseases were established in 1960 by the WHO Expert Committee on Venereal Infections and Treponematoses *(6)*; the same criteria were recommended by the Morges Strategy in 2012 *(5)*. Molecular testing was added to the criteria in 2015.

Clinical criteria: The absence of any report of a **new, infectious, serologically-confirmed indigenous yaws case** for 3 consecutive years, supported by high coverage of active surveillance.

Serological criteria: The absence of transmission as measured by sero-surveys with evidence of continuous negative serological tests (rapid treponemal test) for at least 3 consecutive years in samples of asymptomatic children aged 1–5 years in the community.

Molecular criteria: The absence of molecular positivity (e.g. by polymerase chain reaction [PCR]) for *T. pallidum* spp. *pertenue* in the lesion of any serologically confirmed case during the post-zero surveillance period.[1]

In 1960, the WHO Expert Committee on Venereal Infections and Treponematoses recommended the following criteria for eradication of yaws *(6)*:

Epidemiological eradication was considered as the intermediate stage to complete eradication, defined as the absence of **an indigenous infectious case** in the population for 3 consecutive years. The basis of findings includes information gathered from four sources: (i) all medical centres in the country where proper records of cases of the disease are kept; (ii) biannual medical examinations of all schoolchildren; (iii) annual surveys of randomly selected villages remote from medical facilities, schools, and towns; and (iv) cases reported from any reliable source of information such as publications from universities and private health sectors.

Complete eradication was considered as the final stage of achievement of eradication (interruption of transmission), defined as the absence of an indigenous case in the population for 3 consecutive years, with information from all the above sources having been considered and no sero-reactor in the age group 1–5 years having been found during sero-surveys.

[1] In view of the recent findings of yaws-like lesions caused by other bacteria e.g. *Haemophilus ducreyi*.

Experience of yaws eradication in Haiti in the 1950s

Haiti was one of the endemic countries that embarked on an aggressive effort to eradicate yaws in the 1950s. Although it is unclear whether the disease was completely eradicated, some important lessons should guide the conduct of the renewed efforts to eradicate yaws.

Extracts from the article detailing the experience of yaws eradication in Haiti as published in the *Bulletin of the World Health Organization* in 1956 are reproduced below *(11)*.

Objective

There can be but one objective in a yaws programme—eradication. By eradication of yaws we mean a complete disappearance of all infectious cases from a country and the non-appearance of any primary autocthonous case after the intensive campaign efforts have been terminated; in other words, the complete interruption of transmission. This objective can be attained if suitable techniques are put into effect, as will be described below. Although the differences between an eradication programme and a control programme may seem to be only of degree, if we examine them carefully we will observe the tremendous public health and economic importance of an eradication programme. These differences may be tabulated as follows: [a]

[a] This tabulation has been adapted from document No. 1 of the Co-ordinating Office for Malaria Eradication Programme, Pan American Sanitary Bureau.

Experience of yaws eradication in Haiti in the 1950s (continued)

Elements	*Control programme*	*Eradication programme*
1. Objective	To reduce morbidity.	To prevent the occurrence of any new cases of yaws.
2. Area of operations	Accessible zones, areas of yaws prevalence of high social, political and economic importance.	All the areas where cases occur.
3. Minimum quality of work	Good: reduction of number of cases.	Perfect: all infectious cases must be eliminated (which implies the treatment of contacts), and the chain of transmission must be stopped.
4. Duration of operations	Permanent.	Programme finishes when infectious yaws no longer exists. To be successful it must be an expanding programme to clean up all areas from which reinfection can occur.
5. Economic factors	Treatment measures applied in those areas where the cost is justified by the economic importance of the local area; expenditures must be continued indefinitely (recurrent service).	Treatment measures have to be applied in all areas and will rapidly reduce expenditures, representing a capital investment rather than a recurrent expense.
6. Case-finding	Important in all phases of the programme.	Important especially in the final stages of the programme.
7. Serological diagnosis	Important in all phases (and expensive).	Not important in mass phases.
8. Imported cases	Of relative interest.	Vital after mass treatment has stopped.
9. Epidemiological investigation of individual cases	Very expensive and seldom conducted.	Vital in spite of expense, especially in last phase of the programme; only measuring rod of eradication.
10. Administrative evaluation of the programme	Measurement of accomplishment (reduction in morbidity).	Measurement of what remains to be done.
11. Epidemiological evaluation	Reduction of serological rates.	Disappearance of primary autocthonous cases as proved by the yaws "intelligence service".

5. Countries endemic for yaws since 1950

5.1 Geographical distribution

A review of the historical and current literature on yaws from 1950 to 2013 indicates those countries where the disease has been endemic (Table 1). Two principal reasons underpin this information:

1. In the 1950s, there was no formal procedure to verify the interruption of transmission and certify countries that might have previously achieved elimination of yaws. Hence, in many of these countries, the current status remains unknown.

2. Since the 1990s, formal reporting of yaws from a number of countries to WHO has ceased so it is unclear whether these countries no longer have yaws or have stopped reporting.

Based on the available information *(12)*, countries have been classified into three groups for the purposes of verification and certification (Table 2).

Table 1. Distribution of yaws endemic countries, by WHO region

WHO region	Group A.1 Interrupted transmission and certified	Group A.2 Interrupted transmission Pending verification	Group A.3 Currently endemic countries	Group B Previously endemic countries	Group C Countries with no history of yaws	**Total no. of countries and territories**
African	0	0	8	28	11	**47**
Americas	0	1[b]	0	32	14	**47**
South-East Asia	1[a]	0	2	3	5	**11**
Western Pacific	0	0	4[c]	19	14	**37**
Eastern Mediterranean	0	0	0	2	20	**22**
European	0	0	0	0	54	**54**
Total	**1**	**1**	**14**	**84**	**118**	**218**

Source: reference *12*

[a] India was certified free of yaws by WHO in May 2016 *(8,13)*.

[b] Ecuador reported interruption of yaws transmission in 1998 but has not been certified *(14)*.

[c] The Philippines confirmed cases of yaws in 2017 *(15)* in addition to Papua New Guinea, the Solomon Islands and Vanuatu.

Table 2. Classification of countries for certification of interruption of yaws transmission

Group A	Countries whose status of yaws endemicity is currently known
A.1	Countries that have interrupted transmission and have been certified by WHO
A.2	Countries that have reported interruption of transmission in recent years but which need to be verified and certified by WHO
A.3	Countries with ongoing transmission for which activities to interrupt transmission are to be implemented as per the Morges Strategy
Group B	Countries with a previous history of yaws in the 1950s but no report since 2000 (current status unknown)
Group C	Countries with no history of yaws but that need to be certified for the purpose of global eradication.

5.2 Actions required in different countries

Group A – Countries whose status of yaws endemicity is currently known

Group A1 – Countries that have interrupted transmission and have been certified by WHO

These countries must maintain:

- a high-level awareness about the disease and a robust community-based surveillance system to detect any suspected case;
- the system of rewards or incentives (if already practiced) to encourage voluntary reporting of suspected cases; and
- reporting of any confirmed case (by dual non-treponemal/treponemal positive serology and/or PCR).

India is the only country so far in this group.

Group A2 – Countries that have reported interruption of transmission in recent years but which need to be verified and certified by WHO

These are countries where **more than 3 years have elapsed since the last case of yaws was reported.** This group of countries should:

- confirm interruption of transmission or provide evidence to show the absence of disease transmission as per the criteria and dossier template;
- provide evidence of activities to maintain high-level awareness about the disease in order to detect any suspected case;
- sustain or introduce a reward or incentive system to encourage voluntary reporting of suspected cases (depending on country policy);
- summarize all the available data on yaws case detection and sero-surveillance from all sources;

- reassess the interruption of transmission in a sample of children aged 1–5 years serologically, particularly in areas where yaws was historically endemic; and
- submit the dossier to WHO for verification by an international verification team.

Ecuador is the only country in this group.

Group A3 – Countries with ongoing transmission of yaws for which activities to interrupt transmission are to be implemented

There are 13 countries (as per WHO Global Health Observatory 2012) in this group. In 2017, cases were confirmed in the Philippines bringing the total endemic countries to 14. These countries should implement the Morges Strategy to interrupt transmission in consultation with WHO.

Group B – Countries with a previous history of yaws in the 1950s but no report since 2013 (current status unknown)

There are at least 85 known previously endemic countries (based on 1950–2013 data) that have not reported yaws since 2013. To determine the next course of action, countries may choose one of these two options:

[A] No current disease but will provide comprehensive evidence to support elimination

[B] Cannot conclude that it no longer has the disease and plan an assessment

The following actions are required:

1. Countries choosing Option A should complete the *Declaration of status of yaws endemicity* (Annex 5) and the *Country dossier* (Annex 3).
2. Countries choosing Option B should:

   a. First, assess the status through enhanced awareness, and review past and existing records.

   b. Conduct clinical surveys among children aged under 15 years in previously endemic areas. Those with suspected lesions should be tested serologically.

   c. Conduct serological surveys among children aged 1–5 years in previously endemic areas.

If cases are confirmed, then the country should implement the Morges Strategy in consultation with WHO.

Group C – Countries with no history of yaws but which need to be certified

These are countries that have never reported any indigenous cases of yaws. There are 118 countries and territories in this category. However, these countries will still need to provide documentation to support this claim as part of the global eradication of yaws (Annex 6). In its submission, the country should provide evidence that its health and surveillance systems are sufficient to detect any imported yaws case.

6. The surveillance system

A robust, high-quality surveillance system is essential to both assess the need for, and measure the impact of interventions undertaken by the yaws eradication programme. The programme should ensure that meticulous records are safely maintained to support any request for verification and certification.

- At least 80% of expected routine surveillance reports (including zero cases) should be reported monthly (including integrated disease surveillance programme forms, if in operation).
- All rumoured or reported cases should be investigated within 7 days after the initial report.
- 100% of the serologically confirmed yaws cases should be treated immediately as well as their close contacts.
- Detailed clinical, epidemiological and laboratory investigations should be recorded and reported using the *Case investigation form* during post-TCT period (Annex 7).
- Swabs or scrapings for molecular testing (by the national reference laboratories or sent to a WHO reference laboratory) should be considered during the post-zero case surveillance phase and results appropriately documented.
- Heightened public awareness on yaws and any reward system (if already practiced) should be maintained using all appropriate methods of communication during the post-zero case surveillance phase.

In addition to routine reporting, efforts should be made to collect complementary data from the following sources:

- all health facilities in the country where proper records of cases of the disease are kept;
- medical examinations for skin lesions of all schoolchildren as a part of school health programmes;
- annual surveys of randomly selected villages which are remote from health facilities, schools and towns (end of road communities);
- reports from integrated disease surveillance programmes; and
- reports from any other reliable source of information (e.g. research centres/ publications).

In the 1950s, during the post mass treatment surveillance phase, some of the key problems that could be encountered were identified and possible solutions were also proposed. Figure 3 shows the steps taken then to address factors and problems that could undermine the eradication effort during this phase *(16)*. The lessons learned may guide the current eradication efforts.

Figure 3. Yaws control: surveillance phase in the 1950s
Source: reference *16*

7. Preparation of the country dossier and submission to WHO

Once the yaws eradication programme or the Ministry of Health is fully convinced that interruption of transmission has been achieved, it should compile the documentation in a standard WHO country dossier template (Annex 3).

- The country is responsible for initiating the preparation of the dossier and WHO may provide technical assistance if the programme requests. The documentation process should be initiated as early as possible to ensure that no evidence is lost.
- The dossier must contain all the required information needed to establish whether a country has met the requirements for verification of interruption of transmission.
- The programme must submit the country dossier (two hard copies and an electronic copy) through the WHO Country Office to yaws focal points at the relevant WHO regional office and at headquarters.

8. Structures for yaws eradication at country and global levels

At the national level, each endemic country may consider establishing:

- a national yaws eradication programme as part of the national NTD programme;
- a national task force to give technical advice and strategic guidance for yaws eradication activities; and
- a national verification team to verify local interruption of transmission initially.

A possible structure for yaws eradication at country level is shown in Figure 4.

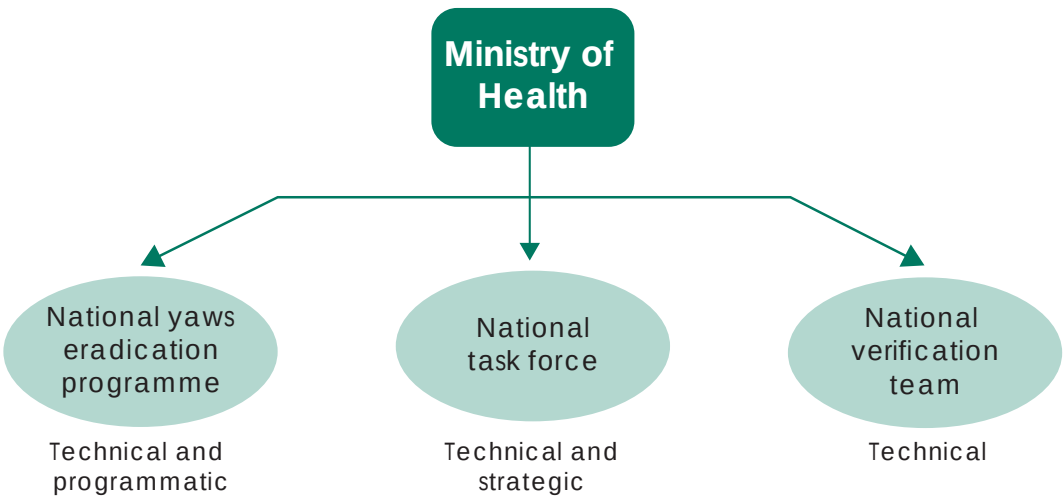

Figure 4. Possible structure for yaws eradication

Source: reference *5*

At the global level, the WHO Yaws Eradication Programme will establish:

- an advisory group to provide technical advice and strategic guidance for yaws eradication activities; and
- an international verification team to certify that countries have met the criteria for interruption of transmission.

9. Organizing the country visit of the International Verification Team

Following the review by WHO headquarters of the dossier, an International Verification Team will visit the country. The WHO Secretariat, in consultation with its regional and country offices, will inform the Ministry of Health about proposed dates for the country visit.

- The WHO Country Office in consultation with the Ministry of Health and the National Task Force for Yaws Eradication Programme or Neglected Tropical Diseases will constitute a national team to plan the visit. The national team will support the international verification team for field visits and also assist in interactions with community members. All consolidated reports at national, regional, district and health facility levels should be maintained to be examined by the International Verification Team.
- The International Verification Team will brief Ministry of Health officials and other partners on yaws eradication (agenda prepared in advance).
- Following the field visits, the International Verification Team will meet with Ministry of Health officials and other stakeholders to present their findings.

10. Guidance for the International Verification Team

The formal process of verification of interruption of yaws transmission in a country should follow a standard methodology, namely:

- preparation, review and feedback on dossiers;
- public acknowledgement by WHO of verification and certification; and
- identification of activities to be continued after verification and certification of a country.

The steps for verification of interruption of transmission and certification of countries have been developed based on vast experience of the dracunculiasis and poliomyelitis eradication programmes and, more recently, of the yaws eradication programme in India.

10.1 Team members

Since yaws eradication is a global target, interruption of transmission in a country should be verified by an International Verification Team. WHO headquarters will be responsible for appointing the members of the International Verification Team.

- Members should not be nationals of the country under consideration or those who have been involved in yaws elimination activities within the country. Experts from the country concerned who are independent of the programme can be part of the local verification team.
- The team may consist of experts in yaws, dermatology, public health, epidemiology, laboratory science and disease certification.
- Geographical representation and gender balance should be ensured.
- Members must sign the WHO Declaration of Interest form.
- WHO yaws focal staff at country offices, regional offices and headquarters will form the Secretariat to provide support to the International Verification Team.
- The Secretariat may organize video, teleconference, or face-to-face meetings of the members of the International Verification Team.
- WHO officials should not influence the process of review, comments/suggestions, or recommendations except to provide administrative and logistic support.

10.2 Dossier review procedures

- Members of the team will elect a chair from the team (if not already proposed). The person will be responsible for chairing meetings, and coordinating and compiling the reports.
- Members will review the dossier without any conflict of interest, maintaining the highest standards of ethical practices.
- Members may have video, teleconference or face-to-face discussions.
- A visit to the country under consideration will be planned by the International Verification Team to verify the evidence submitted in the dossier.

10.3 Feedback on dossier

- The International Verification Team will send its comments and recommendations to WHO for further action.
- WHO will summarize the comments and recommendations of the International Verification Team and share them with the country concerned.
- Additional information or clarification will be obtained from the country if needed.
- A visit to the country concerned will be planned for verification of evidence as per the recommendations of the International Verification Team.

11. Country visit by the International Verification Team

The objectives of visits by the International Verification Team are to verify physically the reported data and to assess the quality of the surveillance system of the country claiming to have interrupted transmission.

11.1 Preparation

The timing of the country visit together with a detailed plan indicating selection of states/regions/provinces/districts and villages will be decided by the International Verification Team in consultation with the WHO Secretariat, regional and country offices and the Ministry of Health.

- WHO Country Office staff will ensure that all the logistics are in place and provide advice on the best methods to assess those inaccessible areas where security may be an issue.
- The WHO Secretariat and members of the International Verification Team will discuss logistics for the visit, selection of areas for field visits, data collection tools and finalize the methodology. The data collection tools or standardized questionnaires may be adapted for a specific situation in the country to be visited.
- WHO will arrange security clearance from the United Nations Security clearance if required.
- Different sub-teams may be constituted (depending on the size of the country and the composition of the team) to carry out the field visit. The sub-teams will comprise international members with the participation of the WHO Secretariat, national experts and programme staff. These teams/sub-teams will be supported by local level health officials and health workers to guide the visit and assist in translation.
- The agendas for briefing sessions, field visits and debriefing sessions will be prepared in advance by the WHO Secretariat in consultation with the national programme and shared with the International Verification Team.

11.2 Meetings with Ministry of Health officials and stakeholders

During the country visit, the international and national team members will first meet the officials of the WHO Country Office, Ministry of Health, the National Yaws Programme and relevant stakeholders to discuss the objectives of the visit and finalize the tentative agenda and data collection tools for the field visits. The International Verification Team may also seek clarification or any additional information needed for completion of an effective verification process.

The International Verification Team may also visit other facilities/institutions engaged in yaws elimination activities (e.g. reference laboratories, health training schools and research centres) for collection of additional information.

11.3 Field visit findings

During the field visits, teams will visit the regional and district health authorities, district hospitals, health centres, private medical care providers (dermatologists and other medical practitioners), health training institutions, primary schools and communities and collect information on:

- demographic and socioeconomic data (region and district);
- the health system (public and private);
- health manpower;
- accessibility to health services especially in rural remote areas;
- coordination between different health system and non-health system functionaries;
- health training institutions and health facilities;
- records and documents (yaws case registers/rumour registers/monthly reports/ serological survey records, rewards system, and information, education and communication (IEC) and training materials);

Teams should also:

- verify data/information provided in the country dossier;
- conduct clinical and serological tests (if needed) in randomly selected schools/ communities to find out any suspected yaws cases;
- assess the surveillance system to detect any indigenous or imported cases;
- review the efficiency of supervision and monitoring of yaws eradication activities;
- examine integrated disease surveillance system;
- assess IEC materials/activities on yaws;
- assess the knowledge of yaws among the school children, teachers, community members and health workers; and
- assess the knowledge about any reward system and amount for a confirmed case.

11.4 Preliminary report of visits

At the end of the country visit, the International Verification Team will compile its findings in a draft report (see suggested format in Annex 2). The report will be used to debrief the Ministry of Health officials, the WHO Country Office and relevant stakeholders.

Within a period of 2 months, the International Verification Team will finalize the draft report and share it with the Ministry of Health. The report will:

- highlight any discrepancies between the information provided in the country dossier and the findings of the International Verification Team;
- state whether the country has or has not met the criteria for interruption of transmission;
- recommend to the country if any further activities need to be implemented to achieve interruption of transmission and certification;

- clarify, when the team is satisfied that the country has achieved interruption of transmission:
    - whether the risk of re-establishment/re-introduction of infection is minimal or high;
    - whether the surveillance system in the country has the capacity to detect any indigenous or imported cases; and
    - whether there is a need to maintain awareness and a zero reporting system as part of integrated activities of other NTDs.

12. Acknowledgement of verification of interruption of transmission

- The International Verification Team will submit its final report to WHO. The report will be discussed by the relevant body (WHO Strategic and Technical Advisory Group for Neglected Tropical Diseases or an international certification body) and recommendations made to the WHO Director-General.
- A letter from the WHO Director-General will be sent to the Ministry of Health to formally acknowledge the achievement of interruption of transmission (yaws free status).
- The letter will also indicate the essential activities to be continued until all endemic countries achieve interruption of transmission of yaws.
- WHO headquarters will accordingly change the status of yaws endemicity in the Global Health Observatory.

It should be noted that the status of zero disease may reverse at any time, and can be identified only through an effective surveillance system.

13. Essential activities to be continued after certification

- Countries should continue to undertake post-elimination awareness and surveillance activities until eradication at the global level is achieved.
- After meeting the criteria for certification, countries should confirm that they have an adequate surveillance and response system for preventing re-introduction of yaws. Possible local transmission is fully established.
- Countries should ensure regular reporting to WHO on zero cases or otherwise.

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ANNEXES

Annex 1. Operational definitions

The following definitions are recommended for use by the programme in order to maintain uniformity in case reporting and data management, and to facilitate the verification and certification process. A meeting on yaws eradication held at WHO headquarters (Geneva, 2013) suggested minor revision of the definitions described in the Morges Strategy 2012 for operational reasons.

- **Suspected case of yaws:** A person of any age who is or was living in a previously or currently endemic area, presenting with clinical signs consistent with yaws (Table A1).
- **Confirmed case of yaws:** A clinically suspected infectious case who is confirmed with dual positive serology (either DPP-dually positive or TPHA/TPPA+RPR positive). PCR may be used during the implementation phase to monitor azithromycin resistance but is not an essential part of the case definition.[1]
- **Endemic village:** A village containing at least one indigenous confirmed infectious case.
- **Previously endemic village:** A village which formerly reported a yaws case but not currently reporting an indigenous confirmed case.
- **Non-endemic village:** A village from where no indigenous case of yaws has ever been reported.
- **Endemic country:** A country with at least one indigenous confirmed infectious case.
- **Formerly endemic country:** A country which formerly reported yaws but which has either eliminated the disease or for which there is no current data.
- **Implementation unit:** The implementation unit will be flexible, covering a population of 100 000–250 000 living in a region where there are known endemic villages.
- **Evaluation unit:** A defined administrative unit that may include one or more implementation units.
- **Imported case:** A case from a current or previously yaws endemic area who presents with infectious lesions, which may be confirmed by dual non-treponemal or treponemal sero-positivity.
- **Index case:** A first case of a confirmed yaws that is detected in a community.
- A **contact** is a person who lives with or comes into close and frequent contact with an infectious yaws case. Contacts, for the purpose of yaws eradication, are household members, schoolmates, or close playmates.
- **Treatment success (cure):** An infectious yaws case who received a single oral dose of azithromycin (or injection of benzathine benzylpenicillin) leading to complete healing of the active lesion(s) within 4 weeks after treatment may be labelled as "**cured**".

[1] During the post-zero surveillance phase, a suspected case with both dual positive serology and positive PCR of lesion material for *T. pallidum* subsp. *pertenue* is considered a confirmed case.

- **Treatment success rate (cure rate):** The total number of patients who display complete healing of lesion(s) out of those who received treatment for suspected or confirmed infectious yaws lesions.
- **Treatment failure:** A serologically confirmed infectious yaws case who received a single oral dose of azithromycin (or injection of benzathine benzylpenicillin) and who did not show any clinical improvement (persistent skin lesions) 4 weeks after treatment.
- **Treatment failure rate:** The total number of cases with persistent lesions out of those who received treatment.
- **Total community treatment (TCT):** The treatment of all eligible people in an endemic community with a single dose of azithromycin (30 mg/kg body weight; maximum 2 g).
- **Total targeted treatment (TTT):** The treatment of all new cases (including imported cases) and their contacts (household, frequent family friends, school, and playmates, etc.) with a single dose of azithromycin.

Table A1. Clinical classification of yaws[1]

Type of lesion	Example	Infectiousness
Early yaws lesions		
Initial lesion	Papilloma	+ + +
Papillomata	Papillomata	+++
Ulceropapilloma		+++
Ulcer		+++
Macules	Squamous macules	+
Maculopapules	Maculopapules	++
Papules	Squamous micropapules	++
Micropapules	Polymorphous	++
Nodules		+
Plaques		+
Hyperkeratosis	Plantar and palmar	–
Bone and joint lesion	Polydactilitis Osteoperiostitis	–
Late yaws lesions		
Hyper-keratosis	These lesions may be same both in early and late stage	–
Nodular	Scars	–
Ulcerated nodular	Gangosa	–
Plaques	Osteoperiosteitis	–
Bone and joint	Sabre tibia, gondu	–
Juxta-articular nodules		–

– not infectious; + infectious; ++ very infectious; +++, highly infectious

[1] Adapted from: Perine PL, Hopkins DR, Niemel PLA, St John RK, Causse G, Antal GM. Handbook of endemic treponematoses: yaws, endemic syphilis and pinta. Geneva: World Health Organization; 1984.

Annex 2. Format of the International Verification Team report

1. Executive summary
2. Background
3. Terms of reference of the International Verification Team
4. Team members (international and national)
5. Methodology
6. Agenda
7. Activities
8. Meetings at central/national level with health officials
9. Field visits to regions/states, districts/health facilities/villages
10. General findings and observations on socioeconomic and health development
11. Specific findings at regional/state level, district level, health facility and village level
12. Programme strengths and weakness
13. Conclusions
14. Recommendations
15. References
16. List of key people met
17. Acknowledgements
18. Annexes

Annex 3. Country dossier

As part of the global eradication of yaws, this template is designed to assist countries to prepare a dossier to request WHO's verification and certification of the interruption of transmission of yaws in formerly endemic countries.

Country profile

- The overall demographic, economic and developmental features of the country
- Political and governance structure
- Administrative structure-state/province/region/district/sub-district/village/ hamlets, etc.
- Population living in urban and rural areas
- Social amenities – water and sanitation, electricity, roads and transportation especially in rural areas
- School system particularly at the primary level

Health system

- National health policy, health governance, health financing
- Total number of and types of health facilities and their distribution
- Health manpower and distribution
- Health training institutions
- Public health structure and key activities
- Community structures for service delivery – formal and informal
- Laboratory services

Yaws history in the country

- History of yaws and past efforts to eliminate the disease
- Geographical distribution of the disease
- Achievements and/or failures

Yaws Eradication Programme

- History of national yaws eradication programmes
- Structure and organization of activities at all levels
- Programme policy, goal and objectives
- Epidemiology and distribution (maps)
    - Surveillance system
    - Include which serology tests were used (test and manufacturer) and what quality assurance programme was in place for serology

- System in place for serological verification
- Activities implemented to achieve zero cases (if previously endemic) including timelines
- Post-zero case surveillance activities including sero-surveys
- Post-zero case awareness activities, rumour investigations and rewards system
- Cross-border and migration issues
- Independent national and international monitoring teams' reports and recommendations
- Role of partners in yaws elimination activities

References

Include references for all citations for the report of published and unpublished reports.

List of abbreviations

Provide a list of definitions for all abbreviations used in the dossier.

Annex 4. Questionnaire supporting the request for verification

Name of the country/territory:		
Have cases of indigenous yaws disease ever been reported in your country?	YES	NO
If NO	STOP and SIGN the document	
IF YES, how long ago?	[ ] 3–10 years [ ] More than 10 years	
Is yaws still a notifiable disease?	YES	NO
If YES, is the surveillance system able to detect a yaws case?	YES	NO
How are yaws cases reported in the current surveillance or health information system?		
Are reported cases confirmed by: 1) Serology? 2) PCR?	 YES [ ] YES [ ]	 NO [ ] NO [ ]
Are any periodic surveys or screening carried out?	YES	NO
Is there a risk of reintroduction of yaws from neighbouring countries?		
Any additional information		

Name (first and last): _____

Title: _____

Signature: _____ Date: _____

Annex 5. Declaration of status of yaws endemicity (category B countries)

DECLARATION OF STATUS OF YAWS ENDEMICITY

(Category B country)

_____

The Government of

_____*

Hereby declares that the country and/or its territory had indigenous cases of yaws disease in the 1950s

This declaration is accompanied by a duly completed questionnaire. We have reviewed the national literature, surveillance system and a detailed report on the extent to which yaws has ever been present in the country and or territory, and conclude that:

[ ] We found no evidence of ongoing transmission of the disease

[ ] We cannot conclude that ongoing transmission of the disease is no longer occurring

The Government of _____* is responsible for the conduct of its international relations (as listed below and indicated on the attached map provided by the Government).

IN WITNESS THEREOF, I have signed this declaration for submission to the World Health Organization for further advice.

Signed at (place): _____ on (dd/mm/yyyy): _____

Name:_____

Signature:_____

(*) Name of the country to be included.

Annex 6. Declaration of yaws-free status (category C countries)

DECLARATION OF STATUS OF YAWS ENDEMICITY

(Category C country)

_____

The Government of

_____*

Hereby declares that no indigenous cases of yaws disease have ever occurred in the country and its territory

The Government of _____* is responsible for the declaration.

IN WITNESS THEREOF, I have signed this declaration for submission to the World Health Organization.

Signed at (place): _____ on (dd/mm/yyyy): _____

Name:_____

Signature:_____

(*) Name of the country to be included.

Form: WHO/YAWS/003

Annex 7. Case investigation form

Country: _____ Province/Region: _____ District:_____

Name of Father:		Name of Mother:
Section A: Demographic data		
1	Name of case:	Phone n°:
2	Case ID number:	
3	Date of birth (dd/mm/yyyy): _____	Age (years):____
4	Sex: ☐ Male ☐ Female	Community/village
Section B: History and clinical examination		
5	Duration of illness (in weeks):	
6	Previous treatment (if any):	
7	Travel history:	
8	Clinical forms of yaws *(Refer to WHO pictorial guide)*[1]	
	☐ Papilloma/papules ☐ Ulcers ☐ Macules	☐ Swellings of bones and joints ☐ Hyper-keratosis of palm/sole ☐ None of above
9	Photograph of lesion: ☐ Yes ☐ No	
Section C: Diagnosis		
10	Sampling method: ☐ Finger prick blood for Trep POC	☐ Finger prick blood for DPP POC ☐ Swab/scraping from lesions for PCR
11	*Enter laboratory results once available:*	
	Treponemal POC test ☐ Positive ☐ Negative ☐ Not done	**PCR results** ☐ Positive ☐ Negative ☐ Not done
	DPP dual POC treponemal line/TPHA ☐ Positive ☐ Negative ☐ Not done	**DPP dual POC non-treponemal line/RPR** ☐ Positive ☐ Negative ☐ Not done
Section D: Treatment		
12	Treatment given: Date (dd/mm/yyyy): _____ ☐ Azithromycin (number of 500 mg tablets): _____ ☐ Benzathine benzylpenicillin (check): ____0.6 MU or _____1.2 MU ☐ Others (please specify):_____	
Section E: Conclusions of clinical assessment		
13	☐ Suspected case ☐ Confirmed case ☐ Not a yaws case	
Notes or comments (including adverse events, diagnosis and management of serologically negative cases):		
Date (dd/mm/yyyy): _____		_____ Signature (health worker)

[1] Yaws: recognition booklet for communities. Geneva: World Health Organization; 2012 (WHO/HTM/NTD/IDM/2012.3; http://apps.who.int/iris/bitstream/10665/75360/1/9789241504096_eng.pdf) DPP, dual path platform (treponemal and non-treponemal) test; PCR, polymerase chain reaction; POC, point-of-care test; RPR, rapid plasma reagin test; TPHA *Treponema pallidum* haemagglutination assay

Yaws is curable with a single dose of oral azithromycin

Before treatment

Four weeks after treatment








Photos credits: K. Asiedu/WHO

Recognize yaws
in your community


1


2


3


4


5


6


7


8

Photo credits - 1, 2, 5, 7, 8: Yaws Clinical Trial, Ghana / WHO ; 4: Yaws campaign, Congo / Médecins Sans Frontières ; 3, 6: Yaws Clinical Trial, Papua New Guinea / WHO)

If you see any of these sores, please report to your nearest health facility

World Health Organization

A young boy from Congo with typical lesions of papilloma on the face, macules on the hand and bone swelling of the fingers. This child was cured with a single dose of oral azithromycin. (Credit: MSF/Epicentre, Paris, France)

Yaws mainly affects children living in poor communities in 14 countries of the World Health Organization (WHO) African, South-East Asia and Western Pacific regions. The disease is targeted for eradication by 2020.

This document sets out the criteria and procedures to be followed by countries in verifying the interruption of yaws transmission. It is intended for use by international verification teams, national yaws eradication programmes and WHO technical staff involved in the eradication of yaws.

Eradication of yaws: procedures for verification and certification of interruption of transmission should be used together with ***Eradication of yaws: a guide for programme managers*** and ***Summary report of a consultation on the eradication of yaws, 5–7 March 2012, Morges, Switzerland.***

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