

# ELIMINATION OF LYMPHATIC FILARIASIS IN SRI LANKA: HOW AN INDEPENDENT RESEARCH GROUP SUPPORTED THE PROGRAMME



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The national Anti-Filariasis Campaign (AFC) was inaugurated in 1947. *Wuchereria bancrofti* infection was widely distributed in the coastal endemic belt extending from Negombo to Matara covering ~400km<sup>2</sup>. *Brugia malayi* which was once common in distinct areas in North Western, Eastern and Southern provinces (Carter, 1933) was dramatically reduced and isolated to a few pockets in the Southern province. By 1967 *B. malayi* infection completely disappeared from the country (Gautamadasa, 1986), but an expanded endemic belt of *W. bancrofti* was recorded by the AFC

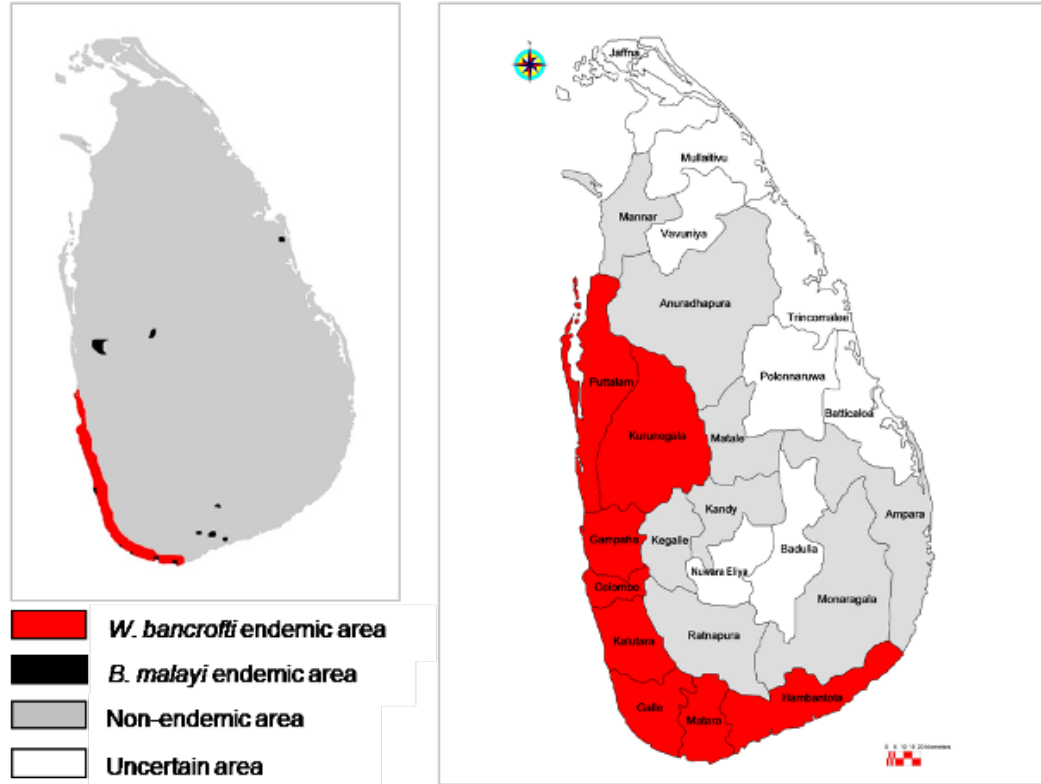
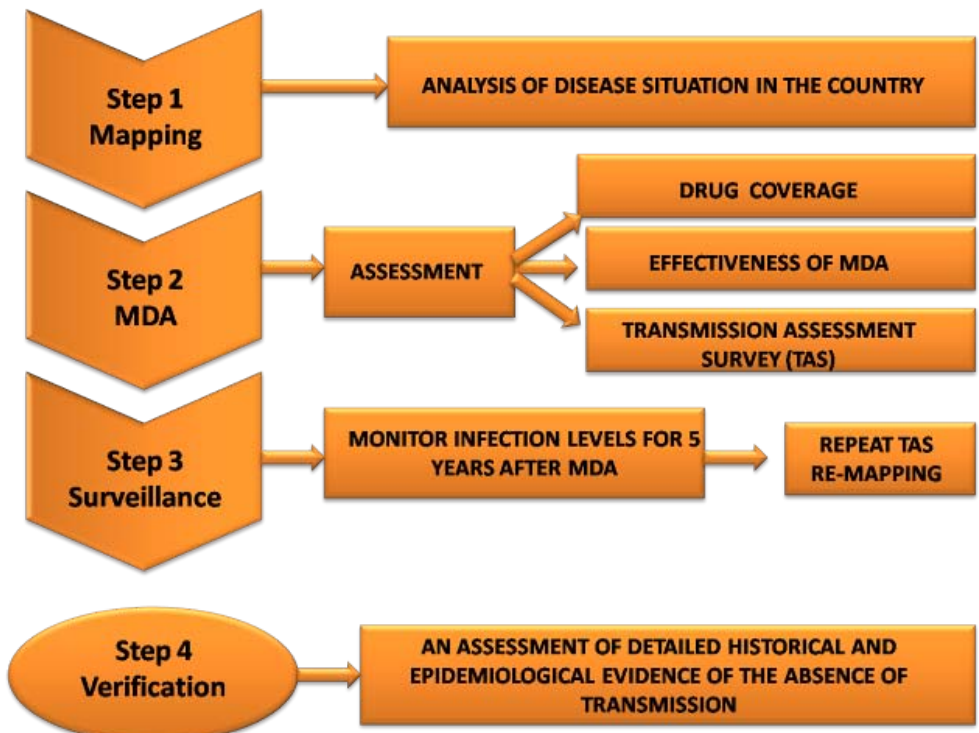


Figure 1: Distribution of endemic areas of *W. bancrofti* and *B. malayi* as observed in the microfilaria surveys conducted in 1947 (Sasa, 1976) and 1999 (Anon. 1999)

## The National Programme and concurrent programme conducted by the Filariasis Research Unit, University of Ruhuna

Following the Global Programme to Eliminate Lymphatic Filariasis (GPELF) (WHO, 2000) the Ministry of Health initiated the national Programme (PELF) in 2002. The goal for achieving elimination was 2020. Two principal strategies were (i) interruption of transmission (ii) disability prevention and control. The Filariasis Research Unit (FRU), University of Ruhuna was formed as an independent group to monitor and evaluate the activities of the national PELF.



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In 1999, the AFC documented bancroftian filariasis in eight districts, three in the Southern province, three in Western province and two in North-Western province (Fig. 1). Initially FRU carried out disease surveys in three districts in Southern Province. In Matara district we found several inland villages with hydrocoele cases (Weerasooriya et al., 2008).

## Meetings conducted by our team covering health professionals



## Gathering drug delivery and consumption information

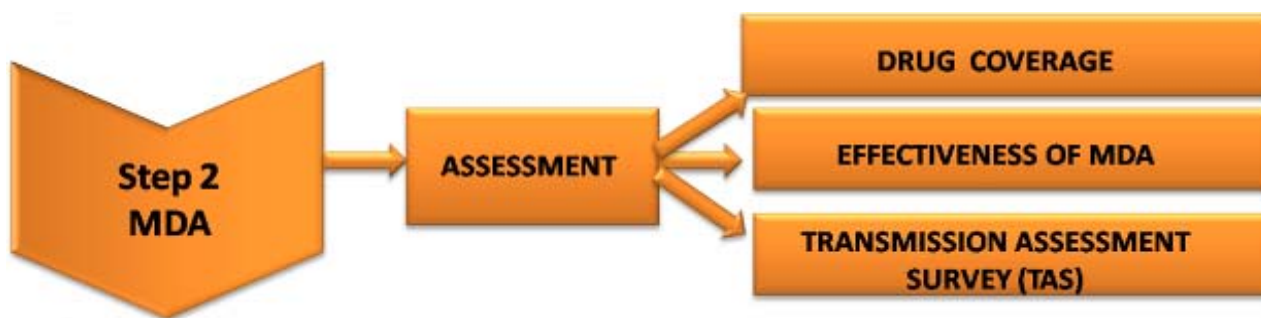


## Enlightening the international scientists



Transmission in these inland areas was confirmed by immunodiagnosis (IgG4 urine ELISA, ICT and Og4C3 ELISA; Weerasooriya, *et al.*, 2008). Elephantiasis cases were confined to coastal villages while hydrocoele cases were heterogeneously distributed. These findings justified the selection of the whole district as an implementation unit (IU) by the PELF.

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Areas with >1% microfilaraemia were considered for MDA (WHO, 1999). However routine surveys by AFC during 1981 to 1998 showed very low mf rates of 0.23 to 0.38. Our surveys in three suburbs of Matara (Weerasooriya, *et al.*, 2001) showed higher mf rates (Polhena=3.3; Madihe=5.6; Walgama=5.7). In the light of our data, the national PELF decided to cover all three provinces, southern, western and north western with MDA (Fig. 1). The national MDA commenced in 2002 and continued annually through 2006 with DEC and albendazole. Drugs were distributed by two methods, house to house delivery by volunteers and through delivery centres.

## Coverage assessments

FRU conducted a series of evaluation studies.

(1) In 2002 we compared the awareness of the MDA in two communities, urban and rural, in the Galle district (Yahathugoda *et al.* 2003). Awareness of MDA increased from 40.2% to 99.6% and drug coverage was 76.9% in Unawatuna (urban) compared with 89.0% in Baddegama (rural) population.

(2) In 2003 we visited all eight endemic districts and interviewed a sample of 4358 subjects (Weerasooriya *et al.* 2007). IEC and coverage, are shown in figure 3a & 3b. The coverage in more urban areas was lower than in more rural areas and house to house coverage was far more successful than coverage from delivery centres.

Figure 3a: The extent of Information, Education and Communication (IEC) coverage in individual districts by different methods

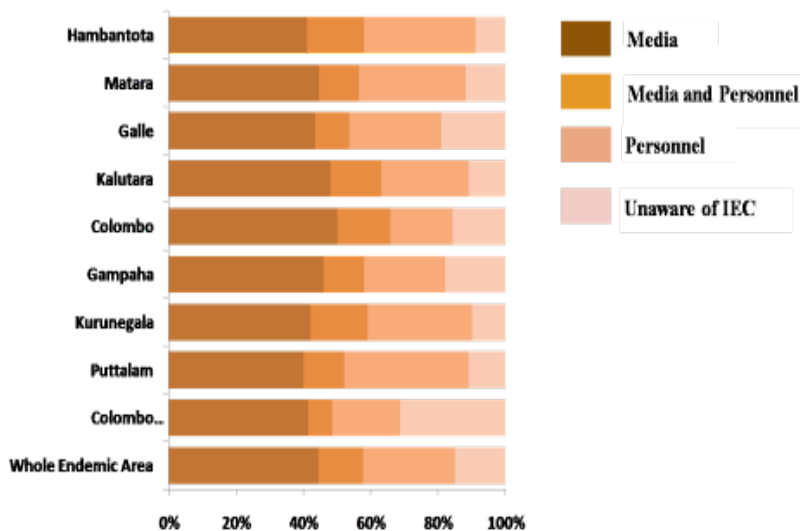
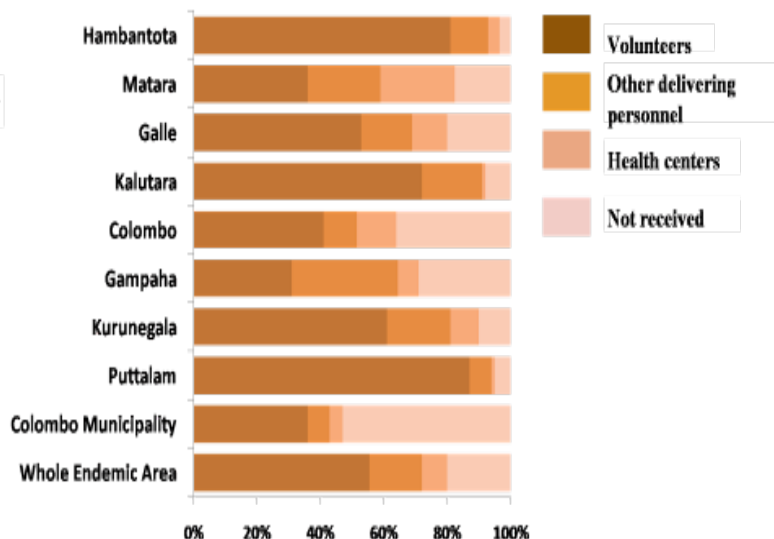


Figure 3b: Observed coverage by different methods in individual districts



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**(3)** To confirm low coverage in urban areas, we evaluated the 2004 MDA in the 47 wards of the Colombo municipality (Weerasooriya *et al.* 2006a) and 12 wards in Matara municipality. We classified the Colombo wards into **(A)** commercial **(B)** upper class residential **(C)** middle class residential **(D)** densely populated slum housing. Awareness and coverage were lowest in the commercial and upper class housing wards. Two of the upper class housing wards recorded coverage below 20%. Matara municipality showed high figures of 97.8% awareness of the MDA and 78.1% coverage compared to Colombo. **(4)** On our recommendations, the national PELF improved after 2004 MDA. National programme was evaluated in the districts of Hambantota, Matara and Galle in 2005 and 2006. 15 villages were selected from three strata—coastal, intermediate and inland—from each district. 100% geographical coverage and >80% drug coverage were observed (Weerasooriya *et al.*, (in preparation).

## Effectiveness of MDA and Transmission Assessment Survey (TAS)

### (i)Walgama, Matara

We conducted a model programme from 2001 to 2008 covering the suburb of Walgama, Matara where the pre-MDA mf rates were relatively high. Our coverage in 4 treatment villages Hamugewatta, Matotagma [sub-division], Walgma and Walgma Central exceeded 96%. Investigations included assessing microfilaria rates, vector infection rates and helminth rates. Prior to each MDA we carried out mf surveys and stools surveys in selected target populations.

Finger prick nocturnal blood samples (60µL) were examined for microfilaria. Faecal samples were screened using Kato-Katz. Vector infections were assessed by dissection of mosquitoes from monthly vector catches.

Walgama suburb had the lowest (~3%) pre-MDA mf prevalence and recorded less than 0.5% prevalence after six rounds of annual MDAs. Hamugewatta and Matotagama [sd], whose pre-MDA mf rates were relatively high (over 5%), also showed a significant reduction following 12 rounds of biannual MDAs; however, Hamugewatta received another round of MDA due to >1% mf rate.

Resting catches (August – July) of *Culex quinquefasciatus* in the three villages in Walgama suburb were dissected to generate infection rates. Walgama village had highest rate (~5%) in 2000/2001 collection year. This was lower in the villages of Walgama Central (~2%) and Matotagama (~2%). After successful MDAs, infection rates reached zero in the 2007/2008 collection year and remained zero thereafter. Very low numbers of L3 larvae were detected in all three villages before MDA; however, infectivity rates reached zero by 2005/2006 collection year (Yahathugoda, *et al.*, 2011(in preparation).

Anti-filarial MDAs provide a cost-effective control method for soil transmitted helminthes (STH) (Molyneux, 2003) and this was observed in our study areas. Following 6/12 rounds of anti-filarial MDAs cumulative pre-MDA STH prevalence (11 - 55%) reached very close to zero (Yahathugoda, in preparation).

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## Surveillance for LF, repeat TAS, and re-mapping

The National PELF had selected sentinel sites (two sentinel sites per million people) and continues monitoring in endemic areas. In our surveillance programme, we had selected one spot check site within the Walgama suburb where MDA was conducted by our team and another site near Galle town where MDAs were conducted by the national PELF. The total resident population in the villages was screened with ICT and urine ELISA in August 2009 (Weerasooriya *et al.*, 2010: in preparation). In Hamugewatta, children aged 2-10 years, the ICT rate was 0.9% (1/111) and the urine ELISA rate 2.5% (3/119). In Unawatuna-West, similar results were obtained: the ICT rate of 2-10 year old children was 0% (0/69) and the ELISA rate was 2.7% (2/73).



Presently we are at the end stage of step 3 and collecting evidence for verification (Figure 2). We plan to carry out school based ICT surveys targeting children 6-7yr old in Matara, Galle (Known endemic areas), Batticaloa and Jaffna (Uncertain endemic areas) educational divisions according to new WHO Monitoring and Evaluation protocol (WHO, 2011). Two staff members from the University of Jaffna and Eastern University and one of our new staff members would be enrolled for this study. The results generated will be much needed data to national PELF and WHO in their process of national and global eradication LF respectively.

## Disability Prevention and Control

Disability prevention and control are the management of suffering caused by existing filarial disease.

## Living with LF

In a study in Matara Yahathugoda *et al.* (2005) before initiation of a home based care programme 101 patients were examined. General hygiene was poor with limbs neglected. Dermatology Life Quality Index



(DLQI) by Finlay and Khan (Finlay *et al.*, 1994) score was 8.6.

Using same group of people we looked in to disease impact on their psychosocial parameters (Perera *et al.*, 2007). The study found that LF was extremely debilitating to participants over long periods of time.

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## Monitoring of Community Home Base Care (CHBC) programme

We selected two groups of 15 patients each for home base care under personal observation. In this interventional study, the efficacy of (a) a daily monitoring scheme and (b) a monthly monitoring scheme was compared after one year of care.

27 Lymphoedema patients who had Grade II or higher lymphoedema with or without elephantiasis (EL) and a history of Acute Inflammatory Episodes (AIEs) were enrolled in the follow-up study. 14 who had their homes close to one another were selected for a daily monitoring

scheme and the balance 13 were followed up monthly. The total number of AIEs occurred in 1 year was monitored and a water displacement technique was adopted to measure the volume. Photographs were taken to record any changes. DLQI was used to assess the quality of life. A significant alleviation of AIEs and EL was observed after one year in both monitoring schemes.

The following are three anecdotes by patients which represent success stories for this method of treatment.

## Evidence of improvement in the appearance of limb and skin hygiene

**Sriya** was born in 1933.

*"35 years ago when I was bearing my first child I first noticed a painful reddish enlargement on my right lower limb. Later it was diagnosed as elephantiasis and I got regular medication for 5 years. Then I stopped all medications because my leg had not improved with it. I took medicine only when I got fever and limb pain which I got at least 3 to 4 times a year. Now I am looked after by my grandson and his wife. My husband is also a chronic patient. My grandson's family has many financial problems due to both of us. How can I even cope-up with day to day activities with this large leg (top photograph – taken after first washing)"*



This was her first dialogue with our team. We trained them to carryout CHBC. A field assistant visited her home daily and helped her family to implement CHBC programme having identified existing problems which were addressed by the team. After one year she had shown a remarkable improvement in her limb size (bottom photograph).

**Sriya** *"Oedema has reduced to great extent, now I feel lightness in the affected side, now I manage to go to toilet without others help, no fever attacks thereafter, my family is very much relieved with this miracle improvement. Villagers are talking about her improvement and they are very much satisfied about new care methods over the conventional methods."*



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## Evidence of changes in the lymphoedema grade

Mala was looked after by her son. She first experienced her painless pitting oedema when she was 30 years old. For the past 18 years or so, she had much trouble due to this oedema. "I got severe cellulitis attacks even after a small scratch of the affected limb. I had experienced two three such attacks per year in the past. Sometimes I was admitted to the government hospital. My son has to bear all the expenses. My husband is home bound due to a nerve problem, he can't work anymore. Most of the time I was treated by a General Practitioner who had a private clinic in our village. Medication resolved my acute problem but I got fever attacks regularly. I do all family work at home and hardly have any time to look after my limbs. I never wore a pair of slippers even I engaged work in the home garden."



limb but I managed to keep it elevated during sleep. I had skin creases over here (red circles – top photograph) but

adapted to suite her life style.

**Mala** "This is the first time a doctor visited our house and talked to us. There is slight reduction in oedema. With the girl who visited me every day I washed my limb but other things, I mean limb elevation and exercises were not done properly. During day time I couldn't get a chance to elevate limb but I managed to keep it elevated during sleep. I had skin creases over here (red circles – top photograph) but now they have disappeared (bottom photograph). I feel that the skin is also smoother than before. I didn't get a single attack of fever for the last year, it is a great thing otherwise my poor son has to suffer a lot".



because she has to look after both me and son. However a reduction of swelling is seen."

**Mala's Husband** "No fever attacks like those days, it is a great relief. She couldn't do the whole programme

Her son and she were given adequate knowledge regarding CHBC. A volunteer visited her daily. CHBC was

## Evidence of improvement of Quality of Life (QOL)

**Nanda** was 55 years old when she first met us. She is an unmarried woman living with her mother (78 years). Her mother has to look after Nanda despite her age. She was home bound and just sat on a chair all day. To her knowledge she bore this limb oedema for more than 45 years: "I took medicine for a small oedema for about six years from government hospital, they gave me monthly injections instead of oral penicillin tablets. I stopped going there because my mother could not afford travelling expenses I didn't want to go out because I wanted to hide my limb from my villagers. After stopping regular injection sometimes I had to be in hospital for several days. With time oedema got worse and many skin nodules and ulcers appeared. Very recently I had a full due to imbalance of the limb and got a fractured leg bone."



Nanda and her mother were introduced to the new limb management protocol (CHBC). She could not do elevation and exercises properly at the beginning of the programme due to the fractured bone. Our volunteer visited her daily and helped her and her mother to implement the CHBC protocol. "When I started regular washing the bad odour of the limbs disappeared and it was a great relief. Oedema too got reduced to certain extent. Now I can walk alone. Now I go to the temple with my mother on Poya days. No fever attacks. This has saved significant amount of money to us. Earlier days I had small nodules, warty like lesions over the affected limb and many skin infections especially in between to webs (top photograph). I am very fortunate, now I can't see those lesions (bottom photograph)."



**Nanda's Mother:** "Now I can take her to a public place because she doesn't have a bad limb smell like those days. There no fever attacks to relief for me."

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