Expert Mission to Maldives for Verification of Elimination of Lymphatic Filariasis

Report of the Mission
Maldives, 19–26 June 2011

World Health Organization
Regional Office for South-East Asia

The members of WHO Expert Mission team debrief the Officials of Ministry of Health in Male

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Contents

Page

Annexes

Executive summary

Lymphatic filariasis (LF) is a neglected tropical disease that continues to be a major public health problem in the South-East Asia Region (SEAR) of the World Health Organization (WHO). Nine of the 11 Member States are endemic for LF. The Region has a disproportionate burden of illness with 63% of the population at risk and 50% of the infected people in the world.

SEAR has made significant progress towards achieving the goal of elimination having completed mapping and launched the WHO-recommended two-drug strategy for mass drug administration (MDA) in all the endemic countries. Maldives completed five rounds of MDA in 2008, stopped MDA in 2009 and is implementing post-MDA surveillance.

Based on the recommendations of the seventh meeting of the Regional Programme Review Group (RPRG) for Elimination of Lymphatic Filariasis in 2010, an expert mission to Maldives was organized by the WHO Regional Office for South-East Asia (WHO-SEARO) from 19–26 June 2011 as the first step to initiate the process of verification of elimination. The mission also provided technical inputs and guidelines to carry out further follow-up action such as Transmission Assessment Surveys (TAS) and preparation of the dossier. A list of members of the expert mission can be found in Section 1.1 of this report.

The terms of reference of the mission were to review the programme and assess the quality of testing and data collection; to review the steps taken by the country to stop MDA; and to assess the steps taken as part of post-MDA surveillance activities, including the preparation of the dossier in accordance with the LF TAS Manual of WHO 2011.[1]

The team held consultations with the programme managers and senior officials of the Ministry of Health (MoH) along with representatives of the WHO Country Office in Maldives. The team examined documents and undertook field visits to observe ICT card testing in the schools to verify the interruption of LF transmission among six-seven year-old children as per the LF TAS Manual, WHO 2011. At the end of the mission, the team had debriefing meetings with the same officials to discuss the field observations, and compilation of the dossier required for certification of elimination of LF in Maldives.

The National Programme for the Control of Lymphatic Filariasis began in 1969. LF case detection and treatment as well as antilarval measures were carried out in endemic islands. In 1998, 10 islands were found to be endemic and the micro filarial (Mf) prevalence rate ranged between 0.19–0.91%. A sample survey carried out in 2003 in Laamu atoll showed that 223 (17.9%) children were positive for filarial antigenaemia. MDA was launched only in Fonadhoo Island in that atoll in 2004 and five annual rounds were completed in 2008. No child in the age

[1] WHO (2011): Monitoring and Epidemiological Assessment of Mass Drug Administration: Lymphatic Filariasis TAS, A Manual for national Elimination Programmes

group of two–eight years was positive during an antigenaemia survey carried out at the end of the fifth round, and thus the programme decided to stop MDA. An Mf survey was carried out in Gaaf Dhal atoll, which was endemic before the MDA period and from where clinical cases of LF were recorded from 1985. The survey indicated that no new clinical cases were recorded since 2002. It also showed that no individual from the nine localities was micro filaria positive, suggesting that they continued to be non-endemic.

The team visited Fonadhoo (MDA area) as well as Thinadhoo and Kaashidhoo (non-endemic and non-MDA islands screened for LF infection). The team did spot-checks with ICT cards in these islands and found that none of the 63 children in Fonadhoo Island or 132 children in Thinadhoo and Kaashidhoo islands were positive for antigenaemia. The team also noticed that the sources of mosquito breeding were open ring wells, overhead/ rainwater harvesting synthetic tanks and septic tanks.

Summary of the recommendations

For the National LF Elimination Programme, the mission:

- approved the stopping of MDA in 2009 after examining all the available data and conducting the field exercises;
- urged the programme to initiate all activities recommended for post-MDA surveillance (according to the LF TAS Manual, WHO 2011) and submit a report of these activities to the RPRG in 2012;
- recommended the initiation of other post-MDA surveillance activities and that consideration be given to strengthening existing infrastructure to continue these post-MDA activities;
- recommended the strengthening of screening activities in non-endemic areas, continuation of morbidity management activities, and initiation of steps to compile the dossier that will be required for the completion of the certification process.
- recommended the preparation of a plan of action for post-MDA surveillance and dossier compilation, and exploration into funding avenues for the activities listed above.

For WHO, the mission:

- recognizing the rich experience and success of Maldives and Sri Lanka, recommended the promotion of intercountry cooperation in LF elimination activities that would benefit other island nations in particular, and other endemic countries of the Region in general;
- urged the Organization to provide necessary technical support to countries that are on the verge of elimination of LF to enable them to complete their activities within the timeframe.

1. Background

Lymphatic filariasis (LF) is a neglected tropical disease and a major health problem in the South-East Asia Region (SEAR): the Region has the highest burden of LF with 63% of the population at risk. Globally, 50% of infected people and more than 60% of children at risk are from SEAR. The Region delivered a cumulative 2.4 million (85%) of the 2.8 billion doses of DEC and albendazole globally from 2000–2009. Nine of its 11 Member States are endemic and all three lymphatic filarial parasites (*Wucheraria bancrofti, Brugia malayi* and *Brugia timori*) are prevalent.

The Global Programme to Eliminate Lymphatic Filariasis (GPELF) launched in 2000 by WHO with the goal to eliminate LF as a public health problem by 2020, is being implemented in 53 out of 72 endemic countries[1]. SEAR has made significant progress towards achieving the goal of elimination. Mapping has been completed by the nine endemic Member countries. The national LF programmes have adopted the WHO-recommended two-drug strategy (diethylcarbamazine citrate (DEC) and albendazole) for mass drug administration (MDA). Member States and partners have demonstrated their commitment to the programme by mobilizing funds to cover operational costs. Significant scaling-up of MDA operations has occurred, with 365 million of the 416 million targeted population treated during the 2010 MDA round. About 30% of the treated were children.

Maldives completed five rounds of MDA in 2008 and stopped in 2009. Post-MDA surveillance is in progress including vector control. In 2010, the seventh meeting of the Regional Programme Review Group (RPRG) for Elimination of LF recommended initiation of the process of verification of elimination of LF in Maldives as soon as the WHO TAS manual became available. Accordingly, the WHO expert mission to Maldives was organized by the WHO Regional Office for South-East Asia (WHO-SEARO) to initiate this process as well as to provide techincal input and guidelines to carry out follow-up action such as Transmission Assessment Surveys (TAS) and preparation of the dossier.

1.1 Members of the mission

The expert mission consisted of the following members:

- Professor R.C. Mahajan, Emeritus Professor, Department of Parasitology, Postgraduate Institute of Medical Education and Research, Chandigarh, India (Chair)
- Professor M.M. Ismail, Professor Emeritus, Faculty of Medicine, University of Colombo, Sri Lanka

- Dr V. Kumaraswami, Lymphatic Filariasis Support Centre, Atlanta, Georgia, USA (Rapporteur)
- Dr K. Krishnamoorthy, Scientist F, Vector Control Research Centre (WHO Collaborating Centre), Puducherry, India
- Dr C.R. Revankar, Scientist, Vector-Borne and Neglected Tropical Diseases Control (VBN/ SEARO)
- Dr A.P. Dash, Regional Adviser, VBN, WHO-SEARO.

1.2 Terms of reference of the mission

The terms of reference of the mission were:

- to review the programme and assess the quality of testing and data collection by carrying out spot-checks;
- to review the steps taken by the country to stop MDA;
- to assess the steps taken by the country as part of its post-MDA surveillance activities including the preparation of the dossier in accordance with the LF TAS Manual ,WHO 2011.

1.3 Planning and description of activities of the mission

On arrival at the capital city Male in Maldives, the mission held consultations/briefings with the national LF programme manager and other officials of the programme. Additionally, senior officials of the Ministry of Health (MoH) along with representatives of the WHO Representative's (WR) Office of the country were briefed about the mission. These meetings facilitated finalization of the activities to be undertaken and necessary logistic arrangements in the country. The list of documents to be consulted was also determined at these meetings. Meetings were also organized with former key LF programme officials for historical documentation.

The mission undertook field visits to selected islands to observe the transmission assessment surveys in schools. Two sub-teams were formed that oversaw the process of selection of the schools, the compilation of the list of children to be tested and Immunochromatographic Test (ICT) card testing. The team also checked the quality of the ICT cards and randomly read the results of the tests along with the testers. The team examined LF patients with disabilities in the villages and interviewed them to find out the socioeconomic aspects of their life including any stigma problems they faced.

On return from the site visits, mission members reviewed their findings with the programme officials, sought clarifications and compiled their findings. At the end of the mission, the members held debriefing meetings with the programme managers and senior

officials of the MoH to apprise them on the findings, recommendations and further follow-up action points, including dossier preparation.

The detailed itinerary of the mission and the list of officials and persons contacted are shown in Annexes 1 and 2, respectively.

2. Lymphatic filariasis control programme prior to the National Lymphatic Filariasis Elimination Programme

Maldives are a group of about 2000 islands in the Indian Ocean (Map 1) covering a total land area of 300 km^2. There are 20 atolls (natural islands) and 201 of the islands are inhabited. The estimated population in 2006 was 298 968 (Table 1). There were 30 757 enumerated human dwellings. Male, the only urban area, accounts for about one third of the total population, or 100 000 people.

Wuchereria bancrofti infection was prevalent for several decades in the country, but microfilarial (Mf) rates have been declining steadily over the last 50 years. Five atolls were considered highly endemic in the southern part of the country. In 1951, a study[2] was carried out regarding prevalence of lymphatic filariasis with WHO support in 34 islands in three atolls by the government. Of 3827 (26% coverage) individuals screened, 37% were found either infected with *W. bancrofti* or with clinical manifestations (Table 2). All 34 islands were endemic and the islands in Suvadiva recorded the highest endemicity rate (43%). Disease prevalence was 19.5% in females and 28.0% in males. Hydrocele constituted about 75% of the clinical manifestations among males. The youngest child with microfilaraemia was four years old and with clinical manifestation was eight years old. *Culex fatigans* (*quinquefasciatus*) was reported to be the most predominant species in the islands: out of 1729 mosquitoes dissected, 24.8% were infected. *Anopheles tessellatus* was also present and filarial infection was recorded in 18.2% of the mosquitoes dissected. The observations suggest that the former is the prinicipal vector and the latter the secondary vector. Step wells were reported to be the major breeding source of *C. fatigans*.

In 1969, a further survey was carried out in nine islands in five atolls and only one atoll (Gaaf Alif) was found to have recorded more than 1% Mf prevalence (Table 3)[3].

Another survey carried out in 1974 by the National Filaria Service Team (NFST) covering 41 islands in 10 atolls showed that only 7 islands had a Mf prevalence rate of less than 1%; in the others it ranged between 1–21% (Table 4, Map 2 and Figure 1)[4]. Most of the atolls covered were in the south.

Filariasis control activities have been in place since 1968. The number of new clinical cases and Mf rates have been declining over the last two decades since selective DEC therapy and vector control were initiated.

Initial control activities in Male consisted of mass night-blood surveys of the whole population and control of vector larvae by spraying breeding places such as unused wells

with Abate at 1 ppm. However, a report indicated the ineffectiveness of larval control due to resistance to Abate[5]. The most frequent breeding places of the vector *C. fatigans* were wells, cisterns and cesspools and sewage pits near the wells.

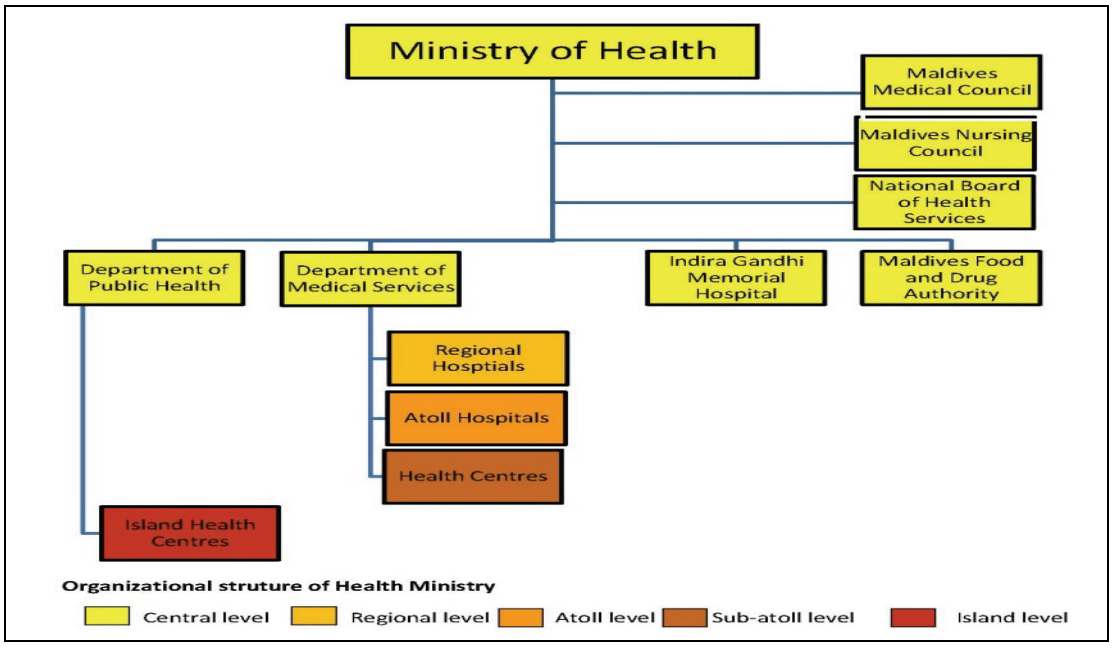
The results of five mass night-blood surveys carried out in Male between 1968 and 1974 showed a reduction in Mf prevalence from 5.5% to 1.3% (Table 5 and Figure 2). Outside Male, there has been no systematic control programme. On the islands, some vector control has been carried out by inhabitants putting larvivorous fish in the wells. Since the first survey in 1951, all the step wells were reported to have been almost filled and fish also introduced in the other wells.

The results of the blood survey carried out from 1978 to 1998 are shown in Table 6[6]. During 1998, a sample blood survey was carried out in 7 atolls and Mf prevalence was below 1% in all the islands with an overall prevalence of 0.4% (Table 7). In 2003, when these islands were reassessed, only Fonadhoo Island in Laamu Atoll was found to be endemic.

3. Organizational structure of the National LF Elimination Programme

The National Lymphatic Filariasis Elimination Programme is being managed by the central team attached to the Department of Public Health of the Ministry of Health. The workers at the island health centres are involved, particulary in line listing and morbidity manangement.

Organizational structure of the Ministry of Health, Maldives(as of June 2011)



4. Review of the National LF Elimination Programme

4.1 Identification/mapping of endemic areas

Maldives completed LF endemicity mapping prior to the conduct of MDA. Past surveys were restricted to the southern group of islands. Follow-up surveys indicated a declining trend in endemicity and many of the islands that were once endemic had become non-endemic. During 1998, a sample blood survey was carried out in 7 atolls and the mf prevalence was found to be below 1% in all the islands with an overall prevalence of 0.4% (Table 7). Fonadhoo is the capital of Laamu Atoll (Map 3) – the administrative name of Haddhunmathi Atoll – with about 82 islands. The population of 14 313 is distributed over 12 islands. An antigenaemia survey among children aged 2–8 years, carried out in the 12 islands in 2003, showed antigen-positive children in 7 islands, with an overall antigenaemia prevalence rate of 17.9% (Table 8).

4.2 Mass drug administration activities

Fonadhoo Island was the designated unit where the LF elimination programme implemented the first MDA round in 2004. The island at that time had a population of 1826. The annual reported treatment coverage with DEC and albendazole combination ranged from 92% to 100% from 2004 to 2008. No independent assessments of coverage and consumption were conducted. The treatment was stopped in 2009. No serious adverse reaction was reported in any of the rounds of MDA. The country also focused attention on increasing vector control activities following the tsunami in December 2004, which affected a number of previously filariasis-endemic islands.

4.3 Impact of mass drug administration

No data are available regarding the prevalence of Mf during the MDA rounds. However, following the fifth round, an antigenaemia survey was carried out during 2008 in all these 10 islands including the island where the MDA was conducted. None of the children in the age class two–eight years were found to be positive (Table 9). During this survey, no new/recent clinical cases were recorded. Follow-up surveys carried out in non-endemic islands also did not show any Mf-positive case (Table 10). In addition, 726 foreigners from five endemic countries (Bangladesh, India, Nepal, Pakistan and Sri Lanka) were screened in 24 islands; none of them was positive for Mf (Table 11).

4.4 Entomological surveys

Breeding habitat surveys are being carried out to record *Culex*/*Anopheles* breeding. Adult mosquito collections are not yet available, reportedly due to lack of infrastructure.

4.5 Morbidity management

Health workers in the health posts of all the islands were reported to have been trained in morbidity management. It is yet to be promoted at community level.

5. Field visits to Thinadhoo, Fonadhoo and Kaasidhoo

The teams visited Thinadhoo Island (non-endemic) in Huvadhu Atoll, Fonadhoo Island (endemic) in Laamu Atoll, and Kaashidhoo Island (non-endemic) in Kaafu Atoll (Map 4).

5.1 Thinadhoo Island

Thinadhoo (formerly known as Havaru Thinadhu) is the capital of Southern Huvadhu Atoll or Gaafu Dhaalu, an administrative district of Maldives formed by the south-western section of Huvadhu Atoll. There are 153 islands in this district, 10 of which are inhabited (Map 5). This district is located about 340 kilometres south of the capital Male. Thinadhoo Island with an estimated population of 6900 was once endemic with 51 chronic LF cases. There are two schools with about 1600 students, of whom 160 were in grade I and II. The team visited Aboobakuru School. Of the 94 students in grade I and II, 82 were present (43 from grade I and 39 from grade II), all of whom were screened for antigenaemia using ICT. All 37 girls and 43 boys were found negative.

The team visited the National Office, Upper South Region and had discussions with the State Secretary, Health Superintendent and other secretaries. The Social Service department covers education and health. The officials assured the team of their support in carrying out the survey in schools using public health workers.

Discussions also took place at the Regional Hospital with the Assistant Manager of Health Cooperation. No cases of hydrocele were recorded in the recent past and patients with chronic cases of filariasis usually visited the hospital for treatment. The team held discussions with members of the Thinadhoo Council who expressed their support for post-MDA surveillance activities.

Five chronic cases (three women and two men) with lymphoedema (two with grade four lymphoedema of bilateral lower limbs and three with unilateral lower limbs) were examined by the mission. All were over 65 years old and traced their illness to their childhood. They reported recurrent bouts of fever, lasting for 3–4 days for which they sought treatment at the Regional Hospital. They had been trained to wash and keep their legs clean and the team members found their limbs to be clean in spite of folds and papillomatous growth. No recent filarial cases were reported from this area.

Culex and *Aedes (albopictus)* were observed and the common breeding sources were open wells (clean with fish) and septic tanks. There was no water stagnation in the area. Step wells were seen in the island.

5.2 Fonadhoo Island

Fonadhoo is the capital of Haddhunmathi Atoll or Laamu Atoll, an administrative division of the Maldives with 82 islands (Map 3). The population of the atoll is 14 313 distributed over 12 islands. The population of Fonadhoo Island is 6376. Only 2000 people, presumably living in Maavah, Hithadhoo and Kunahandhoo (Table 8), were targeted for MDA. Thauleemee Marukax School in Fonadhoo was selected for spot-checking the children for antigenaemia. None of the 63 children of grade I and II screened with ICT cards was found to be positive.

The local health and education authorities were briefed about the importance of the post-MDA activities to be carried out. Physicians at the local hospital were unaware of any cases of filariasis in the area.

5.3 Kaasidhoo Island

The team visited Kaashidhoo Island, a non-endemic island in Kaafu Atoll. Kaashidhoo lies at the eastern side of the Kardiva Channel and is the largest island of Kaafu Atoll administrative division (which also includes North Male, South Male and Gaafaru atolls) and the fifth largest island of the entire archipelago. Kaafu Atoll also has a number of uninhabited islands. The population of Kaasidhoo Island is 1917. This island was once endemic and is now reported as non-endemic.

An ICT survey was carried out in the Health Centre. Children in grade I and II were brought in by the parents. Out of 59 students, 49 (21 boys and 28 girls, 25 in grade 1 and 34 in grade II) were screened for antigenaemia and none were found to be positive.

Six cases of lymph oedema had been line listed. Three cases were visited and the team found that all were over 65 years old. Two patients had bilateral and one had lymph oedema and the duration ranged between 50 and 60 years. No new/recent clinical cases of filariasis had been reported.

The team held discussions with the Kaashidhoo Island Council president and other members who assured it of their necessary support to screen children for filariasis and treatment for chronic cases.

6. Justification/rationale for stopping MDA

The decision to stop MDA was reviewed by the team along with the national programme. The national programme pointed out that MDA was stopped for the following reasons:

- The programme had identified endemic areas based on historical data and screening of the population using standard techniques.

- The lone LF endemic island, Fonadhoo, received MDA with the WHO-approved regimen of DEC and albendazole for five years. Coverage was high and there was a decline in the mf rate.
- In the post-MDA phase, all children in the age group two–eight years were screened for antigenaemia using ICT in selected islands, including endemic islands under MDA. None of the children was positive for antigenaemia. Monitoring in the island also revealed that no new clinical case of filariasis had been reported since 2004 (Table 12)
- Further, it was observed that the step wells and husk pits that were common during the 1950s, where *C. fatigans,* the primary vector in the country, was breeding no longer existed. A sustained antimalarial programme benefited the filariasis programme by controlling *Anopheles tessellates,* the secondary vector of filariasis and the principal vector of malaria.

7. Review with Ministry of Health officials

The members of the mission briefed the Secretary of Health, Maldives, the WR Maldives, the focal point and officials of the National LF Elimination Programme about their findings and discussed further action to achieve the goal of elimination. The team also presented details of the revised WHO guidelines for post-MDA stopping activities. The representatives of the government and the programme assured the team of their continued support for elimination activities. The possibility of appointing a consultant for the preparation of the dossier was also discussed along with the maintenance of requisite staff for future programme activities.

8. Proposed plan of action during the post-MDA phase

The LF TAS Manual,WHO 2011 recommended the conduct of a Transmission Assessment Survey (TAS) after five rounds of MDA have been completed. The country had completed five rounds of MDA in 2008 and is ready to carry out the TAS in the areas where MDA was successfully completed. The ICT card testing carried out during the visit of the team was the first step and TAS will be completed by testing children in the endemic district. In addition, TAS needs to be done at least once in non-endemic areas that were endemic in the past.

The TAS can be executed by the infrastructure available with the National LF Elimination Programme with the assistance of local health workers. Based on the availabilty of resources, the programme could consider xenomonitoring in the MDA areas using polymerase chain reaction (PCR)-based detection of infection in both *Culex quinquefasciatus* and *Anopeles tessellatus* as the known vectors in Maldives. Both species can be included in xenomonitoring.

The further steps to be undertaken by the Programme based on the LF TAS Manual, WHO 2011 are outlined in Annex 3.

9. Summary of programme review and conclusions

- There are 201 inhabited islands in six regions and 19 atolls in Maldives. The population is estimated to be 298 842.
- As per the earliest report (1952), many islands in five atolls surveyed were highly endemic for filariasis with 30–55% endemicity. The national LF control programme was started in 1969 and the programme at atoll level was initiated in 1974. Both case detection and treatment as well as anti-larval measures were carried out in endemic areas.
- Under the National Filariasis Survey Team (NFST), night-blood surveys were carried out showing 44 islands in 12 atolls to be endemic with Mf rates ranging from 0.5 to 32.5%. The disease rate was also high with both lymphoedema and hydrocele.
- In 1998, 7 islands were found to be endemic and the Mf prevalence ranged between 0.19–0.91% in different islands.
- A sample survey carried out in 2003 in Laamu atoll covering 14 islands showed that 223 (17.9%) children out of 1246 were found to be positive for filarial antigenaemia. Other atolls were negative for antigenaemia prevalence. Based on the survey, MDA was launched only in Laamu atoll.
- MDA with co-administration (DEC+albendazole) was started in 2004 and five annual rounds were completed by 2008. A total of 2000 inhabitants were targeted in Fonadhoo.
- The reported coverage was 93–100% in different rounds. No information is available on the independent assessment of coverage and consumption.
- At the end of the fifth round, an antigenaemia survey was carried out in the two–eight years age group and none of the 743 children screened from 10 localities showed any positivity. The decision to stop MDA was supported by the observation that there was no new case of infection among children.
- An Mf survey carried out in Gaaf Dhal atoll, a non-endemic island, showed that none of the individuals from nine localities had Mf carriers, suggesting that it continued to be non-endemic.
- Recording of clinical cases of filariasis was continued from 1985 and since 2002, no new case has been reported from any of these islands.
- Over 700 immigrants from Bangladesh, India, Nepal, Pakistan and Sri Lanka in 24 islands were screened for Mf in 2008. No positive cases were detected.
- Post-MDA surveillance has been initiated and an antigenaemia survey among school entrants is in progress in all islands.
- As part of an independent assessment, the expert team visited Fonadhoo Island (MDA area) and screened 63 children in the age class 6–7 years with ICT cards. No child was found positive for antigenaemia. The team also visited two islands that

were endemic once and are now non-endemic (Thinadhoo and Kaashidhoo) and screened children there. None of 132 children aged 6–7 was positive for antigenaemia.

- There were 51 enumerated cases of filariasis in Thinadhoo Island and six in Kaashidhoo Island. All the cases were over 60 years of age, having lymphoedema. Eight of them were interviewed. They continued to take treatment from health centres/hospitals and did not face any social stigma problems. No recent case of clinical case was observed/reported in these islands.
- The team also noticed that the sources of mosquito breeding were open ring wells, overhead/rainwater harvesting synthetic tanks and septic tanks. Step wells, reported in 1951, that promoted profuse breeding of *C. quinquefasciatus*, were not present and this could be one of the reasons for no infection in many islands. This can be considered a classic example of disappearance of filariasis consequent to reduced vector density due to environmental management. Further, this vector species was found to be less abundant while other mosquito species viz., *Aedes albopictus* and *Aedes aegypti* were found to be more abundant in these islands.
- Post-MDA activities are in progress in all islands. The health personnel involved in the ICT are well trained and highly competent in carrying out the survey. The education department is also cooperating in conducting the surveys in schools and this is facilitated by the cooperation between the departments of schools, public health and social services.
- School-based ICT surveys among school entrants is appropriate as school attendance is near total.

10. Recommendations of the mission

10.1 Recommendations to the National LF Elimiantion Programme

The efforts of the Government of Maldives, the DGHS and the LF Programme to Eliminate Lymphatic Filariasis are appreciated. The mission was impressed by the commitment, dedication and professionalism displayed by the country and the programme. The mission, after examining all the available data and conducting the field exercises, approves the stopping of the MDA in 2009 and further recommends:

(1) the initiation of all activities recommended for post-MDA surveillance (according to the LF TAS Manual, WHO, 2011) and a report of these activities to be submitted to the RPRG in 2012;

(2) the initiation of other post-MDA surveillance activities – parasitological, antigenaemia, xeno monitoring, clinical case documentation (including in non-MDA districts) – that may be appropriate to ensure surveillance utilizing all the available tools; the country is urged to consider strengthening the existing infrastructure to continue these post-MDA stopping activities;

(3) the strengthening of screening activities in non-endemic areas and the establishment of mechanisms to identify and treat Mf-positive immigrants;

(4) the continuation of the morbidity management activities currently in place in all islands/atolls where cases of LF are present, and an integrated approach for disability management;

(5) the initiation of steps to compile the dossier required for the completion of the certification process: a suggested outline based on the LF TAS Manual,WHO, 2011 is in Annex 4;

(6) the preparation of a Plan of Action for TAS, post-MDA surveillance and dossier compilation (including activities, timelines and budget);

(7) the exploration of funding avenues for the activities listed above.

10.2 For WHO

(1) Recognizing the rich experience and success of Maldives and Sri Lanka, the mission recommends the promotion of intercountry cooperation in LF elimination activities that would benefit other island nations in particular and other endemic countries of the Region in general.

(2) The mission urges WHO to provide necessary technical support to countries that are on the verge of elimination of LF to enable them to complete their activities within the timeframe.

11. References

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Annex 1

Programme of the mission in Maldives

19 June (Sunday)

Morning – Briefing with WR Maldives at WHO Country Office – Dr Rajesh Pandav, Medical Officer (Public Health)

– Meeting with Secretary to Health and Directorate of Health Officials

Afternoon – Departure of the teams to the selected islands for spot-checks

20 June (Monday)

Team 1 (Thinadhoo Island)

Morning – Meeting with the Principal of Aboobakuru School

– Antigenaemia survey among school entrants

Afternoon – Meeting with the Secretary, National Office, Upper South Region

– Visit to Regional Hospital and discussion with the Assistant Manager of Health Cooperation

– Discussion with Thinadhoo Administrative Council

Team 2 (Fonadhoo Island)

Morning – ICT testing at school

Afternoon – Discussion with local officials

21 June (Tuesday)

Team 1 (Thinadhoo Island)

Morning – Interview with chronic cases of filariasis

– Vector breeding source survey

Team 2 (Fonadhoo island)

Morning – Discussions with local officials

22 June (Wednesday)

Morning – Meeting with the Island Administrative Council
– Antigenaemia survey among school entrants
– Interview with chronic cases of filariasis

Afternoon – Visit to health centre

23 June (Thursday)

Morning – Meeting with the WR and DGHS

Afternoon – Debriefing with WR

24 June (Friday)

Morning – Discussion on field observations

Afternoon – Preparing mission report

25 June (Saturday)

– Debriefing with the Ministry of Health and programme officials

Annex 2

Officials met by the members of the mission in Maldives

No	Name	Designation
1	Dr Jorge M. Luna	WHO Representative, Maldives
2	Dr Rajesh Pandav	Medical Officer (Public Health), WHO Country Office, Maldives
3	Dr Ibrahim Yasir	DGHS, Government of Maldives
4	Dr Geela Ali	Secretary to Health, Government of Maldives
5	Dr Hazla Raffeq	Medical Officer, WHO focal point for LF elimination, Government of Maldives
6	Mrs. Neesha Nasir	Assistant Public Health Programme Officer, Government of Maldives
7	Mr Hanud Shiyam	Field Officer, Health Cooperation, Government of Maldives
8	Mr Mohamed Faual	Field Officer, Health Cooperation, Government of Maldives
9	Mr Ibrahim Refau	Field Officer, Health Cooperation, Government of Maldives
10	Mr Ahamed Habeeb	Aboobakuru School, Thinadhoo
11	Mr Mohamed Shareef	Secretary, National Office, Upper South Region, Thinadhoo
12	Mr Ahmed Nasser	President, Thinadhoo Island Administrative Council
13	Mr Ali Sultan	Kaashidhoo Island Council
14	Ms Aminath Zaki	Official translator, Health Centre, Kaashidhoo

Annex 3

Summary of activities to be carried out during post-MDA surveillance
(based on LF TAS Manual, WHO,2011)

1. Periodic Transmission Assessment Survey

(a) Antigenaemia survey among children in the age group 6–7 years

A series of two post-MDA surveillance surveys should be conducted to evaluate whether recrudescence has occurred. Each TAS should be conducted approximately 2–3 years following the previous survey and should use a similar design as the original, as described in the revised WHO guidelines 2011. In 2011, the first survey can be completed. Since the school entrance rate is around 75%, a school-based survey of 6–7 year old children can be carried out. The steps involved in this are:

(1) Preparation of list of schools in each implementation unit

(2) Preparation of student lists in the schools in the age class 6 and 7 years

(3) Obtaining permission from the school for conducting the survey

(4) Procurement of ICT cards

(5) Screening of the required number of children in each IU following systematic sampling procedure with written consent of the parents

(6) Treatment of children if found positive for antigenaemia.

(b) Microfilaraemia survey in sentinel and spot-check sites

As has been done prior to, during and post-MDA, cross-sectional community surveys for mf prevalence are to be continued in the sentinel and spot-check sites. The minimum sample size in each site is 500.

(c) Xenomonitoring

Entomological surveys have been found very useful. Xenomonitoring is now recommended as a method of assessing transmission. Mosquitoes can be collected using gravid traps. In each Evaluation Unit (IU=EU), 30 clusters (evaluation area) can be selected using probability proportional to size sampling(PPS) method and from each cluster seven houses/premises can be selected at random. From each house a pool of 25

mosquitoes can be collected. The number of pools per EU will be 270. The vector mosquitoes are to be air dried after identification and sent to the centralized laboratory for PCR assay. The infection rate can be derived following the assay. This has to be done during the peak season of vector abundance.

2. Confirmation of absence of transmission in non-endemic areas

TAS can be carried out at least once during the post-MDA surveillance in known non-endemic islands. This is to ensure that there is no resurgence of infection/transmission.

3. Morbidity management

All the clinical cases of LF are to be line listed and trained on morbidity management (MM). Close monitoring of these cases is also required to ensure that the patients are regularly practising MM and to ascertain the benefits they perceive. MM could be integrated with disability management of leprosy.

4. Long-term monitoring of LF among:

- recruits
- migrants.

5. Integration of surveillance

It may be explored to integrate LF surveillance into other disease surveillance activities.

6. Preparation for certification from programme angle

A rigourous exercise is required for applying for certification. Activities have to be planned well in advance in order to ensure all the necessary documents are compiled and supported by data.

7. Compilation of data and documents for dossier(Annex 4)

Annex 4

Guidelines for the preparation of the dossier
(based on the LF TAS Manual, WHO,2011)

The dossier should present, in an organized fashion, the evidence for filariasis elimination for the entire country. If geographically separate foci existed within a country, they should be dealt with separately.

Terms that are used at a national level that may not be understood internationally should be defined (e.g. "imported case", "endemic district").

Spatial presentation of data is encouraged. At a minimum, maps should be included that show each implementation unit, as well as a national- or regional-level map indicating endemic and non-endemic areas.

The national LF programme manager prepares a detailed dossier describing the evidence for absence of transmission throughout the country. The programme manager may request assistance in preparing the dossier from WHO. The dossier will be submitted to RPRG through the WHO Regional Office.

Dossier Contents

1. General description

The general description should focus on:

- Geographic and economic features of the country, particularly as they relate to risk of filariasis transmission.
- The health system, with an emphasis on the adequacy of the health system to detect affected persons and provide them treatment.
- The geographic distribution, feeding behaviour, density, and competence of the vector mosquitoes.
- Immigration patterns to and from filariasis endemic areas (including other countries).
- The occurrence of lymphatic filariasis in neighbouring countries and the status of filariasis control or elimination efforts in these countries.

2. History of lymphatic filariasis

- A detailed description, including maps, of historic foci of lymphatic filariasis transmission, as documented by both government and research efforts. This should include a review of data on prevalence and intensity of filariasis infection in humans and vector mosquitoes.
- Evidence for the absence of filariasis in areas considered non-endemic. Information should be provided on how non-endemic areas were defined and on surveillance in these areas to provide assurance that they remain non-endemic.
- A description of filarial disease, including geographic distribution, prevalence, and treatment for the various clinical manifestations.

3. Interventions

- A detailed description of all measures to control or interrupt transmission in each focus. This description should include details of screening, selective treatment, MDA, and ancillary measures such as environmental and economic improvement, vector control, and other relevant interventions, such as elimination or control activities targeting other vector borne diseases (e.g. malaria eradication efforts).
- Review of case management for filarial disease.

4. Assessment of interventions

- A detailed description of surveys and studies conducted to evaluate the impact of these measures (e.g. microfilaraemia surveys). This chapter would include data from sentinel sites and surveys for antigenaemia, as currently recommended by WHO, as well as other surveys or evaluations that were conducted before the GPELF was established. It also would include any sampling undertaken as part of the decision to stop MDAs or other interventions.
- Details should be provided on sampling methods and procedures that were used to assess baseline prevalence, monitor the programme, and assess stopping points for MDA.
- Review of any data collected on the impact of interventions on filarial disease.

5. Surveillance

- A full review of any surveillance activities undertaken since MDAs and other interventions were stopped, including a description of case follow-up activities completed for each positive case detected.
- Review of data collected through post-MDA surveys, such as the TAS.

- Review of the filariasis case reports through routine disease surveillance or other systems for case detection.
- Evidence that adequate sampling or surveillance was conducted in all previously endemic areas and in areas that were of uncertain endemicity during initial mapping.
- Details on surveys done in cross-border areas and in immigrants from filariasis-endemic areas (e.g. date of surveys, number of persons tested, test results, follow-up of any microfilaraemia-positives).
- Demonstration that any positive cases detected following MDA represented isolated events not traceable to an area of transmission. If an area of potential transmission was discovered, evidence should be presented that subsequent interventions (e.g. MDA) were successful.

6. Additional data that support the elimination of lymphatic filariasis

7. Bibliography

- Published and any available unpublished studies on lymphatic filariasis, its geographic distribution and control, including theses and dissertations.

Annex 5

Maps, tables and graphs

Map 1: ***Maldives***

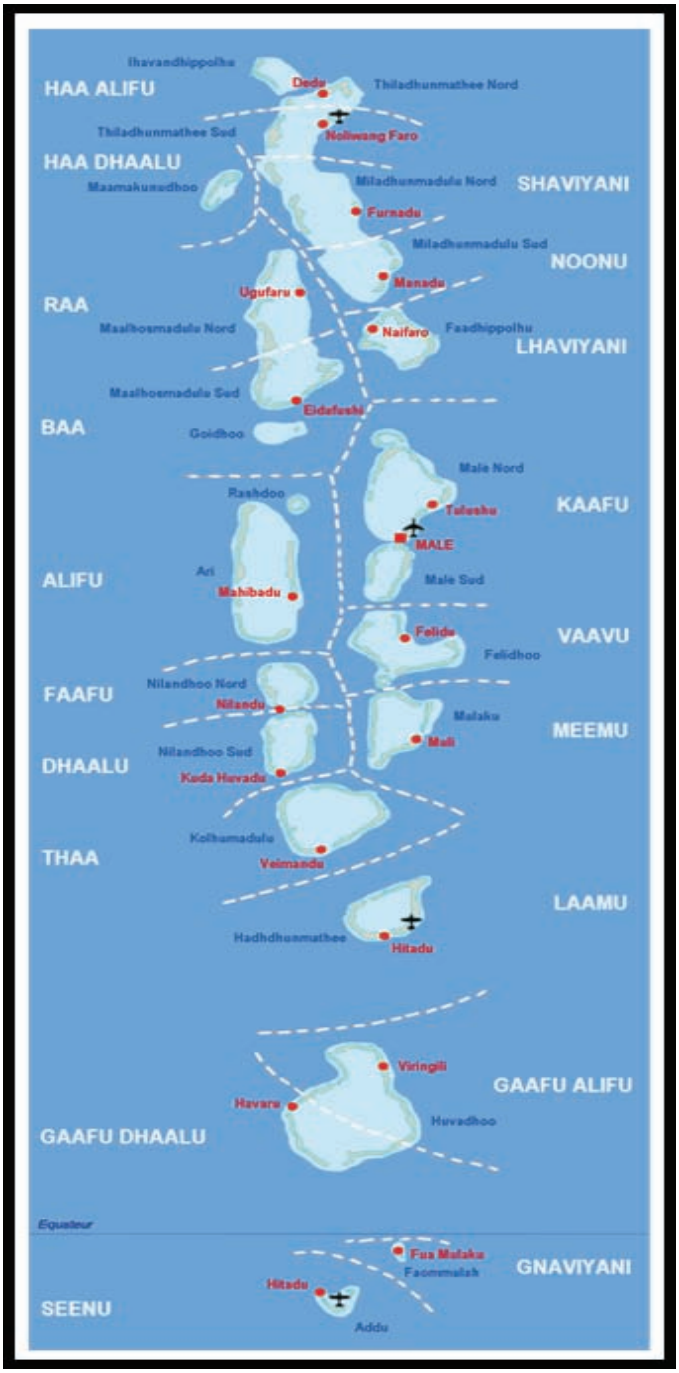


Table 1: *Estimated population of Maldives 2006*

Atolls	Number of inhabited islands	Dwellings	Population (2006 estimated)		
			Females	Males	Total
Male (urban)	1		**51 701**	**51 992**	**103 693**
Faadhippolhu (Lhaviyani)	4	1 371	4 458	4 732	9 190
Felidhu Atoll (Vaavu)	4	777	724	882	1 606
Fuvahmulah (Seenu/Gan)	1	2 969	13 704	11 958	25 662
Hadhdhunmathi (Laamu)	12	1 398	5 817	6 173	11 990
Kolhumadulu (Thaa)	9	1 854	4 277	4 216	8 493
Male' Atoll (Kaafu)	9	1 574	4 545	10 896	15 441
Mulakatholhu (Meemu)	7	541	2 291	2 419	4 710
North Ari Atoll (Alif Alif)	7	762	2 444	3 332	5 776
North Huvadhu Atoll (Gaafu Alif)	9	2 164	4 077	4 185	8 262
North Maalhosmadulu (Raa)	13	2 378	7 620	7 136	14 756
North Miladhunmadulu (Shaviyani)	14	1 977	6 299	5 641	11 940
North Nilandhe Atoll (Faafu)	5	804	1 937	1 828	3 765
North Thiladhunmathi (Haa Alif)	14	2 334	7 184	6 311	13 495
South Ari Atoll (Alif Dhaal)	9	946	3 658	4 721	8 379
South Huvadhu Atoll (Gaafu Dhaalu)	8	1 234	5 618	5 395	11 013
South Maalhosmadulu (Baa)	12	1 458	4 605	4 973	9 578
South Miladhunmadulu (Noonu)	11	1 756	5 426	4 589	10 015
South Nilandhe Atoll (Dhaalu)	6	1 552	2 390	2 577	4 967
South Thiladhunmathi (Haa Dhaalu)	14	2 908	8 734	7 503	16 237
			147 509	**151 459**	**298 968**

Table 2: *Results of the filariasis survey conducted in 1951 in selected areas of Maldives*

Atol	Area	Popu-lation(*)	Sample	** Mf positive	*** Mfr	Disease	Disease rate	Endemicity rate
Haddumatti	Mathimarudu	180	84	18	21.0	13	16.0	37.0
Haddumatti	Mukurimagu	180	107	32	30.2	13	12.3	42.5
Haddumatti	Medawa	200	84	23	27.1	9	11.1	38.2
Haddumatti total		**560**	**275**	**73**	**26.44**	**36**	**13.06**	39.5
Suvadiva	Mathoda	264	120	33	27.1	43	35.5	62.6
Suvadiva	Devvaddu	381	117	27	22.7	37	31.8	54.5
Suvadiva	Ratafandu	438	132	43	32.5	28	21.4	53.9
Suvadiva	Fares	201	104	30	29.3	25	24.2	53.5
Suvadiva	Madveli	325	114	21	18.6	32	28.3	46.9
Suvadiva	Wadu	535	236	68	28.8	52	21.9	50.7
Suvadiva	Gaddu	838	290	55	19.1	68	23.4	42.5
Suvadiva	Mamendu	465	206	35	17.1	54	26.1	43.2
Suvadiva	Hondeddu	235	82	17	20.8	19	23.4	44.2
Suvadiva	Wilingili	750	110	22	20.4	21	19.4	39.8
Suvadiva	Nilandu	306	188	33	17.6	36	19.3	36.9
Suvadiva	Havaru-Tinadu	2 515	236	29	12.4	50	21.2	33.6
Suvadiva	Fiori	422	118	20	17.1	14	11.7	28.8
Suvadiva	Nadella	259	99	15	14.7	12	12.6	27.3
Suvadiva	Dandu	445	100	1	1	2	2	3.0
Suvadiva	Mangaddu	102	98	3	3.1	66	67.3	70.4
Suvadiva total		**8 481**	**2 350**	**453**	**19.27**	**560**	**23.82**	43.1
Addu	Gan	650	254	62	24.4	33	13	37.4
Addu	Hitadu	2 445	394	62	15.7	42	10.7	26.4
Addu	Feidu	233	118	18	15.3	12	10.2	25.5
Addu	Maradu	573	111	18	16.2	11	9.9	26.1
Addu	Midu	656	116	7	5.9	7	5.9	11.8
Addu	Holedu	866	209	15	7.2	15	7.2	14.4
Addu total		**5 423**	**1 202**	**182**	**15.12**	**120**	**9.99**	25.1
Grand total		**14 464**	**3 827**	**707**	**18.48**	**716**	**18.71**	**37.2**

* Population in actual number ** Mf positive: Microfilaria positive in blood sample
*** Mfr: micro filarial rate in percentage

Table 3: *Filariasis survey carried out in 1969*

Sl.No	Atoll	Locality	Pop*	Sample	Mf rate**	Disease rate	Endemicity rate
1	Alifu	Mahibadu	760	NA	0.0	2.0	2.0
2	Vavu	Rakedu	NA	NA	0.0	0.0	0.0
3	Dhaalu	Meedhu	489	NA	0.0	0.9	0.9
4	Thaa	Guraidu	NA	NA	0.3	0.0	0.3
5	Gaaf Alif	Gaddu	838	303	7.8	15.3	23.1
6		Willingili	750	NA	5.2	8.3	13.5
7		Havathinadu	2 516	174	4.6	23.3	27.9
8		Fiori	422	225	17.1	11.7	28.8
9		Kolumafushi	NA	271	11.0	18.5	29.5

* Population in actual number

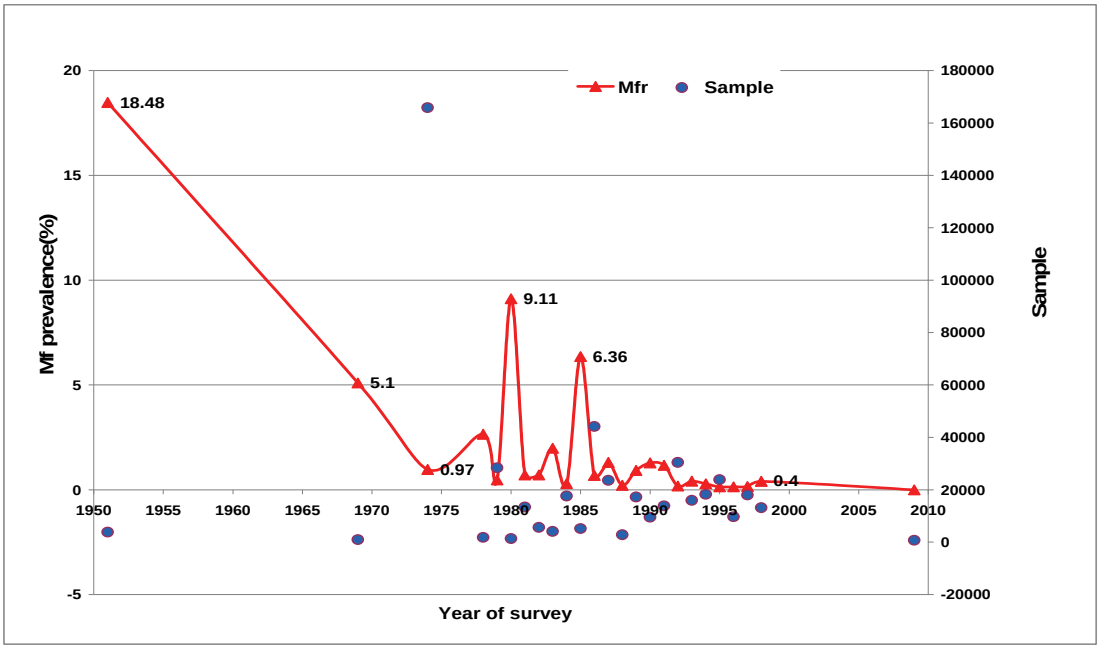
** Mf rate: Microfilarial rate

Table 4: *Results of the survey conducted in 1974 in selected areas by the National Filarial Survey Team*

Atol	Area	Population	Sampled	* Mf positive	** Mfr (%)	Disease	Disease rate	Endemicity rate
Laviyani	Oluvelifushi		25	4	4.0	0	0.0	4.0
Kaafu	Male	19 762	156 336	921	0.6	0	0.0	0.6
Kaafu	Kaashidoo	814	782	95	12.1	77	9.8	21.9
Alifu	Mahibadu	760	176	0	0.0	0	0.0	0.0
Faafu	Feeali	386	111	0	0.0	4	3.6	3.6
Faafu	Magoodhu	322	250	3	1.2	1	0.4	1.6
Dhaalu	Meedhu	489	216	0	0.0	2	0.9	0.9
Meemu	Muli	488	279	2	0.7	0	0.0	0.7
Meemu	Mulak	606	224	3	1.3	4	1.7	3.0
Meemu	Kolufushi	564	373	0	0.0	1	0.2	0.2
Thaa	Wandoo	NA	103	9	8.7	0		8.7
Laamu	Hithadhoo	NA	150	7	4.7	2	1.3	6.0
Laamu	Gamu	NA	150	10	6.6	12	8.0	14.6
Laamu	Fonadhoo	NA	150	30	20.0	9	6.0	26.0
Laamu	Gaadhoo	NA	100	6	6.0	23	23.0	29.0
Laamu	Kunahandhoo	NA	100	18	18.0	18	18.0	36.0
Laamu	Maavah	NA	150	12	7.9	15	10.0	17.9
Laamu	Mundoo	NA	152	4	2.6	4	2.6	5.2
Laamu	Dhan'bidhoo	NA	110	5	4.5	3	2.6	7.1
Laamu	Ishdhoo	NA	225	16	7.0	30	13.3	20.3
Gaaf Alif	Mathoda	264	280	19	6.8	54	19.3	26.1
Gaaf Alif	Devvaddu	381	362	51	14.1	94	26.1	40.2
Gaaf Alif	Ratafandu	438	501	65	13.0	79	15.8	28.8
Gaaf Alif	Fares	201	346	32	9.3	6	1.7	11.0
Gaaf Alif	Madaveli	325	595	43	7.3	62	10.4	17.7
Gaaf Alif	Wadu	535	366	11	3.0	0	0.0	3.0
Gaaf Alif	Gaddu	838	397	19	4.9	0	0.0	4.9
Gaaf Alif	Naamendu	465	205	35	17.1	54	26.3	43.4
Gaaf Alif	Hodeddu	230	82	17	20.8	19	23.4	44.2
Gaaf Alif	Willingili	750	110	22	20.4	21	19.4	39.8
Gaaf Alif	Nilandu	306	188	33	17.6	36	19.3	36.9
Gaaf Alif	Havathinadu	2 516	236	29	12.4	50	21.2	33.6
Gaaf Alif	Fiori	422	174	12	6.7	17	9.5	16.2
Gaaf Alif	Nadella	259	385	30	7.8	23	6.0	13.8
Gaaf Alif	Dandu	445	225	24	10.6	16	7.1	17.7
Gaaf Alif	Maguddu	102	98	3	3.1	66	67.3	70.4
Gaaf Alif	Kolumafushi		558	19	3.4	81	14.5	17.9
Gnaviyani	Mulaku		554	4	0.7	0	0.0	0.7
Total			**165 824**	**1613**	**0.9**	**882**	**54.7**	**55.6**

* Mf positive: Micro filarial positive in blood sample
** Mfr: Micro filarial rate in percentage

Figure1: ***Trend in microfilarial rate(Mfr) in Maldives***



Map 2: **Distribution of filariasis in 1974**

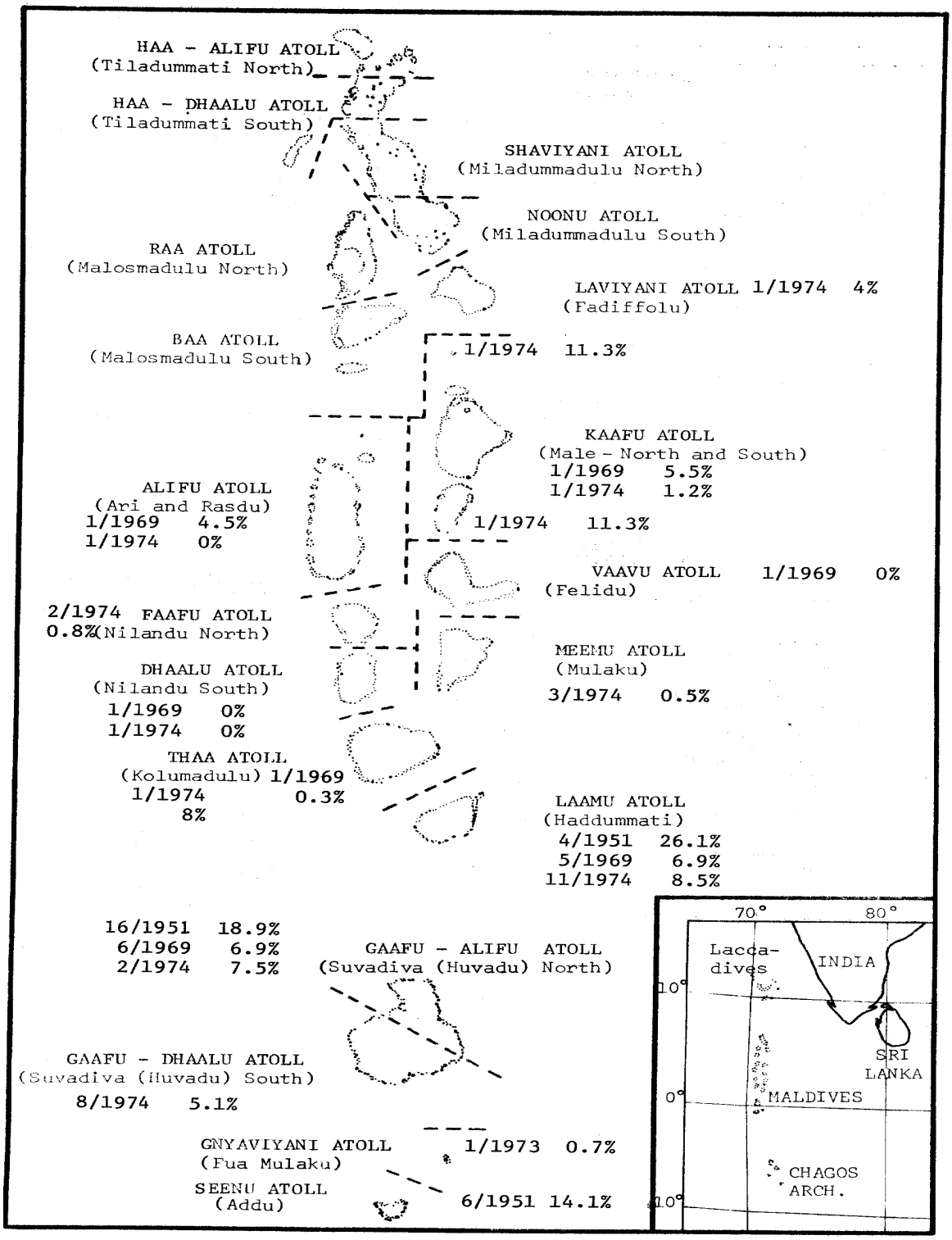


Table 5: *Night blood survey carried out in Male*

Year	Number. examined	Number positive for Microfilaria	Micro filarial rate(%)
1968 - 1969	13 164	723	5.5
1970	15 646	418	2.7
1971	16 217	239	1.5
1972 - 1973	16 321	94	0.6
1973	8 851	119	1.3

Figure 2: ***Prevalence rate of microfilaria from night blood surveys carried out in Male from 1968-1973***

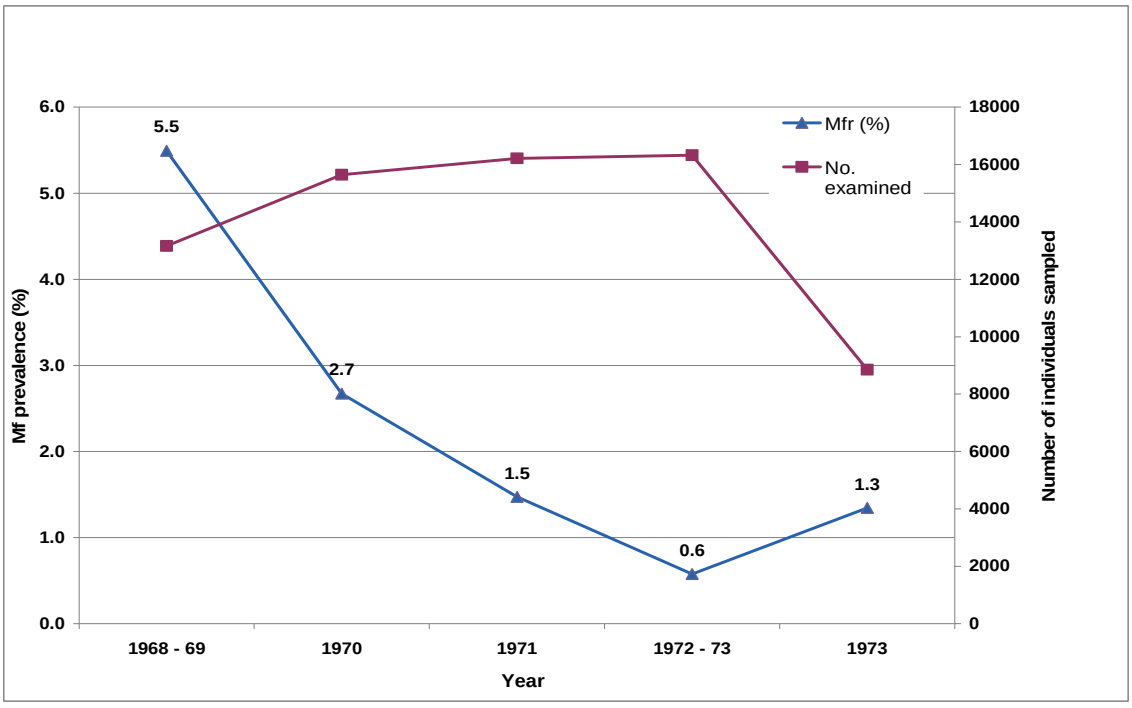


Table 6: *Filariasis situation from 1978-1998*

Year	No. of blood slides taken	New cases	Discharged cases	Cases under treatment	Positive %
1978	1 813	48	156	216	2.65
1979	28 370	134	90	260	0.47
1980	1 350	123	236	147	9.11
1981	13 400	95	134	108	0.71
1982	5 599	40	110	110	0.71
1983	4 074	80	5	185	1.98
1984	17 621	52	191	46	0.29
1985	5 205	331	104	273	6.36
1986	44 162	299	200	372	0.68
1987	23 614	307	339	340	1.30
1988	2 826	6	117	229	0.21
1989	17 210	158	12	375	0.92
1990	9 510	122	85	412	1.28
1991	13 884	162	241	333	1.17
1992	30 413	56	145	244	0.18
1993	15 946	66	81	229	0.41
1994	18 263	52	64	217	0.28
1995	23 866	34	74	177	0.14
1996	9 722	14	79	112	0.14
1997	17 991	28	23	117	0.16
1998	4 807	9	9	117	0.19

Table 7: *Filariasis survey carried out in 1998 in different atolls*

Atoll	Locality/island	Population	Sample	Microfilaria positive	Microfilarial rate
Laamu	Maavah	1 373	1 351	68	0.91
Laamu	Fonadhoo	1 762	1 740	59	0.20
Gaaf Dhaal	Thinadhoo	4 442	4 893	179	0.20
Gaaf Dhaal	Gadhdhoo	1 439	1 701	104	0.19
Shaviyani	Lhanimagu	529	493	22	0.23
Noonu	Kendhikulhud	1 204	1 114	60	0.59
Noonu	Holhudhoo	1 527	1 562	41	0.48
Thaa	Vandhoo	268	273	5	0.41
Gaaf Alif	Kanduhulhudh	443			
Alifu	Thoddu	1 199			
		14 186	**13 127**	**538**	**0.40**

Map 3: ***Laamu atoll showing MDA unit - Fonadhoo Island***

Table 8: *Antigenaemia survey in Laamu (Hadhdhunmathi) atoll 2003*

Sl. No.	Island	Pop*	Sample in the age of years								No. of ICT positive	**Ag Pre. rate (%)
			2	3	4	5	6	7	8	Total		
1	Ishdhoo	1 559	23	29	23	28	28	26	13	170	1	0.6
2	Dhan'bidhoo	537	9	11	10	13	9	10	7	69	0	0.0
3	Maabaidhoo	690	11	16	15	13	13	15	0	83	1	1.2
4	Mundoo	372	2	5	8	4	7	9	12	47	0	0.0
5	Kalhaidhoo	434	12	11	12	17	9	11	11	83	0	0.0
6	Gamu	2 502	35	42	37	41	30	34	21	240	3	1.3
7	Maavah	1 373	40	18	16	26	15	26	32	173	77	44.5
8	Fonadhoo	1 762	NA	NA	NA	NA	NA	NA	NA	NA	NA	N
9	Gaadhoo	231	9	6	6	12	5	10	2	50	0	0.0
10	Maamendhoo	845	6	23	18	12	11	13	0	83	2	2.4
11	Hithadhoo	836	17	26	23	15	20	29	26	156	71	45.5
12	Kunahandhoo	602	16	16	10	13	12	13	12	92	68	73.9
Total		**11 743**	**180**	**203**	**178**	**194**	**159**	**196**	**136**	**1246**	**223**	**17.9**

* Pop: Population ** Ag.Pre.rate:Antigenaemia prevalence rate

Table 9: *ICT survey in children (2-8 years) in selected islands in 2008*

Sl. No	Locality/ island	Non endemic/ intervention	Pop.	Sample (age in years)							ICT +ve
				2-3	3-4	4-5	5-6	6-7	7-8	Total	
1	Kolamaafushi	Non endemic	1 087	18	12	21	18	14	38	121	0
2	Viligili	Non endemic	1 976	20	44	16	38	29	77	224	0
3	Maamendhoo	Endemic & intervention	1 000	16	16	28	29	21	65	175	0
4	Nilandhoo	Non endemic	534	9	12	15	14	6	35	91	0
5	Dhaandhoo	Non endemic	1 113	19	27	30	22	21	65	184	0
6	Devvadhoo	Non endemic	480	14	10	11	5	10	21	71	0
7	Kodey	Non endemic	213	4	7	7	9	5	14	46	0
8	Dhiyadhoo	Non endemic	79	2	3	2	1	3	4	15	0
9	Gemanafushi	Non endemic	1 082	9	28	25	24	12	64	162	0
10	Kandhuhul-hudhoo	Non endemic	443	8	8	12	7	17	25	77	0
Total			**8 007**	**119**	**167**	**167**	**167**	**138**	**408**	**1166**	**0**

Table 10: *Filariasis survey carried out in 2009 in Gaaf Dhall (non-endemic) island*

Sl. No	Locality/island	Population	Sample	*Mf positive	**Mfr(%)
1	Madaveli	1065	95	0	0.0
2	Hoadhedhdhoo	668	69	0	0.0
3	Nadallaa	614	57	0	0.0
4	Gadhdhoo	1439	79	0	0.0
5	Rathafandhoo	492	40	0	0.0
6	Vaadhoo	662	57	0	0.0
7	Fiyoari	673	47	0	0.0
8	Maathodaa	491	40	0	0.0
9	Fares	445	36	0	0.0
10	Thinadhoo	4442	223	0	0.0
Total		**10 991**	**743**	**0**	**0.0**

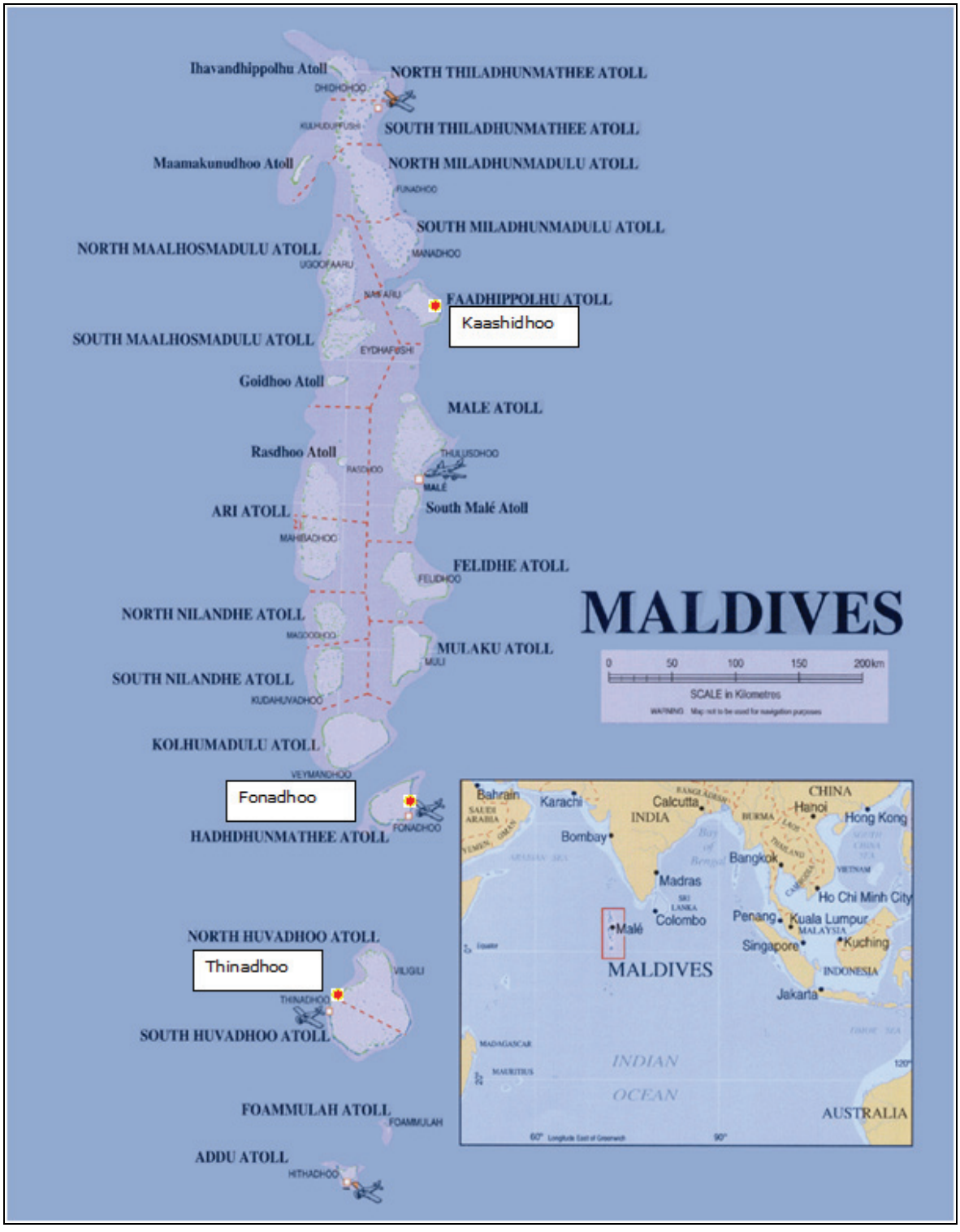
* Mf positive: Micro filarial positive
** Mfr(%): Micro filarial rate (%)

Table 11: *Microfilarial screening among foreigners in different islands (2008-2009)*

Sl. No	Locality/island	Country of Origin						*Mf positive
		Pakistan	Nepal	Bangladesh	India	Sri Lanka	Total	
1	Kolamaafushi	0	3	50	27	1	81	0
2	Viligili	0	0	115	27	3	145	0
3	Maamendhoo	0	0	36	21	0	57	0
4	Nilandhoo	0	0	39	18		57	0
5	Dhaandhoo	0	0	29	26	0	55	0
6	Devvadhoo	1	0	30	9	6	46	0
9	Gemanafushi	1	0	21	10	5	37	0
10	Kandhuhulhudhoo	0	0	8	12	3	23	0
11	Mukurimagu	0	0	5	1	0	6	0
12	Mathimaradhoo	0	0	0	4	0	4	0
13	Thundi (Gamu)	0	0	10	15	0	25	0
14	Kalhaidhoo	0	0	0	0	0	0	0
15	Mundoo	0	0	0	0	0	0	0
16	Maabaidhoo	0	0	9	1	0	10	0
17	Dhanbidhoo	0	0	0	0	0	0	0
18	Isdhoo avah	0	0	1	0	0	1	0
19	Kalaidhoo avah	0	0	30	0	2	32	0
20	Gaadhoo	0	0	7	0	0	7	0
21	Maamendhoo	1	0	16	8	14	39	0
22	Hithadhoo	0	2	19	10	1	32	0
23	Kunahandhoo	0	0	0	0	0	0	0
24	Maavah	0	0	52	17	0	69	0
Total		**3**	**5**	**477**	**206**	**35**	**726**	**0**

* Mf positive: Micro filaria positive

Map 4: ***Islands visited by the Mission for spot-check***



Map 5: **Gaafu Dhaalu atoll**

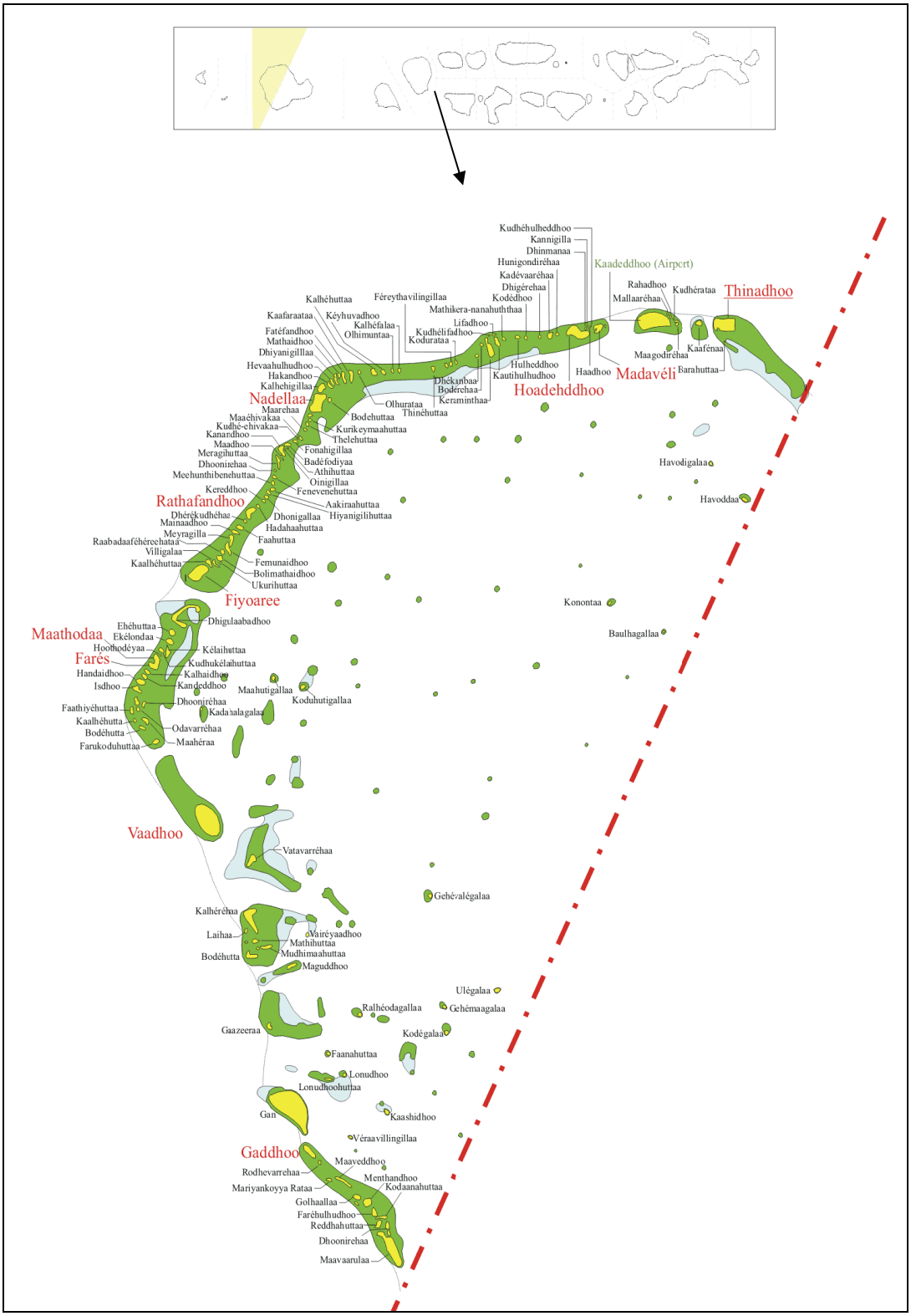


Table 12: *New cases of filariasis, by age group during 2000-2008*

Year	Total	0 - 4	15 - 24	25 - 34	35 - 44	45 & Over	Total
1999	5	–	2	1	2	–	
2000	1	–	1	–	–	–	
2001	3	–	–	1	2	–	
2002	0	–	–	–	–	–	
2003	0	–	–	–	–	–	
2004	5	–	–	4	1	–	
2005	0	–	–	–	–	–	
2006	13*	–	3	7	3	–	
2007	3**	–	–	2	1	–	
2008	6**	–	–	4	2		

*Includes 13 imported cases from other countries.(India 12, Sri Lanka 01)
**Includes 09 imported cases from other countries.(India 08, Bangladesh 01)
Source: Vector-borne Disease Control Unit, Ministry of Health, Maldives

ICT card testing of school children in Maldives

Lymphatic Filariasis (LF) is endemic in 9 of its 11 Member States. Mass Drug Administration (MDA) has been implemented to achieve elimination of lymphatic filariasis in the South-East Asia Region. Maldives implemented mass drug administration (MDA) in 2004 in Fonadhoo island for a population of 2000 in Laamu atoll. MDA was stopped in 2009 after five rounds. The microfilarial (mf) rate was well below 1%. Post-MDA surveillance with vector surveillance was introduced. In other endemic islands, the MF rate was reduced to zero through vector and environmental control and treatment.

The Regional Programme Review Group (RPRG) for Elimination of lymphatic filariasis recommended in 2010, that a WHO expert mission visit Maldives. In 2011, the WHO expert mission initiated the process of verification of LF elimination. As per the revised guidelines for transmission assessment survey (TAS) of WHO (2011), the team visited three islands (two of which were non-MDA islands) and ICT tested 195 school children aged six and seven years for antigenaemia. All were found to be negative indicating that there was no transmission.

The expert team recommended Dossier preparation and continuation of ICT testing of samples and a continued process of verification.

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