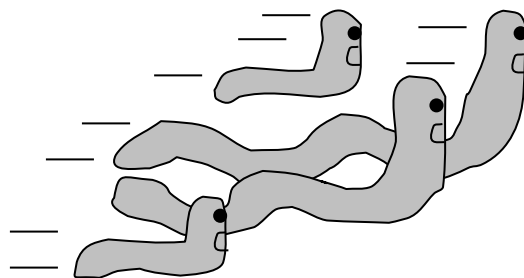
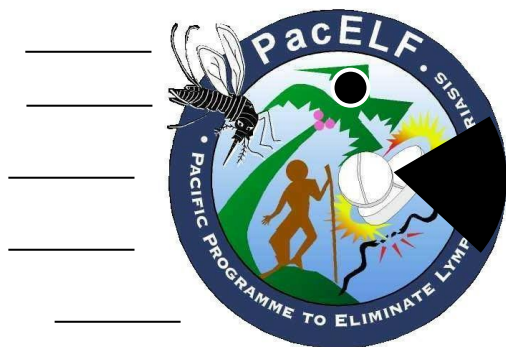


# PacMAN

(PacELF Monitoring and Analysis Network)

## BOOK:

### Country-Specific Monitoring and Evaluation, and Mosquito Control Plans



February 2004

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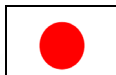
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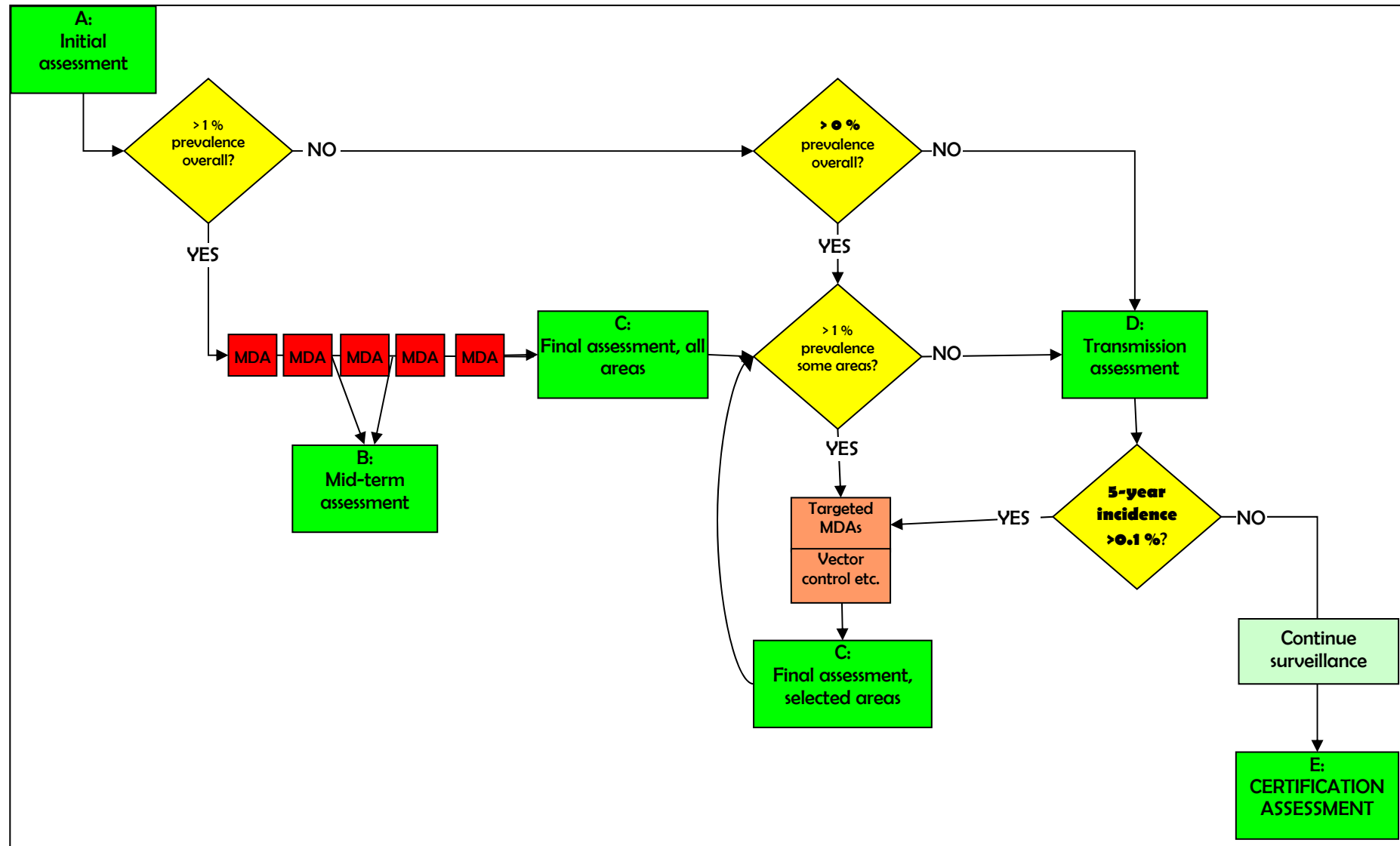
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# 1. INTRODUCTION

The objectives of this manual is to provide to the PacELF programme managers with the following:

- 1- Descriptions of the methodology used in the PacELF surveys.
- 2- Country-specific recommendations for different types of surveys and the timetable of those surveys.
- 3- Country-specific guidelines for conducting mosquito control for filariasis vectors.

Figure 1: FLOWCHART OF PACELF MDA AND ASSESSMENTS FOR PacELF



**Figure 2: COUNTRY SPECIFIC PacELF SURVEILLANCE GUIDELINES**

Endemicity category	Population size category	Country	Estimated Population in 2005 (WHO*)	A: Baseline prevalence assessment	B: Mid-term prevalence assessment (sentinel and spot-check sites)	C: Final prevalence assessment**: stratified cluster or LQAS***sample plus sentinel sites	D: Transmission (incidence) assessment in school- entering children
Non-endemic 0% positive	< 10,000	PTC	47	Test whole popn.	No	No	
		TOK	1640	Test whole popn.	No	Test whole population	
	10,000 – 200,000	NAU	13,145	Sample	No	No	All children 5-6 yr
		NMI	77,111	Sample	No	No	All children 5-6 yr
		GUM	170,197	Sample	No	No	All children 5-6 yr
	>200,000	SOL	479,393	Sample	No	Sample by region	Sample children 5-6 yr
Partially endemic 0-1% positive	<10,000	(None)					
	10,000 – 200,000	WAF	15,227	Sample	Yes (Wallis Is)	Sample by island	All children 5-6 yr
		PAL	21,582	Sample	Yes (Ngardmau Is)	Sample by island group	All children 5-6 yr
		MAR	58,868	Sample	Yes (Mejit Is)	Sample by island group	All children 5-6 yr
		FSM	131,275	Sample	Yes (Satawal Is)	Sample by state	All children 5-6 yr
	>200,000	NEC	230,541	Sample	Yes	Sample by province	Sample children 5-6 yr
Endemic >1% positive	<10,000	NIU	1,990	Test whole popn.	Test whole popn.	Test whole population	
	10,000 – 200,000	TUV	10,704	Sample	Yes	Sample by island group	All children 5-6 yr
		COK	20,062	Sample	Yes	Sample by island group	All children 5-6 yr
		KIR	99,194	Sample	Yes	Sample by island group	All children 5-6 yr
		ASM	67,687	Sample	Yes	Sample by health district	All children 5-6 yr
		TNG	102,247	Sample	Yes	Sample by island group	All children 5-6 yr
		SMA	181,935	Sample	Yes	Sample by health district	All children 5-6 yr
	>200,000	VAN	219,319	Sample	Yes	Sample by province	Sample children 5-6 yr
		FRP	256,562	Sample	Yes	Sample by island group	Sample children 5-6 yr
		FIJ	882,375	Sample	Yes	Sample by health subdivision	Sample children 5-6 yr
		PNG	5,814,250	Sample	Yes	Sample by district	Sample children 5-6 yr

\* Demographic tables for Western Pacific region 2000-05 \*\* Suggested geographic regions are given for dividing the country into sub-implementation units for sampling. \*\*\* LQAS = Lot quality assurance sampling



## 2. SURVEILLANCE

### **DEFINITIONS OF SURVEY TYPES AND PURPOSES**

#### **A type assessment**

- Initial baseline survey: Various methodologies used (e.g. sentinel sites, convenience sampling, cluster sampling, random sampling).
- Purpose: To define the country endemicity regarding LF and to decide whether to implement an MDA or not.

#### **B type assessment**

- Mid term assessment: surveys in sentinel sites and spot check sites.
- Purpose: To assess the impact of MDAs, and to check that the programme is being implemented properly.

#### **C type assessment**

- Final prevalence assessment: Surveys in all areas of the country and in sentinel sites.
- Purpose: To assess the impact of MDAs, to determine whether all areas are at less than 1% prevalence and to find any remaining pockets of LF.
- Morbidity survey
- During the time of the C (final prevalence survey), a morbidity survey can also be carried out – this will minimize the amount of work to find out where people suffering from the symptoms of filariasis are living.

#### **D type assessment**

- Transmission assessment: To determine the five year incidence, this survey targets 5-6 year old children (children that were born in the year of the first MDA or after).
- Purpose: To confirm that there is no more LF transmission.

## **DIAGNOSTIC TESTS**

The ICT (Immunochromatographic test, for more information on this test, see the PacELF Handbook) is the main test used for all surveys. However, this test is not perfect. It has about 99% specificity, which means that one out of every hundred samples tested will give a 'false positive' result. This becomes a serious problem when prevalence falls to low levels. At 1% prevalence, about 2% of those tested will be positive, and of the positives about half will be false positives.

It will be necessary to confirm the ICT positives by a second test. It is very unlikely that a sample would give a false positive on both tests.

The choices for a second test are:

1. Og4C3 antigen test,
2. mf microscopy,
3. PCR, or
4. IgG4 antibody test.

The Og4C3 antigen test is the first choice for the second test because it detects antigen (i.e. the person has a current infection) and is recommended for a second test. The mf and PCR tests are not very suitable as they will be negative if a person has no mf, even though adult worms are present. IgG4 may be positive if the person had a past infection, which is now cured and it is very difficult to do.

In order to do a second confirming test, either

- 1) Collect additional blood sample on filter paper from every ICT positive person; or
- 2) A blood sample must be collected and labelled on filter paper from every person, at the same time as the ICT is done (which increases the workload significantly); or
- 3) The ICT positive cases must be found again later and a second sample taken (i.e. record keeping must be very good).

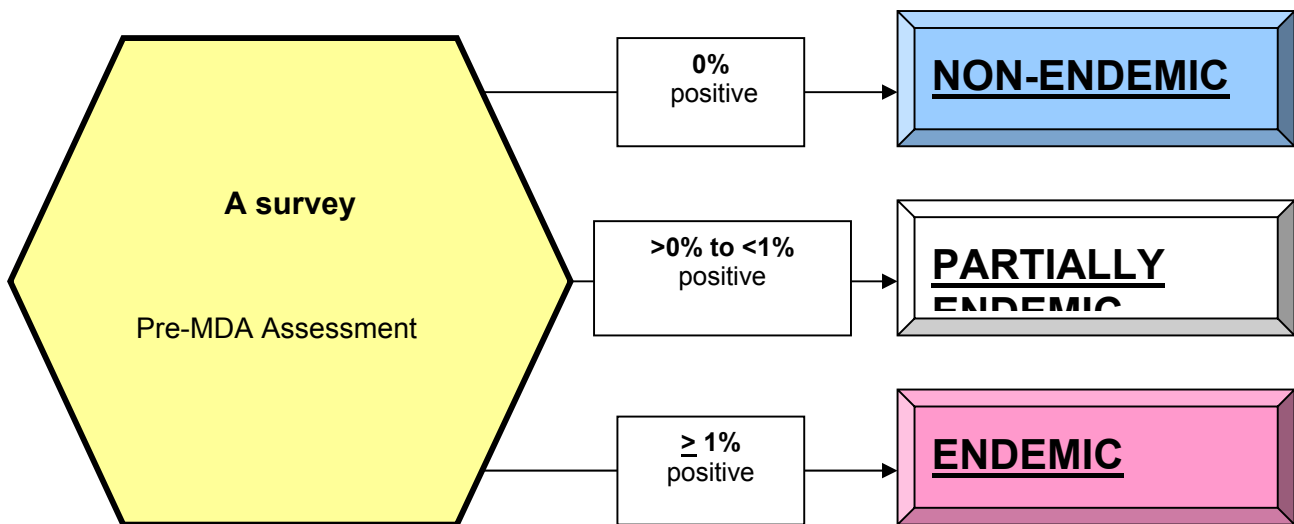
The first choice may be best, as there will be relatively few people who test positive.

## PRE MDA ENDEMICITY STATUS

According to the initial baseline assessment (A survey), if

- ICT+ prevalence = 0%  $\Leftrightarrow$  non endemic country
- ICT+ prevalence >0% and <1%  $\Leftrightarrow$  partially endemic country
- ICT+ prevalence  $\geq$ 1%  $\Leftrightarrow$  endemic country

**Figure 3: PRE MDA ENDEMICITY STATUS FLOWCHART**



*Non-endemic countries:* No MDAs are being conducted. If type A assessments were adequate and representative, go straight to verification of no transmission (type D survey) by ICT surveys on 5-6 year old children (all or a sample, depending on size of country).

*Partially endemic countries:* MDAs are being conducted only in some areas (sub-implementation units). Do mid-term assessment (B survey) in these areas mainly to assess the impact of the programme (sentinel surveys), and to check programme implementation. At end of MDAs, do type C survey in whole country to have more comprehensive data and to find other pockets of filariasis. Do transmission assessment (D survey) when all areas are below 1% ICT positive prevalence.

*Endemic countries:* MDAs are being conducted in the whole country. Mid term assessment (B survey) to assess the impact of the MDA and implementation of the programme (sentinel surveys and spot check sites). After 5 MDAs, final prevalence assessment (C survey) in sentinel sites and in a sample of all areas. Transmission assessment (D survey) when all areas are below 1% prevalence.

## **SAMPLING METHODS FOR TYPE C PREVALENCE ASSESSMENT SURVEYS: FINAL OR POST MDA ASSESSMENTS**

The type C surveys must cover the whole country to make sure there are no pockets of remaining filariasis infection. There are many choices for how to sample the population for this survey. The main requirement is that the whole country is covered. Two of the possible methods are described below. They are 1) stratified cluster sampling and 2) lot quality assurance sampling. *Please see Country-specific: Suggested Guidelines for Country C Surveys for Final Prevalence Assessment.*

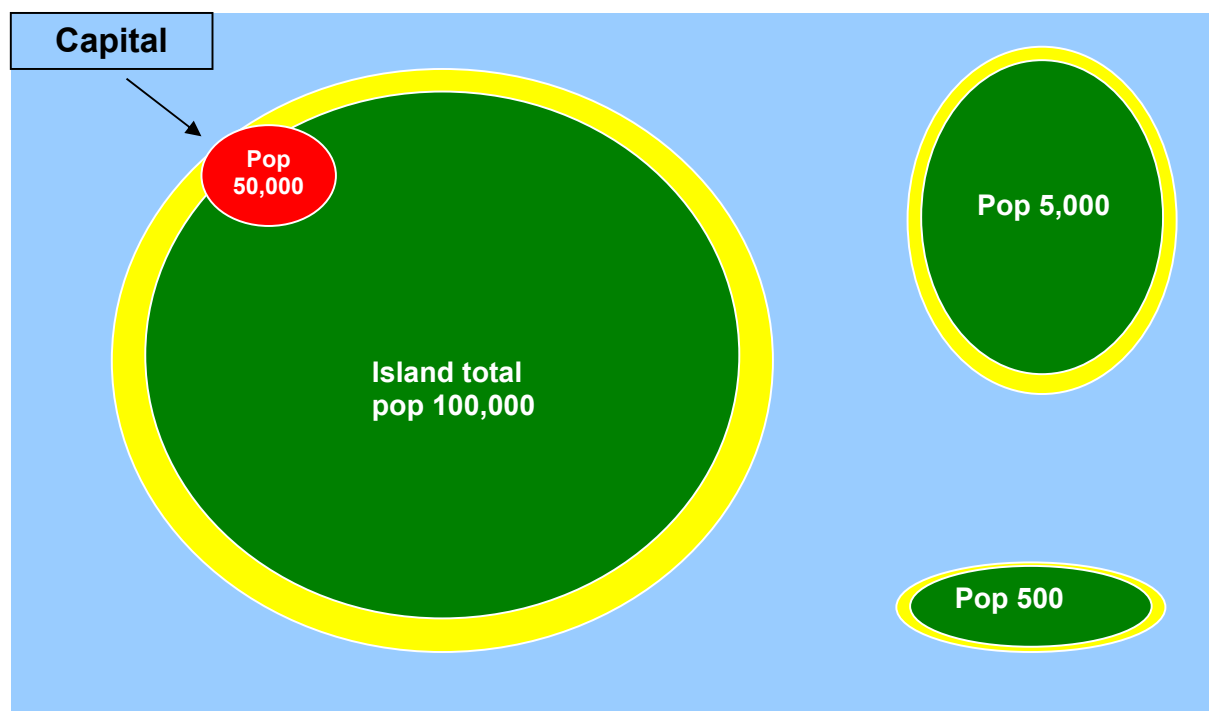
For both methods a country is divided into non-overlapping geographical areas that we can call “sub-implementation units” or sub-IUs. This can be done according to administrative boundaries or by health division (e.g. subregion, health area, health district).

Some small countries will have only one sub-IU. Medium size countries will have a few sub-IUs, and some large countries like Fiji may have 20 or more sub-IUs.

Within countries, large islands can be divided into several sub-IUs, while small islands can be grouped with neighbouring islands into ‘island groups’. Cities and towns with large concentrated populations may need to be divided into two or more sub-IUs.

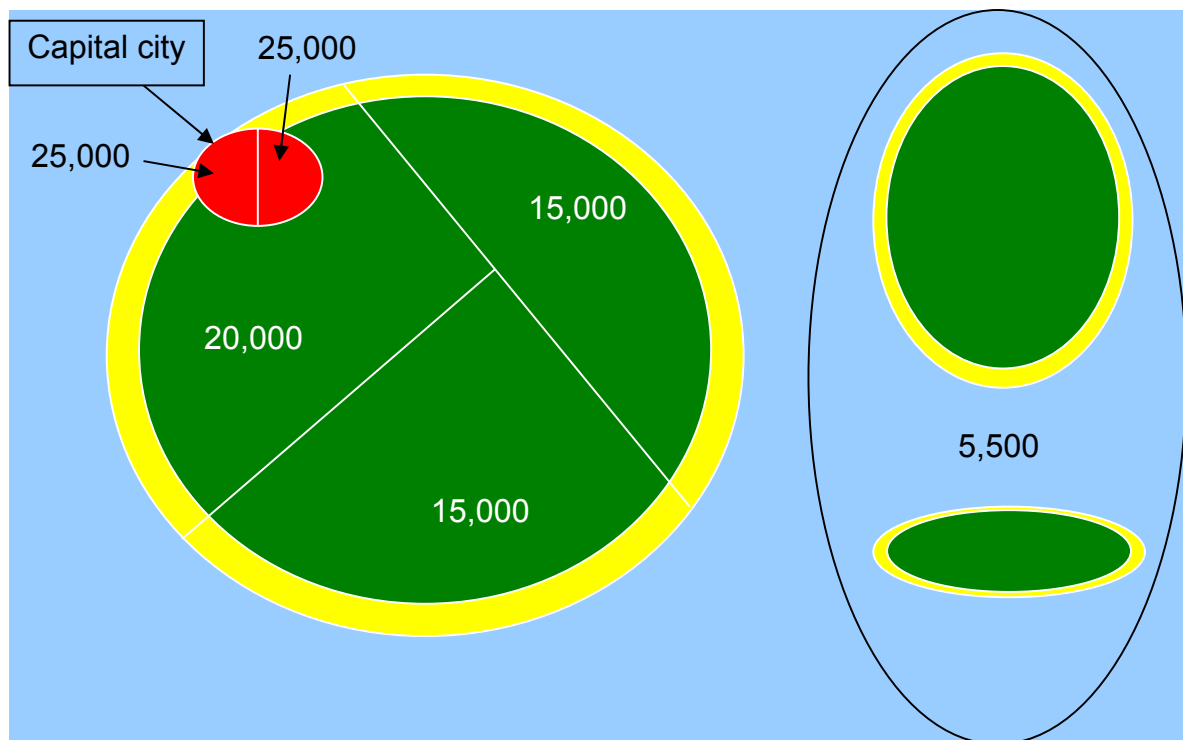
An example of an imaginary nation of three islands with different population sizes is shown below (Figure 1). The large island has a population of 100,000, including a city with 50,000. The two smaller islands have populations of 5000 and 500 people.

**Figure 4: EXAMPLE OF NATION WITH 3 ISLANDS**



We need to divide the island nation into sub-implementation units (sub-IUs) for sampling. The number of people in each sub-IU can vary, but a good range would be about 5,000 to 25,000. For the imaginary country above, we could divide it using a combination of natural divisions (islands) and administrative divisions (see Fig 2).

**Figure 5: EXAMPLE OF NATION WITH 3 ISLANDS DIVIDED INTO SUB-IMPLEMENTATION UNITS**



The rural part of the big island is divided into three sub-IUs using health area divisions. The town is divided into two parts (e.g. east and west). The two small islands are put together into one sub-IU. We now have 6 sub-IUs and the population of a sub-IU varies from 5,500 to 25,000 (total 105,500).

We have to test a sample of people from every sub-IU. Ideally, we should sample people at random within each sub-IU. However, to do that, we would need a list of every person in the sub-IU, to pick from, and we don't have that. Therefore we have to use a different method.

Two methods are suggested below. Each country, together with the assistance of the PacELF home office, can decide which of these two suggested methods of sampling is best for them (as explained below).

Ideally, we should calculate the required sample size separately for each sub-IU. However, if we use the **average** sample size per IU, this will lead us to sample more people in the smaller sub-IUs and fewer in the more highly populated sub-IUs (such as the towns). This sampling bias is good because it means we will sample proportionally more people in the less-populated areas, like small remote islands, and proportionally less in the urban areas.

To determine the average population size per sub-IU, divide the total country population by the number of sub-IUs. Therefore in this example we would divide 105,500 by 6, giving 17,583.

## METHOD 1: STRATIFIED CLUSTER SAMPLING, USING VILLAGES AS CLUSTERS

In this method, each sub-implementation unit (sub-IU) is technically called a 'stratum'. The plural of this word is 'strata'. However we can call them sub-IUs.

Within each sub-IU, we will test all the people in a number of 'clusters' or groups. For clusters we will use villages. To decide how many people to test, do the following:

- 1) Estimate the average number of people per sub-IU, by dividing the total population of the country by the number of sub-IUs. This does not have to be an exact number.
- 2) Using the table below, estimate the number of people to be tested in each sub-IU. (This will tell you the number required to detect with 95% confidence whether the prevalence is 1% (plus or minus 1%)). It is based on double the number required for a simple random sample, to allow for between and within-cluster variance).

Average population in sub-IU	Sample size needed (95% confidence)
500	302
1000	432
2000	551
5000	660
10000	707
20000	733
25000	739
50000	750
100000	755

If the average number of people per sub-IU is between two of the numbers in the table, pick the next highest number.

Thus for example, if the average number of people per sub-IU is 17,583, we need to test 733 people per sub-IU to be 95% sure that prevalence is 1% or lower.

- 3) Now you need a list of villages/settlements in each sub-IU to be tested (these are the 'clusters'). Try and estimate how many villages will be needed to get the number of people to meet the sample size, but add a few extra to allow for refusals and absent people. For example, if there are about 100 people per village, you need eight villages (~800 people) to get at least 733 people. Add a couple more villages just in case, and this gives you 10 villages to pick. Your country sub-IUs will probably have a different number.

You need to select villages randomly. To do this, first get or make a list of the villages.

Each village needs a sequential code number. You can either number them by hand on a list, or use village code numbers which already exist (e.g. in the census).

Here are two possible ways to randomly sample the villages (Choose either i or ii):

- i. Write each village code number on a small piece of paper and fold it. Put all the code numbers in a bowl, mix them up thoroughly, and get someone to pick them out one at a time with eyes closed. Write down the code numbers picked out. Continue until you have the required number of villages.

- ii. Use a table of random numbers (see Appendices 1 & 2) to pick out the villages. If you have less than 100 villages, use the 2-digit random number table. If you have 100 or more villages, use the 3-digit random number table.

Ask someone to close their eyes and put their finger anywhere on the random number table. The number where the finger lands is the number of the first village. For example, if the finger lands near number 22, then pick the 22<sup>nd</sup> village on the list.

Continue down the column of numbers from the point where the finger landed. For example, if the next number after 22 is 3, pick the 3<sup>rd</sup> village on the list. (If a number in the random list is higher than the total number of villages you have, skip that one and go on to the next number). Continue until you have the required number of villages.

Alternatively, you can give the list of villages to the PacELF home office. PacELF will pick the villages in random order for each sub-IU and advise which villages/settlements must be surveyed (The PacELF home office's recommendations are in Section 4).

- 4) Arrange to visit the villages on the randomly-selected list to do blood surveys, continuing until you reach the sample size (see the following section **Sampling Methods for Selecting People in Villages**).
- 5) Ask people to come in family groups to the survey, to maximize the chances of representative sampling by age if you cannot sample the whole village, and to help in tracing people again later.
- 6) If a large village or town is picked, then stop when you get to 200 people and go on to the next village on the randomly-selected list.
- 7) If you are half way through a village when you reach the required number of people, complete that village (up to 200 people). **Always do more, rather than fewer than the sample size, to make sure the target number of people is met.**

Make every effort to do the selected villages. If for some major reason a selected village is not possible (e.g. recent death) go to the next village on the list.

- 8) If you find one or more positives in a village by ICT, this case must be confirmed by another test and treated for filariasis. Therefore make sure that you can find the person a second time by good record-keeping.

## METHOD 2: LOT QUALITY ASSESSMENT SAMPLING

### (Using Main Health Centre Catchment Areas as ‘Lot’)

In this method, we assume that each sub-IU (subdivision, district, medical area, etc) is the catchment area for a major health centre or hospital. Each main health centre catchment area is technically called a ‘lot’ but we can continue to call it a sub-IU.

- 1) Within each sub-IU, pick the largest health facility. It could be a hospital or main health centre. If there is a choice of more than one (e.g. more than one major hospital in an urban sub-IU), toss a coin or pick health facility names out of a hat to choose which facility you will sample.
- 2) Decide how many patients you have to test in each sub-IU using the following table:

Average population in sub-IU	Number of people to be tested (95% confidence, critical value= 1)
200	155
300	190
400	210
600	235
800	250
1000	260
1500	270
2000	275
2500	280
≥ 3000	300

For example, if the average size of the sub-IU (catchment area) is 17,583, you need to sample 300 patients. If you find one or more positive in that number of patients, then the prevalence is estimated to be 1% or more in that sub-IU.

- 3) Test patients who come into the health centre, until you reach the sample size. If there are too many to do every patient, then either test some of them each day (e.g. every tenth patient) or test them only on certain days of the week. If necessary, a special technician might have to come and help you test them.
- 4) If you find a positive, this will have to be confirmed by a second test. The patient should also be followed up and treated for filariasis. Make sure you can find the patient again when necessary.

#### Technical notes:

*1: In Method 1, stopping at 200 people in larger villages means that the populations of these villages will be sampled at lower probability than the populations of smaller villages (in which everyone is tested). This bias may be acceptable in order to increase the number of separate sites sampled. It means that we will be under-sampling more dense populations, which is not a bad thing. However in villages where we stop at 200 people, the cluster may not be representative sample of the total village population.)*

*2: Method 2 (LQAS at health centres) requires a smaller sample size than Method 1 (stratified random sample of villages). However, it assumes that the health centre is randomly sampling the population within that sub-IU, which is probably not true. Thus, it will probably not test a representative sample of each age group. Also, remember that Method 2 will not reach the people who don't come to health facilities).*



## **SAMPLING METHOD FOR SELECTING PEOPLE IN VILLAGES TO BE SAMPLED WHEN THERE ARE MORE THAN 200 PEOPLE IN THE VILLAGE**

Once the villages have been selected randomly, the next step to select who in the villages will be surveyed by ICT card. Ideally we want a random sample with a maximum of 200 people in any one village that is representative of the people in that village. In order to include school children and adult men in the survey, the survey will need to take place when children and men are in the village. This probably means doing the survey in the late afternoon or evening. There are a number of different ways to select people to be tested. Four ways of selecting people are described below.

If you have a list of the families in the villages and know where they live, you can select families randomly and then go to their houses and test them. Two ways of doing this are described (A- House unit and B-Family unit)

### **A- House unit**

In a village, houses can be used as a sampling unit. Every person living in the same selected house has to be ICT tested. All houses have to be numbered arbitrarily (you may begin at one end of the village and give to the first house #1, the second one #2, and proceed so on until you reach the last house of the village). You may put on your list the name of the chief of family of each house (or the name of an person living in this house) in order to track down easily the selected house later. A random number list can be generated using Epi Info 6 (version 6.04c - freeware from the US Centers for Disease Control and Prevention, CDC, [www.cdc.gov](http://www.cdc.gov)) as below :

- 1- Open Epi Info;
- 2- Click on the Programme section;
- 3- Go to the Epi table calculator section;
- 4- Open the Sample section at the upper line;
- 5- Choose the random number list option;
- 6- Enter the number of random numbers you need (corresponding to the number of houses you have to ICT test). Pretended this number is 40;  
An example:
  - The average number of persons in one house of your village is supposed conservatively to be 5 (in reality there are probably more than 5 persons by house);
  - You need to ICT tested 200 persons, according to our method, so you need to choose randomly at least 40 houses (200 divided by 5);
  - So the number of random numbers you need is theoretically 40.
- 7- Enter the minimum range of numbers: 1 (the first house);
- 8- Enter the maximum range of numbers: that is in fact the total number of houses in the village;
- 9- Click on Calculate;
- 10- You have the list of random numbers that corresponds to the numbered houses you have to visit and ICT test every person living in these houses;
- 11- You have to test **all those 40 houses** even if you reach already 200 persons tested before the end of your house list, otherwise the last houses may be systematically excluded and cause bias to occur.

### **B- Family unit**

If you have the list of all the families in the village, you can use this list as sampling unit. Give the number 1 for the first name on the list, the number 2 for second ones, and so on until you have numbered all the families. The list must be exhaustive and no families can be left off this list. Proceed then with the same method described above to have the list of 40 randomly selected numbers. You have to test all members (living in the same house) of those 40 families in that village.

**C. Random line of houses. A third method for selecting people for testing would be based on sampling houses on a “random line”:**

1. Pick a spot at random in the village
2. Spin a bottle at the random spot
3. Sample all people in all the houses in the line that the bottle pointed at until you get to the end of the village.
4. If the number of people in the line of houses sampled is less than 200 then pick another spot, spin the bottle and sample everyone in the houses along the new line (if the new line crosses the previous “random line”, people in the houses where the lines cross each other should not be resampled 9people can only be sampled once in a survey)
5. Repeat until 200 people have been sampled.

**D. Random sector. A fourth way of selecting people in villages for testing, that doesn't require too much extra work is based on sampling “random sector” in a village:**

1. Get a sketch map of the village (or quickly make one).
2. Using the map, divide the village into sections of roughly equal size with 200 people in each section.
3. The size of the section needs to be constant for all villages. Villages may have different numbers of sections (a village with 600 people will be divided into 3 sections while villages with 2000 people will be divided into 10 sections).
4. Select one section per village at random.
5. Survey everyone in that section.

## **METHOD FOR SELECTING PEOPLE IN TOWNS**

If you have towns as the sub implementation unit (sub IU), the population in each town is usually greater than several thousand people, although a similar sampling method can be used. You have to divide the town into smaller sections, (for ex. districts or areas or quarters), then allocate a different number for each of these section. According to the method described in this manual, you have probably no more than 750 persons to sample in your town as sub IU, and theoretically no more than 200 persons by section.

You can use the same random process described above to choose 4 sections out of the total number of sections of your town.

- 1- Open Epi Info;
- 2- Click on the Programme section;
- 3- Go to the Epi table calculator section;
- 4- Open the Sample section at the upper line;
- 5- Choose the random number list option;
- 6- Enter the number 4 for the random numbers;
- 7- Enter the minimum range of numbers : 1 (the first section);
- 8- Enter the maximum range of numbers : that is the number of sections of your town;
- 9- Click on Calculate;
- 10- You have the list of the 4 sections where you have to carry your survey;
- 11- In each section proceed the same way than in village.

## **SAMPLING METHODS FOR TYPE D ASSESSMENTS** **(TRANSMISSION INCIDENCE SURVEYS)**

The reason for this survey is to confirm that there is no transmission of filariasis. Therefore we have to check for new infections. This is done with 5-6 year-old children who were born after the first PacELF MDA because we know they were not infected at birth.

**METHOD: LOT QUALITY ASSURANCE SAMPLING IN SCHOOL-ENTERING CHILDREN (USING SCHOOLS AS 'LOTS').**

Remember that this method will not sample the children who do not attend school. You should find out what proportion of children in your country does not attend school at all. If this proportion is large, you should try other methods to find them (e.g. by MCH clinic).

- 1) Get or make a list of all primary schools (government, church, private etc).
- 2) Estimate the number of 5-6 year old children in each school (for planning purposes).
- 3) In some countries, where the total number of children is less than 4000, it is probably easier to test all the children than try to sample them (refer to Section 4).
- 4) In larger countries, we need to sample the children. The table shows how many children you need to sample according to the total number of children.

Total number of 5-6 year old children	Number of children to be tested ( <i>95% confidence, critical value= 1</i> )
2,000	1,550
3,000	1,900
5,000	2,250
10,000	2,600
15,000	2,700
20,000	2,800
25,000	2,850
≥ 30,000	3,000

For example, if there are estimated to be 10,000 5-6 year old children, you need to test 2,600 of them. Allowing some extra in case the total number is under-estimated, we should aim to sample 3000 (about one third of the total). This could be done in two ways:

### **i) Sample all children in some of the schools.**

Select the schools using the random number tables given above. First list the schools and give them sequential numbers, or use an already- existing numbered list of schools.

If you have less than 100 schools, use the 2-digit random number table. If you have 100 or more schools, use the 3-digit random number table (see Appendices 1 & 2).

Ask someone to close their eyes and put their finger anywhere on the random number table. The number on which the finger lands is the code number of the first school. For example, if the finger lands near number 22, then pick the 22<sup>nd</sup> school on the list.

Continue down the column of numbers from the point where the finger landed. For example, if the

next number after 22 is 3, pick the 3<sup>rd</sup> school on the list.

If a number in the random list is higher than the total number of schools you have, skip that one and go on to the next number. Continue until you have the required number of schools (in this example, one third of the schools. Your country may have a different proportion).

The PacELF home office can help with the random selection of schools if necessary.

**ii) Sample some of the children in each of the schools.**

A good way to do this is to have the children pick a ball out of a cloth bag (i.e. without looking). In the bag, put a mixture of black and white balls, stones or shells that are the same except for the colour.

In this example you need to pick one third of children (your country may be different). So one third of the balls should be black and two-thirds white. If a child picks a black ball is picked, that child will be tested.

- 5) Arrange with the school staff and administrators to visit the schools (either all, or selected schools) to do blood surveys, continuing until you have done all the sample of 5-6 year old children required.
- 6) If you find one or more positives by ICT, this case must be confirmed by another test (Og4C3 or Mf) and the child must be treated. Therefore make sure that you can find the child a second time by good record-keeping.
- 7) If you find **any** definite positives in the sampled children, this means that the 5-year cumulative incidence is greater than 0.1%, i.e. transmission is still occurring. Thus, you will need a consultation with the PacELF home office.

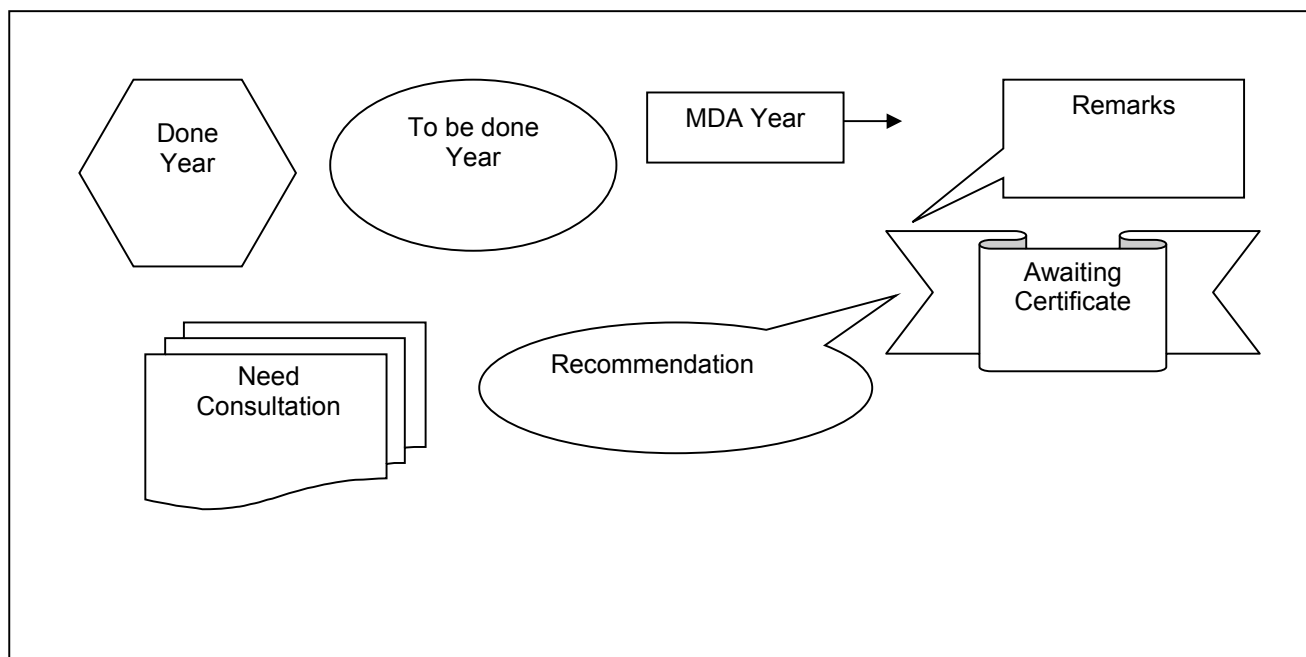
### 3. COUNTRY SPECIFIC MONITORING AND EVALUATION PLANS

The next section will outline, the status, progress made and recommendations for each of the PacELF countries. A flowchart for each country is also provided to assist in planning the C Survey (Final Assessment).

**Also included for each country are country specific guidelines for conducting mosquito control for vectors of filariasis.**

It is hoped that the country specific guidelines that follow will focus efforts on cost-effective control of the most important mosquitoes that transmit filariasis. During dengue outbreaks or malaria epidemics, other control measures may be more effective and may justify greater costs. Large populations of nuisance mosquitoes may also warrant control measures. The key to all mosquito control is knowledge of the biology of the mosquitoes that we are trying to control in order to choose the control measures that are most likely to be effective. As long-term effective control requires monitoring the effectiveness of the interventions, suggested techniques for monitoring the vector mosquito are also given.

#### DIAGRAM LEGENDS FOR FLOWCHARTS



# **AMERICAN SAMOA**

**Endemic country**

**Population estimated:** 64,100 (2000)

**Geographic dispersion:** 7 islands

**A type survey (Initial Baseline survey):** ICT testing in 1999

- Type: whole country (18 villages) - convenience sample
- Result: 3,018 tested - 498 positives
- ICT+ prevalence: 16.5%

**MDA for the whole country:** 1<sup>st</sup> round in 1999-2000

**B type survey (Mid term evaluation):** ICT and mf testings in 2001 (after 2 MDA)

- Type: sentinel sites (Fagasa - Pago Pago - Faga'itua - Aunu'u islands) – Random sampling (by CDC Atlanta group)
- Result: 1052 tested – 115 (11.5%) ICT positive– 28 (2.6%) mf positive

## **Recommendation:**

**C type survey (final assessment):**

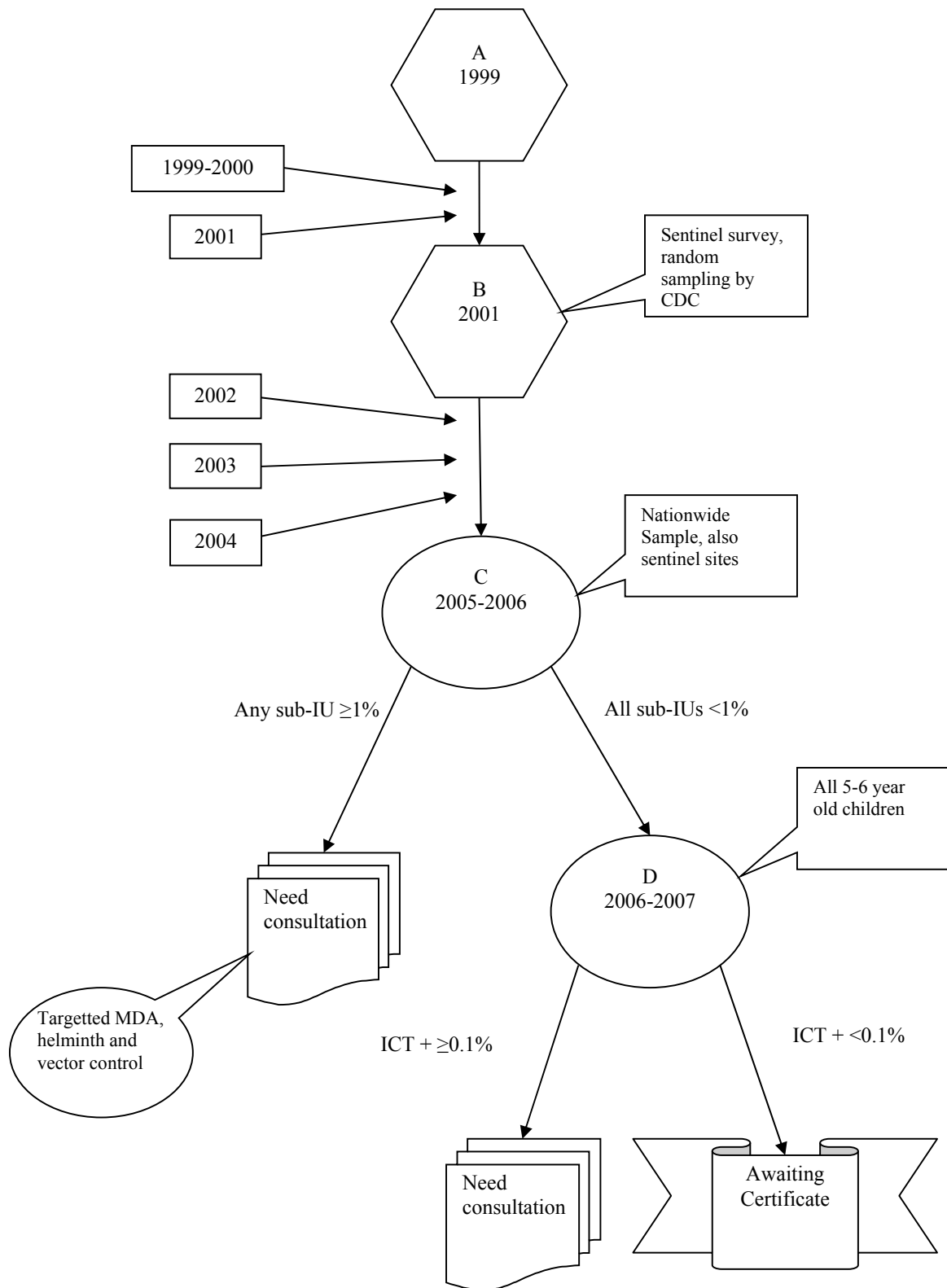
Stratified sample survey by health district should be carried out in 2005-2006 (if necessary depending on results of CDC survey).

**D type survey (transmission assessment):**

This ICT (and other testing techniques, if any) survey should be carried out in 2006-07, after the 5<sup>th</sup> MDA, in all 6 year-old children in American Samoa. The estimated number of this target population is 2,000 persons.

- If ICT positive prevalence is <0.1%, await the certification of LF elimination.
- If ICT positive prevalence is  $\geq 0.1\%$ , do additional investigations around positive cases:
  - Confirm with other biological test (i.e. Og4C3);
  - Discussion with the PacELF Monitoring & Evaluation group;
  - Discussion for the post MDA alternative strategies;
    - Partial MDA in still endemic areas;
    - Helminth control programme;
    - Integrated vector control programme.

## FLOWCHART: AMERICAN SAMOA



## SUGGESTED GUIDELINES FOR COUNTRY C SURVEYS FOR FINAL PREVALENCE ASSESSMENT: AMERICAN SAMOA

1. The C survey for American Samoa should take place in 2005-2006 and will be by Stratified Cluster Sampling using villages as clusters.
2. The Sub-implementation Units will be the 5 Districts: Central, Eastern, Manu'a, Swains and Western.
3. Using the Demographic Tables for the Western Pacific Region 2000-2005 (WHO publication), the estimated population in 2005 for Am Samoa will be 67,687.
4. Therefore the average population of each sub-implementation unit will be 13,537 (67,687 divided by 5 districts).
5. From the table for Stratified Cluster Sampling (Section 2), the sample size needed for each district (sub-implementation unit) for an average population of 20,000 is 733 (since the table has no average population for 13,537, the next largest average population for a sub-implementation unit is used (e.g., 20,000)).
6. Villages were chosen randomly with a maximum of 200 people per village. Villages should be sampled in the order given in the table below.

**Villages to be Sampled and the Number of People per Village to be Sampled (based on 2000 census village population)**

Village Order	Central District	Eastern District	Manu'a District	Swains District	Western District
1	Matu'u-200	<b>Auasi</b>	<b>Si'ufaga</b>	<b>Swains</b>	Lili-200
2	Atu'u-200	Aoa-200	Ofu-200		Nuuuli-200
3	Leloaloa-200	<b>Avaio</b>	<b>Sili</b>		Vaitogi-200
4	Vatia-200	Fagaitua-200	Olosega-200		<b>Maloata</b>
5	Fagatogo*-200	<b>Utumea</b>	Luma-200		Aasu-200
6		Auto-200	Maia*		
7		<b>Sa'ilele*</b>			
8		Alofau*-200			

- Village names in **bold** should have entire population tested by ICT. A maximum of 200 villagers should be tested in villages with more than 200 people (these villages are shown followed by the number '200').
  - \*Alternative villages to be surveyed if less than 733 people are sampled from the villages listed for each sub-implementation unit.
7. Sampling should be done until at least 733 people per district have been sampled by ICT. It is estimated that a total of 2,968 ICT cards will be required.



## GUIDELINES FOR CONDUCTING MOSQUITO CONTROL FOR FILARIASIS VECTORS: AMERICAN SAMOA

<b>Primary Vector</b>	<i>Aedes polynesiensis</i>
<b>Distribution of Primary Vector</b>	All islands
<b>Activity pattern</b>	Daytime
<b>Biting preference</b>	All animals
<b>Location of biting</b>	Prefers outdoors but will go inside houses
<b>Resting location</b>	Outdoors
<b>Flight range</b>	Less than 100m
<b>Breeding sites</b>	Man provided containers (tires, drums, small plastic containers) Natural containers (treeholes, crabholes)
<b>Insecticide resistance</b>	Resistance to DDT shown in Fiji and French Polynesia including Tahiti
<b>Other important characters</b>	Avoids bright sunlight Also a vector of dengue virus
<b>Monitoring the Primary Vector</b>	Larval/pupal survey at least twice a year (once during the wet season, once during the dry season)

### Recommended Control Methods for Primary Vector

1. Breeding source reduction of domestic containers\*
2. Bednets to protect young children when napping
3. Insecticide impregnated curtains and bednets
4. Repellents and mosquito coils
5. Screening houses

\*Effort should be directed towards reducing the number of breeding sites that are producing the most adult mosquitoes. The importance of different container types will be determined from the larval/pupal surveys.

<b>Secondary Vectors</b>	<i>Aedes tutuilae</i> <i>Aedes upolensis</i> <i>Ochlerotatus samoanus</i>
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# **COOK ISLANDS**

**Endemic country**

**Population estimated:** 18,700 (2000)

**Geographic dispersion:** 15 islands

**A type survey (Initial Baseline survey):** ICT testing in 1999

- Type : whole country (9 islands) - convenience sample
- Result: 1,884 tested - 162 (8.6%) ICT positive

**MDA for the whole country:** 1<sup>st</sup> round in 2000

**B type survey (Mid term evaluation):** ICT testing in 2001

- Type: sentinel sites – convenience sampling?
- Result: 460 tested – 35 (7.6%) ICT positive

## **Recommendation:**

**C type survey (final evaluation):**

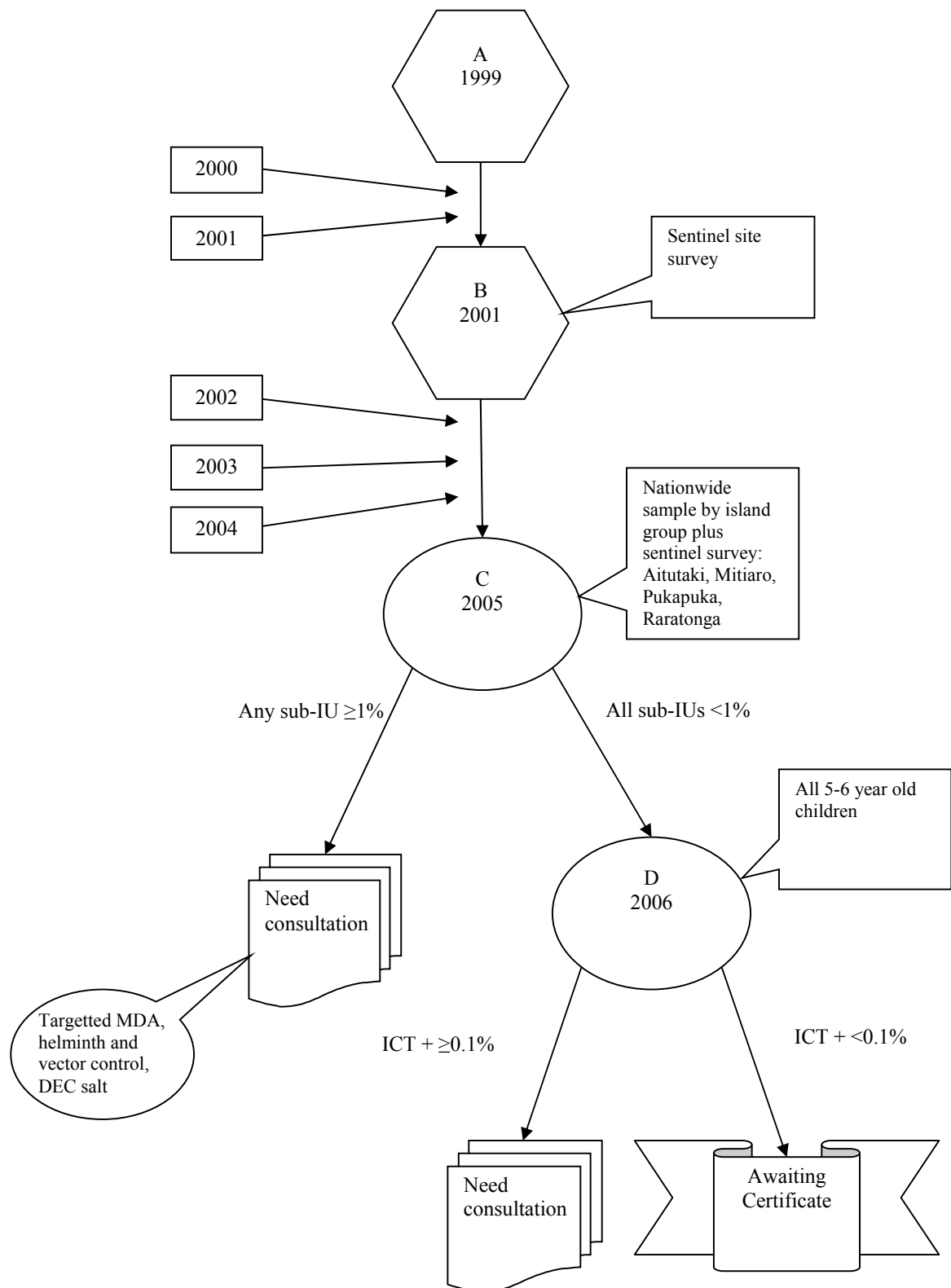
Stratified sample survey by island group (if necessary depending on results of CDC survey) should be carried out in 2005. Also, a sentinel sites survey should be carried out (in Aitutaki, Mitiaro, Pukapuka, Rarotonga islands).

**D type survey (transmission assessment):**

This ICT survey should be carried out in 2006, after the 5<sup>th</sup> MDA, in all 6-year-old children in the Cook Islands. The estimated number of this target population is 460 persons.

- If ICT positive prevalence is <0.1%, await the certification of LF elimination
- If ICT positive prevalence is ≥0.1%, do additional investigations around positive cases:
  - Confirm with other biological test (i.e. Og4C3);
  - Discussion with the PacELF Monitoring & Evaluation group;
  - Discussion for the post MDA alternative strategies;
    - Partial MDA in still endemic areas;
    - Helminth control programme;
    - Integrated vector control programme.

## FLOWCHART: COOK ISLANDS



## SUGGESTED GUIDELINES FOR COUNTRY C SURVEYS FOR FINAL PREVALENCE ASSESSMENT: COOK ISLANDS

1. The C survey for Cook Islands should take place in 2005 and will be by Stratified Cluster Sampling using villages as clusters.
2. The Sub-implementation Units will be the 3 island groups: Rarotonga, Southern, Northern
3. Using the Demographic Tables for the Western Pacific Region 2000-2005 (WHO publication), the estimated population in 2004 for Cook Islands will be 19,939.
4. Therefore the average population of each sub-implementation unit will be 6,646 (19,939 divided by 3 island groups).
5. From the table for Stratified Cluster Sampling (Section 2), the sample size needed for each district (sub-implementation unit) for an average population of 10,000 is 707 (since the table has no average population for 6,646, the next largest average population for a sub-implementation unit is used (e.g., 10,000).
6. Villages were chosen randomly with a maximum of 200 people per village. Villages should be sampled in the order given in the table below.

**Villages to be Sampled and the Number of People per Village to be Sampled (based on 2000 census village population)**

Village Order	Rarotonga	Southern Island Group	Northern Island Group
1	Rutaki/Aroa-200	Atiu-200	<b>Palmerston</b>
2	Tupapa/Maraerenga-200	Aitutaki-200	Puka Puka-200
3	Pokoinu-200	Mauke-200	<b>Nassau</b>
4	Tutakimoa/Teotue-200	Mangaia-200	Penrhyn-200
5	<b>Tatuvaine*</b>	Mitiaro*-200	Manihiki-200
6			<b>Suvarrow*</b>

- Village names in **bold** should have entire population tested by ICT. A maximum of 200 villagers should be tested in villages with more than 200 people (these villages are shown followed by the number '200').
  - \*Alternative villages to be surveyed if less than 707 people are sampled from the villages listed for each sub-implementation unit.
7. Sampling should be done until at least 707 people per island group have been sampled by ICT. At least 2,121 ICT cards will be needed for the C surveys in the Cook Islands

## GUIDELINES FOR CONDUCTING MOSQUITO CONTROL FOR FILARIASIS VECTORS: COOK ISLANDS

<b>Primary Vector</b>	<i>Aedes polynesiensis</i>
<b>Distribution of Primary Vector</b>	Confirmed in both the Northern (Penrhyn and Manikiki) and Southern (Mitiaro, Atiu, Mauke, Mangaia, Aitutaki and Rarotonga) Group islands (Ichimori, 1994. “Stop <i>Aedes aegypti</i> ” report)
<b>Activity pattern</b>	Daytime
<b>Biting preference</b>	All animals
<b>Location of biting</b>	Prefers outdoors but will go inside houses
<b>Resting location</b>	Outdoors
<b>Flight range</b>	Less than 100m
<b>Breeding sites</b>	Man provided containers(tires, drums, small plastic containers) Natural containers (treeholes, crabholes)
<b>Insecticide resistance</b>	Resistance to DDT shown in Fiji and French Polynesia including Tahiti
<b>Other important characters</b>	Avoids bright sunlight Also a vector of dengue virus
<b>Monitoring the Primary Vector</b>	Larval/pupal survey at least twice a year (once during the wet season, once during the dry season)
<b>Recommended Control Methods for Primary Vector</b>	<ol style="list-style-type: none"> <li>1. Breeding source reduction of domestic containers*</li> <li>2. Bednets to protect young children when napping</li> <li>3. Insecticide impregnated curtains and bednets</li> <li>4. Repellents and mosquito coils</li> <li>5. Screening houses</li> </ol> <p>*Effort should be directed towards reducing the number of breeding sites that are producing the most adult mosquitoes. The importance of different container types will be determined from the larval/pupal surveys.</p>
<b>Secondary Vectors</b>	<i>Aedes cooki</i> is a vector of lymphatic filariasis in Niui and is found in the Northern Cook Islands (but has not been confirmed as a vector in the Cook Islands)

# **FEDERATED STATES OF MICRONESIA**

**Partially endemic country**

**Population estimated:** 107,008 (2000)

**Geographic dispersion:** 607 islands scattered over vast ocean area

**A type survey (Initial Baseline survey):** ICT blood testing in 1999-2001

- Type: convenience sample
- Result: 2,392 tested (in Chuuk-Yap) – 5 (0.2%) ICT positive

**Additional surveys were carried out:**

In Satawal area (2002):

- Type: convenience sample – target population: 8 to 15 year old school children
- Result: 971 tested – 19 (1.9%) ICT positive (mainly in Satawal island)

In Pohnpei (2002):

- Type: convenience sample – Target population: students
- Result: 1000 test – 0 (0%) ICT positive

**Survey in Kosrae is planned for 2003**

**Partial MDA - Target population:** Satawal island - 1<sup>st</sup> round in 2002.

## **Recommendation:**

**Completion of A survey in former endemic areas**

Surveys with convenience sampling or preferentially in adult should be carried out in 2003-2004. The purpose of these additional surveys is to detect other potential LF foci and to decide on the implementation of MDA.

**B type survey (Mid term evaluation) in Satawal:**

This survey should be carried out in 2004 after the 3<sup>rd</sup> MDA in Satawal island (all inhabitants should be ICT tested). It should allow assessment of the impact of MDA on the LF endemic areas.

**C type survey (Final evaluation):**

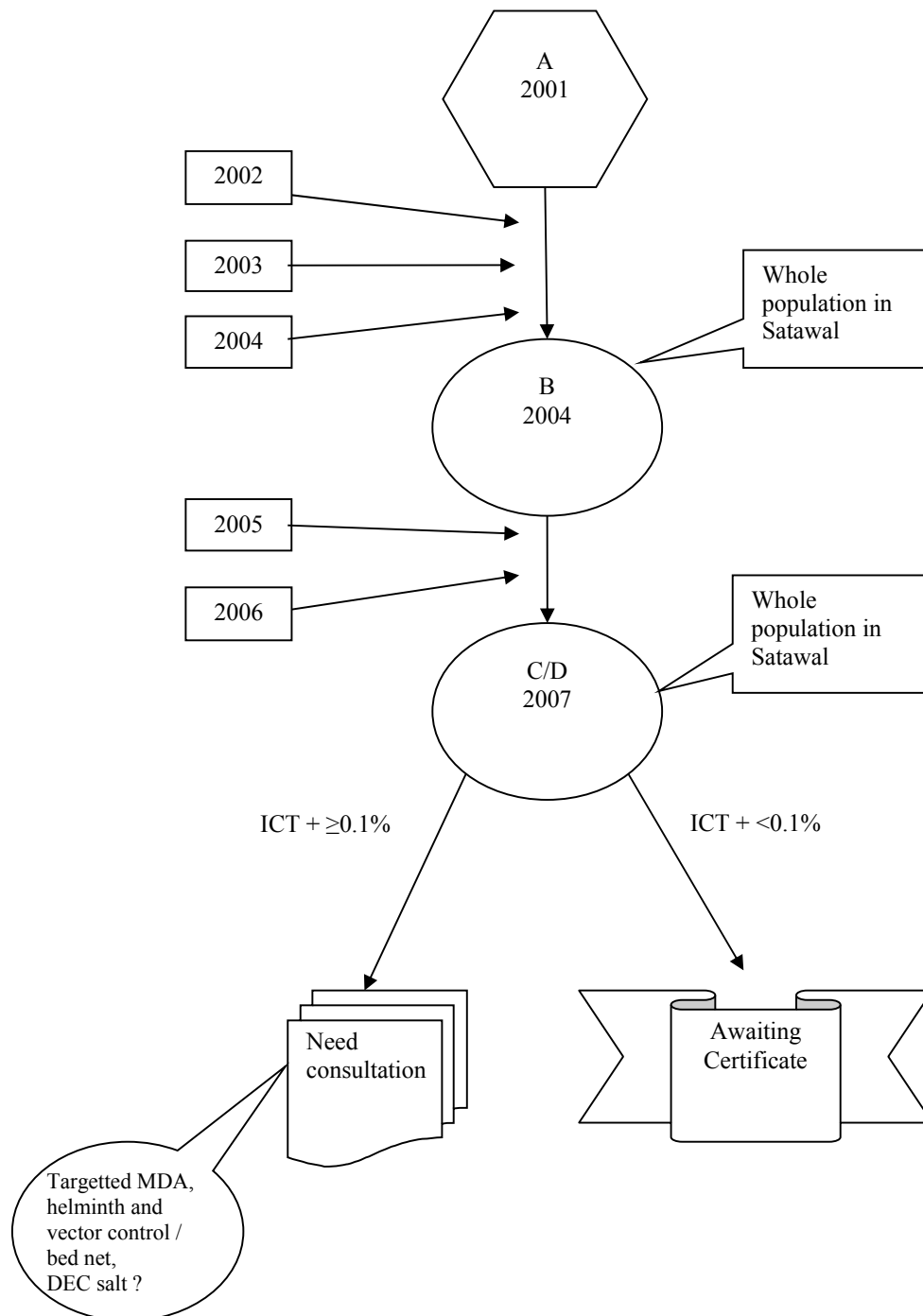
- For Satawal island, the C type survey should be planned after the last round of MDA (2007). In this case, because of its small population, all inhabitants of Satawal should be tested.
- For the other areas of FSM outside of Satawal, this ICT survey should be carried out in 2005 in villages sampled by state.

**D type survey (transmission assessment)**

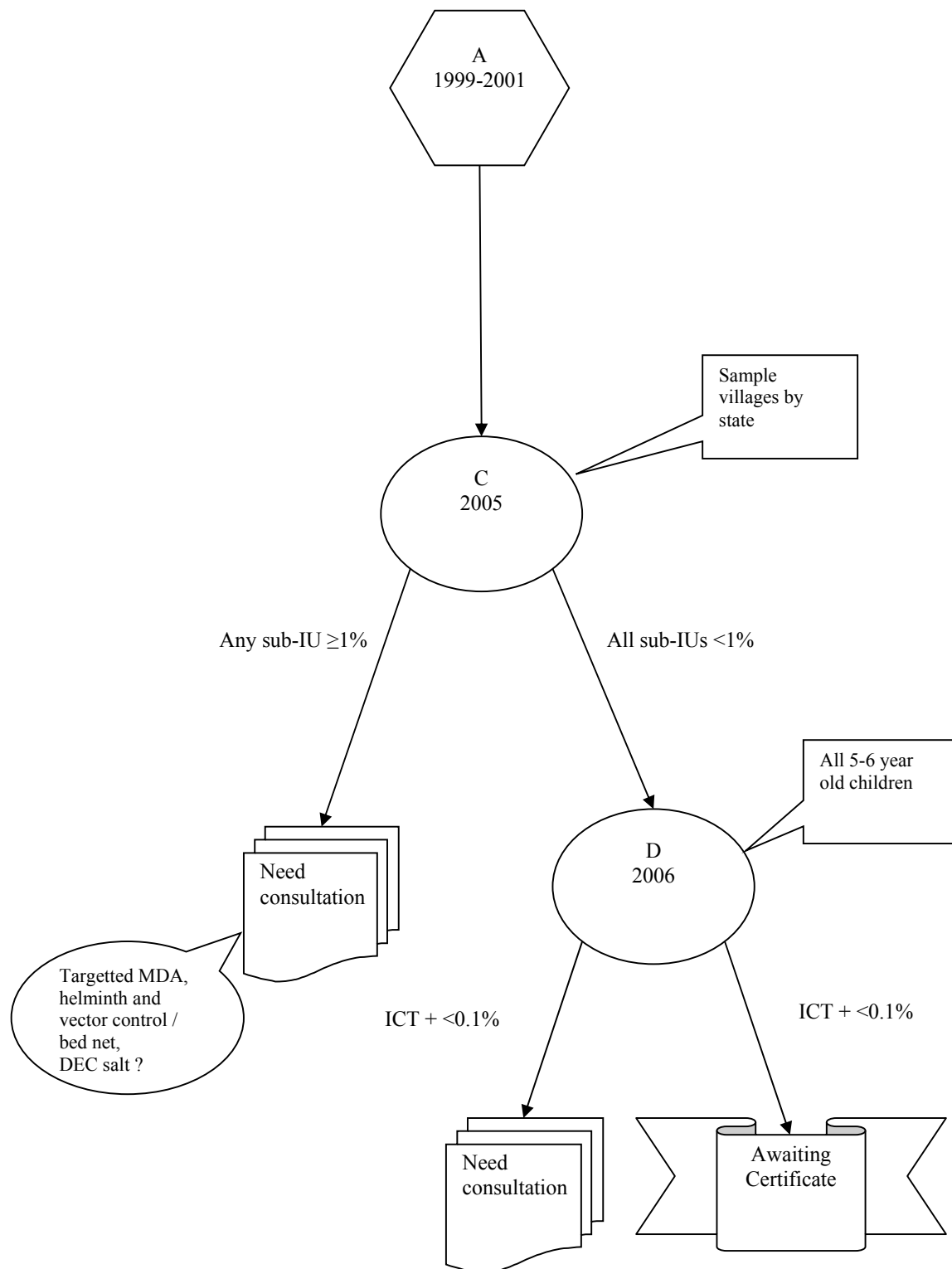
In all 6 year old children. The estimated number of this target population is about 3,000 children.

- If ICT positive prevalence is <0.1%, await the certification of LF elimination.
- If ICT positive prevalence is ≥0.1%, do additional investigations around positive cases:
  - Confirm with other biological test (i.e. Og4C3);
  - Discussion with the PacELF Monitoring & Evaluation group;
  - Discussion for the post MDA alternative strategies;
    - Partial MDA in still endemic areas;
    - Helminth control programme;
    - Use of DEC medicated salt;
    - Integrated Vector control (*Culex quinquefasciatus*) - Impregnated bednets.

**FLOWCHART: SATAWAL ISLAND, FEDERATED STATES OF MICRONESIA**



## FLOWCHART: OTHER AREAS OF FEDERATED STATES OF MICRONESIA





## SUGGESTED GUIDELINES FOR COUNTRY C SURVEYS FOR FINAL PREVALENCE ASSESSMENT: FEDERATED STATES OF MICRONESIA

1. The C survey for Federated States of Micronesia should take place in 2005 in areas of other than Satawal Island. Satawal Island will be surveyed in 2007. Sampling will be by Stratified Cluster Sampling using villages as clusters in areas other than Satawal Island. The whole population of Satawal Island will be tested in 2007.
2. The Sub-implementation Units will be the 4 states (excluding Satawal Island: Yap, Chuuk, Pohnpei and Kosrae).
3. Using the Demographic Tables for the Western Pacific Region 2000-2005 (WHO publication), the estimated population in 2004 for Federated States of Micronesia will be 128,549.
4. Therefore the average population of each sub-implementation unit will be 32,137 (128,549 divided by 4 states).
5. From the table for Stratified Cluster Sampling (Section 2), the sample size needed for each district (sub-implementation unit) for an average population of 50,000 is 750 (since the table has no average population for 32,137, the next largest average population for a sub-implementation unit is used (e.g., 50,000)).
6. Villages within municipalities were chosen randomly with a maximum of 200 people per village to be tested. Municipalities and villages should be sampled in the order given in the table below.

### Municipalities to be Sampled and the Number of People per Municipality to be Sampled

Yap State Municipality & Village Names	Chuuk State Municipality & Village Names	Pohnpei State Municipality & Village Names	Kosrae State Municipality & Village Names
Ifalik, <b>Falalap</b> Rawey-200	Romanum, Chorong-200	Sapwuaifit, <b>Ponparh</b> <b>Welehpw</b> <b>Liksarhwei</b>	Tafunsak Is-200
	Nama, <b>Efong</b> <b>Leinuch</b> <b>Pilos</b>	Madolenihmw, <b>Lehdau</b> Temwen-200	Lelu-200
Woleai <b>Tagailap</b> <b>Wattagai</b>	<b>Patta</b> , Epin-200	Uh, <b>Dien</b> <b>Mwahnd Peidak</b>	Malem-200
	Nomoluk, <b>Soponewel</b> <b>Pukos</b>	Kitti, <b>Paliapailong</b> <b>Seinwar</b> Tamwoaroalong-200	Utwe-200
Lamotrek Lamotrek-200			
<b>Maap Amin</b> <b>Malway</b> <b>Palaw</b> <b>Talngith</b>			

- Village names in **bold** should have entire population tested by ICT. A maximum of 200 people should be tested in villages with more than 200 people (these villages are shown followed by the number '200').
  - \*Alternative villages to be surveyed if less than 750 people are sampled from the villages listed for each sub-implementation unit.
7. Sampling should be done until at least 750 people per district have been sampled by ICT. Approximately 3,000 ICT cards will be needed for the C survey

## GUIDELINES FOR CONDUCTING MOSQUITO CONTROL FOR FILARIASIS VECTORS: FEDERATED STATES OF MICRONESIA

<b>Primary Vector</b>	<i>Culex quinquefasciatus</i>
<b>Distribution of Primary Vector</b>	All islands
<b>Activity pattern</b>	Nighttime
<b>Biting preference</b>	Large animals including humans
<b>Location of biting</b>	Indoors and outdoors
<b>Flight range</b>	Up to 5 km
<b>Breeding sites</b>	Temporary and permanent water including larger and provided containers (tires, drums, small plastic containers), pit latrines, septic tanks, ditches, marshes, both clean and polluted water
<b>Insecticide resistance</b>	Resistant to DDT, organophosphorus compounds (including malathion and temephos), carbamates and pyrethroids in 36 countries
<b>Other important characters</b>	Lays eggs in groups called rafts. Known to rapidly develop resistance to insecticides
<b>Monitoring the Primary Vector</b>	Gravid traps for adults. Larval/pupal survey at least twice a year (once during the wet season, once during the dry season)
<b>Recommended Control Methods</b>	<ol style="list-style-type: none"> <li>1. Insecticide impregnated curtains and bednets</li> <li>2. Breeding source reduction of domestic containers</li> <li>3. Polystyrene beads in pit latrines</li> <li>4. <i>Bacillus sphaericus</i> in polluted water</li> <li>5. Drainage of permanent water sources</li> <li>6. Repellents and mosquito coils</li> <li>7. Screening houses</li> </ol> <p>The importance of control methods 2-5 will depend on what is learned during the larval/pupal surveys (e.g., effort should be spent on the breeding sites producing the most adult mosquitoes).</p>
<b>Secondary vector</b>	<i>Aedes marshallensis</i> *
<b>Biting habits</b>	Day time
<b>Hosts</b>	Man
<b>Breeding sites</b>	Natural containers (treeholes, coconut shells)
	<p>* <i>Aedes marshallensis</i> is a secondary vector of filariasis in Kiribati. This mosquito is found in the Federated States of Micronesia, but not confirmed as a vector. This is presumably due to <i>Wuchereria bancrofti</i> being periodic in FSM but <i>A marshallensis</i> is a daytime biting mosquito.</p>

## **FIJI ISLANDS**

**Endemic country**

**Population estimated:** 824,700 (2000)

**Geographic dispersion:** 2 big islands + 298 scattered islands

**Initial Baseline survey in 1997 (Rotuma) and 2000-01 (other areas):** ICT testing

- Type: sentinel sites – Target pop. : all inhabitants - convenience sampling
- Results: 5,983 tested – 993 (16.6%) ICT positive

**MDA for whole country:** 1<sup>st</sup> MDA at the end of 2002

**Mid term evaluations planned on periodic basis (each year):** ongoing

- Type: sentinel site
- Target pop.: all inhabitants - convenience sampling

### **Recommendation:**

**Periodic surveys in sentinel sites**

- This ongoing activity should be supported.

**C type survey (final assessment):**

Stratified survey by health subdivision should be carried out in 2007-08, after the 5<sup>th</sup> MDA.

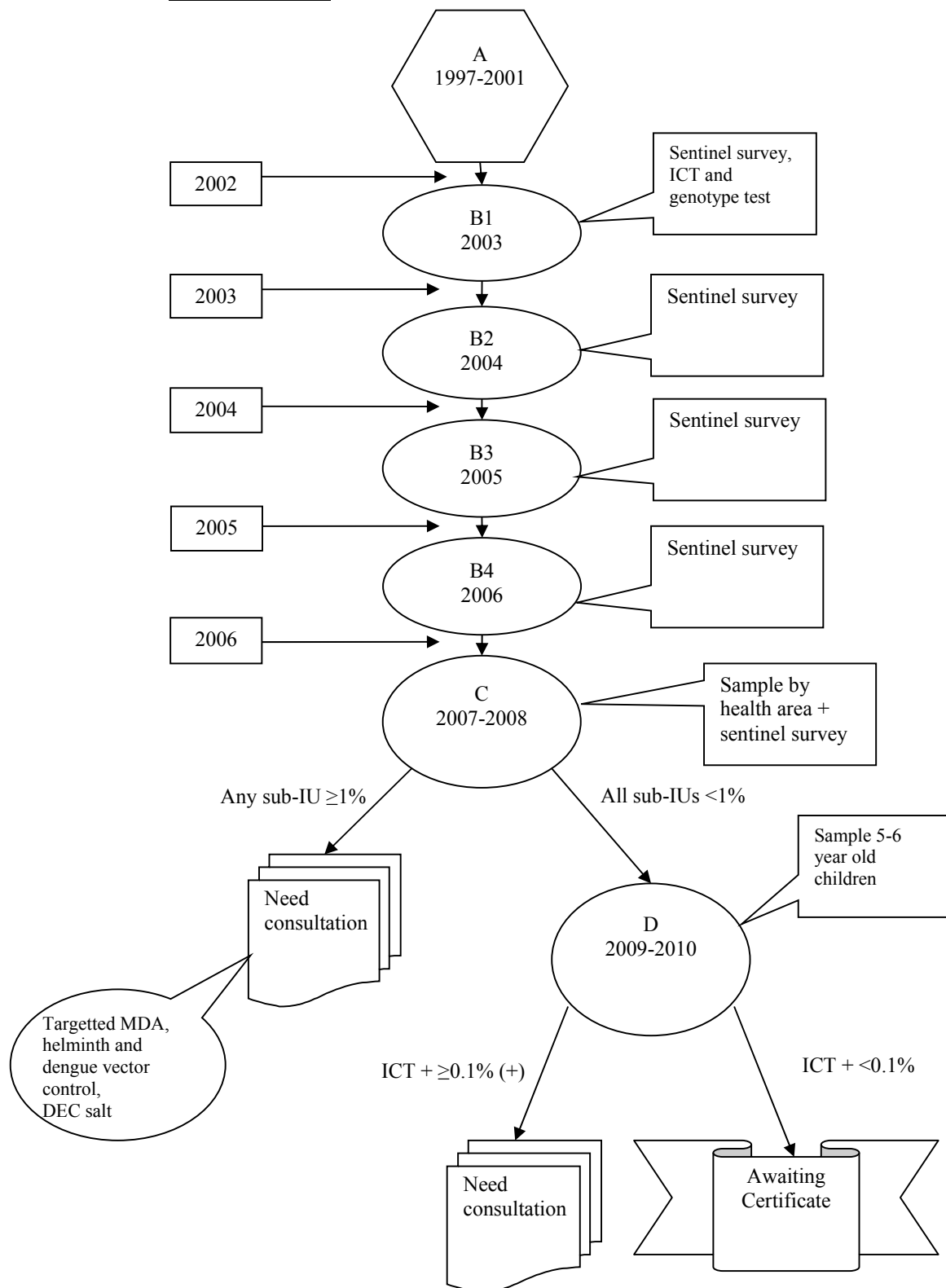
**D type survey (transmission assessment):**

This survey should be carried out in 2009-2010, in a sample of 6 year old children in Fiji. The estimated number of these children is about 21,000. Thus random or systematic sampling of these children is recommended in large islands such as Viti Levu and Vanua Levu, while in other smaller islands all 6 year old children should be ICT tested.

Sample surveys of Viti Levu and Vanua Levu should be planned in 2005-06 with the last data regarding the school distribution of 6 year old children. In addition, it is necessary that surveys should be carried out in previously selected sentinel sites in 2007.

- If ICT positive prevalence is <0.1%, await the certification of LF elimination.
- If ICT positive prevalence is ≥0.1%, further investigations should be done:
  - With other biological test (i.e. Og4C3);
  - Discussion with the PacELF Monitoring & Evaluation group;
  - Discussion for the post MDA alternative strategies;
    - Partial MDA in still endemic areas;
    - Helminth control programme;
    - Integrated Vector control programme;
    - DEC salt.

## FLOWCHART: FIJI ISLANDS



## SUGGESTED GUIDELINES FOR COUNTRY C SURVEYS FOR FINAL PREVALENCE ASSESSMENT; FIJI ISLANDS

1. The C survey for Fiji should take place in 2007 and will be by Stratified Cluster Sampling using villages as clusters.
2. The Sub-implementation Units will be the medical area. In addition, Suva will be divided into 4 sub-implementation units (Suva, Tamavua, Lami, and [Samabua+Raiwaqa]). The medical areas of Lomaloma and Lakeba are grouped in one sub implementation unit. Thus, Fiji is divided to 23 sub-implementation units
3. Using the Demographic Tables for the Western Pacific Region 2000-2005 (WHO publication), the estimated population in 2005 for Fiji will be 882,375.
4. Therefore the average population of each sub-implementation unit will be 38,364 (882,375 divided by 23).
5. From the table for Stratified Cluster Sampling, the sample size needed for each district (sub-implementation unit) for an average population of 50,000 is 750 (since the table has no average population for 38,364, the next largest average population for a sub-implementation unit is used [e.g., 50,000]).
6. Villages were chosen randomly with a maximum of 200 people per village. Villages should be sampled in the order given in the table below.

### Villages to be Sampled and the Number of People per Village to be Sampled (based on 1996 census village population)

Village order	Suva (Suva)	Tamavua (Suva)	Lami (Suva)
1	<b>Beqa(Muanikau)</b>	<b>SDA Settlement (Colo-I-suva)</b>	<b>Paranome Road (Naboro)</b>
2	<b>Desvouex(Naiqaqi)</b>	<b>Wairua Rd (Wailoku)</b>	<b>Wainadoi AG School (Naboro)</b>
3	<b>Eden(Naiqaqi)</b>	<b>Woodward (Tamavua)</b>	<b>Naboro Primary School (Naboro)</b>
4	<b>Suva(Naiqaqi)</b>	<b>Tamavuaicake (Nuffield)</b>	<b>Navesi Catholic (Naboro)</b>
5	<b>Stoddart(Muanikau)</b>	Salato Rd (Nabua) - 200	<b>Kaudamu (Navesi)</b>
6	<b>Gladstone(Naiqaqi)</b>	<b>Every PI (Nabua)</b>	Qauia (Lami) - 200
7	<b>Kadavu(Muanikau)</b>	Dokanaisuva (Colo-I-suva) -200	Veisari 71/2 Mls Settlement (Naboro) - 200
8	<b>Goodenough(Naiqaqi)</b>	<b>Damu PI (Tamavua)</b>	Valenicina Settlement (Suvavou) -200
9	<b>Amy(Toorak)</b>	<b>Forestry Station (Colo-I-suva)</b>	<b>Wainamasi Settlement (Naboro)</b>
10	<b>Rewa 1-5(Naiqaqi)</b>		<b>Isa Lei Road (Suvavou)</b>
11	<b>Brewster(Toorak)</b>		<b>Ben Naiveli Farm (Naboro)</b>
12	<b>Moli(Muanikau)</b>		<b>Wailekutu Road (Naboro)</b>
13	<b>O'Brien(Muanikau)</b>		
14	<b>Short(Naiqaqi)</b>		
15	<b>Serea(Naiqaqi)</b>		
16	<b>Anand(Toorak)</b>		
17	<b>Draiba Govt Qrt(Muanikau)</b>		
18	<b>Hercules St(Naiqaqi)</b>		
19	<b>Kavika(Muanikau)</b>		
20	<b>Butt(Naiqaqi)</b>		
21	<b>Yanuca(Muanikau)</b>		
22	<b>Duncan(Muanikau)</b>		

23	<b>Leka(Toorak)</b>		
24	<b>Raojibhai Patel(Naiqaqi)</b>		
25	<b>Hamilton Beatie(Muanikau)</b>		
26	<b>Knolly St(Naiqaqi)</b>		
27	<b>Rewa(Toorak)</b>		

Village order	Raiwaqa-Samabula (Suva)	Valelevu	Rewa
1	<b>Udit Narayan Rd (Raiwaqa)</b>	<b>Secala Rd (Nasole)</b>	Vusuya Mix (Kuku) -200
2	<b>Belo St (2) (Baniwai)</b>	<b>Tuirara/Tovata Housing (Kalabu)</b>	Muana (Davuilevu)-200
3	<b>Lomanikoro Ln (Raiwaqa)</b>	<b>Dovi Seaside Settlement (Nasole)</b>	<b>Matamaivere (Namara)</b>
4	<b>Grantham Housing (Laucala)</b>	<b>Sharda Nand Rd (Nasole)</b>	<b>Tobunigio (Namara)</b>
5	<b>Spowart Ln (Raiwaqa)</b>	<b>Delana Settlement (Kalabu)</b>	<b>Chandra Prasad Rd (Davuilevu)</b>
6	<b>Ellis Pl (Baniwai)</b>	<b>Mamas Pl (Wainivula)</b>	<b>Nabuli (Naililili)</b>
7	<b>Tawake St (Baniwai)</b>	<b>Waidranu st (Muanikoso)</b>	<b>Vanualevu (Naililili)</b>
8	<b>Browning St (Raiwaqa)</b>	<i>Ram Purwa Rd Narere Stg 1 (Narere)-200</i>	<b>Nadali (Nausori)</b>
9	<b>Savita Ben Pl (Vatuwaqa)</b>	<b>Kinoya Rd (Nadera)</b>	<i>Lomainasau (Wainibokasi)-200</i>
10	<b>Sawau Street (Baniwai)</b>	<b>Drodrolagi Settlement (Makoi)</b>	
11	<b>Bryce St (Raiwaqa)</b>		
12	<b>Raghwand Ln (Raiwaqa)</b>		

Village order	Tailevu	Serua Namosi	Naitasiri
1	<b>Saiyavo (Sawakasa)</b>	<b>Tadevo (Navua)</b>	<b>Waibau (Naqali)</b>
2	<b>Waidalice Road site (Waidalice)</b>	<b>Dada (Navunikabi)</b>	<b>Wailase (Naqali)</b>
3	<b>Nabuseini (Wailotua)</b>	<b>Namaqumaqua (Korovisilou)</b>	<b>Waituitui (Muaniweni)</b>
4	<i>Sote (Waidalice)-200</i>	<b>Wainivuniuto (Navunikabi)</b>	<b>Sasarika (Saumakia)</b>
5	<b>Dogo (Sawakasa)</b>	<b>Raviravi (Beqa)</b>	<b>Saumakia (Saumakia)</b>
6	<b>Naiborebore (Verata)</b>	<b>Mataikadawa (Korovisilou)</b>	<b>Naqele (Naqali)</b>
7	<b>Ululoli (Verata)</b>	<i>Navutulevu (Korovisilou)-200</i>	<b>Mataisuva (Vunidawa)</b>
8	<i>Suvasuva settlement (Namalata)-200</i>	<b>Tokotoko (Navua)</b>	<i>Nauluvatu (Naqali)-200</i>
9	<b>Nasoni (Namena)</b>	<b>Wainiyabia (Galoa)</b>	<b>Navatu (Matailobau)</b>
10	<b>Nabili (Waidalice)</b>	<b>Serua (Korovisilou)</b>	<b>Vuniduba (Matailobau)</b>
11	<b>Nakanacagi (Sawakasa)</b>	<i>Dranikula (Galoa)-200</i>	<i>Sector 5 (Lomaivuna)-200</i>
12	<b>Maco (Verata)</b>	<b>Galoa Indian (Galoa)</b>	
13	<b>Schools (Dawasamu)</b>		

Village order	Rakiraki	Lautoka	Tavua
1	<b>Katudrau (Vaileka)</b>	<b>Nanuya Lilai (Yaqeta)</b>	<b>Narau (Zone 2)</b>
2	<b>Waimari (Rewasa)-200</b>	<b>Tavewa (Yaqeta)</b>	<b>Koro (Nagatagata)</b>
3	<b>Navoalau II (Ellington)-200</b>	<b>Vitogo - 200</b>	<b>Malele 1-2-3 (Zone 2) -200</b>
4	Dokanavatu (Nanukuloa)	<b>Kenani - 200</b>	<b>Qalinaolo (Nadrau)</b>
5	<b>Nokonoko (Nanukuloa)</b>	<b>Wayalevu (Yalobi)-200</b>	<b>Nakoroboya (Zone 1)</b>
6	<b>Onabua (Nailuva)</b>	<b>Hawrah Cr. (Kenani)</b>	<b>Rabulu Indian (Zone 3)</b>
7	<b>Natakiveilade (Nailuva)</b>	Sukanaivalu Rd (Saru)	<b>Davota (Zone 2)-200</b>
8	<i>Nakorovou (Matawailevu)</i>	<b>Police Barrack (Natokowaqa)</b>	Nadrau (Nadrau)
9	<b>Nailawa (Nanukuloa)</b>		<b>Buyabuya (Nagatagata)</b>
10	<b>Naivutu (Tokaimalo)</b>		<b>Nasomo No.1-7 (Zone 1)-200</b>

Village order	Nadoraga Navosa	Ba	Nadi
1	<b>Yalavou (Yalavou)</b>	<b>Moto (Moto)-200</b>	<b>Sanasana (Namaka)-200</b>
2	<b>Barara (Loma)</b>	<b>Sasa (Sorokoba)-200</b>	<b>Toko (Nausori)</b>
3	<b>Sautabu (Naqalimare)</b>	<b>Wailagi (Vatulaulau)-200</b>	<b>Careras (Votualevu)-200</b>
4	Raunitogo (Naqalimare)	<b>Natanuku (Sorokoba)</b>	<b>Sorovi I (Nawaka Zone)-200</b>
5	<b>Natovi (Zone1 - Korolevu)</b>	<b>Yaloku (Nukuloa)</b>	<b>Nakavu (Martintar Zone)-200</b>
6	<b>Beranana Catholic Sch. (Tuvu)</b>	<b>Vatubia (Narau)</b>	<b>Marasa (Nawaicoba)-200</b>
7	<b>Batiri (Zone1 -Lomawai) -200</b>	Wailailai (Wailailai)-200	<b>Nadi Town (Narewa Zone)-200</b>
8	<i>Lawarua (Zone 1 Namataku)</i>	<b>Balevuto (Moto)-200</b>	
9	<b>Malomalo (Cuvu)</b>	<b>Naitasiri (Narau)</b>	
10	<b>Navovo (Zone 1-Sigatoka)</b>		
11	<b>Korolevu (Cuvu)</b>		
12	<b>Nacocolevu (Loma)</b>		

Village order	Lomaloma-Lakeba	Lomaiviti	Kadavu
1	<b>Sailoama (Naroi Zone )-200?* (Lakeba)</b>	<b>Toki (Levuka)-200</b>	<b>Nabouwalu (Naqara)</b>
2	<b>Saqani (Lomaloma)</b>	<b>Nubu (Bureta)</b>	<b>Lomati (Nalotu)</b>
3	<b>Delana Govt Stations (Mualevu) - (Lomaloma)</b>	<b>Natuvu (Qalivakabau)</b>	<b>Solotavui (Kavala)</b>
4	Udu (Dravuwalu Zone ) (Lakeba)	<b>Bentley Lane (Qalivakabau)</b>	<b>Levuka (Gasele)</b>
5	<b>Waciwaci (Lakeba Zone ) (Lakeba)</b>	<b>Vunikavika (Qarani)</b>	<b>Tiliva (Kavala)</b>
6	<b>Keteira (Nasoki Zone ) (Lakeba)</b>	<b>Tai (Bureta)</b>	<b>Nukuvou (Vacalea)</b>
7	<b>Tubou (Lakeba Zone )-200 (Lakeba)</b>	Nakuloaloa (Qalivakabau)	<b>Drue (Vunisea)</b>
8	<b>Avea (Mualevu) (Lomaloma)</b>	<b>Nasama (Narocake)</b>	Baravi (Nalotu)
9	<b>Oru (Lakeba Zone ) (Lakeba)</b>	<b>PWD Depot (Levuka)</b>	<b>Cevai (Vunisea)</b>

10	<b>Tuvuca (Tuvuca) (Lomaloma)</b>	<b>Narocake School (Narocake)</b>	<b>Wailevu (Vunisea)</b>
11	<i>Vanuavatu (Vanuavatu Zone )-200 (Lakeba)</i>	<i>Naicabecabe (Moturiki)</i>	<b>Naqalotu (Nalotu)</b>
12		<b>Wailailai (Levuka)</b>	<b>Nasegai school (Ravitaki)</b>
13		<i>Navaga (Nabasovi)-200</i>	<b>Nakaugasele (Kavala)</b>
14	<b>* Pop unknown</b>	<b>Naitiqatiqa (Nairai)</b>	<b>Baravi (Nalotu)</b>
15		<b>Nasova Prison (Qalivakabau)</b>	<b>Talaulia (Nalotu)</b>
16		<b>Veituto (Qalivakabau)</b>	
17		<b>Rukuruku rst (Levuka)</b>	
18		<b>Royal Hotel (Qalivakabau)</b>	
19		<b>Raratabu (Levuka)</b>	
20		<b>Saula (Qalivakabau)</b>	
21		<b>Lawaki Toki (Levuka)</b>	
22		<b>Nawai (Nasau)</b>	

Village order	Rotuma	Bua	Taveuni
1	<b>Maftoa (Itumuta)</b>	Burutovoa (Zone 1 Daria)-200	<b>Vunitavola (Zone 2)</b>
2	Motusa (Itutiu)-200	Ganama (Zone 2 Dama)-200	Welagi (Zone 1)-200
3	<b>Islepi (Juju)</b>	Vuninoko (Lekutu Zone 1)-200	<b>Wai (Bouma)</b>
4	<b>Saolei (Itutiu)</b>	Naevuevu (Zone 2)-200	<b>Waiyevo (Zone 2)</b>
5	<b>Pap'tea (Oinafa)</b>	Wailevu (Bua Zone Nurse)-200	<b>Waitavala (Zone 2)</b>
6	<b>Fikioko (Noatau)</b>	Nabau (Zone 1)-200	<b>Waidamudamu (Bouma)</b>
7	<b>Else'e (Malhaha)</b>	Balawavere (Zone 2 Nasarowaqa)-200	<b>Vetaicake (Bouma)</b>
8	<b>Keua (Itumuta)</b>	<i>Nasevu (Zone 1 Daria)-200</i>	Yacata (Yacata)-200
9	<b>Koheatiu (Juju)</b>	<i>Nakale (Lekutu Zone 1)-200</i>	<b>Laucala (Qamea)</b>
10	<b>Hapmak (Itutiu)</b>	<i>Kerekaka Ind. (Lekutu Zone 1)-200</i>	<b>Muaniwaga (Bouma)</b>
11	<b>Lau (Itutiu)</b>		<b>Waisamuta (Bouma)</b>
12	<b>Matu'ea (Noatau)</b>		<b>Niusawa Prim. Sch (Zone 1)</b>
13	<b>Tuai (Juju)</b>		<b>Naniu (Zone 2)</b>
14			<b>Nakauvadra (Zone 1)</b>
15			<b>Niubavu (Qamea)</b>
16			<i>Naq. Shopping Ctr (Zone 1)-200</i>



Village order	Cakaudrove	Macuata
1	<b>Domoniwai (Bagasau)</b>	<b>Nasealevu (Vunivutu)</b>
2	Nuku (Rabi 1)-200	<b>Vatuvula (Visoqo)</b>
3	<b>Nasobi (Nabalebale)</b>	<b>Doloko (Zone - 2)</b>
4	<b>Berau (Savusavu 3)</b>	<b>Rauriko (Dogotuki)</b>
5	<b>Natewa (Natewa)</b>	<b>Rokanace (Zone - 1)</b>
6	<b>Navorau Indian (Navakaka)</b>	<b>Kaka (Coqeloa)</b>
7	<b>Vatukali (Bagasau)</b>	<b>Vunikawakawa (Zone 8)</b>
8	<b>Waivula (Navakaka)</b>	<b>Vudibasoga (Zone - 2)</b>
9	<b>Nakula Estate (Tawake)</b>	Wavuwavu (Vunivutu)-200
10	<b>Nasoga (Natewa)</b>	<b>Kita (Visoqo)</b>
11	<b>Savuloa (Savusavu 1)</b>	<b>Nadogo (Zone -1)</b>
12	<b>Natovotovo (Tunuloa)</b>	Naduri (Zone - 1)-200
13	<b>Naku (Korotasere)</b>	<b><i>Nukubati Resort (Naqumu)</i></b>
14	<b>Naqai (Tunuloa)</b>	<i>Vunicuicui (Korotari Zone 6)-200</i>
15	<b>Nuku (Korotasere)</b>	<i>Nabavatu (Zone 1)-200</i>
16	<b>Natuvu (Saqani)</b>	<i>Vanuavou Fiji. Sett. (Vunivau Zone 9)-200</i>
17	<b><i>Nawanawa (Nabalebale)</i></b>	
18	<b><i>Matoqedelamu (Naweni)</i></b>	
19	<b><i>Vadravadra (Savusavu 2)</i></b>	
20	<b><i>Nasese (Natewa)</i></b>	
21	<b><i>Naduri (Korotasere)</i></b>	
22	<b><i>Kasavu Sch-Camp (Bagasau)</i></b>	
23	<b><i>Biaratarawa (Savusavu 3)</i></b>	
24	<b><i>Naturuku (Bagasau)</i></b>	
25	<b><i>Dreketi (Natewa)</i></b>	
26	<b><i>Duiloma (Naweni)</i></b>	
27	<b><i>Nadawa (Bagasau)</i></b>	
27	<b><i>Nacula (Natewa)</i></b>	
27	<b><i>Bagasau Block (Bagasau)</i></b>	
27	<b><i>Naveli (Saqani)</i></b>	
27	<b><i>Levuka (Tawake)</i></b>	

Village names in **bold** should have entire population tested by ICT. A maximum of 200 villagers should be tested in villages with more than 200 people (these villages are shown followed by the number '200'). Alternative villages (*in italic*) to be surveyed if less than 750 people are sampled from the villages listed for each sub-implementation unit

7. Sampling should be done until at least 750 people per sub-implementation unit have been sampled by ICT.

## GUIDELINES FOR CONDUCTING MOSQUITO CONTROL FOR FILARIASIS VECTORS: FIJI ISLANDS

<b>Primary Vector</b>	<i>Aedes polynesiensis</i>
<b>Distribution</b>	All islands
<b>Activity pattern</b>	Daytime
<b>Host biting preference</b>	All animals
<b>Location of biting activity</b>	Prefers outdoors but will go inside houses
<b>Resting location</b>	Outdoors
<b>Flight range</b>	Less than 100m
<b>Breeding sites</b>	Man provided containers (tires, drums, small plastic containers); Natural containers (treeholes, crabholes)
<b>Insecticide resistance</b>	Resistance to DDT shown in Fiji
<b>Other important characters</b>	Avoids bright sunlight. Also a vector of dengue virus
<b>Monitoring the Primary Vector</b>	Larval/pupal survey at least twice a year (once during the wet season, once during the dry season)
<b>Recommended Control Methods</b>	<ol style="list-style-type: none"> <li>1. Breeding source reduction of domestic containers*</li> <li>2. Bednets to protect young children when napping</li> <li>3. Insecticide impregnated curtains and bednets</li> <li>4. Repellents and mosquito coils</li> <li>5. Screening houses</li> </ol> <p>*Effort should be directed towards reducing the number of breeding sites that are producing the most adult mosquitoes. The importance of different container types will be determined from the larval/pupal surveys.</p>
<b>Secondary Vectors</b>	<ol style="list-style-type: none"> <li>1. <i>Aedes pseudoscutellaris</i> (resistance shown to DDT in Fiji)</li> <li>1. <i>Aedes fijiensis</i></li> <li>2. <i>Aedes rotumae</i> (Rotuma Island only)</li> <li>3. <i>Culex quinquefasciatus</i> **</li> </ol> <p>**Resistant to DDT, organophosphorus compounds (including malathion and temephos), carbamates and pyrethroids in 36 countries</p>

# **FRENCH POLYNESIA**

**Endemic country**

**Population estimated:** 233,000 (2000)

**Geographic dispersion:** 118 scattered islands

**A type survey (Initial Baseline survey):** ICT testing in 1997 and 2000:

- Type: sentinel sites (3 endemic islands) – Target pop.: all inhabitants of sentinel sites
- Results:
  - o Maupiti (97): 993 tested – 24 (2.6%) ICT positive
  - o Tevaitoa-Tahuata (2000): 1,859 tested – 256 (13.8%) ICT positive

**MDA for the whole country:**

- From 1950 to 1983 : MDA with DEC alone (with various dosages and schedules)
- From 1993 to 1999 : MDA with DEC alone every 6 months
- Since 2000: yearly MDA with DEC+ALB

**B type survey (Mid term evaluation):** ICT testing in Jan-Feb 2003:

- Type: sentinel sites (Maupiti-Tevaiota-Tahuata) – Target pop.: all inhabitants of the sites
- Result: 2,924 tested – 318 (10.9%) ICT positive

## **Recommendation:**

**C type survey (final evaluation):**

Stratified sampling by island group and sentinel sites survey.

**D type survey (final evaluation):**

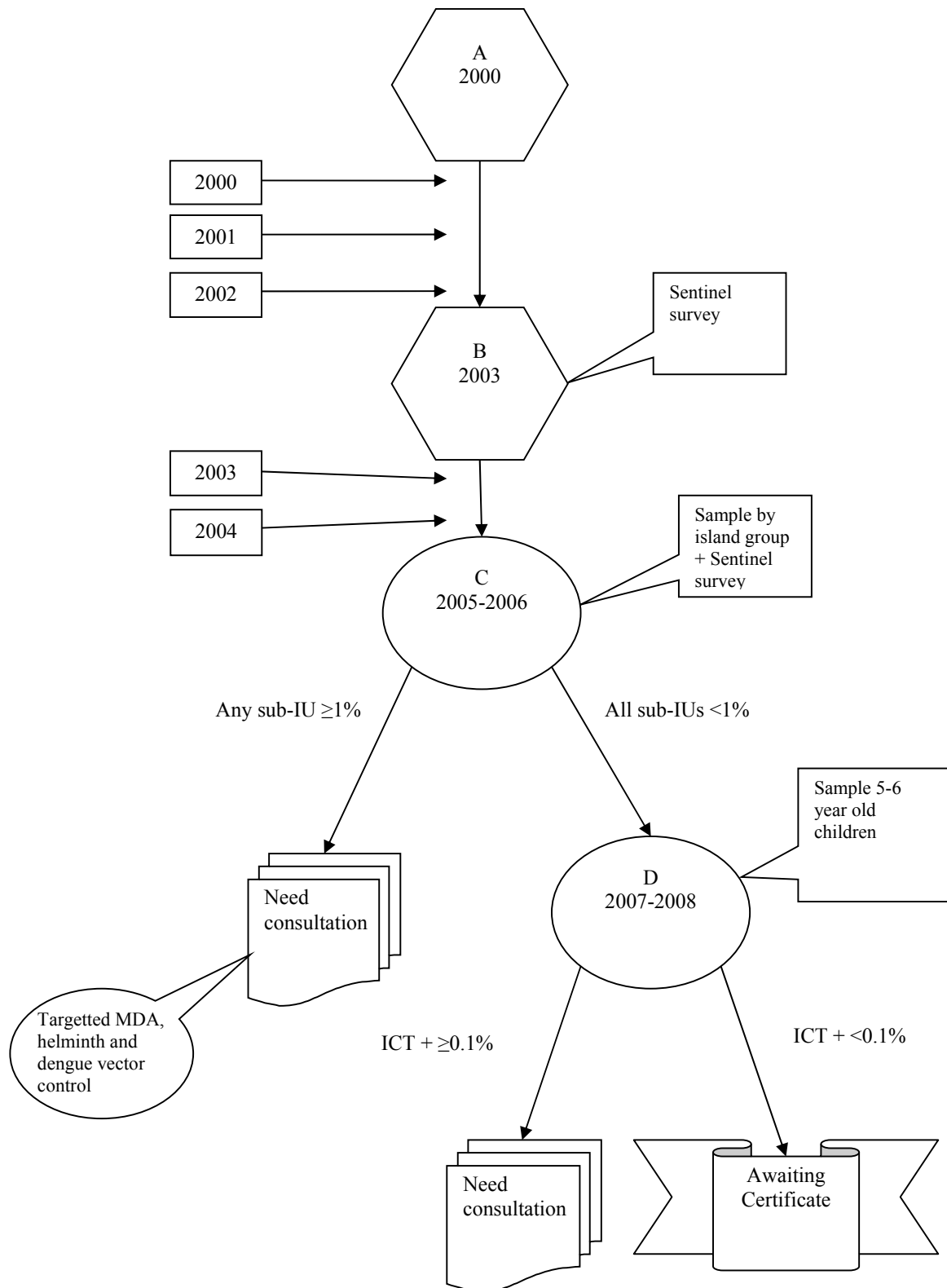
This survey should be carried out in 2007-2008, after the 5<sup>th</sup> MDA, in a sample of 6-year-old school attendants (or enterers) in FRP. The estimated number of this target population is about 5,000 persons. Alternatively, surveys in 6 year old children can be carried out:

- o In random samples in Tahiti and Moorea islands (the most populated islands)
- o **And** in the whole 6 year old population of other islands.

In addition, it is necessary to carry out surveys in previously selected sentinel sites.

- If ICT positive prevalence is <0.1%, await the certification of LF elimination.
- If ICT positive prevalence is  $\geq 0.1\%$ , further investigations should be done:
  - o Confirm with other biological test (i.e. Og4C3);
  - o Discussion with the PacELF Monitoring & Evaluation group;
  - o Discussion for the post MDA alternative strategies;
    - Partial MDA in still endemic areas;
    - Helminth control programme;
    - Integrated vector control programme.

## FLOWCHART: FRENCH POLYNESIA



## SUGGESTED GUIDELINES FOR COUNTRY C SURVEYS FOR FINAL PREVALENCE ASSESSMENT: FRENCH POLYNESIA

1. The C survey for French Polynesia should take place in 2005 and will be by Stratified Cluster Sampling using districts as clusters
2. The Sub-implementation Units will be the 4 archipelagoes with the Society archipelago divided into 2 parts (Windward and Leeward island groups). Thus, there are 5 Sub IU: Winward, Leeward, Marquesas , Tuamotu Gambier, Australes. In addition the surveys of the sentinel sites will be performed.
3. Using the Demographic Tables for the Western Pacific Region 2000-2005 (WHO publication), the estimated population in 2005 for French Polynesia will be 256,562.
4. Therefore the average population of each sub-implementation unit will be 51,312 (256,562 divided by 5).
5. From the table for Stratified Cluster Sampling, the sample size needed for each district (sub-implementation unit) for an average population of 100,000 is 755 (since the table has no average population for 51,312, the next largest average population for a sub-implementation unit is used (e.g., 100,000).
6. Districts were chosen randomly with a maximum of 200 people per district. Districts should be sampled in the order given in the table below.
7. Sampling should be done until at least 755 people per sub implementation unit have been sampled by ICT. 4000 cards will be needed for C surveys in French Polynesia

### Districts to be Sampled and the Number of People per district to be Sampled (based on census district population)

Village order	Winward	Leeward	Marquesas
1	Maiao (Moorea-Maiao)-200	Faie (Huahine)-200	Puamau (Hiva Oa)-200
2	Faaone (Taïarapu Est)-200	Avera (Raïatea)-200	Fatu Hiva (Fatu Hiva)-200
3	Paopao (Moorea-Maiao)-200	Tapuamu (Tahaa)-200	Atuona (Hiva Oa)-200
4	Papeete1 (Papeete)-200	<b>Puohine (Raïatea)</b>	Taiohae (Nuku Hiva)-200
5	<i>Afaahiti (Taïarapu Est)-200</i>	<i>Maeva (Huahine)-200</i>	<i>Hatiheu (Nuku Hiva)-200</i>
6		<i>Ruutia (Tahaa)-200</i>	
7			

Village order	Tuamotu Gambier	Australes
1	Arutua (Arutua)-200	Vaiuru (Raivavae)-200
2	Makemo (Makemo)-200	Anapoto (Rimatara)
3	<b>Tepoto (Napuka)</b>	Rairua (Raivavae)-200
4	<b>Niau (Fakarava)</b>	Mahu (Tubuai)-200
5	<b>Vairaatea (Nukutavake)</b>	<i>Moerai (Rurutu)-200</i>
6	Kauehi (Farakara)-200	
7	<i>Apataki (Arutua)-200</i>	

District names in **bold** should have entire population tested by ICT. A maximum of 200 inhabitants should be tested in districts with more than 200 people (these districts are shown followed by the number '200').

Alternative districts (*in italics*) to be surveyed if less than 755 people are sampled from the districts listed for each sub-implementation unit.

## GUIDELINES FOR CONDUCTING MOSQUITO CONTROL FOR FILARIASIS VECTORS: FRENCH POLYNESIA

<b>Primary Vector</b>	<i>Aedes polynesiensis</i>
<b>Distribution of Primary Vector</b>	Austral, Marquesas, Society and Tuamotu, Archipelagoes
<b>Activity pattern</b>	Daytime
<b>Biting preference</b>	All animals
<b>Location of biting</b>	Prefers outdoors but will go inside houses
<b>Resting location</b>	Outdoors
<b>Flight range</b>	Less than 100m
<b>Breeding sites</b>	Man provided containers (tires, drums, small plastic containers); Natural containers (treeholes, crabholes)
<b>Insecticide resistance</b>	Resistance to DDT shown in French Polynesia including Tahiti
<b>Other important characters</b>	Avoids bright sunlight. Also a vector of dengue virus
<b>Monitoring the Primary Vector</b>	Larval/pupal survey at least twice a year (once during the wet season, once during the dry season)
<b>Recommended Control Methods</b>	<ol style="list-style-type: none"> <li>1. Breeding source reduction of domestic containers</li> <li>2. Bednets to protect children when napping</li> <li>3. Insecticide impregnated curtains and bednets</li> <li>4. Repellents and mosquito coils</li> <li>5. Screening houses</li> </ol> <p>*Effort should be directed towards reducing the number of breeding sites that are producing the most adult mosquitoes. The importance of different container types will be determined from the larval/pupal surveys.</p>

# **GUAM**

**Non endemic country**

**Population estimated:** 148,200 (2000)

**Geographic dispersion:** 1 inhabited island

**A type survey (Initial Baseline survey):** ICT testing in 2001

- Type: convenience sample
- Result: 980 tested (19 villages) – 0 (0%) ICT positive

**No MDA**

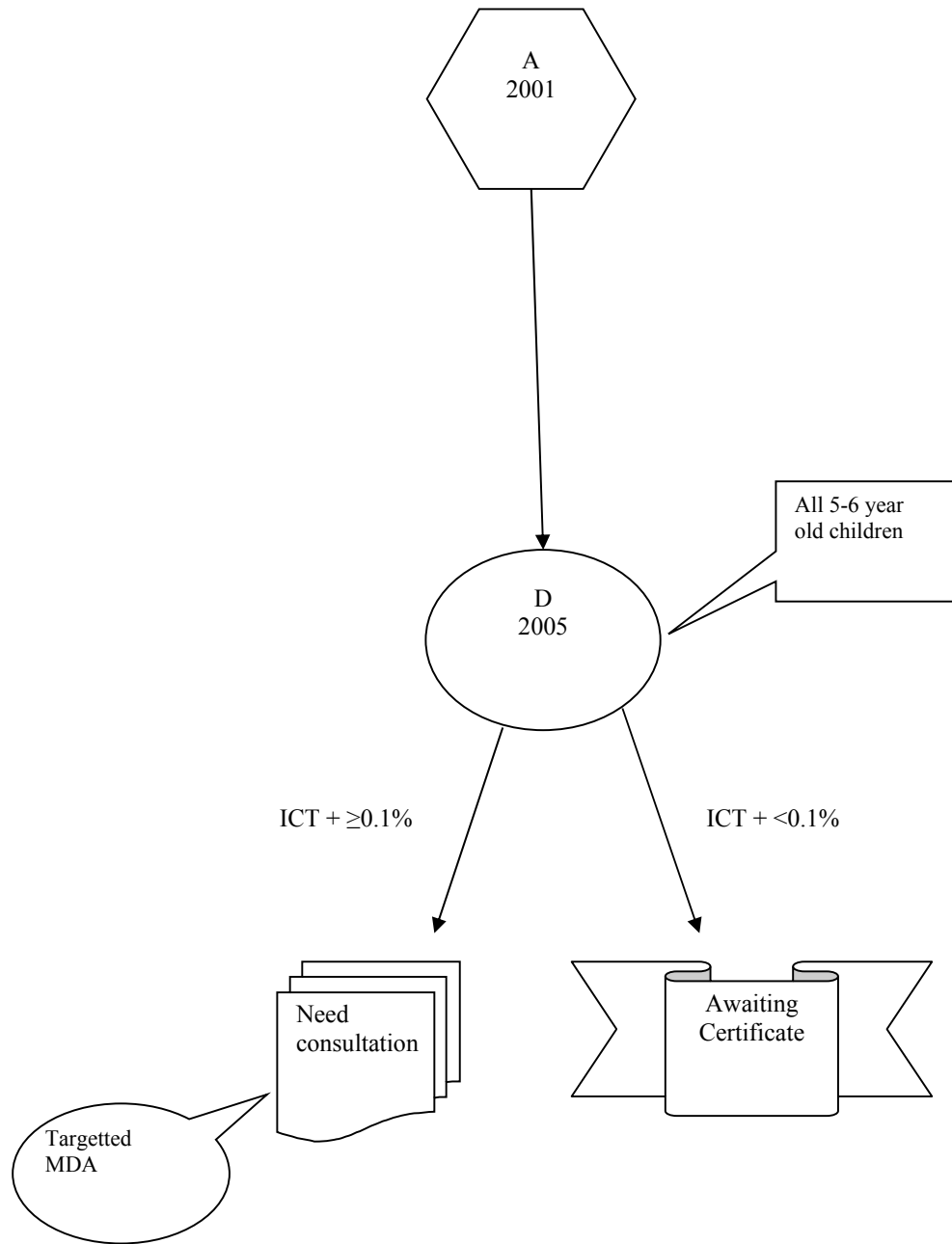
## **Recommendation:**

### **Implementation of D type survey:**

The final ICT survey in all 5-6 year old children in Guam should be carried out in 2005 if possible. The estimated number of this target population is 3,800 persons.

- If ICT positive prevalence is  $<0.1\%$ , await the certification of LF elimination.
- If ICT positive prevalence is  $\geq 0.1\%$ , additional investigations around positive cases:
  - Confirm with other biological test (i.e. Og4C3);
  - Geographic location (cluster?);
  - Survey households of the positive cases;
  - Discussion with the PacELF Monitoring and Evaluation group;
  - Partial MDA.

**FLOWCHART: GUAM**





## GUIDELINES FOR CONDUCTING MOSQUITO CONTROL FOR FILARIASIS VECTORS: GUAM

<b>Primary Vector</b>	<i>Culex quinquefasciatus</i>
<b>Activity pattern</b>	Nighttime
<b>Biting preference</b>	Large animals including humans
<b>Location of biting</b>	Indoors and outdoors
<b>Flight range</b>	Up to 5 km
<b>Breeding sites</b>	Temporary and permanent water including larger man provided containers (tires, drums, small plastic containers), pit latrines, septic tanks, ditches, marshes, both clean and polluted water
<b>Insecticide resistance</b>	Resistant to DDT, organophosphorus compounds (including malathion and temephos), carbamates and pyrethroids in 36 countries
<b>Other important characters</b>	Lays eggs in groups called rafts. Known to rapidly develop resistance to insecticides.
<b>Monitoring the Primary Vector</b>	Gravid traps for adults. Larval/pupal survey at least twice a year (once during the wet season, once during the dry season).
<b>Recommended Control Methods</b>	<ol style="list-style-type: none"> <li>1. Insecticide impregnated curtains and bednets</li> <li>2. Breeding source reduction of domestic containers</li> <li>3. Polystyrene beads in pit latrines</li> <li>4. <i>Bacillus sphaericus</i> in polluted water</li> <li>5. Drainage of permanent water sources</li> <li>6. Repellents and mosquito coils</li> <li>7. Screening houses</li> </ol> <p>The importance of control methods 2-5 will depend on what is learned during the larval/pupal surveys (e.g., effort should be spent on the breeding sites producing the most adult mosquitoes).</p>

# **KIRIBATI**

**Endemic country**

**Population estimated:** 90,700 (2000)

**Geographic dispersion:** 33 scattered islands

**A type survey (Initial Baseline survey):** ICT testing in 1999-2000

- Type : Sentinel survey (Gilbert islands) – Convenience sample
- Result: 2,824 tested – 48 (1.7%) ICT positive

**Subsequent survey (2001)**

- Type : Sentinel survey (Christmas Island) – Convenience sampling
- Result: 400 tested – 27 (6.8%) ICT positive

**MDA for the whole country:** 1<sup>st</sup> MDA in 2001

## **Recommendation:**

**B type survey (Mid term evaluation):**

This ICT survey should be carried out in 2003-04 in sentinel sites, during or after MDA, depending on logistic considerations. Sentinel sites could be 2 villages each in the 3 highly endemic islands (For example: Christmas, Tarawa, Nikunau). The target population consists of all inhabitants of sentinel sites. This survey should allow assessment of the impact of MDA.

**C type survey (final evaluation):**

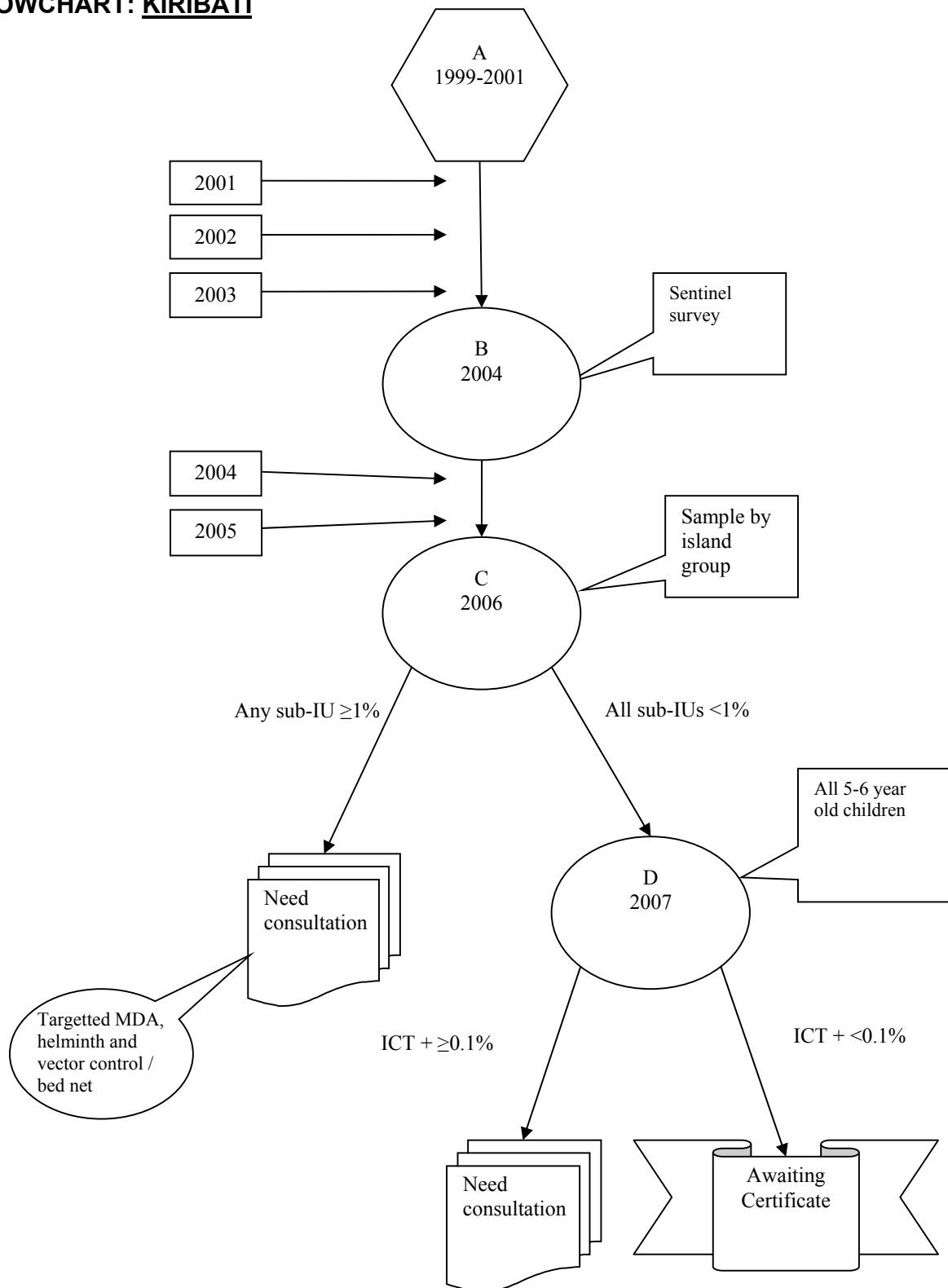
Stratified sampling by island group.

**D type survey (final evaluation):**

This survey should be carried out in 2007, in all 6 year old children in Kiribati. The estimated number of this target population is about 2,500 persons.

- If ICT positive prevalence is <0.1%, await the certification of LF elimination.
- If ICT positive prevalence is  $\geq 0.1\%$ , further investigations should be done:
  - Confirm with other biological test (i.e. Og4C3);
  - Discussion with the PacELF Monitoring & Evaluation group;
  - Discussion of the post MDA alternative strategies;
    - Partial MDA in still endemic areas;
    - Integrated Vector control programme, impregnated bednets;
    - Helminth control programme.

## FLOWCHART: KIRIBATI



## SUGGESTED GUIDELINES FOR COUNTRY C SURVEYS FOR FINAL PREVALENCE ASSESSMENT: KIRIBATI

1. The C survey for Kiribati should take place in 2006 and will be by Stratified Cluster Sampling using villages as clusters.
2. The Sub-implementation Units will be the 4 island groups (South Tarawa Island, North Tarawa Island with the rest of the Gilbert Islands, Phoenix Islands and Central Line Islands).
3. Using the Demographic Tables for the Western Pacific Region 2000-2005 (WHO publication), the estimated population in 2005 for Kiribati will be 99,194 (tables do not go to 2006).
4. Therefore the average population of each sub-implementation unit will be 24,798 (99,190 divided by 4 island groups).
5. From the table for Stratified Cluster Sampling (Section 2), the sample size needed for each district (sub-implementation unit) for an average population of 25,000 is 739 (since the table has no average population for 24,798, the next largest average population for a sub-implementation unit is used (e.g., 25,000)).
6. Villages were chosen randomly with a maximum of 200 people per village. Villages should be sampled in the order given in the table below.

### Villages to be Sampled and the Number of People per Village to be Sampled (based on 2000 census village population)

South Tarawa Island	North Tarawa Island and the rest of the Gilbert Islands	Phoenix Islands	Central Line Islands
Betio-200	<b>Taburao</b>	Makin-200	Banana-200
Teaoraereke-200	Manoku-200	Kiebu-200	<b>Uteute</b>
Taborio-200	Tekaman-200	<b>Kanton</b>	<b>Tereitanano</b>
<b>Tanaea</b>	Kauma-200		Matanibike-200
Nanikai-200	Buariki-200		<b>Mwanuku</b>
Abarao*-200	Bakaka*-200		Tenenebo*-200

- Village names in **bold** should have entire population tested by ICT. A maximum of 200 villagers should be tested in villages with more than 200 people (these villages are shown followed by the number '200').
- \*Alternative villages to be surveyed if less than 739 people are sampled from the villages listed for each sub-implementation unit.

Sampling should be done until at least 739 people per island group have been sampled by ICT. A minimum of 3,414 ICT assays will need to be done for the C surveys.

## GUIDELINES FOR CONDUCTING MOSQUITO CONTROL FOR FILARIASIS VECTORS: KIRIBATI

<b>Primary Vector</b>	<i>Culex quinquefasciatus</i>
<b>Distribution of Primary Vector</b>	All islands
<b>Activity pattern</b>	Nighttime
<b>Biting preference</b>	Large animals including humans
<b>Location of biting</b>	Indoors and outdoors
<b>Flight range</b>	Up to 5 km
<b>Breeding sites</b>	Temporary and permanent water including larger man provided containers (tires, drums, small plastic containers), pit latrines, septic tanks, ditches, marshes, both clean and polluted water
<b>Insecticide resistance</b>	Resistant to DDT, organophosphorus compounds (including malathion and temephos), carbamates and pyrethroids in 36 countries
<b>Other important characters</b>	Lays eggs in groups called rafts. Known to rapidly develop resistance to insecticides.
<b>Monitoring the Primary Vector</b>	Gravid traps for adults. Larval/pupal survey at least twice a year (once during the wet season, once during the dry season).
<b>Recommended Control Methods</b>	<ol style="list-style-type: none"> <li>1. Insecticide impregnated curtains and bednets</li> <li>2. Breeding source reduction of domestic containers</li> <li>3. Polystyrene beads in pit latrines</li> <li>4. <i>Bacillus sphaericus</i> in polluted water</li> <li>5. Drainage of permanent water sources</li> <li>6. Repellents and mosquito coils</li> <li>7. Screening houses</li> </ol> <p>The importance of control methods 2-5 will depend on what is learned during the larval/pupal surveys (e.g., effort should be spent on the breeding sites producing the most adult mosquitoes).</p>
<b>Secondary vector</b>	<i>Aedes marshallensis</i>
<b>Biting habits</b>	Day time
<b>Hosts</b>	Man
<b>Breeding sites</b>	Natural containers (treeholes, coconut shells)
<b>Distribution</b>	Gilbert Islands

# **MARSHALL ISLANDS**

**Partially endemic country**

**Population estimated:** 51,800 (2000)

**Geographic dispersion:** 5 islands – 29 atolls

**A type survey (Initial Baseline survey):** ICT testing in 2001

- Type : whole country - convenience sample
- Result: 2,004 tested - 2 (0.1%) ICT positive (from Mejit island)
- Subsequent survey in Mejit island in 2002:
  - o Result : 294 tested – 130 (44.2%) ICT positive

**Partial MDA - Target population:** Mejit island - 1<sup>st</sup> round in 2002

## **Recommendation:**

**B type survey (Mid term evaluation):**

This survey should be carried out in 2004 during or after the 3<sup>rd</sup> MDA, depending on logistic considerations, in Mejit island (all inhabitants should be ICT tested) and, if possible, islands in the vicinity of Mejit should be tested. The number of MDA rounds should be determined in relation to the 2004 survey results. This survey should allow assessment of the impact of MDA on the LF endemic areas and detection of other potential foci.

**C type survey (final evaluation):**

For Mejit island, this final survey should be carried out in 2007. Because of the small population size, all inhabitants of Mejit should be tested. For other areas of Marshall, this ICT survey can be carried out in 2004. Stratified sampling is based on island group.

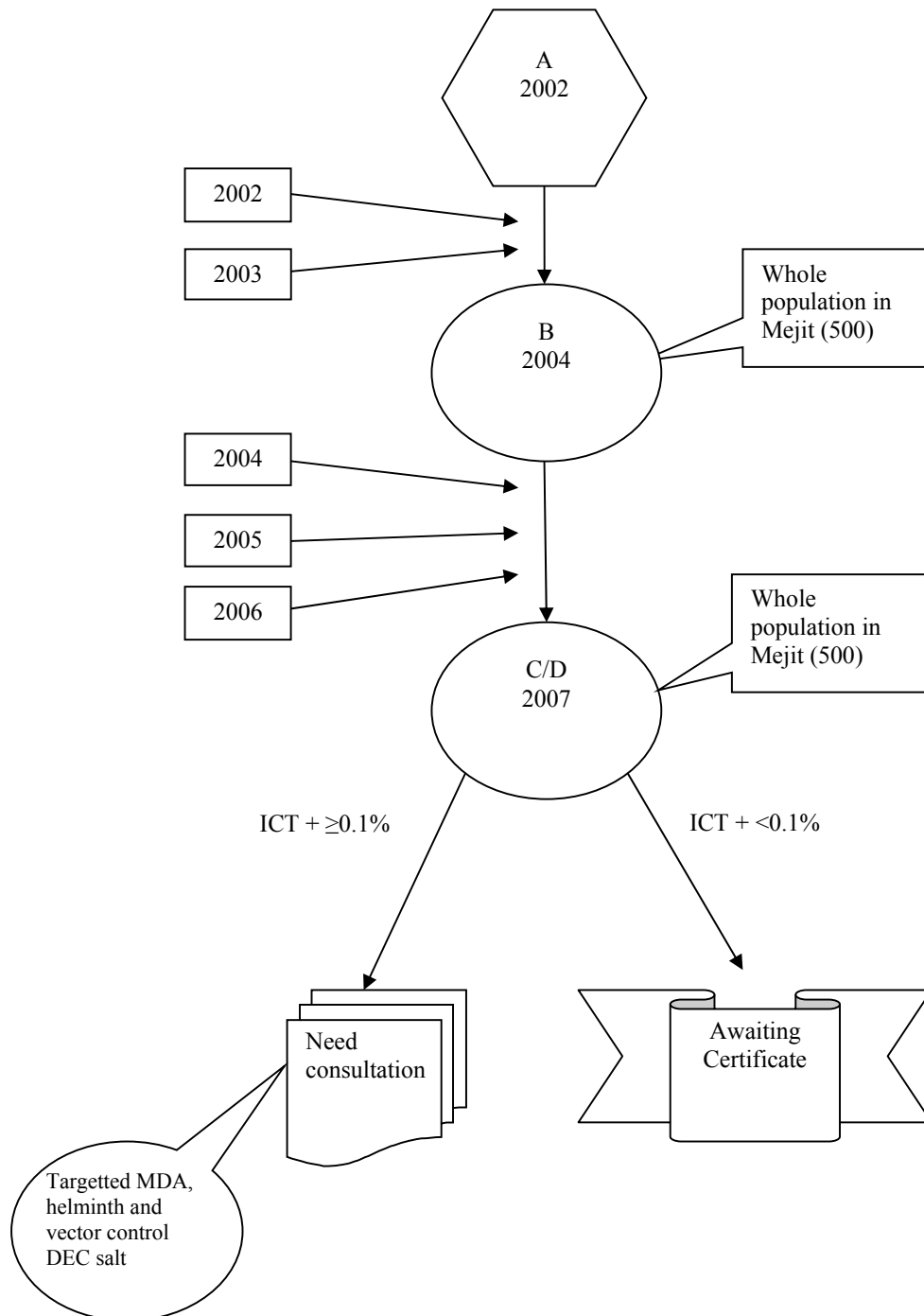
**D type survey (final evaluation):**

In Mejit island, the C survey also serves as a D-type survey since the whole population has been tested.

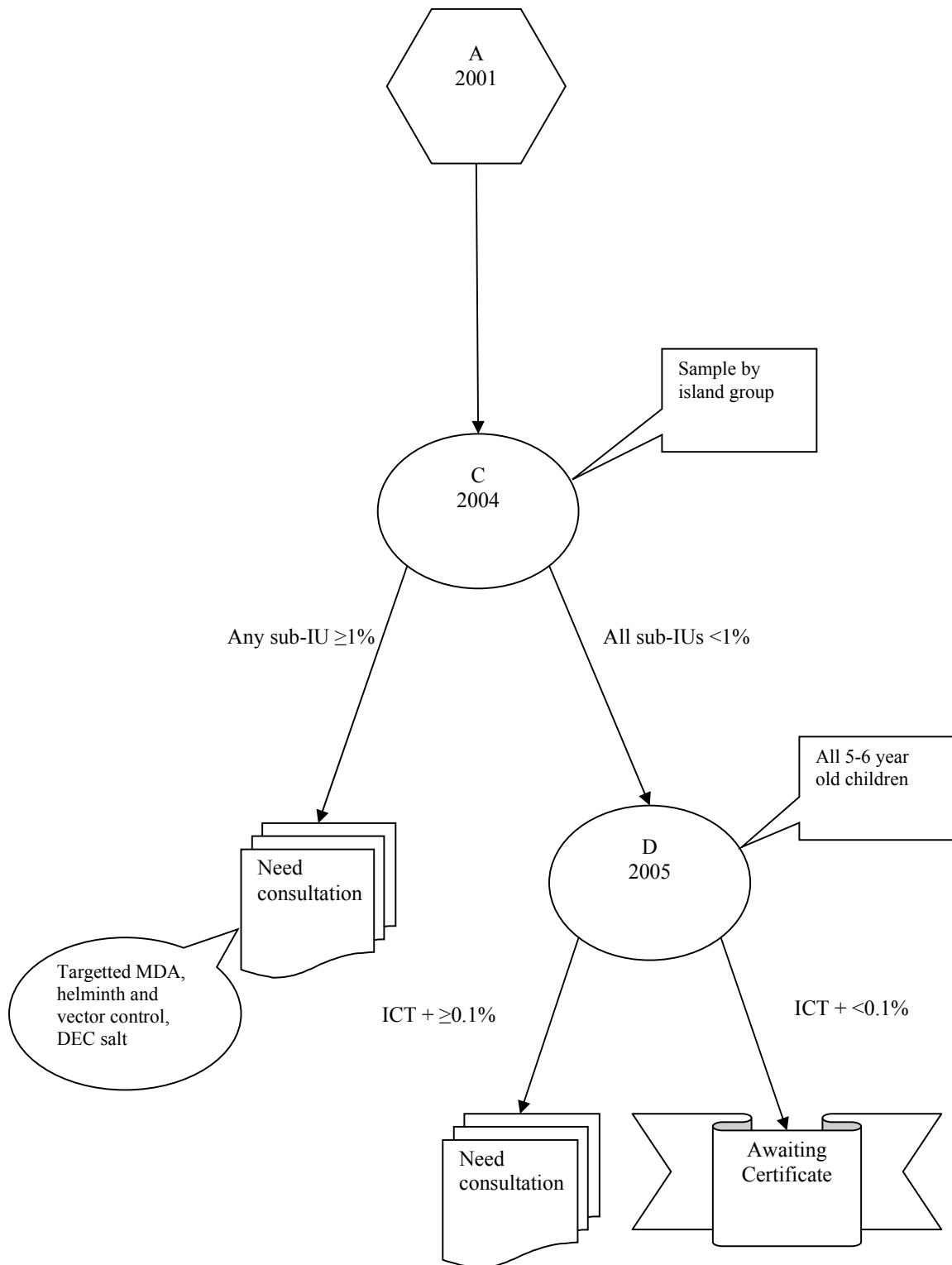
In other areas, this D survey should be carried out in 2007, in all 6 year old children in the Marshall Islands. The estimated number of this target population is about 1,500 persons.

- If ICT positive prevalence is <0.1%, await the certification of LF elimination.
- If ICT positive prevalence is ≥0.1%, do additional investigations around positive cases:
  - o Confirm with other biological test (i.e. Og4C3);
  - o Discussion with the PacELF Monitoring & Evaluation group;
  - o Discussion for the post MDA alternative strategies;
    - Extension of partial MDA in still endemic areas;
    - Helminth control programme;
    - Use of DEC medicated salt;
    - Integrated Vector control programme.

**FLOWCHART: MEJIT ISLAND, MARSHALL ISLANDS**



## FLOWCHART: OTHER AREAS, MARSHALL ISLANDS





## SUGGESTED GUIDELINES FOR COUNTRY C SURVEYS FOR FINAL PREVALENCE ASSESSMENT: MARSHALL ISLANDS

1. The C survey for the Marshall Islands should take place in 2004 for the Marshall Islands other than Mejit, which will be surveyed in 2007. Sampling other than Mejit will be by Stratified Cluster Sampling using villages as clusters.
2. The Sub-implementation Units will be the 2 island groups. Majuro, Arno and Mili Islands will be one sub-implementation unit with the remainder of the Marshall Islands (excluding Mejit) making up a second sub-implementation unit. The whole population of Mejit will also be tested by ICT in 2007.
3. Using the Demographic Tables for the Western Pacific Region 2000-2005 (WHO publication), the estimated population in 2005 for the Marshall Islands will be 56,868 (table does not go to 2007).
4. Therefore the average population of each sub-implementation unit will be approximately 28,434 (56,868 divided by 2 island groups).
5. From the table for Stratified Cluster Sampling (Section 2), the sample size needed for each district (sub-implementation unit) for an average population of 50,000 is 750 (since the table has no average population for 28,434, the next largest average population for a sub-implementation unit is used (e.g., 50,000).
6. Villages were chosen randomly with a maximum of 200 people per village. Villages should be sampled in the order given in the table below.

**Villages to be Sampled and the Number of People per Village to be Sampled (based on 2000 census village population)**

Village Order	Majuro, Arno and Mili Islands	Remainder of Marshall Islands	
1	<b>Langor</b>	<b>Imiej</b>	<p>- Village names in <b>bold</b> should have entire population tested by ICT. A maximum of 200 villagers should be tested in villages with more than 200 people (these villages are shown followed by the number '200').</p> <p>- *Alternative villages to be surveyed if less than 750 people are sampled from the villages listed for each sub-implementation unit.</p>
2	<b>Bikonele</b>	<b>Mae</b>	
3	<b>Enemanet</b>	<b>Eneu</b>	
4	Woja-200	<b>Ningi</b>	
5	<b>Manrar</b>	<b>Anilep</b>	
6	<b>Denmeo</b>	Mejatto	
7	<b>Enajet</b>	<b>Emej</b>	
8	<b>Kilemman</b>	<b>Jabnoren</b>	
9	<b>Anel</b>	<b>Enewe</b>	
10	<b>Neenkotkot</b>	Likiep-200	
11	<b>Ijoen</b>	<b>Mejatto*</b>	
12	<b>Kejbwe</b>		
13	<b>Aneko</b>		
14	<b>Bikonel Name</b>		
15	<b>Namwi</b>		
16	<b>Eneaidrik</b>		
17	<b>Japo</b>		
18	<b>Matolen*</b>		

7. Sampling should be done until at least 750 people per island group have been sampled by ICT. In addition the entire population of Mejit (approximately 500) will be sampled. Approximately 1,879 ICT cards are needed for the two sub-implementation units plus 500 for Mejit. A total of 2,379 ICT cards will be needed for the C surveys.

## GUIDELINES FOR CONDUCTING MOSQUITO CONTROL FOR FILARIASIS VECTORS: MARSHALL ISLANDS

<b>Primary Vector</b>	<i>Culex quinquefasciatus</i>
<b>Distribution of Primary Vector</b>	All islands
<b>Activity pattern</b>	Nighttime
<b>Biting preference</b>	Large animals including humans
<b>Location of biting</b>	Indoors and outdoors
<b>Flight range</b>	Up to 5 km
<b>Breeding sites</b>	Temporary and permanent water including larger man provided containers (tires, drums, small plastic containers), pit latrines, septic tanks, ditches, marshes, both clean and polluted water.
<b>Insecticide resistance</b>	Resistant to DDT, organophosphorus compounds (including malathion and temephos), carbamates and pyrethroids in 36 countries.
<b>Other important characters</b>	Gravid traps for adults. Lays eggs in groups called rafts. Known to rapidly develop resistance to insecticides
<b>Monitoring the Primary Vector</b>	Larval/pupal survey at least twice a year (once during the wet season, once during the dry season).
<b>Recommended Control Methods</b>	<ol style="list-style-type: none"> <li>1. Insecticide impregnated curtains and bednets</li> <li>2. Breeding source reduction of domestic containers</li> <li>3. Polystyrene beads in pit latrines</li> <li>4. <i>Bacillus sphaericus</i> in polluted water</li> <li>5. Drainage of permanent water sources</li> <li>6. Repellents and mosquito coils</li> <li>7. Screening houses</li> </ol> <p>The importance of control methods 2-5 will depend on what is learned during the larval/pupal surveys (e.g., effort should be spent on the breeding sites producing the most adult mosquitoes).</p>
<b>Secondary vector</b>	<i>Aedes marshallensis</i> *
<b>Biting habits</b>	Day time
<b>Hosts</b>	Man
<b>Breeding sites</b>	<p>Natural containers (treeholes, coconut shells)</p> <p>* <i>Aedes marshallensis</i> is a secondary vector of filariasis in Kiribati. This mosquito is found in the Marshall Islands, but not confirmed as a vector. This is presumably due to <i>Wuchereria bancrofti</i> being periodic in the Marshall Islands, but <i>A. marshallensis</i> is a daytime biting mosquito.</p>

## **NAURU**

**Non endemic country**

**Population estimated:** 11,500 (2000)

**Geographic dispersion:** 1 inhabited island

**A type survey (Initial Baseline survey):** ICT testing in 1999

- Type: whole population - convenience sample
- Result: 388 tested – 1 (0.3%) ICT positive

**No MDA**

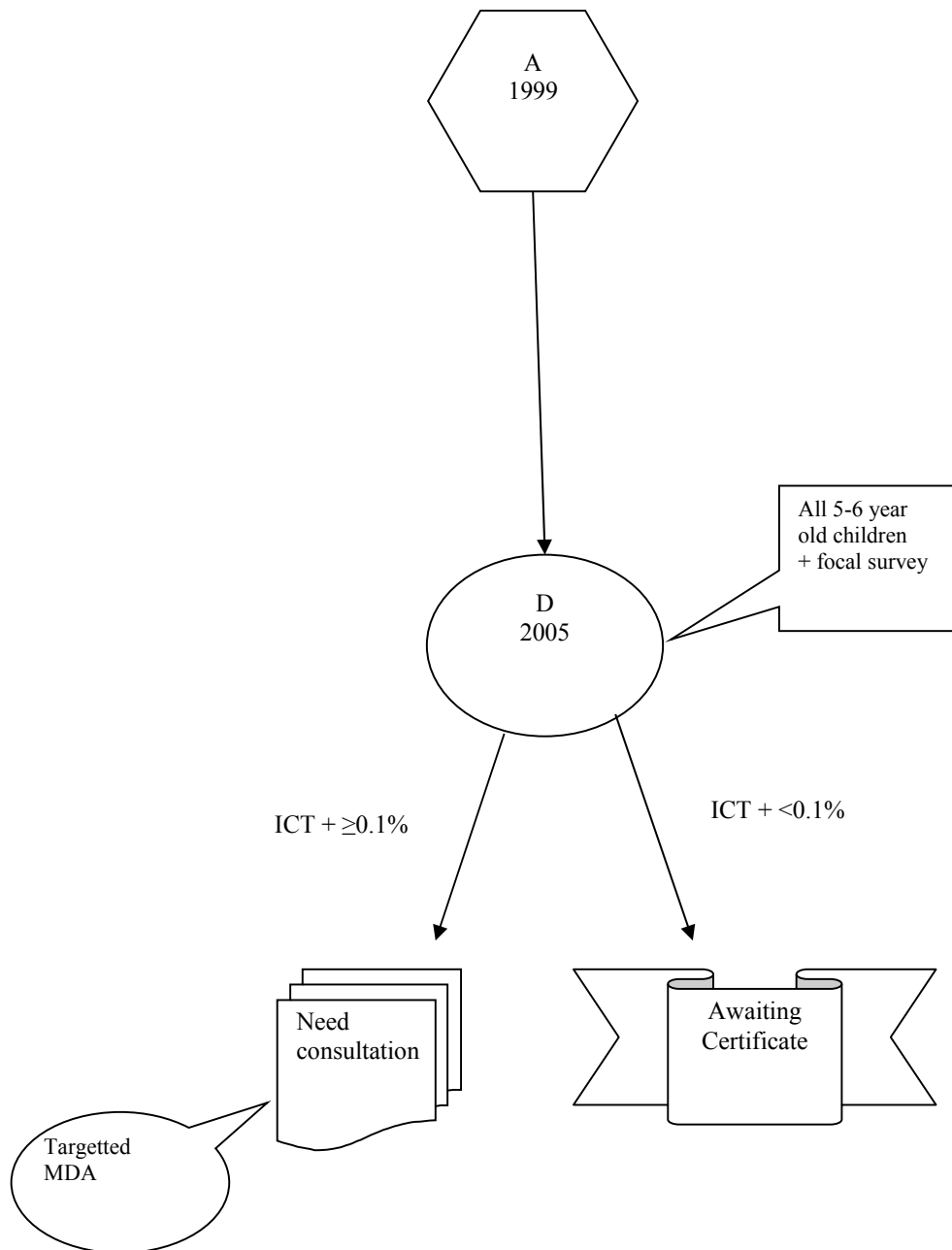
### **Recommendation:**

#### **Implementation of D type survey:**

Final ICT survey in all 6 year old children in Nauru should be carried out in 2005. The estimated number of this target population is about 340 persons. If possible, survey in other target populations (for example: adults) or focal survey in former endemic village should be recommended.

- If ICT positive prevalence is  $<0.1\%$ , await the certification of LF elimination.
- If ICT positive prevalence is  $\geq 0.1\%$ , do additional investigations around positive cases:
  - Confirm with other biological test (i.e. Og4C3);
  - Survey of the positive cases household;
  - Discussion with the PacELF Monitoring and Evaluation group;
  - Individual treatment (positive persons);
  - Vector control programme? Impregnated bednets?

## FLOWCHART: NAURU



## GUIDELINES FOR CONDUCTING MOSQUITO CONTROL FOR FILARIASIS VECTORS: NAURU

<b>Primary Vector</b>	<i>Culex quinquefasciatus</i>
<b>Activity pattern</b>	Nighttime
<b>Biting preference</b>	Large animals including humans
<b>Location of biting</b>	Indoors and outdoors
<b>Flight range</b>	Up to 5 km
<b>Breeding sites</b>	Temporary and permanent water including larger man provided containers (tires, drums, small plastic containers), pit latrines, septic tanks, ditches, marshes, both clean and polluted water.
<b>Insecticide resistance</b>	Resistant to DDT, organophosphorus compounds (including malathion and temephos), carbamates and pyrethroids in 36 countries.
<b>Other important characters</b>	Lays eggs in groups called rafts. Known to rapidly develop resistance to insecticides.
<b>Monitoring the Primary Vector</b>	Gravid traps. Larval/pupal survey at least twice a year (once during the wet season, once during the dry season).
<b>Recommended Control Methods</b>	<ol style="list-style-type: none"> <li>1. Insecticide impregnated curtains and bednets</li> <li>2. Breeding source reduction of domestic containers</li> <li>3. Polystyrene beads in pit latrines</li> <li>4. <i>Bacillus sphaericus</i> in polluted water</li> <li>5. Drainage of permanent water sources</li> <li>6. Repellents and mosquito coils</li> <li>7. Screening houses</li> </ol> <p>The importance of control methods 2-5 will depend on what is learned during the larval/pupal surveys (e.g., effort should be spent on the breeding sites producing the most adult mosquitoes).</p>

## **NEW CALEDONIA**

**Endemic (or partially endemic?) country**

**Population estimated:** 212,700 (2000)

**Geographic dispersion:** 1 main island – 4 small inhabited islands

**A type survey (Initial Baseline survey):** ICT testing in 1999

- Type: sentinel survey – School children (9 to 11 year olds) in Ouvea island
- Result: 136 tested – 2 (1.47%) ICT positive

**No MDA for the last 2 decades**

### **Recommendation:**

#### **Completion of the A type survey:**

ICT Survey in former endemic areas (foci in North Province and Loyalty Islands Province) should be implemented by 2003.

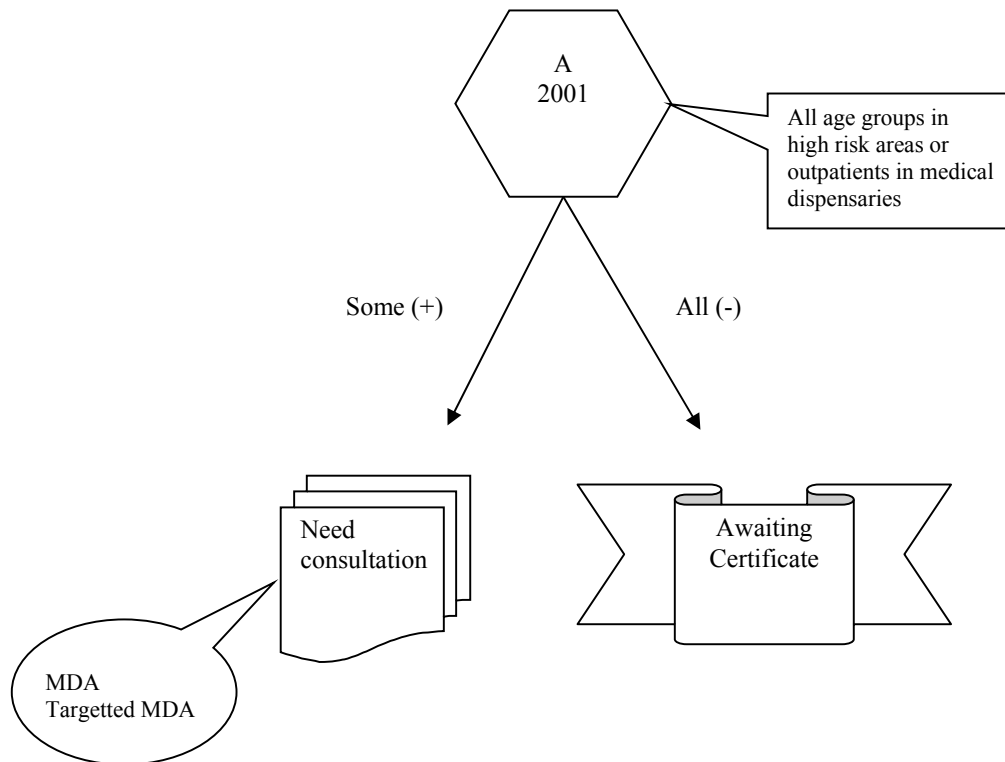
- Target population: all age groups of those areas or all outpatients of medical dispensaries (convenience sample).
- Tests: ICT, and/or mf associated with clinical examination (legs, arms, scrotum, breast) and questionnaire about any known cases of LF chronic signs amongst relatives or friends
- Duration: 3 to 6 months.

The result of this survey should enable the decision whether to implement full MDA in the 2 former endemic provinces, or partial MDA in some areas or individual treatment if the LF prevalence is under 1%.

- If no new LF area is detected, do partial MDA (in Ouvea island only). Plan mid term evaluation in this sentinel site after 3 MDA with similar methodology to initial survey.
- If new LF areas are detected, MDA should be considered in these provinces (national MDA or partial MDA).

C and D type survey (final and transmission assessments) should be planned in all 6 year old children when MDA is completed.

## FLOWCHART: NEW CALEDONIA



## GUIDELINES FOR CONDUCTING MOSQUITO CONTROL FOR FILARIASIS VECTORS: NEW CALEDONIA

<b>Primary Vector</b>	<i>Ochlerotatus vigilax</i>
<b>Distribution of Primary Vector</b>	Wide spread along the coasts of New Caledonia including the Ile des Pins and Loyalty islands (Ouvea, Lifu and Mare) .
<b>Activity pattern</b>	Day and Night time
<b>Biting preference</b>	Large animals including humans
<b>Location of biting</b>	Indoors and outdoors
<b>Resting location</b>	Outdoors
<b>Flight range</b>	More than 10 km
<b>Breeding sites</b>	Salt Marshes
<b>Other important characters</b>	
<b>Monitoring the Primary Vector</b>	Light traps
<b>Recommended Control Methods</b>	<ol style="list-style-type: none"> <li>1. Insecticide impregnated bednets</li> <li>2. Physical control in marshes (ditching, runnels)</li> <li>3. Repellents and mosquito coils</li> <li>4. Screening houses</li> </ol>



## **NIUE**

**Endemic country**

**Population estimated:** 1,900 (2000)

**Geographic dispersion:** 1 island

**A type survey (Initial Baseline survey):** ICT testing in 1999

- Type: whole country – All inhabitants
- Result: 1,794 tested - 56 (3.1%) ICT positive

**MDA for the whole country:** 1<sup>st</sup> MDA in 2000

**B type survey (Mid Term evaluation):** ICT testing in 2001

- Type: whole country – All inhabitants
- Result: 1,630 tested – 22 (1.3%) ICT positive

**Subsequent surveys:** ICT surveys were carried out each year in all inhabitants.

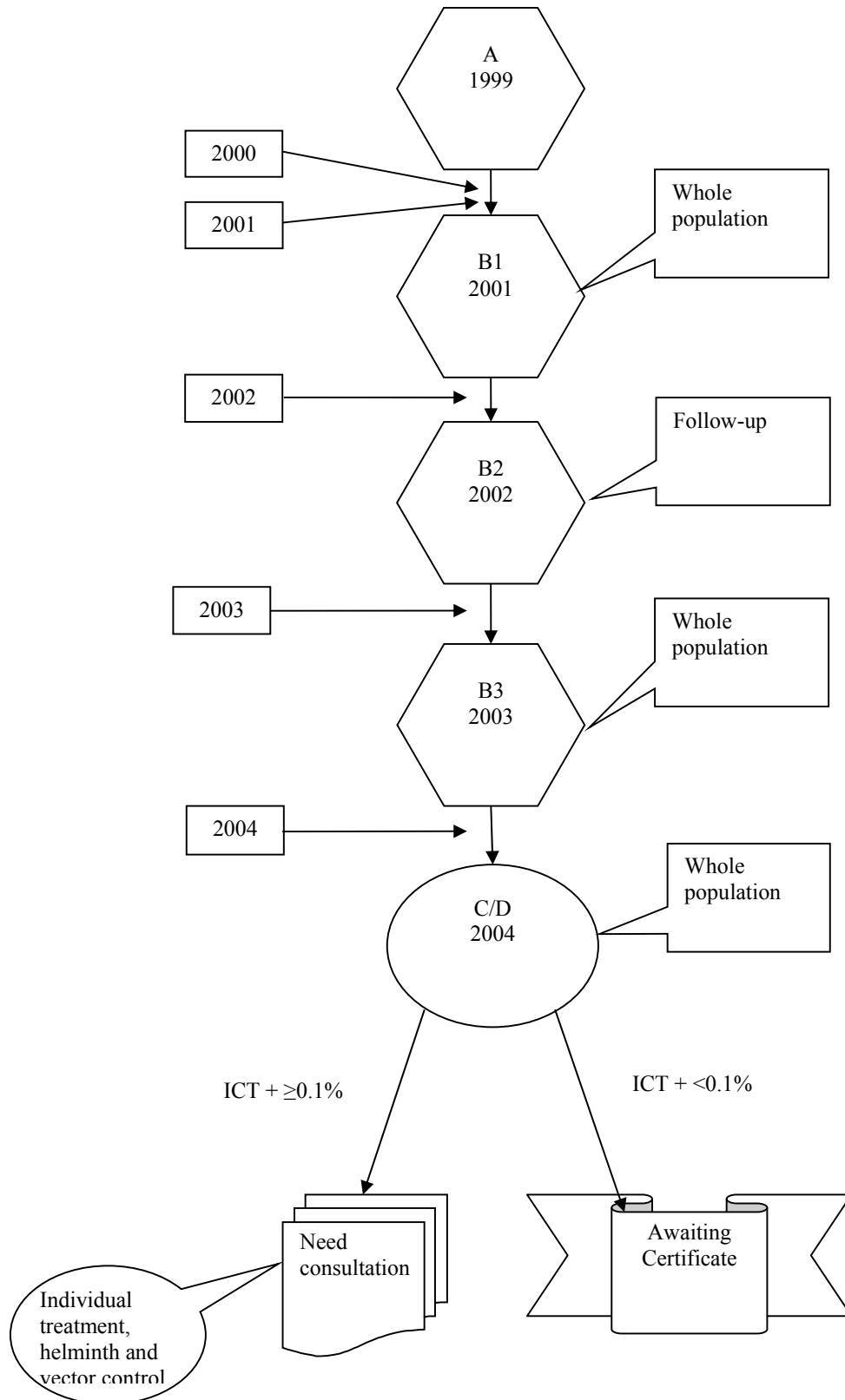
### **Recommendation:**

**C/D type survey (final and transmission assessments):**

This survey should be carried out in 2004, after the 5<sup>th</sup> MDA, in all inhabitants. In addition to ICT, other testing techniques can be used.

- If ICT positive prevalence is  $<0.1\%$ , await the certification of LF elimination.
- If ICT positive prevalence is  $\geq 0.1\%$ , further investigations should be done:
  - Confirm with other biological test (i.e. Og4C3);
  - Discussion with the PacELF Monitoring & Evaluation group;
  - Discussion for the post MDA alternative strategies;
    - Selective treatment for positive cases and their relatives (same household);
    - Helminth control programme;
    - Integrated Vector control programme.

## FLOWCHART: NIUE



## GUIDELINES FOR CONDUCTING MOSQUITO CONTROL FOR FILARIASIS VECTORS: NIUE

<b>Primary Vector</b>	<i>Aedes cooki</i>
<b>Biting activity pattern</b>	Daytime
<b>Biting preference</b>	A common human biter
<b>Location of biting</b>	Indoors and outdoors
<b>Resting location</b>	Indoors (more than other scutellaris group mosquitoes)
<b>Flight range</b>	Unknown
<b>Breeding sites</b>	Man provided barrels, canoes); Natural water containers (treeholes, coconut shells, Pandanus axils)
<b>Other important characters</b>	A suspected dengue vector. Prefers dense vegetation/shady areas.
<b>Monitoring the Primary Vector</b>	Larval/pupal surveys
<b>Recommended Control Methods</b>	<ol style="list-style-type: none"><li>1. Removal of breeding site</li><li>2. Insecticide impregnated bednets and curtains</li><li>3. Repellents and mosquito coils</li><li>4. Screening houses</li></ol>

## **NORTHERN MARIANA ISLANDS**

**Non endemic country**

**Population estimated:** 76,700 (2000)

**Geographic dispersion:** 14 inhabited islands

**A type survey (Initial Baseline survey):** ICT testing in 2001

- Type: convenience sample (3 islands including Saipan)
- Result: 980 tested (19 villages) – 0 (0%) ICT positive

**No MDA**

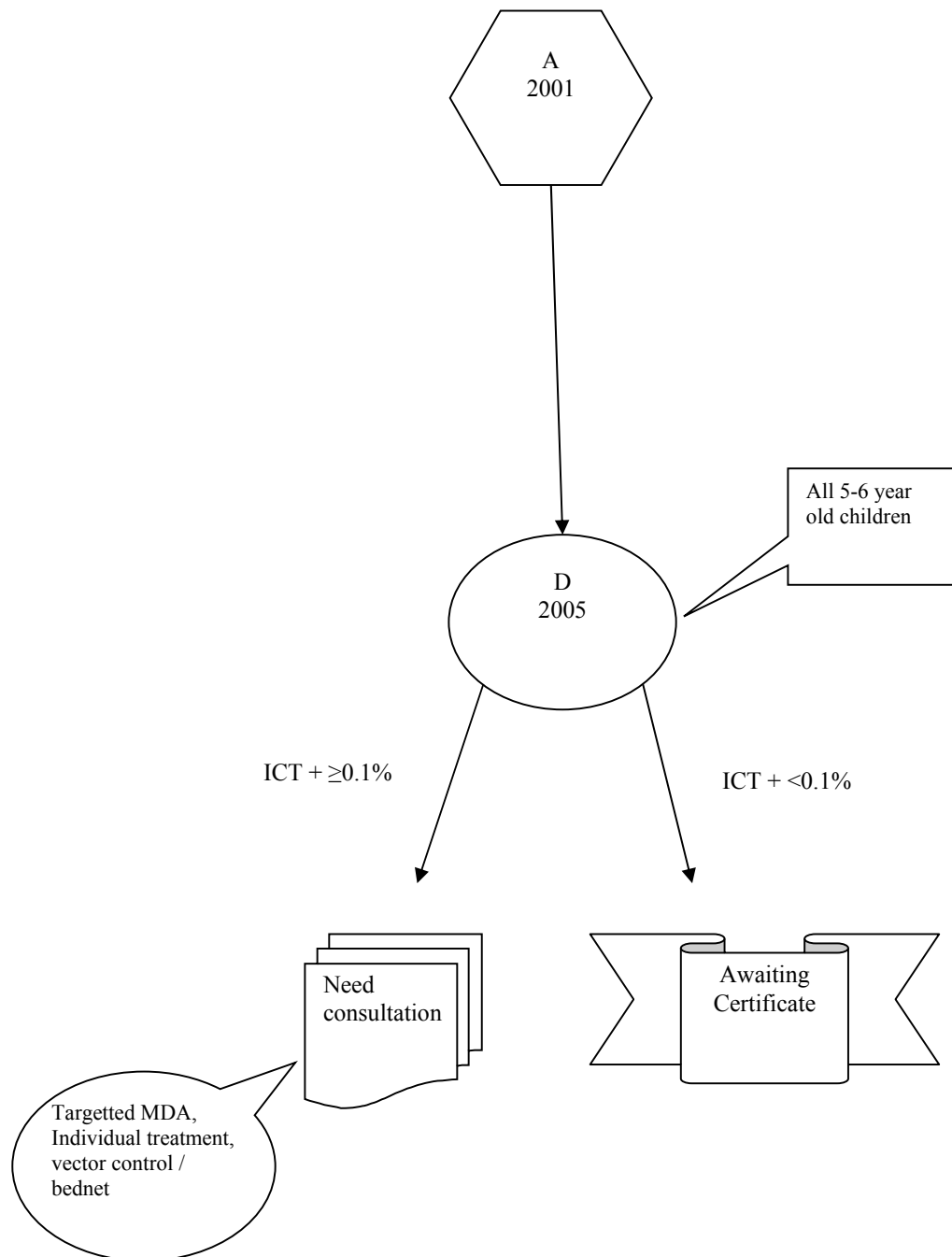
### **Recommendation:**

#### **Implementation of D type survey:**

The final ICT survey in all 6 year old children in the Northern Mariana Islands should be carried out in 2005. The estimated number of this target population is about 1,700 persons.

- If ICT positive prevalence is  $<0.1\%$ , await the certification of LF elimination.
- If ICT positive prevalence is  $\geq 0.1\%$ , do additional investigations around positive cases with other biological test (i.e. Og4C3). If confirmed infection then:
  - Survey of the positive cases household;
  - Discussion with the PacELF Monitoring & Evaluation group;
  - Vector control programme ? Impregnated bednets?
  - Partial MDA? Individual treatment (infected persons)?

## FLOWCHART: NORTHERN MARIANA ISLANDS



## **GUIDELINES FOR CONDUCTING MOSQUITO CONTROL FOR FILARIASIS VECTORS: NORTHERN MARIANA ISLANDS**

<b>Primary Vector</b>	<i>Culex quinquefasciatus</i>
<b>Activity pattern</b>	Nighttime
<b>Biting preference</b>	Large animals including humans
<b>Location of biting</b>	Indoors and outdoors
<b>Flight range</b>	Up to 5 km
<b>Breeding sites</b>	Temporary and permanent water including larger man provided containers (tires, drums, small plastic containers), pit latrines, septic tanks, ditches, marshes, both clean and polluted water.
<b>Insecticide resistance</b>	Resistant to DDT, organophosphorus compounds (including malathion and temephos), carbamates and pyrethroids in 36 countries.
<b>Other important characters</b>	Lays eggs in groups called rafts. Known to rapidly develop resistance to insecticides.
<b>Monitoring the Primary Vector</b>	Gravid traps. Larval/pupal survey at least twice a year (once during the wet season, once during the dry season).
<b>Recommended Control Methods</b>	<ol style="list-style-type: none"> <li>1. Insecticide impregnated curtains and bednets</li> <li>2. Breeding source reduction of domestic containers</li> <li>3. Polystyrene beads in pit latrines</li> <li>4. <i>Bacillus sphaericus</i> in polluted water</li> <li>5. Drainage of permanent water sources</li> <li>6. Repellents and mosquito coils</li> <li>7. Screening houses</li> </ol> <p>The importance of control methods 2-5 will depend on what is learned during the larval/pupal surveys (e.g., effort should be spent on the breeding sites producing the most adult mosquitoes).</p>

# **PALAU**

**Partially endemic country**

**Population estimated:** 19,100 (2000)

**Geographic dispersion:** 1 main island and 9 other islands

**A type survey (Initial Baseline survey):** ICT testing in 2001

- Result: 2,031 tested - 9 (0.4%) ICT positive (mainly from Ngardmau area)

**No MDA until this point**

## **Recommendation:**

**Palau should be divided in 3 functional units**

- Ngardmau area (endemic) where MDA should be started
- The rest of Palau for which non endemicity has to be confirmed will be divided into 2 sub-implementation units (Koror Island and the rest of Palau).

### ***(1) In Ngardmau unit:***

**B type survey (Mid term evaluation):**

This ICT survey should be carried out in Ngardmau area (221 inhabitants) after 2 MDA rounds, because of the LF low prevalence.

**C and D type surveys (final and transmission assessments)**

If the previous survey shows no infection, C and D surveys will not be necessary

If the previous survey still shows infection, 2 or 3 more MDA rounds should be considered and C and D surveys should be planned after the last MDA, in all inhabitants.

### ***(2) In Koror Island and the rest of Palau:***

**C type survey (final assessment)**

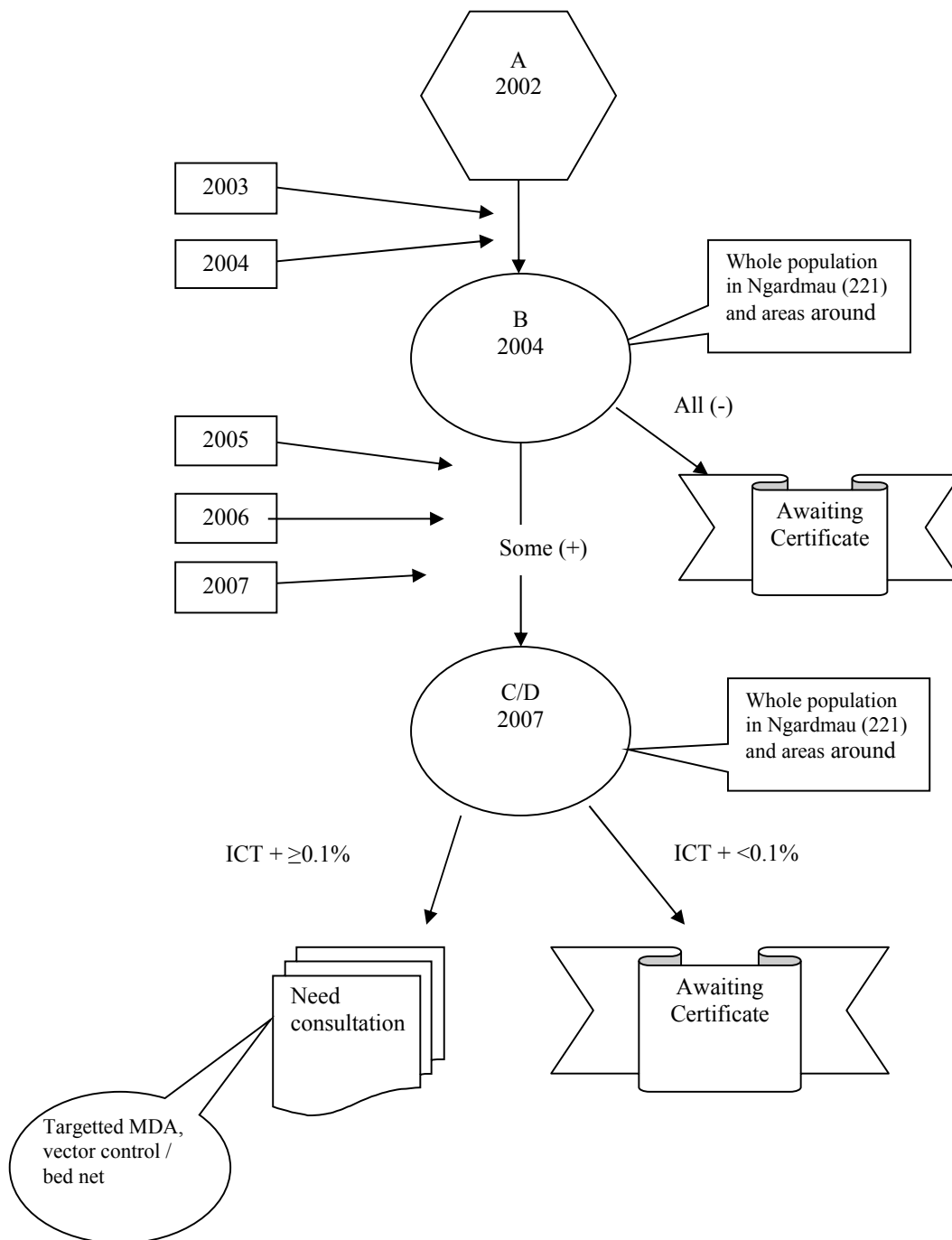
This should be carried out in sampled island group. In any other pockets are found, partial MDA should be done until the prevalence in all areas is <1%.

**D type survey (transmission assessment)**

This ICT survey should be carried out in 2005 in all 6 year old children in Palau (except in the Ngardmau area). This survey should confirm the lack of LF transmission in these areas. The estimated size of this target population is about 400.

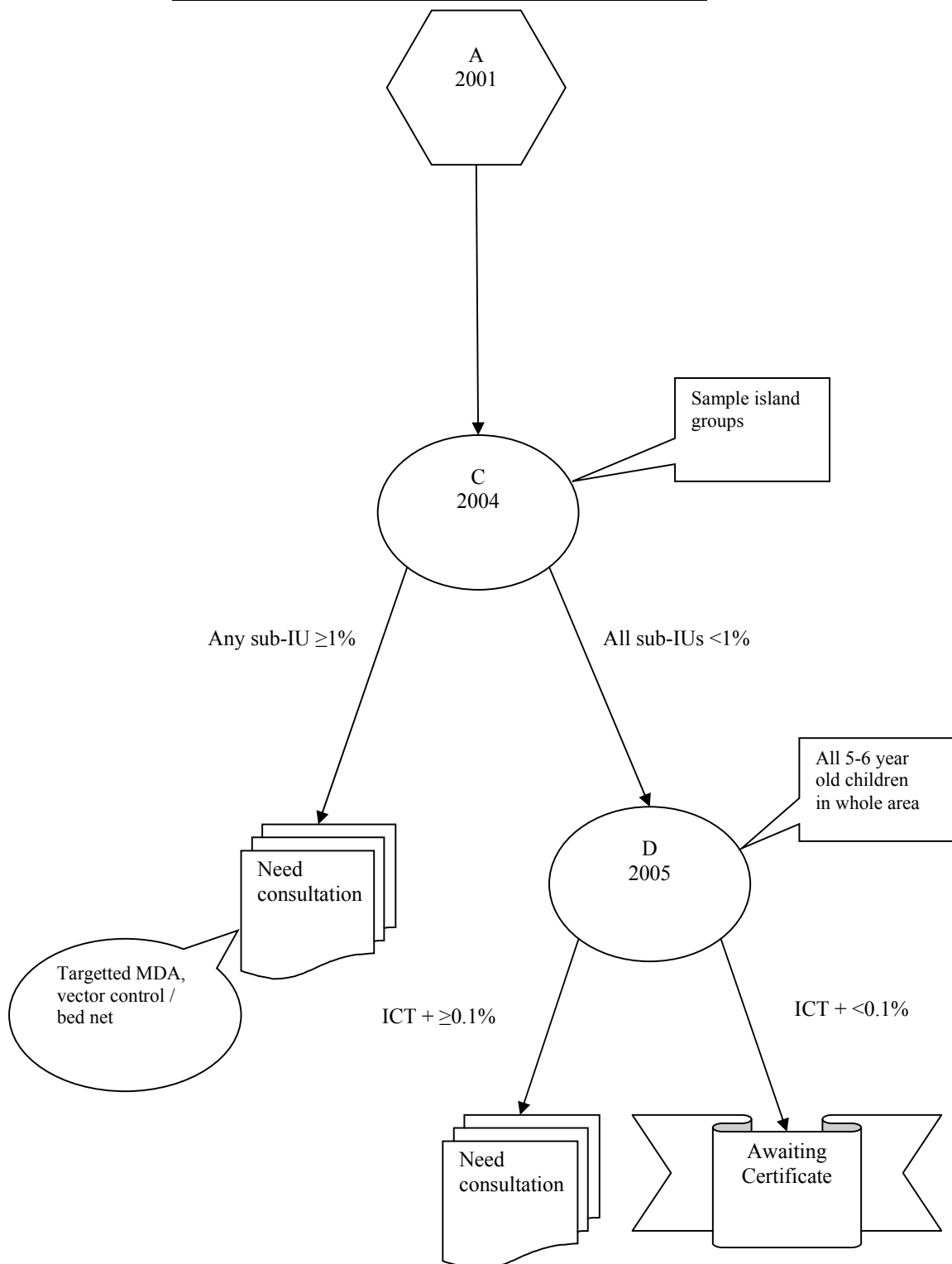
- If ICT positive prevalence is <0.1%, await the certification of LF elimination.
- If ICT positive prevalence is ≥0.1%, do additional investigations around positive cases with other biological test (i.e. Og4C3). If confirmed infection then:
  - Discussion with the PacELF Monitoring & Evaluation group;
  - Partial MDA - Individual treatment;
  - Integrated Vector control programme - Impregnated bednets.

## **FLOWCHART: NGARDMAU, PALAU**





## FLOWCHART: KOROR ISLAND AND THE REST OF PALAU



## SUGGESTED GUIDELINES FOR COUNTRY C SURVEYS FOR FINAL PREVALENCE ASSESSMENT: PALAU

1. The C survey for Palau should take place in 2004, except for Ngardmau. Ngardmau will be tested in 2007. Sampling in areas other than Ngardmau will be by Stratified Cluster Sampling using villages as clusters. An exception is bIn Ngardmau and the surrounding area the entire population will be tested.
2. The Sub-implementation Units will be (1) Konor Island and (2) the remainder of the islands in Palau
3. Using the Demographic Tables for the Western Pacific Region 2000-2005 (WHO publication), the estimated population in 2005 (the last year that we have estimated populations for Palau) will be 21,582.
4. Therefore the average population of each sub-implementation unit will be 10,680 (21,361 (after subtracting the population of Ngardmau) divided by 2).
5. From the table for Stratified Cluster Sampling (Section 2), the sample size needed for each district (sub-implementation unit) for an average population of 20,000 is 733 (since the table has no average population for 10,680, the next largest average population for a sub-implementation unit is used (e.g., 20,000).
6. Villages were chosen randomly with a maximum of 200 people per village. Villages should be sampled in the order given in the table below.

### Villages to be Sampled and the Number of People per Village to be Sampled (based on 2000 census village population)

Village Order	Koror Island	Remainder of Islands
1	<b>Ikela</b> -200	<b>Ngchesar</b> -200
2	<b>Ibukel</b> -200	<b>Ngerchelung</b> -200
3	<b>Dngerongel</b> -200	<b>Aimeliik</b> -200
4	<b>Ngerbeched</b> -200	<b>Ngardmau</b> -200
5	<b>Madalaii*</b> -200	<b>Peleliu*</b> -200

- Village names in **bold** should have entire population tested by ICT. A maximum of 200 villagers should be tested in villages with more than 200 people (these villages are shown followed by the number '200').
  - \*Alternative villages to be surveyed if less than 733 people are sampled from the villages listed for each sub-implementation unit.
7. Sampling should be done until at least 733 people per sub-implementation unit have been sampled by ICT in 2003-2004. In addition the entire population of Ngardmau (about 221) will be sampled in 2007. Approximately 1,600 ICT cards are needed for the two sub-implementation units plus an estimated 221 for Ngardmau. A total of 1,821 ICT cards will be needed for the C surveys.

## GUIDELINES FOR CONDUCTING MOSQUITO CONTROL FOR FILARIASIS VECTORS: PALAU

<b>Primary Vector</b>	<i>Culex quinquefasciatus</i>
<b>Activity pattern</b>	Nighttime
<b>Biting preference</b>	Large animals including humans
<b>Location of biting</b>	Indoors and outdoors
<b>Flight range</b>	Up to 5 km
<b>Breeding sites</b>	Temporary and permanent water including larger man provided containers (tires, drums, small plastic containers), pit latrines, septic tanks, ditches, marshes, both clean and polluted water
<b>Insecticide resistance</b>	Resistant to DDT, organophosphorus compounds (including malathion and temephos), carbamates and pyrethroids in 36 countries.
<b>Other important characters</b>	Gravid traps for adults. Lays eggs in groups called rafts. Known to rapidly develop resistance to insecticides.
<b>Monitoring the Primary Vector</b>	Larval/pupal survey at least twice a year (once during the wet season, once during the dry season).
<b>Recommended Control Methods</b>	<ol style="list-style-type: none"> <li>1. Insecticide impregnated curtains and bednets</li> <li>2. Breeding source reduction of domestic containers</li> <li>3. Polystyrene beads in pit latrines</li> <li>4. <i>Bacillus sphaericus</i> in polluted water</li> <li>5. Drainage of permanent water sources</li> <li>6. Repellents and mosquito coils</li> <li>7. Screening houses</li> </ol> <p>The importance of control methods 2-5 will depend on what is learned during the larval/pupal surveys (e.g., effort should be spent on the breeding sites producing the most adult mosquitoes).</p>

## **PAPUA NEW GUINEA**

**Endemic country**

**Population estimated:** 4,790,800 (2000)

**Geographic dispersion:** 1 very large island and other smaller islands

**Surveys and special LF elimination programme in some limited areas**

**Recommendation to follow the WHO LF global guidelines.**

## GUIDELINES FOR CONDUCTING MOSQUITO CONTROL FOR FILARIASIS VECTORS: PAPUA NEW GUINEA

Primary Vectors	Anopheles farauti complex (An. farauti, An punctulatus)	
Distribution of Primary Vector	Areas below 5500 feet; filariasis has been found in all provinces except Chimbu	
Activity pattern	Night	
Biting preference	Large animals (humans, pigs, dogs)	
Location of biting	Indoors and outdoors	
Resting pattern	Rests inside houses after feeding until daytime	
Flight range	1-2 km	
Breeding sites	Fresh and brackish water, large swamps, edges of slow flowing rivers	
Insecticide resistance	An farauti	Resistant to DDT in the Solomon Islands; behavioural resistance shown in Papua New Guinea.
	An koliensis	Resistant to DDT in Indonesia
	An punctulatus	Resistant to DDT in Indonesia
Monitoring the Primary Vector	Landing catches, bednet baited light traps	
Recommended Control Methods for Primary Vectors		
	1. Insecticide impregnated bednets	
	2. Residual insecticide wall spraying	
	3. Mosquito coils, repellents	
	4. Screening houses	

### Secondary Vectors

1. *Culex quinquefasciatus*\*\*
2. *Mansonia uniformis*
3. *O. kochi*

\*\*Resistant to DDT, organophosphorus compounds (including malathion and temephos), carbamates and pyrethroids in 36 countries.

## **PITCAIRN ISLAND**

**Non endemic country**

**Population:** 47

**Geographic dispersion:** 1 inhabited island

**A type survey (Initial baseline survey):** ICT testing in 2002

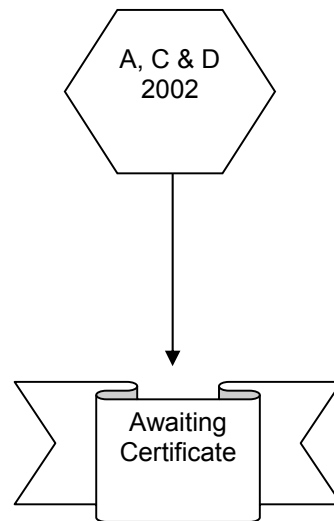
- Type: whole country survey
- Results: 33 tested – 0 (0%) ICT positive

**No MDA**

**Recommendation:**

Wait for the certification of LF elimination.

**FLOWCHART: PITCAIRN ISLAND**



## GUIDELINES FOR CONDUCTING MOSQUITO CONTROL FOR FILARIASIS VECTORS: PITCAIRN ISLAND

<b>Primary Vector</b>	<i>Aedes polynesiensis</i>
<b>Activity pattern</b>	Daytime
<b>Biting preference</b>	All animals
<b>Location of biting</b>	Prefers outdoors but will go inside houses
<b>Resting location</b>	Outdoors
<b>Flight range</b>	Less than 100m
<b>Breeding sites</b>	Man provided containers (tires, drums, small plastic containers); Natural containers (treeholes, crabholes).
<b>Insecticide resistance</b>	Resistance to DDT shown in Fiji and French Polynesia including Tahiti.
<b>Other important characters</b>	Avoids bright sunlight. Also a vector of dengue virus.
<b>Monitoring the Primary Vector</b>	Larval/pupal survey at least twice a year (once during the wet season, once during the dry season).
<b>Recommended Control Methods</b>	<ol style="list-style-type: none"> <li>1. Breeding source reduction of domestic containers</li> <li>2. Bednets to protect children when napping</li> <li>3. Insecticide impregnated curtains and bednets</li> <li>4. Repellents and mosquito coils</li> <li>5. Screening houses</li> </ol> <p>*Effort should be directed towards reducing the number of breeding sites that are producing the most adult mosquitoes. The importance of different container types will be determined from the larval/pupal surveys.</p>



# **SAMOA**

**Endemic country**

**Population estimated:** 169,200 (2000)

**Geographic dispersion:** 2 big inhabited islands – 7 small islands

**A type survey (Initial Baseline survey):** ICT testing in 1999

- Type: convenience sample
- Result: 7,006 tested – 317 (4.5%) ICT positive

**MDA for the whole country:** with DEC+ALB for the whole country starting in 1999 – Last round of MDA in 2003

**B type survey (Mid Term evaluation):** ICT and mf in 2002

- Type: sentinel sites
- Results:
  - o ICT: 2,141 tested – 96 (4.5%) ICT positive
  - o mf: 2,265 tested – 6 (0.2%) mf positive

Subsequent surveys were carried out in sentinel sites each year

## **Recommendation:**

**C type survey (final assessment):**

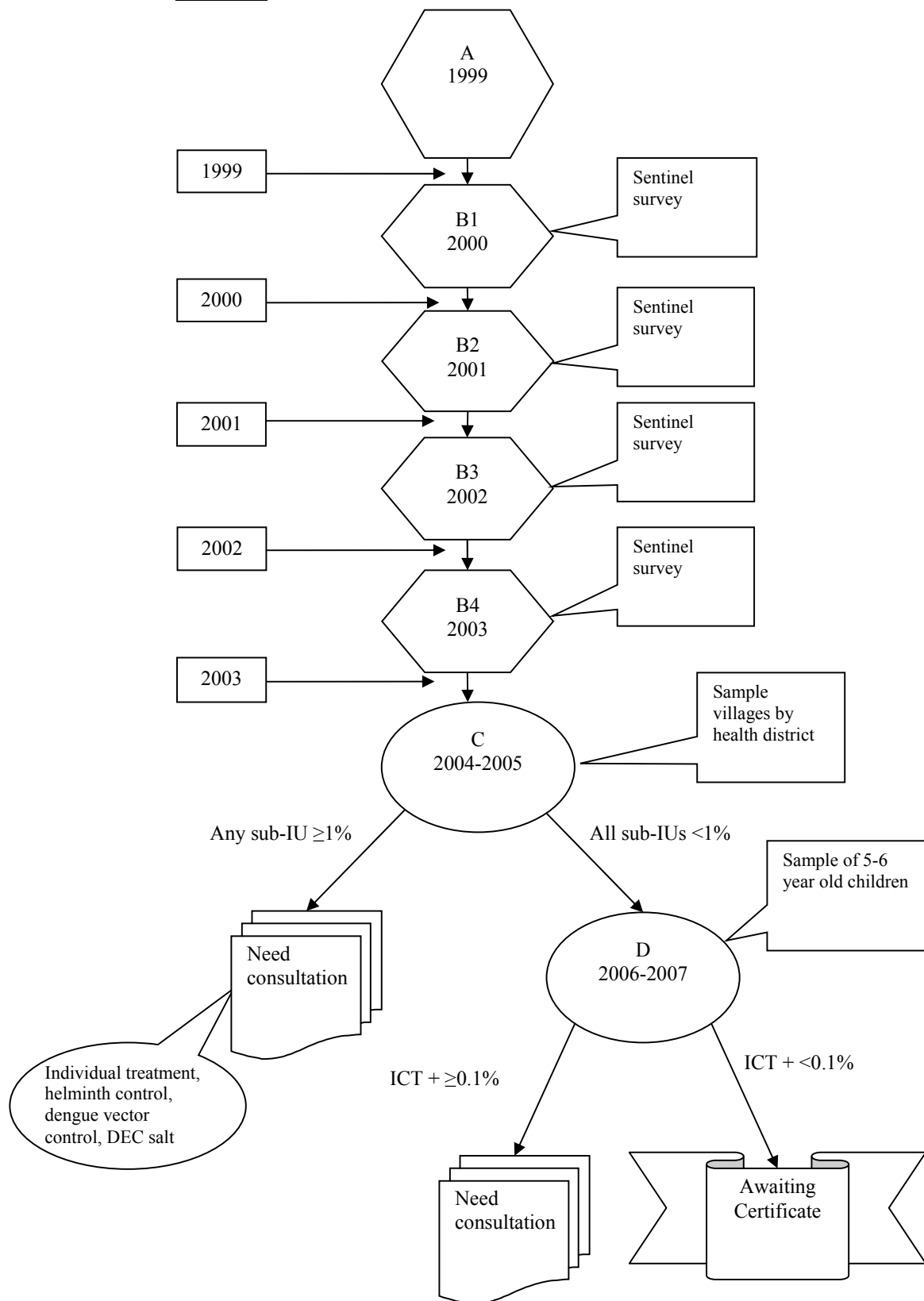
Stratified sample survey by health districts in 2004-05 after the 5th MDA.

**D type survey (transmission assessment):**

This ICT survey in all 6 year children Samoa should be carried out in 2006-07. The estimated number of this target population is about 4,800 persons. If possible, surveys in sentinel sites should also be carried out.

- If ICT positive prevalence is  $< 0.1\%$ , await the certification of LF elimination.
- If ICT positive prevalence is  $\geq 0.1\%$ , do additional investigations around positive cases:
  - o Confirm with other biological test (i.e. Og4C3);
  - o Discussion with the PacELF Monitoring & Evaluation group;
  - o Discussion for the post MDA alternative strategies;
    - Partial MDA in still endemic areas;
    - Helminth control programme;
    - DEC medicated salt;
    - Integrated vector control programme.

## FLOWCHART: SAMOA



## **SUGGESTED GUIDELINES FOR COUNTRY C SURVEYS FOR FINAL PREVALENCE ASSESSMENT: SAMOA**

1. The C survey for Samoa should take place in 2004-2005 and will be by Stratified Cluster Sampling using villages as clusters.
2. The Sub-implementation Units will be the 16 health districts
3. Using the Demographic Tables for the Western Pacific Region 2000-2005 (WHO publication), the estimated population in 2004 for Samoa will be 180,249.
4. Therefore the average population of each sub-implementation unit will be 11,265 (180,249 divided by 16).
5. From the table for Stratified Cluster Sampling (Section 2), the sample size needed for each district (sub-implementation unit) for an average population of 20,000 is 733 (since the table has no average population for 11,265, the next largest average population for a sub-implementation unit is used (e.g., 20,000).
6. Villages were chosen randomly with a maximum of 200 people per village. Villages should be sampled in the order given in the table below.
7. Sampling should be done until at least 733 people per health district have been sampled by ICT. Approximately 13,232 ICT cards are needed for the C surveys in the 16 sub-implementation units.

Villages to be Sampled by Health District and the Number of People per Village to be Sampled (based on 2001 census)

	<b>Health District Number</b>							
Village Order	1.1-1.7	1.8-1.14	2	3	4	5	6	7
1	<b>Aai o Niue</b>	Vaitoloa-200	Nofoalii-200	<b>Apai</b>	Tafagamanu-200	Saanapu Uta-200	<b>Matautu</b>	<b>Alafou</b>
2	Togafua-100	Alamutu-200	<b>Afia</b>	<b>Apolima island</b>	Savaia-200	Siumu-200	<b>Piu</b>	Lotofaga-200
3	<b>Mulivai</b>	Tanumapua-200	Fasitoo Tai-200	<b>Salua</b>	Faleseela-200	Tafitoala-200	Satalo-200	<b>Lealatele</b>
4	Toomatagi-100	<b>Ululoloa</b>	<b>Sina</b>	<b>Satuilagi</b>	Safaatoa-200	Sataoa Uta-200	<b>Togitogia</b>	<b>Vaigalu</b>
5	<b>Leififi</b>	Faleula -200	<b>Faleolo</b>	Manono Uta-200	<b>Tanumalala*</b>	<b>Siumu Uta*</b>	Salani-200	Saleapaga-200
6	<b>Vinifou*</b>	Leauvaa*-200	Satuimalufilufi-200	Faleu-200			Vaovai-200	Lotopue-200
				<b>Matautu</b>			Saleilua*-200	<b>Ulutogia*</b>
	<b>Health District Number</b>							
Village Order	8	9	10	11	12	13	14	15
1	Uafato-200	Salelesi-200	<b>Vaisaulu</b>	Patamea-200	<b>Fatuvalu</b>	Sataua-200	Siutu-200	<b>Gautavai</b>
2	<b>Samamea</b>	Saolufata-200	Saasaai-200	Fagamalo-200	Paia-200	Tufutafoe-200	Foaluga-200	Papa-200
3	<b>Taelefaga</b>	<b>Solaua</b>	Saipipi-200	Lelepa-200	Lefagaoalii-200	Falelima-200	Sagone-200	Pitonuu-200
4	<b>Musumusu</b>	Falefa-200	Salimu-200	Avao-200	Letui-200	<b>Vaotupua</b>	Satuiatua-200	Gataivai-200
5	<b>Salimu</b>	Faleapuna-200	Lua-200	Saleia*-200	Samauga*-200	<b>Utulua*</b>	Fogatuli*-200	Vaitoomuli*-200
6	<b>Saletele</b>	<b>Sauniatu*</b>	Asaga*-200					
7	Sauao*-200							

- Village names in **bold** should have entire population tested by ICT. A maximum of 200 villagers should be tested in villages with more than 200 people (these villages are shown followed by the number '200').
- \*Alternative villages to be surveyed if less than 733 people are sampled from the villages listed for each sub-implementation unit

## GUIDELINES FOR CONDUCTING MOSQUITO CONTROL FOR FILARIASIS VECTORS: SAMOA

<b>Primary Vector</b>	<i>Aedes polynesiensis</i>
<b>Distribution of Primary Vector</b>	All islands
<b>Activity pattern</b>	Daytime
<b>Biting preference</b>	All animals
<b>Location of biting</b>	Prefers outdoors but will go inside houses
<b>Resting location</b>	Outdoors
<b>Flight range</b>	Less than 100m
<b>Breeding sites</b>	Man provided containers (tires, drums, small plastic containers); Natural containers (treeholes, crabholes).
<b>Insecticide resistance</b>	Resistance to DDT shown in Fiji and French Polynesia including Tahiti.
<b>Other important characters</b>	Avoids bright sunlight
<b>Monitoring the Primary Vector</b>	Larval/pupal survey at least twice a year (once during the wet season, once during the dry season).

### Recommended Control Methods for Primary Vector

1. Breeding source reduction of domestic containers
2. Bednets to protect young children when napping
3. Insecticide impregnated curtains and bednets
4. Repellents and mosquito coils
5. Screening houses

\*Effort should be directed towards reducing the number of breeding sites that are producing the most adult mosquitoes. The importance of different container types will be determined from the larval/pupal surveys.

### Secondary Vectors

1. *Aedes tutuilae*
2. *Aedes upolensis*
3. *Ochlerotatus samoanus*

# **SOLOMON ISLANDS**

**Non endemic country**

**Population estimated:** 420,851 (2000)

**Geographic dispersion:** 992 islands

**A type survey (Initial Baseline survey):** ICT testing in 1998-2001

- Type: whole country (especially in former endemic areas) – Stratification and EPI type cluster sampling
- Test: ICT and clinical survey
- Result: 4,035 tested (19 villages) – 0 (0%) ICT positive

**No MDA**

## **Recommendation:**

### **Implementation of C type survey:**

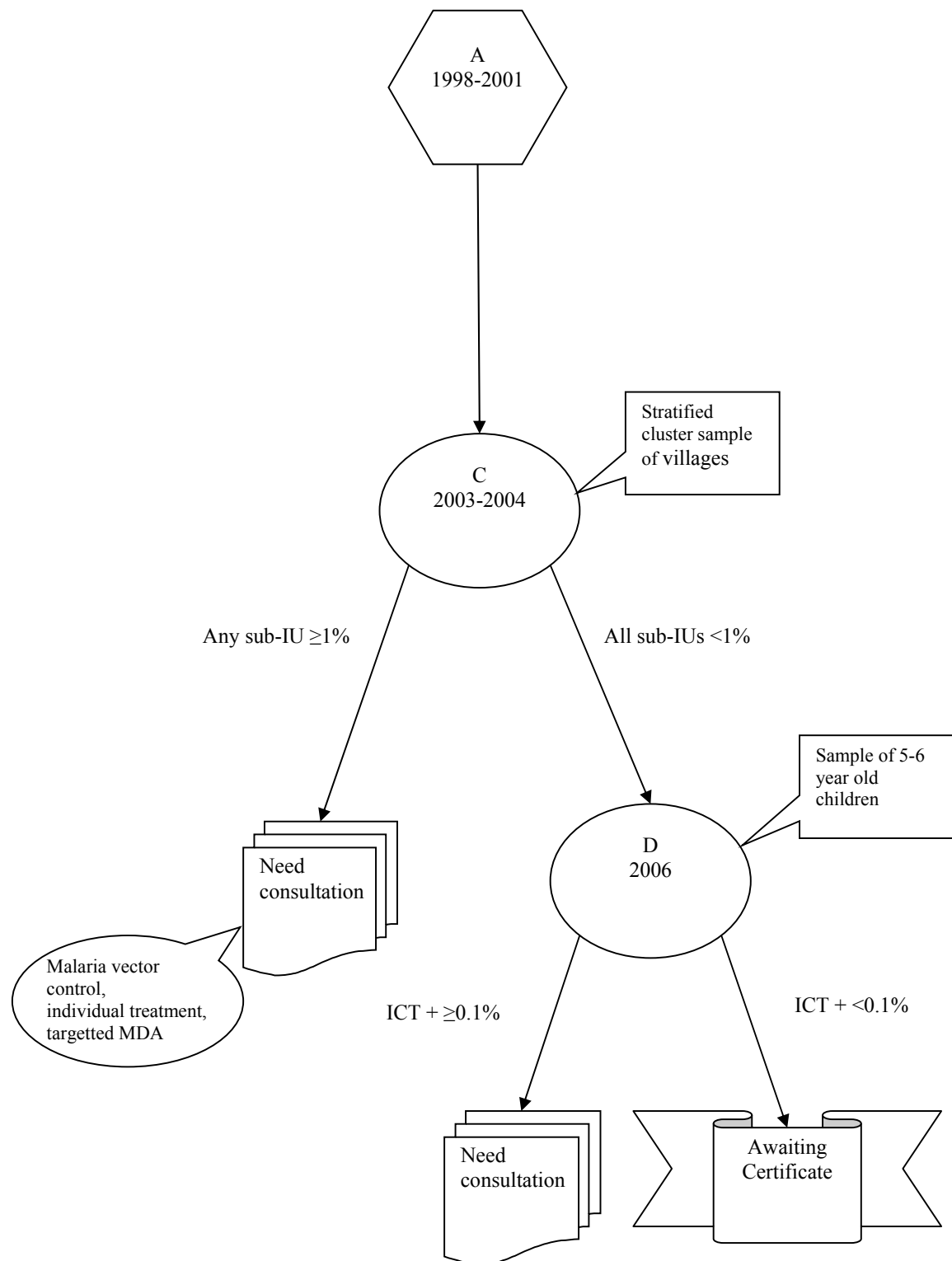
Additional prevalence sample survey is required due to concern about selection of sites for A survey, remoteness of some islands and former high endemicity. Random sampling of villages, stratified by region, should be done. This will be carried out in 2003-2004. If no pockets of filariasis are uncovered, proceed to type D survey.

### **Implementation of D type survey:**

The final ICT survey in a sampled population of 6 year old children in the Solomon Islands should be carried out in 2006. The estimated number of this target population is about 14,400 persons. Thus, a more cost effective alternative approach for this 6 year old population is to use sampling technique in big islands, while in small islands all 6 year old should be ICT tested. Detailed sampling method should be based on the most recent data regarding the distribution of this target population by areas. *Note: >30% children do not attend school.*

- If ICT positive prevalence is <0.1%, await the certification of LF elimination.
- If ICT positive prevalence is ≥0.1%, do additional investigations around positive cases. Test with other biological test (i.e. Og4C3).
  - If infection not confirmed by other test: no further investigation.
  - If infection confirmed:
    - Survey of the positive cases household;
    - Discussion with the PacELF Monitoring & Evaluation group (Partial MDA, individual treatment for positive persons?);
    - Integrated vector control programme (Roll Back Malaria).

## FLOWCHART: SOLOMON ISLANDS



## **SUGGESTED GUIDELINES FOR COUNTRY C SURVEYS FOR FINAL PREVALENCE ASSESSMENT: SOLOMON ISLANDS**

1. The C survey for the Solomon Islands should take place in 2003 - 2004 and will be by Stratified Cluster Sampling using villages as clusters.
2. The Sub-implementation Units will be regions (n = 28).
3. Using the mid-year population estimate (from the 1999 census), the estimated population in 2003 for the Solomon Islands will be 450,000.
4. Therefore the average population of each sub-implementation unit will be 16,071 (450,000 divided by 28).
5. From the table for Stratified Cluster Sampling (Section 2), the sample size needed for each district (sub-implementation unit) for an average population of 20,000 is 733 (since the table has no average population for 16,071, the next largest average population for a sub-implementation unit is used (e.g., 20,000)).
6. Villages were chosen randomly with a maximum of 200 people per village. Villages should be sampled in the order given in the table below.

**Number of regions per province and their total sample size.**

PROVINCE	Number of Regions	Sample size (calculated)
Temotu	2	1466
Makira Ulawa	4	2932
Malaita	5	3665
Guadalcanal	4	2932
Honiara	2	1466
Central	2	1466
Isabel	2	1478
Western	4	2932
Choiseul	2	1466
Banner Belona	1	733
- A TOTAL	28	20,524

maximum of 200 villagers should be tested in villages with more than 200 people

Sampling should be done until at least 733 people per region have been sampled by ICT. A total of approximately 20, 524 ICT cards will be required for the C surveys.



## GUIDELINES FOR CONDUCTING MOSQUITO CONTROL FOR FILARIASIS VECTORS: SOLOMON ISLANDS

<b>Primary Vectors</b>	<i>Anopheles farauti</i> complex ( <i>An. farauti</i> , <i>An. punctulatus</i> )	
<b>Distribution of Primary Vector</b>	All islands - Rennell and Bellona are malaria-free, but it is unclear if anopheline mosquitoes are on these two islands	
<b>Activity pattern</b>	Night	
<b>Biting preference</b>	Large animals (humans, pigs, dogs)	
<b>Location of biting</b>	Indoors and outdoors	
<b>Resting pattern</b>	Rests inside houses after feeding until daytime	
<b>Flight range</b>	1-2 km	
<b>Breeding sites</b>	Fresh and brackish water, large swamps, edges of slow flowing rivers	
<b>Insecticide resistance</b>	<i>An farauti</i>	Resistant to DDT in the Solomon Islands; behavioural resistance shown in Papua New Guinea
	<i>An punctulatus</i>	Resistant to DDT in Indonesia
<b>Monitoring the Primary Vector</b>	Landing catches, bednet baited light traps	
<b>Recommended Control Methods</b>	<ol style="list-style-type: none"> <li>1. Insecticide impregnated bednets</li> <li>2. Residual insecticide wall spraying</li> <li>3. Mosquito coils, repellents</li> <li>4. Screening houses</li> </ol>	

## **TOKELAU**

**Non endemic country**

**Population:** 1,507 (1996 census)

**Geographic dispersion:** 3 inhabited islands

**A type survey (Initial Baseline survey):** ICT testing in 1999

- Type: whole country survey
- Results: 1,311 tested – 1 (0.1%) ICT positive (non resident who has since left the country)

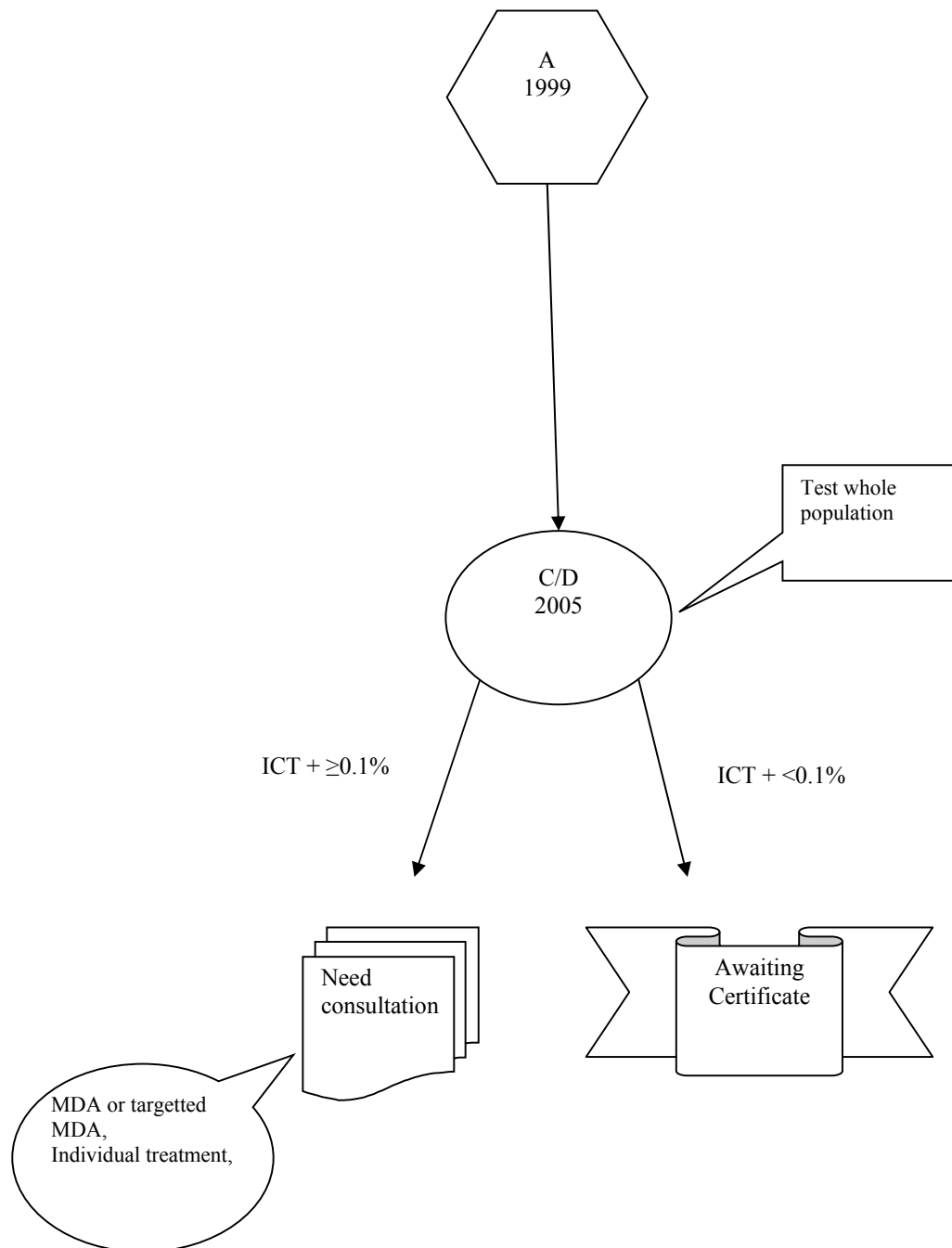
**No MDA**

### **Recommendation:**

**Retest the whole population in combined C/D type survey.**

- If ICT positive prevalence is  $<0.1\%$ , await the certification of LF elimination.
- If ICT positive prevalence is  $\geq 0.1\%$ , do additional investigations around positive cases. Test with other biological test (i.e. Og4C3):
  - If infection not confirmed by other test: no further investigation.
  - If infection confirmed:
    - Survey of the positive cases household;
    - Discussion with the PacELF Monitoring & Evaluation group (Partial MDA, individual treatment for positive persons?).

## FLOWCHART: TOKELAU



## GUIDELINES FOR CONDUCTING MOSQUITO CONTROL FOR FILARIASIS VECTORS: TOKELAU

<b>Primary Vector</b>	<i>Aedes polynesiensis</i>
<b>Distribution of Primary Vector</b>	All islands
<b>Activity pattern</b>	Daytime
<b>Biting preference</b>	All animals
<b>Location of biting</b>	Prefers outdoors but will go inside houses
<b>Resting location</b>	Outdoors
<b>Flight range</b>	Less than 100m
<b>Breeding sites</b>	Man provided containers (tires, drums, small plastic containers); Natural containers (treeholes, crabholes).
<b>Insecticide resistance</b>	Resistance to DDT shown in Fiji and French Polynesia including Tahiti.
<b>Other important characters</b>	Avoids bright sunlight. Also a vector of dengue virus.
<b>Monitoring the Primary Vector</b>	Larval/pupal survey at least twice a year (once during the wet season, once during the dry season).
<b>Recommended Control Methods</b>	<ol style="list-style-type: none"> <li>1. Breeding source reduction of domestic containers*</li> <li>2. Bednets to protect children when napping</li> <li>3. Insecticide impregnated curtains and bednets</li> <li>4. Repellents and mosquito coils</li> <li>5. Screening houses</li> </ol> <p>*Effort should be directed towards reducing the number of breeding sites that are producing the most adult mosquitoes. The importance of different container types will be determined from the larval/pupal surveys.</p>

# **TONGA**

**Endemic country**

**Population estimated:** 100,200 (2000)

**Geographic dispersion:** 3 main islands – 168 small islands

**A type survey (Initial Baseline survey):** ICT testing in 1999-2000

- Type: Main island – Convenience sampling
- Result: 4,002 tested - 108 (2.7%) ICT positive

**MDA for the whole country:** 1<sup>st</sup> MDA in 2001

## **Recommendation:**

**B type survey (Mid term evaluation):**

This ICT survey should be carried out at the end of 2003 in sentinel sites. Sentinel sites are known high endemic areas (3 villages). The target population is all inhabitants of sentinel sites, with the same sampling method used during initial survey and, if possible, with the same inhabitants. This survey should allow assessment of the impact of MDA.

**C type survey (final assessment):**

Stratified survey by island groups should be carried out in 2006-2007, after the 5<sup>th</sup> MDA. In parallel, survey of sentinel sites should be carried out.

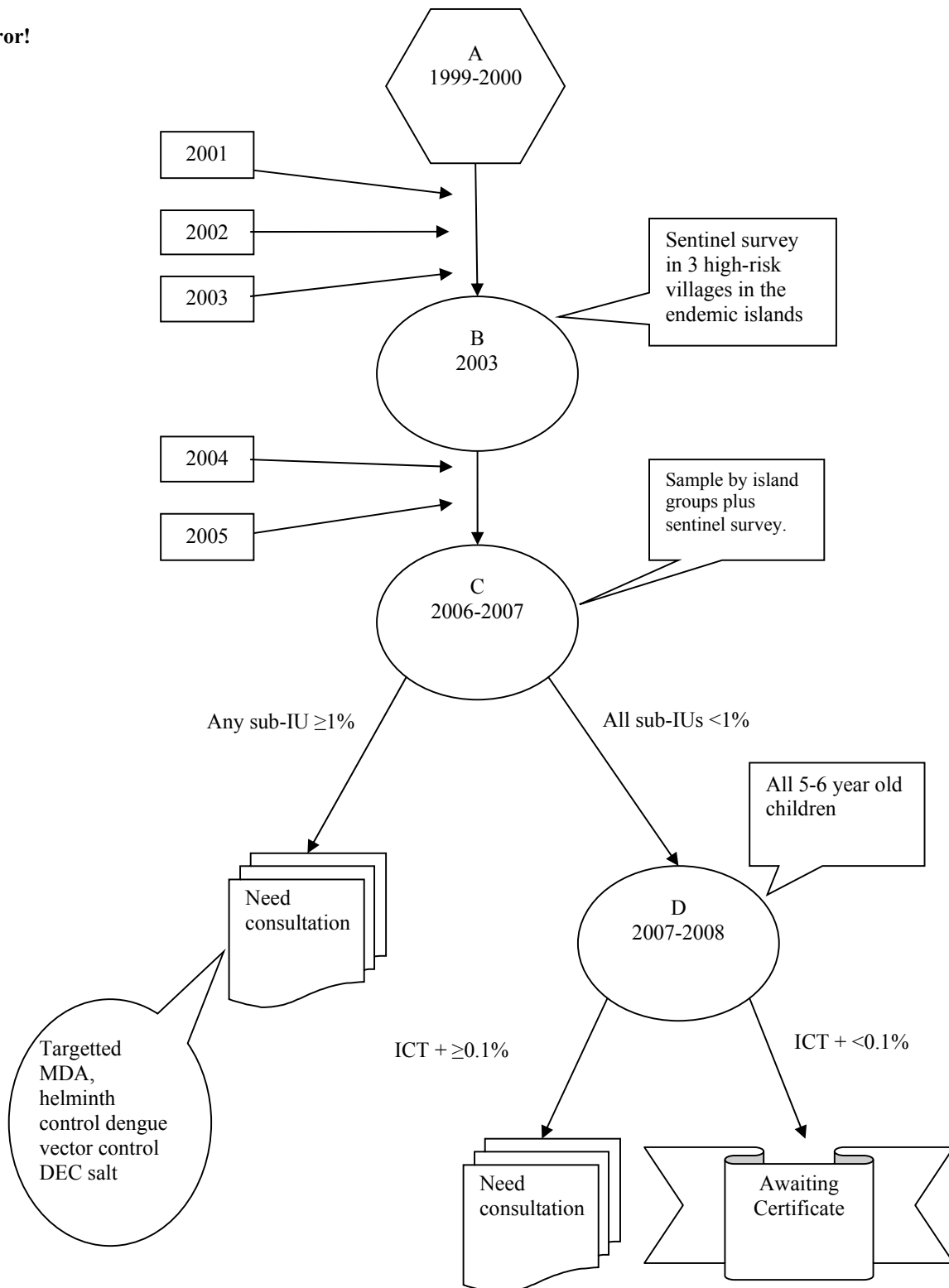
**D type survey (transmission assessment):**

This survey should be carried out in 2007-2008, in all 6 year old children in Tonga. The estimated number of this target population is about 2,500 persons.

- If ICT positive prevalence is <0.1%, await the certification of LF elimination.
- If ICT positive prevalence is  $\geq 0.1\%$ , further investigations should be done:
  - Confirm with other biological test (i.e. Og4C3);
  - Discussion with the PacELF Monitoring & Evaluation group;
  - Discussion for the post MDA alternative strategies;
    - Partial MDA in still endemic areas;
    - Helminth control programme;
    - Integrated vector control programme;
    - DEC salt.

## FLOWCHART: TONGA

Error!



## SUGGESTED GUIDELINES FOR COUNTRY C SURVEYS FOR FINAL PREVALENCE ASSESSMENT: TONGA

1. The C survey for Tonga should take place in 2006-2007 and will be by Stratified Cluster Sampling using villages as clusters. In addition the sentinel sites will also be surveyed in 2005-2006.
2. The Sub-implementation Units will be 5 islands groups, Tongatapu, Vava'u, Ha'apai, 'Eua and Niuas.
3. Using the Demographic Tables for the Western Pacific Region 2000-2005 (WHO publication), the estimated population in 2005 for Tonga will be 102,247.
4. Therefore the average population of each sub-implementation unit will be 20,449 (102,247 divided by 5).
5. From the table for Stratified Cluster Sampling (Section 2), the sample size needed for each island group (sub-implementation unit) for an average population of 25,000 is 739 (since the table has no average population for 20,449, the next largest average population for a sub-implementation unit is used (e.g., 25,000).
6. Villages were chosen randomly with a maximum of 200 people per village. Villages should be sampled in the order given in the table below.

Villages to be Sampled and the Number of People per Village to be Sampled (based on 1996 census village population)

Village Order	Tongatapu	Vava'u	Ha'apai	'Eua	Niuas
1	Longoteme	<b>Vaimalo</b>	Fakakai-200	Angaha-200	<b>Mu'a</b>
2	Veitongo	<b>Kapa</b>	Faleloa-200	Mata'aho-200	Hihifo-200
3	Kolomotu'a	Toula-200	<b>Holopeka</b>	<b>Fata'ulua</b>	<b>Sapa'ata</b>
4	Tukutonga	Neiafu-200	Koulo-200	Ha'atu'a-200	Falehau-200
5	<b>'Ataa Is.*</b>	<b>Nuapau</b>	Fotua*-200	Pangai*-200	<b>Petani</b>
6	Tatakamotonga*-200	<b>Okoa Is*</b>	'Uiha*-200	Angaha-200	<b>Fata'ulua</b>
7				Pangai*-200	Vaipoa*-200
8					

- Village names in **bold** should have entire population tested by ICT. A maximum of 200 villagers should be tested in villages with more than 200 people (these villages are shown followed by the number '200').
- \*Alternative villages to be surveyed if less than 739 people are sampled from the villages listed for each sub-implementation unit.

Sampling should be done until at least 739 people per island group have been sampled by ICT. Approximately 4,041 ICT cards are estimated to be needed for the five sub-implementation units for the C surveys. Additional ICT cards are needed for the sentinel sites.

## GUIDELINES FOR CONDUCTING MOSQUITO CONTROL FOR FILARIASIS VECTORS: TONGA

<b>Primary Vector</b>	<i>Aedes tabu</i>
<b>Distribution of Primary Vector</b>	Tongatapu Group
<b>Activity pattern</b>	Daytime (midday peak)
<b>Biting preference</b>	Humans, dogs
<b>Location of biting</b>	Prefers outdoors but will go inside houses
<b>Resting location</b>	Outdoors
<b>Flight range</b>	Unknown
<b>Breeding sites</b>	Natural containers (treeholes, crabholes), taro leaf axils, man provided containers (tires, drums, small plastic containers).
<b>Other important characters</b>	Primarily a “bush” mosquito that prefers shade. Capable of transmitting dengue.
<b>Monitoring the Primary Vector</b>	Larval/pupal survey at least twice a year (once during the wet season, once during the dry season).
<b>Recommended Control Methods</b>	<ol style="list-style-type: none"> <li>1. Breeding source reduction of domestic containers</li> <li>2. Bednets to protect children when napping</li> <li>3. Insecticide impregnated curtains and bednets</li> <li>4. Repellents and mosquito coils</li> </ol> <p>*Effort should be directed towards reducing the number of breeding sites that are producing the most adult mosquitoes. The importance of different container types will be determined from the larval/pupal surveys.</p>
<b>Secondary vector</b>	<i>Ochlerotatus oceanicus</i> has been reported as a vector of filariasis in Tonga but its importance as a filariasis vector is uncertain in other island groups.
<b>Breeding sites</b>	Taro and Pandanus axils
<b>Biting habits</b>	Night biter, infrequent feeder on humans



# **TUVALU**

**Endemic country**

**Population estimated:** 9,900 (2000)

**Geographic dispersion:** 9 islands

**A type survey (Initial Baseline survey):** ICT testing in 1999

- Type: school children in Funafuti
- Result: 574 tested – 128 (22.3%) ICT positive

**MDA for the whole country:** 1<sup>st</sup> MDA in 2001

## **Recommendation:**

**B type survey (Mid term evaluation):**

This ICT survey should be carried out in 2003-2004 during or after MDA, depending on logistic considerations. The same sampling method and target population as the initial survey can be used. In addition, all 6 year old children of Tuvalu should be ICT tested. The estimated number of this population is about 230 children.

This survey should allow assessment of the impact of MDA and provide more accurate data on the country endemic situation.

**C type survey (final assessment):**

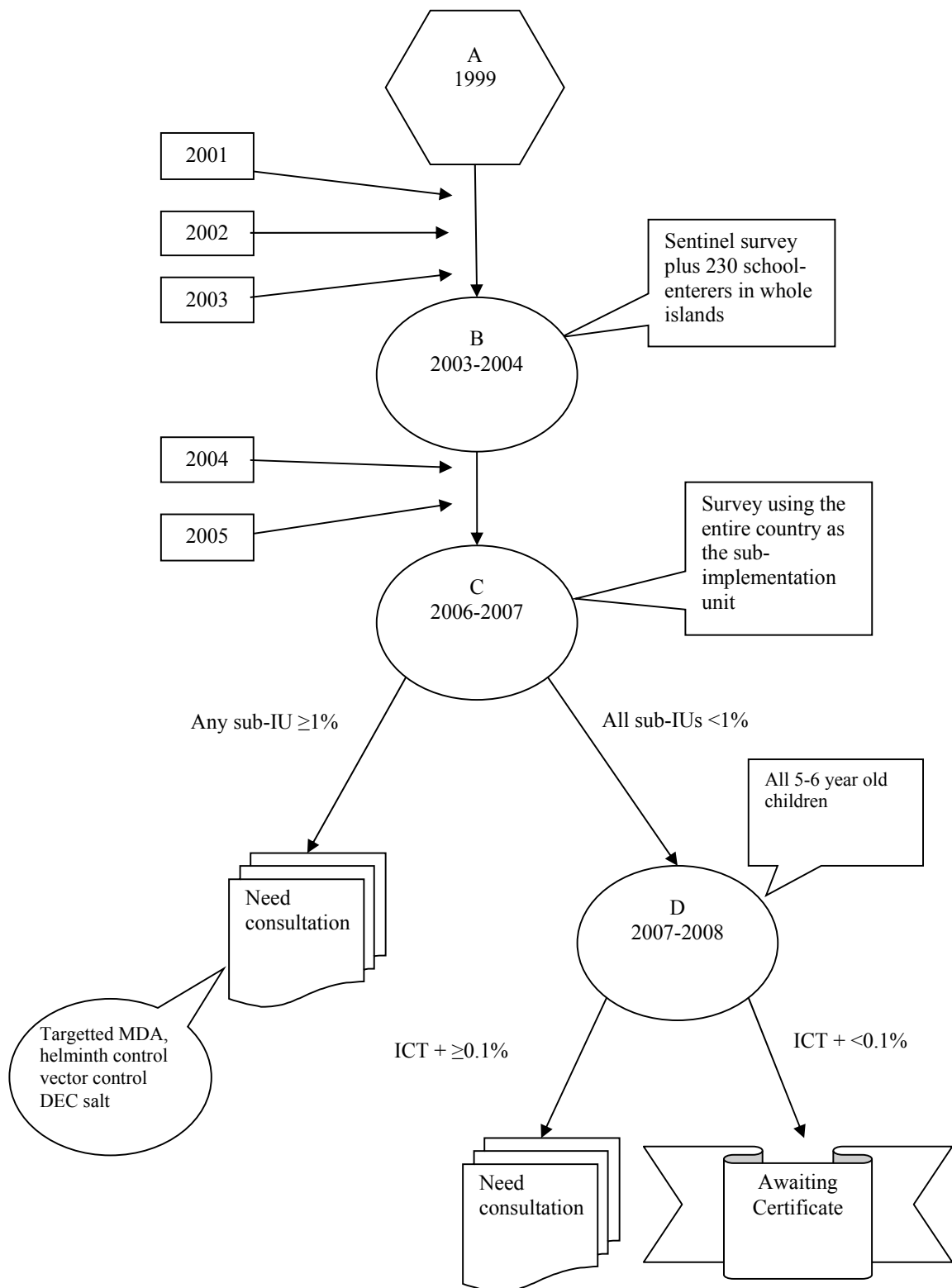
A stratified survey based on island group should be carried out in 2006-2007, after the 5<sup>th</sup> MDA. The entire country of Tuvalu will serve as a single sub-implementation unit.

**D type survey (transmission assessment):**

This survey should be carried out in 2007-2008, in all 6 year old children in Tuvalu. The estimated number of this target population is about 230 persons. Additionally, survey of sentinel sites is recommended (convenience sample – target population: adults).

- If ICT positive prevalence is <0.1%, await the certification of LF elimination.
- If ICT positive prevalence is ≥0.1%, further investigations should be done:
  - Confirm with other biological test (i.e. Og4C3);
  - Discussion with the PacELF Monitoring & Evaluation group;
  - Discussion for the post MDA alternative strategies;
    - Partial MDA in still endemic areas;
    - Helminth control programme;
    - Integrated vector control programme;
    - DEC salt.

## FLOWCHART: TUVALU



## SUGGESTED GUIDELINES FOR COUNTRY C SURVEYS FOR FINAL PREVALENCE ASSESSMENT; TUVALU

1. The C survey for Tuvalu should take place in 2006-2007 and will be by Stratified Cluster Sampling using villages as clusters.
2. The Sub-implementation Unit will be the entire country of Tuvalu
3. Using the Demographic Tables for the Western Pacific Region 2000-2005 (WHO publication), the estimated population in 2005 for Tuvalu will be 10,704.
4. Therefore the average population of each sub-implementation unit will be 10,704 (10,704 divided by 1).
5. From the table for Stratified Cluster Sampling (Section 2), the sample size needed for each district (sub-implementation unit) for an average population of 20,000 is 733 (since the table has no average population for 10,704, the next largest average population for a sub-implementation unit is used (e.g., 20,000).
6. Villages were chosen randomly with a maximum of 200 people per village. Villages should be sampled in the order given in the table below.

### Villages to be Sampled and the Number of People per Village to be Sampled (based on 2002 census village population)

Village Order	Island	Village
1	Nui	Tekaiga-200
2	Nukufetau	Maneapa-200
3	Nanumaga	Toga-200
4	Vaitupu	<b>Muli</b>
5	Niutao*	Teava*-200
6	Funafuti*	Vaiaku*-200

- Village names in **bold** should have entire population tested by ICT. A maximum of 200 villagers should be tested in villages with more than 200 people (these villages are shown followed by the number '200').
- \*Alternative villages to be surveyed if less than 733 people are sampled from the villages listed for each sub-implementation unit

Sampling should be done until at least 733 people in Tuvalu have been sampled by ICT. Approximately 748 ICT cards are needed for the C surveys.

## GUIDELINES FOR CONDUCTING MOSQUITO CONTROL FOR FILARIASIS VECTORS: TUVALU

<b>Primary Vector</b>	<i>Aedes polynesiensis</i>
<b>Distribution of Primary Vector</b>	All islands
<b>Activity pattern</b>	Daytime
<b>Biting preference</b>	All animals
<b>Location of biting</b>	Prefers outdoors but will go inside houses
<b>Resting location</b>	Outdoors
<b>Flight range</b>	Less than 100m
<b>Breeding sites</b>	Man provided containers (tires, drums, small plastic containers); Natural containers (treeholes, crabholes).
<b>Insecticide resistance</b>	Resistance to DDT shown in Fiji and French Polynesia including Tahiti.
<b>Other important characters</b>	Avoids bright sunlight. Also a vector of dengue virus.
<b>Monitoring the Primary Vector</b>	Larval/pupal survey at least twice a year (once during the wet season, once during the dry season).
<b>Recommended Control Methods</b>	<ol style="list-style-type: none"> <li>1. Breeding source reduction of domestic containers*</li> <li>2. Bednets to protect children when napping</li> <li>3. Insecticide impregnated curtains and bednets</li> <li>4. Repellents and mosquito coils</li> <li>5. Screening houses</li> </ol> <p>*Effort should be directed towards reducing the number of breeding sites that are producing the most adult mosquitoes. The importance of different container types will be determined from the larval/pupal surveys.</p>

# **VANUATU**

**Endemic country**

**Population estimated:** 199,800 (2000)

**Geographic dispersion:** 64 inhabited islands

**A type survey (Initial Baseline survey):** ICT testing in 1997-98:

- Type: whole country (16 villages in 6 provinces) – Stratification - Convenience sampling
- Result: 4,362 tested - 208 (4.8%) positives

**MDA for the whole country:** 1<sup>st</sup> MDA in 2000

**B type survey (mid term evaluation):** ICT and mf testing in 2002

- Type: sentinel sites + other areas (cross sectional survey in outpatients)
- Tests : ICT and mf
- Results:
  - o ICT: 1,940 tested – 155 (8%) ICT positive
  - o mf: 1,940 tested – 28 (1.4%) mf positive

## **Recommendation:**

**C type survey (final assessment):**

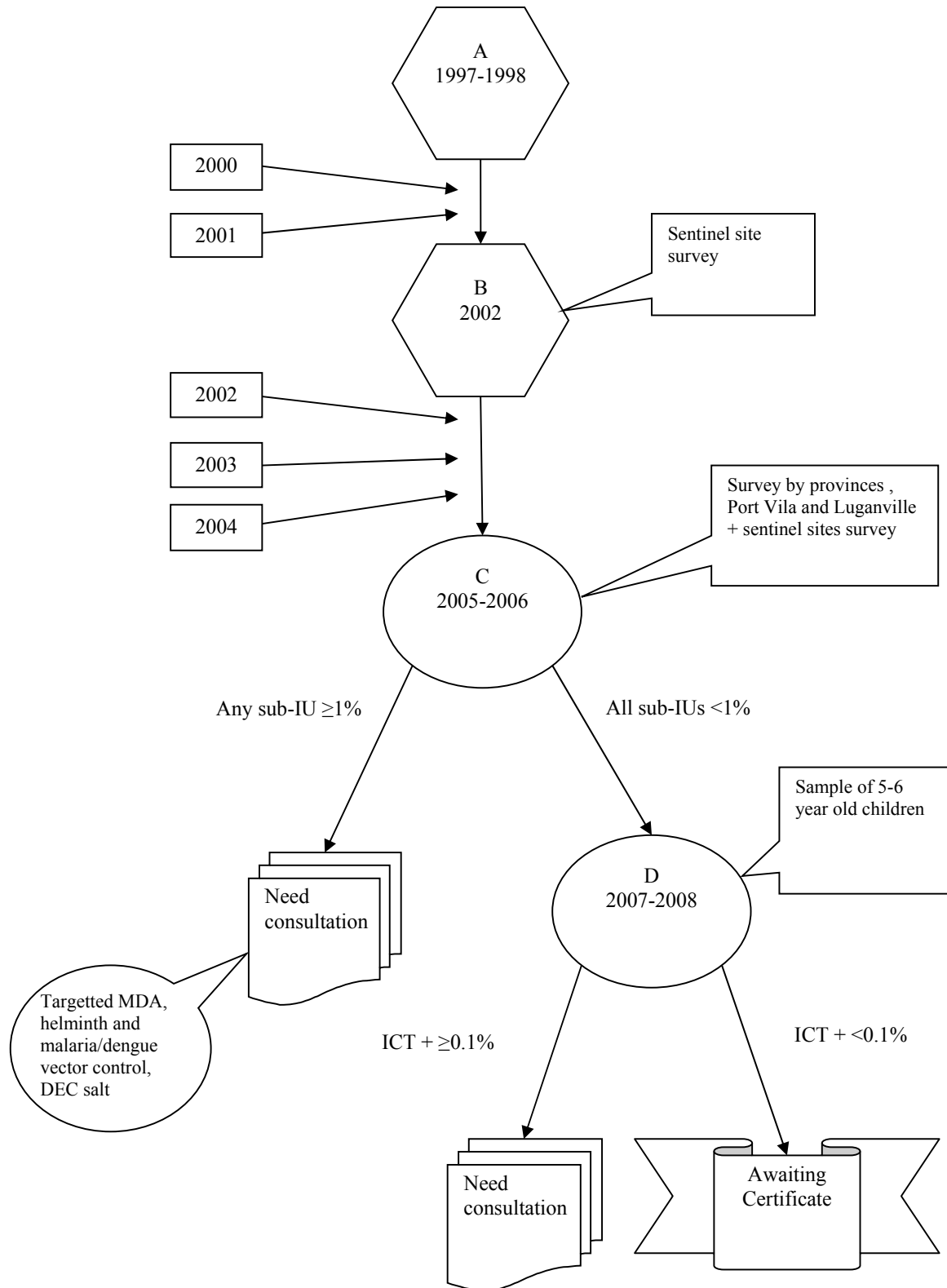
Stratified survey by provinces and the cities of Port Vila and Luganville should be carried out in 2005-2006, after the 5<sup>th</sup> MDA. Also, surveys in sentinel sites should be carried out.

**D type survey (transmission assessment):**

This survey should be carried out in 2007-08, in all 6 year old children in Vanuatu. The estimated number of this target population is about 8,000 persons.

- If ICT positive prevalence is <0.1%, await the certification of LF elimination.
- If ICT positive prevalence is ≥0.1%, further investigations should be done:
  - o Confirm with other biological test (i.e. Og4C3);
  - o Discussion with the PacELF Monitoring & Evaluation group;
  - o Discussion for the post MDA alternative strategies;
    - Partial MDA in still endemic areas;
    - Integrated Vector control programme (Roll Back Malaria, Dengue), impregnated bednets?
    - Helminth control programme;
    - DEC salt.

## FLOWCHART: VANUATU



## **SUGGESTED GUIDELINES FOR COUNTRY C SURVEYS FOR FINAL PREVALENCE ASSESSMENT: VANUATU**

1. The C survey for Vanuatu should take place in 2005 and will be by Stratified Cluster Sampling using villages as clusters. In addition, the sentinel villages will also be surveyed
2. The Sub-implementation Units will be the 6 provinces plus the town of Port Vila which was divided into two sub-implementation Units (total of 8 sub-implementation units)
3. Using the Demographic Tables for the Western Pacific Region 2000-2005 (WHO publication), the estimated population in 2005 for Vanuatu will be 219,319.
4. Therefore the average population of each sub-implementation unit will be 27,415 (219,319 divided by 8).
5. From the table for Stratified Cluster Sampling, the sample size needed for each district (sub-implementation unit) for an average population of 50,000 is 750 (since the table has no average population for 27,415, the next largest average population for a sub-implementation unit is used (e.g., 50,000).
6. Villages were chosen randomly with a maximum of 200 people per village. Villages should be sampled in the order given in the table on the following page.
7. Sampling should be done until at least 750 people per sub-implementation unit (province or city) have been sampled by ICT. 6,182 ICT cards will be needed for C surveys in Vanuatu.

**Villages to be Sampled and the Number of People per Village to be Sampled (based on 2000 census village population)**

Village Order	Port Vila-1	Port Vila-2	Tafea	Torba
1	Malapoa Estate (847) -200	Namburu South Total (810) -200	<b>Yuniel</b>	<b>Qoke</b>
2	Malapoa College (806) -200	Public Works Total (828) -200	<b>Louniparu</b>	<b>Lalngetak</b>
3	Tagabe South (805) -200	Bouganville North Total (814) -200	Waisisi-200	<b>Telaklak</b>
4	Jack Fong (839) -200	Independence Park Total (819) -200	<b>Lakalangia</b>	<b>Tukwetap</b>
5	<i>Tebakor Pressing (808) -200</i>	<i>Stade Total (812) -200</i>	<b>Lamrao</b>	<b>Avar-200</b>
6	<i>Tagabe Central (802)-200</i>	<b>Crowne Plaza Total (832)</b>	<b>Lowya</b>	<b>Port Patterson</b>
7		<b>Post Office Total (815)</b>	<b>Ipilmai</b>	<b>Lesus</b>
8		<i>Nambatu East Total (827) -200</i>	<b>Lownuo Tuan</b>	<b>Levolvol</b>
9			<b>Louliuliu</b>	<b>Big Water</b>
10	<i>Areas included in Port Vila1</i>	<i>Areas included in Port Vila2</i>	<b>Iwarua</b>	<b>Losolava School</b>
11	<i>801 to 809 ; 835 to 839</i>	<i>810 to 832 ; 840 to 845</i>	<b>Kings Cross*</b>	<b>Busman Bay</b>
12	<i>846 and 847</i>			<b>Dorig</b>
13				<b>Qetegaveg</b>
14				<b>Yeugavigamena</b>
15				<b>Lemanman*</b>

Village Order	Shefa	Sanma	Penama	Malampa
1	<b>Sasake</b>	<b>Bene</b>	<b>Lolongwele</b>	<b>Ruplet</b>
2	<b>Woliliu</b>	<b>Talvotor</b>	<b>Longana</b>	<b>Wiel</b>
3	<b>Nalema</b>	<b>Araki</b>	<b>Sakao</b>	<b>Vanjevere</b>
4	<b>Chicken City</b>	<b>Vavavia</b>	<b>Nandunga</b>	<b>Rensarie</b>
5	<b>Melektree</b>	<b>Avunarara</b>	<b>Matai Manaro</b>	<b>Nazareth</b>
6	<b>Votlo</b>	<b>Belinboji</b>	<b>Loigememea</b>	<b>Paamal</b>
7	<b>Ravenga</b>	<b>Peyrolles</b>	Palimarbing-200	<b>Tavie Netan</b>
8	<b>Yopuna</b>	<b>Gingonikoru</b>	<b>Saratamata</b>	<b>Lembetiar</b>
9	<b>Na'Asang</b>	<b>Vorovoke</b>	<b>Tafala Hake</b>	<b>Lorlow*</b>
10	<b>Port Quime</b>	<b>Nambel</b>	<b>Tosi*</b>	
11	<b>Pulpiara</b>	Avunatari-200		
12	<b>Teouma</b>	<b>Jaraty</b>		
13	<b>Samatua</b>	<b>Matantas*</b>		
14	<b>Matangi*-200</b>			

Village names in **bold** should have entire population tested by ICT. A maximum of 200 villagers should be tested in villages with more than 200 people (these villages are shown followed by the number '200').

\*Alternative villages (*in blue and italic*) to be surveyed if less than 750 people are sampled from the villages listed for each sub-implementation unit.



## GUIDELINES FOR CONDUCTING MOSQUITO CONTROL FOR FILARIASIS VECTORS: VANUATU

<b>Primary Vector</b>	<i>Anopheles farauti</i>
<b>Distribution of Primary Vector</b>	All islands
<b>Activity pattern</b>	Night
<b>Biting preference</b>	Large animals (humans, pigs, dogs)
<b>Location of biting</b>	Indoors and outdoors
<b>Resting pattern</b>	Rests inside houses after feeding until daytime
<b>Flight range</b>	1-2 km
<b>Breeding sites</b>	Fresh and brackish water, large swamps, edges of slow flowing rivers
<b>Insecticide resistance</b>	Resistant to DDT in the Solomon Islands; behavioural resistance shown in Papua New Guinea.
<b>Monitoring the Primary Vector</b>	Landing catches, bednet baited light traps
<b>Recommended Control Methods</b>	<ol style="list-style-type: none"> <li>1. Insecticide impregnated bednets</li> <li>2. Residual insecticide wall spraying</li> <li>3. Mosquito coils, repellents</li> <li>4. Screening houses</li> </ol>

# **WALLIS & FUTUNA**

**Partially endemic country**

**Population estimated:** 14,600 (2000)

**Geographic dispersion:** 2 inhabited islands

**A type survey (Initial Baseline survey):** ICT testing in 2001

- Type: convenience sample / focal testing around positive cases
- Result: 803 tested – 6 (0.7%) positives

**MDA for the whole country**

- From 1987 to 2001: MDA with DEC alone every 6 months
- Since 2002: yearly MDA with DEC+ALB

## **Recommendation:**

**B type survey (Mid term evaluation):**

This survey should be carried out in 2004 after the 3<sup>rd</sup> MDA in sentinel sites of Wallis (Futuna had no positive cases during baseline survey). The same methodology and the same target population as the ones in 2001 survey can be used, or sentinel sites (villages where positive cases were located) can be selected for surveys. If possible, former positive persons should be tested. This survey should allow assessment of the impact of MDA on LF endemicity.

**C type survey (final assessment):**

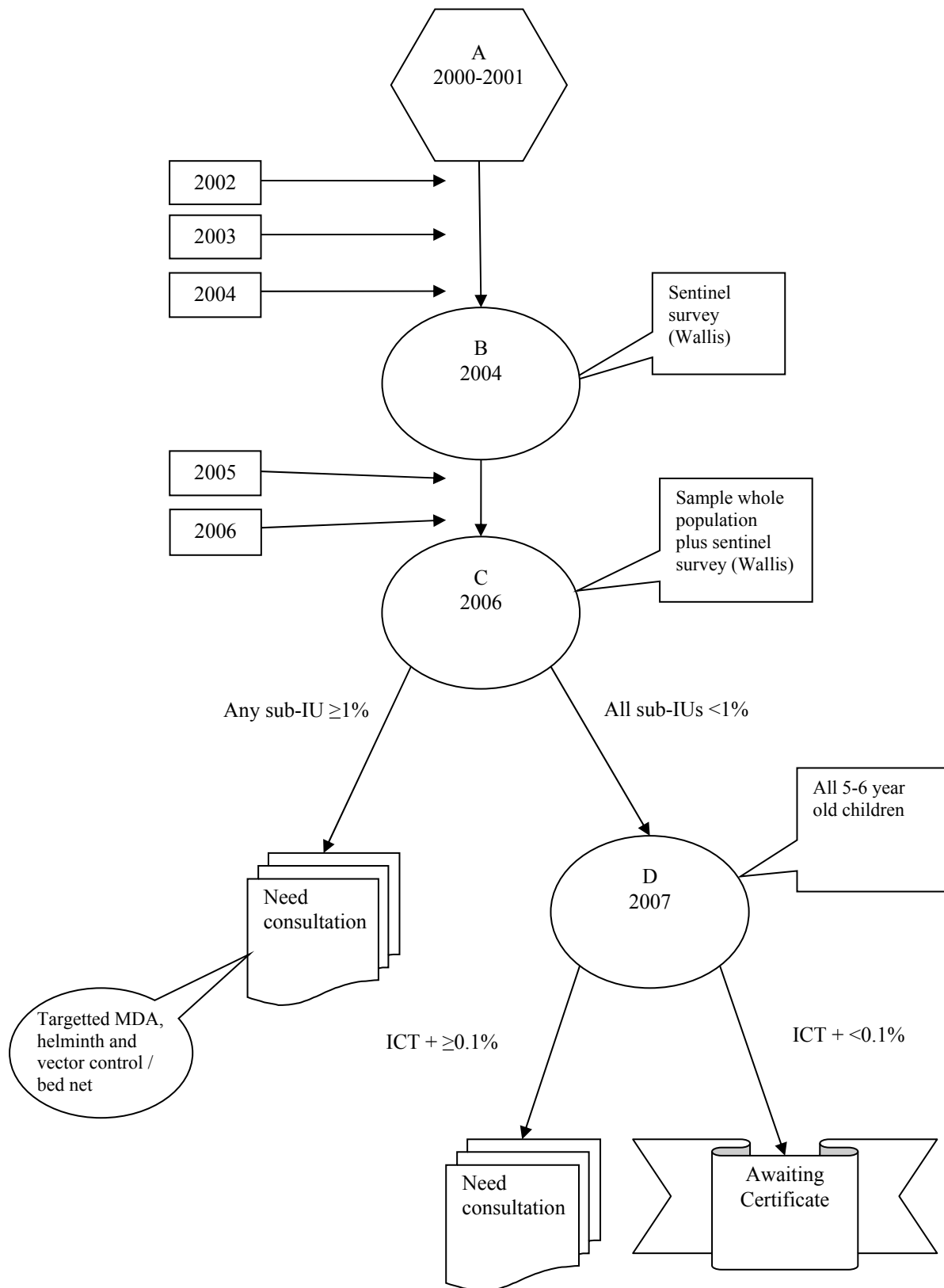
Village cluster survey by island in 2006. If any positives are found then partial MDA or other methods can be done until prevalence is below 1%.

**D type survey (transmission assessment):**

This ICT survey in all 6 year old children in Wallis and Futuna should be carried out in 2007 after the 5<sup>th</sup> MDA. The estimated number of this target population is about 340 persons. Also, survey in sentinel sites should be carried out (same sampling method as previous surveys).

- If ICT positive prevalence is <0.1%, await the certification of LF elimination.
- If ICT positive prevalence is ≥0.1%, additional investigations around positive cases:
  - Confirm with other biological test (i.e. Og4C3);
  - Survey households of the positive cases;
  - Discussion with the PacELF Monitoring & Evaluation group;
  - Discussion about the post MDA alternative strategies:
    - Extension of MDA (country-wide, Wallis only or selected villages);
    - Helminth control programme;
    - Integrated vector control programme.

## FLOWCHART: WALLIS & FUTUNA



## SUGGESTED GUIDELINES FOR COUNTRY C SURVEYS FOR FINAL PREVALENCE ASSESSMENT: WALLIS & FUTUNA

- 1 The C survey for Wallis and Futuna should take place in 2006 and will be by Stratified Cluster Sampling using villages as clusters.
- 2 The Sub-implementation Units will be the 2 main islands: Wallis and Futuna. In addition the surveys of the sentinel sites will be performed.
- 3 Using the Demographic Tables for the Western Pacific Region 2000-2005 (WHO publication), the estimated population in 2005 for Wallis and Futuna will be .
- 4 Therefore the average population of each sub-implementation unit will be 7,614 (15,227 divided by 2).
- 5 From the table for Stratified Cluster Sampling, the sample size needed for each district (sub-implementation unit) for an average population of 10,000 is 707 (since the table has no average population for 7,614, the next largest average population for a sub-implementation unit is used (e.g., 10,000).
- 6 Villages were chosen randomly with a maximum of 200 people per village. Villages should be sampled in the order given in the table below.
- 7 Sampling should be done until at least 707 people per sub implementation unit have been sampled by ICT. 1,600 ICT cards will be needed for C surveys in Wallis & Futuna

Villages to be Sampled and the Number of People per Village to be Sampled (based on census village population)

Village order	Wallis	<b><u>FUTUNA</u></b>
1	<b>Alele (Hihifo)-200</b>	Nuku (Royaume de Sigave)-200
2	<b>Tepa (Mua)-200</b>	Fiua (Royaume de Sigave)-200
3	<b>Akaaka (Hahake)-200</b>	Poi (Royaume d'Alo)-200
4	<b>Malae (Hihifo)-200</b>	Taoa (Royaume d'Alo)-200
5	<i>Falaleu (Hahake)-200</i>	<i>Ono (Royaume d'Alo)-200</i>
6	<i>Vailala (Hihifo)-200</i>	<i>Leava (Royaume de Sigave)-200</i>

Village names in **bold** should have entire population tested by ICT. A maximum of 200 villagers should be tested in villages with more than 200 people (these villages are shown followed by the number '200').

Alternative villages (*in italics*) to be surveyed if less than 707 people are sampled from the villages listed for each sub-implementation unit.

## GUIDELINES FOR CONDUCTING MOSQUITO CONTROL FOR FILARIASIS VECTORS: WALLIS & FUTUNA

<b>Primary Vector</b>	<i>Aedes polynesiensis</i>
<b>Distribution of Primary Vector</b>	All islands
<b>Activity pattern</b>	Daytime
<b>Biting preference</b>	All animals
<b>Location of biting</b>	Prefers outdoors but will go inside houses
<b>Resting location</b>	Outdoors
<b>Flight range</b>	Less than 100m
<b>Breeding sites</b>	Man provided containers (tires, drums, small plastic containers); Natural containers (treeholes, crabholes).
<b>Insecticide resistance</b>	Resistance to DDT shown in Fiji and French Polynesia including Tahiti.
<b>Other important characters</b>	Avoids bright sunlight. Also a vector of dengue virus.
<b>Monitoring the Primary Vector</b>	Larval/pupal survey at least twice a year (once during the wet season, once during the dry season).
<b>Recommended Control Methods</b>	<ol style="list-style-type: none"> <li>1. Breeding source reduction of domestic containers*</li> <li>2. Bednets to protect children when napping</li> <li>3. Insecticide impregnated curtains and bednets</li> <li>4. Repellents and mosquito coils</li> <li>5. Screening houses</li> </ol> <p>*Effort should be directed towards reducing the number of breeding sites that are producing the most adult mosquitoes. The importance of different container types will be determined from the larval/pupal surveys.</p>

## SUMMARY OF ICT CARDS NEEDED FOR C SURVEYS

Country	Year of C Surveys	No. ICT for Sub-Implementation Units	Notes of Additional ICT cards Needed
American Samoa	2005-2006	2,968	Plus sentinel sites
Cook Islands	2005	2,121	Plus sentinel sites
FSM	2005	3,000	
	2007	Satawal Island: 650	
Fiji	2007	18,508	Plus sentinel sites
French Polynesia	2005-2006	4,000	Plus sentinel sites
Guam	No C survey	0	
Kiribati	2006	3,414	
Marshall Islands	2004	1,879	
	2007	Mejit: 500	
Nauru	No C survey	0	
New Caledonia	?	?	
Niue	2004	1,972	
Northern Mariana Islands	No C survey	0	
Palau	2004	1,600	
	2007	Ngardmau: 221	
Papua New Guinea	?	?	
Pitcairn	Completed	0	
Samoa	2005	13,232	Plus sentinel sites
Solomon Islands	2003-2004	20,524	
Tokelau	2005	1,640	
Tonga	2006-2007	4,041	Plus sentinel sites
Tuvalu	2006-2007	748	
Vanuatu	2005-2006	6,182	Plus sentinel sites
Wallis and Futuna	2006	1,600	Plus sentinel sites
<b>Total as of 1 January 2004:</b>		<b>125,340</b>	

## 6. APPENDICES

### APPENDIX 1. TABLE OF 2-DIGIT RANDOM NUMBERS

59	6	13	20	97	53	53	17
59	27	25	26	20	1	12	57
17	30	81	46	39	91	28	58
81	17	13	77	61	33	15	94
48	70	81	31	54	97	48	41
54	9	59	10	52	8	26	4
80	46	21	56	66	85	32	77
63	70	69	83	86	25	35	10
31	85	70	63	86	16	20	25
29	97	33	87	88	77	81	50
2	87	7	68	29	76	10	43
9	14	8	25	8	33	17	62
82	26	29	63	51	93	94	89
57	64	66	51	59	71	91	93
16	40	28	61	84	58	6	46
79	5	60	11	37	31	54	67
46	18	75	54	55	30	7	70
72	77	82	8	32	51	92	12
71	52	67	39	68	8	79	98
98	91	79	36	19	68	74	89
80	6	17	3	38	34	98	8
28	42	61	73	78	32	82	16
61	81	79	27	38	97	93	90
53	15	4	21	8	91	27	62
99	16	75	93	43	43	95	33
70	25	40	78	45	68	44	34
28	90	77	50	93	69	88	64
14	44	30	3	52	37	21	51
6	73	7	7	4	70	27	97
27	54	41	77	16	52	6	3
25	59	48	6	29	72	55	42
14	13	27	56	1	3	97	87
13	42	25	9	1	7	54	91
5	22	20	99	17	53	47	93
43	8	37	24	27	36	41	25
37	26	24	8	74	47	7	33
8	18	6	48	55	85	45	88
73	76	6	10	37	35	46	29
90	18	9	55	57	33	61	70
45	41	78	63	50	4	87	11
25	71	34	83	54	62	27	54
34	68	38	16	34	58	62	13
42	28	33	36	29	97	17	8
78	74	62	72	9	31	46	75
40	81	35	56	34	69	99	45
58	13	89	56	48	75	62	92
14	11	46	64	83	47	78	1
35	62	1	7	24	51	96	16
93	6	8	2	87	30	43	76

7	69	37	99	90	13	87	25
84	67	76	81	90	41	47	36
38	32	75	4	25	75	16	13
60	76	49	51	7	59	58	65
76	15	69	70	6	8	66	22
20	22	29	15	73	74	72	87
70	11	59	57	50	44	98	14
7	23	22	82	72	46	27	48
76	59	56	52	60	24	45	66
81	93	23	28	97	34	71	27
1	29	53	74	13	45	66	65
65	29	53	47	63	67	29	61
32	30	13	92	82	54	56	14
41	9	27	11	71	3	87	64
79	46	83	61	66	2	55	95
2	81	34	91	55	92	11	85
90	25	60	6	32	86	49	33
36	76	42	63	91	83	87	50
63	45	31	48	23	53	13	29
15	74	15	23	9	85	88	70
52	75	81	16	18	30	78	90
73	38	56	41	19	26	50	41
19	20	82	49	47	95	46	30
18	58	37	14	23	51	68	28
8	92	1	45	24	28	84	32
58	46	53	79	5	29	12	89
75	46	48	32	92	40	52	26
5	10	2	83	39	35	30	66
97	25	97	42	82	72	16	69
29	14	67	17	79	67	2	19
34	64	51	45	7	15	7	79
22	86	96	42	67	64	96	16
49	11	19	31	40	17	97	35
44	66	97	83	23	62	82	14
29	52	86	32	88	73	18	66
32	2	30	82	35	11	4	95
70	67	14	40	43	25	65	15
77	81	46	1	58	63	88	35
46	22	97	42	15	4	9	82
12	30	81	28	39	39	16	53
31	47	73	67	30	26	80	65
11	52	28	41	56	46	4	43
42	19	84	12	87	10	52	99
2	12	20	31	13	53	82	95
31	25	66	15	46	4	26	7
7	41	87	7	49	92	56	77
66	82	43	46	4	87	91	61
56	38	15	15	61	83	42	71
92	74	5	68	91	10	31	99
29	14	98	49	88	37	1	11
49	16	84	89	23	18	51	99
62	39	15	19	94	65	76	46
15	72	27	45	69	19	66	90
61	30	26	54	93	2	57	69



## **APPENDIX 2. TABLE OF 3-DIGIT RANDOM NUMBERS**

737	295	6	34	78	402	91	877
704	982	643	447	842	253	847	759
427	201	465	607	809	221	669	433
22	877	871	196	6	691	349	958
485	850	942	234	562	518	245	647
202	349	560	435	983	330	207	660
389	353	384	674	575	109	808	884
642	320	92	798	11	257	847	859
437	804	876	663	215	354	340	981
5	372	125	588	525	570	973	481
327	843	843	71	150	231	115	953
116	384	755	260	808	911	21	918
898	827	714	344	852	27	438	347
738	642	126	512	260	970	157	456
618	450	252	52	133	378	113	140
732	803	513	142	843	343	9	464
437	291	494	443	87	894	319	677
831	978	914	584	486	127	67	342
397	471	192	111	254	276	155	621
638	327	539	356	667	39	719	681
386	595	407	445	311	937	157	256
708	501	593	283	436	694	741	276
915	145	504	544	598	511	250	755
974	699	933	502	583	712	637	245
784	67	336	513	146	841	281	425
873	211	462	831	454	546	127	39
374	285	926	47	131	86	619	259
384	747	5	472	993	187	436	616
805	339	997	488	103	151	816	549
782	947	485	401	759	52	858	935
141	515	947	417	682	243	155	895
967	804	371	125	193	4	542	233
604	115	89	152	438	395	212	649
769	39	571	100	75	971	753	548
786	744	321	633	263	582	903	379
431	526	250	60	162	568	268	87
204	496	487	39	146	627	337	661
509	488	815	686	971	94	25	301
883	54	678	941	760	774	624	293
623	671	480	519	935	580	635	670
89	140	936	776	280	659	859	11
251	974	702	488	189	691	881	129
683	227	685	777	186	405	290	482
271	173	480	722	163	780	256	9
137	47	854	930	727	191	630	818
387	829	133	606	838	342	60	169
61	97	139	32	452	662	994	148
478	29	181	567	121	425	631	981
963	641	313	383	404	284	376	342
726	362	106	766	387	346	244	829
41	493	477	821	671	232	269	464

833	603	308	993	632	721	998	991
192	894	14	451	414	301	433	227
364	459	95	381	750	280	938	474
971	943	612	225	511	840	452	677
527	387	930	272	297	923	617	181
25	901	235	774	38	38	13	159
981	677	293	986	41	715	48	760
679	262	38	540	76	28	852	413
999	142	689	414	566	503	115	621
189	148	215	346	999	735	368	276
400	132	356	475	639	467	402	50
91	871	186	524	787	827	906	881
593	376	108	850	385	127	39	369
868	255	330	723	937	108	616	661
204	427	916	207	412	980	583	445
289	778	878	787	551	472	661	678
643	216	556	909	672	335	651	940
388	15	644	121	695	624	665	166
553	951	847	60	575	391	516	886
919	961	109	41	620	58	906	644
221	999	49	800	505	350	392	898
602	204	851	22	848	776	440	967
527	26	251	800	217	299	888	624
642	737	344	241	985	916	196	557
850	978	466	189	881	813	5	815
429	499	507	926	51	404	122	851
594	472	877	47	153	86	74	814
571	397	150	699	246	357	701	109
525	58	911	270	477	992	526	514
955	857	989	932	545	116	711	145
318	681	538	225	639	629	53	914
616	804	731	57	910	132	283	940
4	483	912	139	853	158	85	815
969	101	360	656	775	19	52	671
136	471	242	772	59	649	19	888
545	282	156	611	791	998	923	557
228	696	674	104	771	192	348	714
817	751	6	956	918	887	12	85
216	763	807	79	439	911	530	144
773	808	194	37	117	5	678	102
898	735	958	705	276	442	616	488
390	410	927	254	844	973	485	803
443	176	316	948	95	992	710	718
953	707	412	367	157	337	991	221
536	318	152	867	23	462	633	730
550	187	261	900	403	299	865	524
528	450	81	838	959	825	694	870
610	354	337	402	258	748	491	620
3	140	202	221	77	635	429	364
750	369	93	645	84	24	581	199
438	200	816	795	430	663	713	823
117	789	991	76	962	162	172	300