



**GOVERNMENT OF SAMOA
MINISTRY OF HEALTH**

**National Disease Surveillance & International Health Regulations
(IHR) Division**

Lymphatic Filariasis

Transmission Assessment Survey 2013

Final Report
23-July-13

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2.0 ABBREVIATION

Alb	Albendazole
AUA	Apia Urban Area
CEO	Chief Executive Officer
DEC	Diethylcarbamazabine
DOTS	Directly Observed Treatment Strategy
EU	Evaluation Unit
GPELF	Global Program for the Elimination of Lymphatic Filariasis
ICT	Immunochromatography
IU	Implementation Unit
JCU	James Cook University (Australia)
JICA	Japan International Cooperation Agency
LF	Lymphatic Filariasis
MESC	Ministry of Education, Sports and Culture (Samoa)
MDA	Mass Drug Administration
MOH	Ministry of Health (Samoa)
NWU	North West Upolu
PacELF	Pacific Program for the Elimination of Lymphatic Filariasis
ROU	Rest of Upolu
SBS	Samoa Bureau of Statistics
SSBT	Survey Sample Builder Tool
TAS	Transmission Assessment Survey
W.H.O	World Health Organization

3.0 EXECUTIVE SUMMARY

Samoa has come a long way in trying to eliminate LF from the country in the form of country wide MDAs which first begun in 1962. Since 1999, about eight rounds of MDAs with varying coverage rates had been completed in Samoa. This year, Samoa would be assessing whether or not LF had been interrupted following the series of MDAs. Using ICT cards, antigen prevalence would be assessed in the 3 regions of Samoa namely North West Upolu, Savaii and Rest of Upolu combined with Apia Urban Area. To out rightly state that LF had been interrupted, children born after the MDAs would not be infected with LF if MDAs were effective. Thus, in this Transmission Assessment Survey, children of all primary schools in grades 1 and 2 are targeted. WHO argues that antigen prevalence of <0.5% would be too low to sustain transmission of LF in a country or region. The result of the survey suggests that EU Savaii with a prevalence of 0.46% and EU Apia Urban Area and Rest of Upolu with a prevalence of 0.08% indicate interrupted LF transmission in these regions. On the other hand, North West Upolu region which had been indicated in past prevalence surveys to be a problem area showed a prevalence rate of 1.49%. As such, Samoa needs to consider conducting 2 more rounds of MDAs in the North West Upolu region and repeating the Transmission Assessment Survey after 2-3 years in Savaii and Apia Urban Area and Rest of Upolu to establish recrudescence. Simultaneously, Samoa needs to strengthen mosquito surveillance and control to address Lymphatic Filariasis as well as personal protection from mosquitoes.

4.0 BACKGROUND

Samoa has come a long way in her efforts to control Lymphatic Filariasis (LF) in the country since 1962 when we conducted our first Mass Drug Administration (MDA) (PacELF, 2005). Subsequently, series of rounds of MDAs about 10 in total had been conducted in the country before 1999. Since joining the Pacific Elimination for Lymphatic Filariasis program (PacELF) in a renewed effort to eliminate LF in 1999, the entire country has had 7 rounds of MDAs over this period with varying coverage rates. The baseline ICT prevalence of 4.52% in 1999 reduced to 1.1% in 2004. Two more rounds of MDAs were conducted for the entire country following the 2007 survey which showed a resurgence of 2.62% ICT prevalence. The last round of MDA which covered the entire country achieved a coverage rate of 83% (MOH unpublished report). This year, it is timely that the Ministry of Health assesses whether or not transmission of LF had been interrupted following this new approach by PacELF. The result of which would determine the next strategy in controlling LF in the country.

Samoa has a current population of 187,820 people (2011 Census). The population in the four regions of Samoa include: Apia Urban Area: 36,735; North West Upolu: 62,390; Rest of Upolu (ROU): 44,293 and Savaii island: 44,402. The Net Attendance Ratio (NAR) according to the 2009 Samoa Demographic and Health Survey for the 4 regions include Savaii 89.4%, AUA 88.8%, ROU 88.5% and NWU 87.5%. At the end of 2012, the government of Samoa had passed a bill for free compulsory education in Samoa. The bill states that the parents would be fined WST \$1,000 should their child be found to be not attending school during school hours which is equivalent to 2 years imprisonment.

5.0 METHODOLOGY

The country (Samoa) was divided into 3 Evaluation Units (EUs) (i) Apia Urban Area (AUA) combined with the Rest of Upolu (ROU) (ii) North West Upolu (NWU) and (iii) Savaii. The division into EUs utilized the regions predetermined by the Samoa Bureau of Statistics (SBS) for census purposes (Figure 1). The decision to divide the country into 3 EUs was essentially based on the availability of resources that we had and the fact that we needed to assess the country in small regions for targeted future MDAs as opposed to country wide MDAs. The decision to keep NWU as one EU was largely based on the fact that previous LF prevalence studies conducted in Samoa in the past years showed villages in this region to be problem areas. Subsequently, the decision to keep Savaii as one EU was due to the small population living on the island and because limited resources wouldn't allow us to divide the island as we initially wanted.

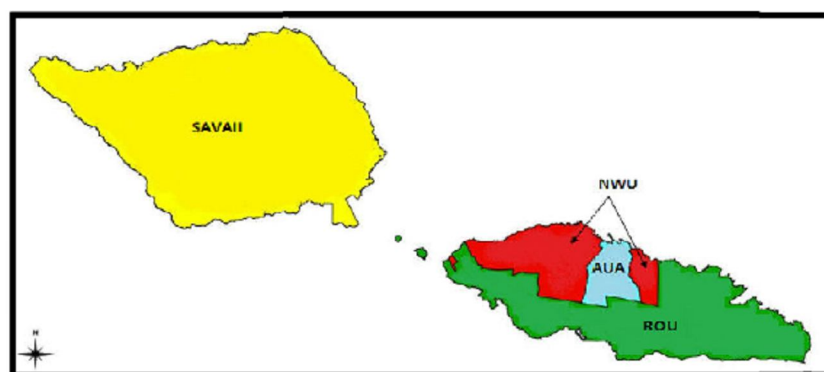


Figure 1: Map of Samoa, showing the four regions

The Survey Sample Builder Tool 2.0 (SSBT 2.0) was used to determine the survey design for the 3 EUs. Information from the 2012 School Census obtained from the Ministry of Education, Sports and Culture (MESC) was used to determine the survey design for the 3 EUs. Table 1 summarizes the LF TAS 2013.

The decision to conduct systematic sample surveys of all primary schools in 3 EUs as opposed to cluster surveys which we preferred was primarily due to the fact that only 4,000 ICT cards had been donated for the purpose of this survey and to do cluster survey meant that the study population would far exceed the number of ICT cards. In addition, the funding bodies were reluctant to fund any more supplies for the purpose of this survey than the amount already donated due to other commitments.

LYMPHATIC FILARIASIS TRANSMISSION ASSESSMENT SURVEY, SAMOA 2013				
	Apia Urban Area plus Rest of Upolu	North West Upolu	Savaii	TOTAL
Survey design	Systematic sample of 72 schools	Systematic sample of 42 schools	Systematic sample of 53 schools	
Sample size	1,214	1,188	1,042	3,444
Sampling fraction	0.29	0.4	0.45	
Sampling Interval	3.41	2.52	2.22	
Critical cut off value	7	7	6	

Table 1 –Summary of LF TAS 2013 in Samoa

A list of all 167 primary schools was obtained from the Ministry of Education, Sports and Culture. The schools were sorted into the 3 EUs which were confirmed by MESC. Using the 2012 School Census and the sampling fraction determined by the SSBT 2.0, the number of study participants was tabulated for all primary schools in each EU. A 10% non-response rate was considered for all EU surveys. The total population size for each EU TAS includes (i) 1,214 for AUA and ROU (ii) 1,188 for NWU and (iii) 1,042 for Savaii.

Study participants from each school were selected randomly using the selected random number chart (Chart A for all EUs) generated by the SSBT 2.0 for each TAS. This was determined prior to the field work as all roll calls for grades 1 and 2 from each primary school were obtained from all schools, fed into an excel database, sorted alphabetically and students were selected accordingly using the random number chart. The prepared sheets listing the selected students for each school were mostly given out prior to or during the field work in respective schools. All the students who were randomly selected were tested in the schools or were followed up at their homes with the assistance of the teachers who went to summon the absent children or were tested at their homes by the survey team that went straight to a participant's home. Selected children who had moved to another island of Samoa or to another village further away from the school, migrated overseas or whose parents had not consented to their child participating in the survey or whose whereabouts were unknown were the ones who were not tested in the survey.

Follow up visits were done for schools with low coverage rates. Once the targeted sample size was reached for all three EUs and all 167 schools had been visited, results were analyzed.

Study participants with positive results had repeat ICT tests for confirmation. Once confirmed, DEC and Albendazole was administered to these children according to WHO standards (DEC 6mg/kg). The survey teams also paid visit to the families and everyone in the household were given DEC and Albendazole to swallow. Further follow up visits to these families would be carried out by Health Inspectors on separate visits following the survey.

Prior to field implementation, we sought the assistance of the Ministry of Education, Sports and Culture in supporting the survey. MESC in turn sought the assistance from all Government Primary School Principals in assisting us with the survey. The Ministry of Health also sought individually the help of Private and Mission School Boards in supporting the survey either through face to face meetings or through letters. Consultations with all school principals in relation to the survey were carried out on March 21st and 22nd for Upolu and Savaii respectively. Consent forms detailing the survey purpose and process in English and Samoan languages were given out to all Principals on the day of consultation for distribution to all parents of Year 1 and 2 for awareness and endorsement. Additionally, there was also a 30 minutes television panel discussion (The “Lali” Program) on TV 1 to promote awareness in regard to the survey.

On the 25th March, training was conducted for all the survey staff on how to enter data in the register books, how to conduct the tests and how to read the test cards. On the 27th March, the pilot test was conducted at Leauvaa primary school after approval from MESC and the school. Following the pilot test, issues were raised and discussed on how to improve our field work.

Incentives in the form of a pencil, eraser and sharpener were given to every child that participated. This was our way of thanking them for taking part in the survey as well as to attract them in having their tests done.

Lastly, a survey protocol detailing the process of the survey was prepared and given to the CEO and management for their discretion at the outset of the survey.

6.0 SURVEY RESULTS

The following tables present the summary of the survey results.

	Apia Urban Area and Rest of Upolu	North West Upolu	Savaii
Targeted sample population	1,214	1,188	1,042
Total population tested	1,216	1,271	1,098
Critical cut off of ICT positives	7	7	6
Total ICT positives found during field work	1	19	5
ICT Prevalence (%)	0.08	1.49	0.46

Table 2 –Summary of survey results by EUs

No	EU	Village	Number of ICT positive
1	AUA and ROU	Leusoalii	1
1	NWU	Faleasiu	5
2		Leauvaa	1
3		Afega	1
4		Aleisa	2
5		Fasitootai	1
6		Fasitoo uta	2
7		Satuimalufilufi	1
8		Mulifanua	1
9		Laulii	1
10		Puipaa	1
11		Tufulele	1
12		Tuanai	2
1	Savaii	Fagaee	1
2		Samalaeulu	1
3		Salelavalu	1
4		Vaipua	2

Table 3 –Lists the villages and number of positive tests found in respective villages in each EU

	EU NWU	EU AUA + ROU	EU SAVAII
<u>Age distribution</u>			
4y	48 (4%)	44 (4%)	42 (4%)
5y	397 (31%)	466 (38%)	394 (36%)
6y	465 (37%)	428 (35%)	398 (36%)
7y	287 (23%)	226 (19%)	237 (22%)
8y	68 (5%)	41 (3%)	25 (2%)
9y	4 (0%)	7 (1%)	1 (0%)
10y	2 (0%)	1 (0%)	0
<u>Average Age (y)</u>	6.0	5.8	5.8
<u>Gender distribution</u>			
Female	648 (51%)	605 (50%)	511 (47%)
Male	623 (49%)	611 (50%)	587 (53%)
<u>Class/Grade distribution</u>			
One	630 (50%)	645 (53%)	612 (56%)
Two	641 (50%)	571 (47%)	486 (44%)
<u>Total positive ICTs (ICT Prevalence)</u>	19/1271 (1.49%)	1/1216 (0.08%)	5/1098 (0.46%)
<u>Age distribution of ICT positives</u>			
5y	3	1	1
6y	8	0	2
7y	7	0	2
8y	1	0	0
<u>Gender distribution of ICT positives</u>			
Female	12	1	3
Male	7	0	2

Table 4 –Detailed summary of Survey Results

7.0 DISCUSSION OF SURVEY RESULTS

In LF endemic areas where *Aedes* species is predominantly the vector of LF as in the case of Samoa, transmission of LF is said to be interrupted in a country or from a region should the antigen prevalence falls to <0.5%. By PacELF/GPELF standards, MDAs are unwarranted once this prevalence is achieved. This is based on the argument that the prevalence of antigenemia is too low in a country/region to sustain transmission at this rate.

In this survey, Samoa was divided into 3 EUs based on the available resources and results of past LF surveys. The mean age of study participants in all 3 EUs was 6 years. In AUA and ROU, the prevalence rate was 0.08%; NWU has a prevalence rate of 1.49% and Savaii has a prevalence of 0.46%. Thus, by GPELF/PacELF standards LF transmission seems to be interrupted in 2 EUs which are EU: Savaii and EU: AUA and ROU. NWU which was previously indicated to be a problem area in the 2007 LF survey of a different methodology surprisingly remains a problem area despite years of MDAs.

If this is in fact a true picture of what is happening in Samoa in relation to LF transmission, it should be worth investigation why NWU remains a problem area and why other regions have succeeded. An interesting research finding which primed us in anticipation that NWU could remain a problem area at the outset of the survey was JCU's Dr Hayley Joseph and Dr Limb Hapairai's research in early 2012 on vectors of LF focusing on one village in NWU. Their research showed a prevalence of 5.8% of LF vectors had been infected with LF in the village of Fasitootai extending from the coastal area towards the inland area. Whatever the reasons may be for this occurrence, Samoa should address this region thoroughly and instigate what other regions may be doing right that NWU isn't. Certainly we anticipate interplay of many factors such as the continuing presence of reservoirs of infection amongst the old population, complacency to swallow the antifilarial medications after years of MDAs and poor mosquito control.

8.0 CONCLUSION AND RECOMMENDATIONS

The result of this survey is extremely important to Samoa in relation to future decisions made in order to eventually eliminate LF from the country. After many years of attempts and hard work at MDAs, it is indeed satisfying to know that at least parts of the country show interrupted LF transmission. Having very limited resources in terms of finances and manpower to conduct country wide MDAs it is indeed reassuring to know that the least resources we may get should be spend on the rightful area needing the most help.

In consideration of the survey results, we recommend the following:

- 1) To conduct DOTS MDA for 2 more years in NWU (The entire population of NWU is the at risk population and should be targeted)
- 2) To conduct DOTS MDA in villages found to have positives in EU AUA and ROU and EU Savaii
- 3) MOH to ensure the maximum coverage is achieved for all villages that were found to have positive cases in this survey. Also, the ineligible population in the 2011 MDA should be followed up and be given their filarial tablets
- 4) To establish a stringent vector surveillance and control for mosquitoes focusing on NWU
- 5) To emphasize and continue to strengthen the importance of MDAs and source reduction in the population of Samoa

- 6) To conduct TAS after 2 years in EU AUA and ROU and EU Savaii to establish recrudescence applying the same methodology as in the 2013 TAS
- 7) To strengthen the LF surveillance and control program in the Ministry of Health
- 8) To publish and share the result of this survey with all Samoans so they would understand where we are at with the control of LF in Samoa

9.0 ANNEX

ANNEX 1: Survey Results for individual EUs and schools

No	EU: AUA + ROU	Actual No of students selected (Target)	No of random students tested	No of students to follow up	% Coverage	No of Positive ICTs
1	Ah Mu Academy – Pesega	33	31	2	94	0
2	Apia Primary	84	78	6	93	0
3	Aufaga Primary	18	17	1	94	0
4	Faleapuna Primary	6	4	2	67	0
5	Falease'ela Primary	13	12	1	92	0
6	Falefa Primary	20	15	5	75	0
7	Falefitu Primary	21	21	0	100	0
8	Falevao Primary	14	12	2	86	0
9	Fusi (Anoamaa) Adventist School	3	3	0	100	0
10	Fusi (Safata) Primary School	14	12	2	86	0
11	Lalomanu Primary	12	12	0	100	0
12	Lalomauga Primary	9	9	0	100	0
13	Lepa Primary	10	10	0	100	0
14	Lepea Primary	34	29	5	85	0
15	Lona Primary	1	1	0	100	0
16	Lotofaga Primary (Lepa/Lotofaga District)	17	15	2	88	0
17	Lotofaga Primary (Safata District)	15	15	0	100	0
18	Lotopue Primary	14	12	2	86	0
19	Luatuanuu Primary	16	15	1	94	1
20	Lufilufi Primary	11	10	1	91	0
21	Magiagi Primary	27	23	4	85	0
22	Manumalo Baptist School Leone	28	25	3	89	0
23	Manunu Primary	4	1	3	25	0
24	Marist Brothers School	42	40	2	95	0
25	Matatufu Primary	8	8	0	100	0
26	Matautu (Lefaga) Primary	18	17	1	94	0
27	Moata'a Primary	18	15	3	83	0
28	Mulivai Primary	5	5	0	100	0
29	Nene Primary	7	7	0	100	0
30	Peace Chapel Christian School	18	17	1	94	0
31	Pesega Fou Primary	24	19	5	79	0
32	Robert Louis Stevenson Primary	33	32	1	97	0
33	Saanapu Primary	22	22	0	100	0
34	Safa'ato'a Primary	16	14	2	88	0
35	Salamumu Primary	6	4	2	67	0
36	Salani Primary	13	12	1	92	0
37	Saleaamua Primary	13	11	2	85	0
38	Saleapaga Primary	9	8	1	89	0
39	Saleilua Primary	15	13	2	87	0

40	Salelesi Primary	15	14	1	93	0
41	Salesatele Primary	6	2	4	33	0
42	Samoa Adventist School Lalovaea	28	25	3	89	0
43	Samusu Primary	16	16	0	100	0
44	Saoluafata Primary	11	11	0	100	0
45	Sapoe Primary	8	8	0	100	0
46	Sapunaoa Primary	10	9	1	90	0
47	Satalo Primary	6	6	0	100	0
48	Sataoa Primary	26	24	2	92	0
49	Satitoa Primary	11	8	3	73	0
50	Sauano Primary	8	7	1	88	0
51	Sauniatu Primary - LDS	14	14	0	100	0
52	Savaia Primary	5	3	2	60	0
53	Siumu Primary	30	26	4	87	0
54	Solosolo Primary	21	21	0	100	0
55	St Peter's Falefa	25	22	3	88	0
56	St. Theresa's School - Lepea	21	19	2	90	0
57	St. Mary's - Savalalo	73	70	3	96	0
58	Taelefaga Primary	6	6	0	100	0
59	Tafitoala Primary	10	9	1	90	0
60	Tanugamanono Primary	29	24	5	83	0
61	Tiavea Primary	16	13	3	81	0
62	Uafato Primary	2	2	0	100	0
63	Ulutogia Primary	5	5	0	100	0
64	Vaiala Beach School	13	10	3	77	0
65	Vaie'e Primary	16	16	0	100	0
66	Vailima Primary	20	18	2	90	0
67	Vailoa Primary (Aleipata District)	5	3	2	60	0
68	Vailoa Primary (Faleata District)	13	12	1	92	0
69	Vaimea Primary	43	34	9	79	0
70	Vaimoso Primary	68	64	4	94	0
71	Vaivase Primary	60	57	3	95	0
72	Vaovai Primary	14	12	2	86	0
		1345	1216	129	90	1

No	EU: NWU	Actual No of students selected (Target)	No of random students tested	No of students to follow up	% Coverage	No of Positive ICTs
1	Aele Primary School	63	55	8	87	0
2	Afega Primary	26	26	0	100	1
3	Aleisa Primary	46	39	7	85	2
4	Aoga Faamasani Amosa (Le Amosa Preparatory Sc	6	6	0	100	0
5	Apolima-uta Primary	20	17	3	85	0
6	Fagali'i Primary	23	19	4	83	0
7	Faleasi'u Primary	73	69	4	95	5
8	Matautu Falelatai Primary	27	24	3	89	0
9	Faleu Primary	13	12	1	92	0
10	Fale'ula Primary	32	29	3	91	0
11	Fasito'otai Primary	34	31	3	91	1
12	Fasito'outa Primary	47	41	6	87	2
13	George Brown Primary School	58	54	4	93	0
14	Lauli'i Primary	38	35	3	92	1
15	Le'auva'a Primary	34	33	1	97	0
16	Letogo Primary	35	33	2	94	0
17	Leulumoega Primary	13	11	2	85	0
18	Levi Primary	23	20	3	87	0
19	Malie Primary	44	39	5	89	0
20	Manono Primary	29	27	2	93	0
21	Manumalo Baptist - Tuanai	20	17	3	85	1
22	Mulifanua Primary	32	31	1	97	1
23	Nofoalii Primary	37	35	2	95	0
24	Pata Primary	12	10	2	83	0
25	Saina/Toamua Primary School	51	45	6	88	1
26	Sale'imoa Primary	37	29	8	78	0
27	Salua Primary	15	15	0	100	0
28	Samatau Primary	23	21	2	91	0
29	Samoa Primary School	55	45	10	82	0
30	Satapuala Primary	32	26	6	81	0
31	Satuimalufilufi Primary	23	22	1	96	1
32	Siufaga Primary	10	10	0	100	0
33	St. Joan of Arc School	23	19	4	83	0
34	St. Joseph's Primary - Leauvaa	52	48	4	92	0
35	Tuanai Adventist Primary	11	11	0	100	0
36	Tuana'i Primary	21	20	1	95	2
37	Utuali'i Primary	46	45	1	98	1
38	Vaigaga Primary	41	35	6	85	0
39	Vailele Primary	31	31	0	100	0
40	Vailu'utai Primary	26	23	3	88	0
41	Vaitele Primary	90	77	13	86	0
42	Vaiusu Primary	36	36	0	100	0
		1408	1271	137	90	19

No	EU: SAVAII	Actual No of students selected (Target)	No of random students tested	No of students to follow up	% Coverage	No of Positive ICTs
1	Aopo Primary	9	9	0	100	0
2	Asaga Primary	13	13	0	100	0
3	Asau Primary	34	34	0	100	0
4	Auala Primary	16	16	0	100	0
5	Faga Primary	27	24	3	89	0
6	Fai'a'ai & Fogatuli Primary	20	19	1	95	0
7	Falealupo Primary	27	26	1	96	0
8	Falelima Primary	10	10	0	100	0
9	Gagaemalae Primary	36	36	0	100	0
10	Gataivai Primary	25	21	4	84	0
11	Gautavai Primary	12	12	0	100	0
12	Iva Primary	39	32	7	82	0
13	Lalomalava Primary	21	21	0	100	0
14	Lano Primary	15	13	2	87	0
15	Laumoli Primary	24	23	1	96	0
16	Letui Primary	12	11	1	92	0
17	Manumalo Baptist (Salelologa)	20	17	3	85	0
18	Neiafu Primary	22	19	3	86	0
19	Paia Primary School	13	11	2	85	0
20	Palauli Primary	63	58	5	92	0
21	Papa Sataua Primary	15	13	2	87	0
22	Patamea Primary	15	14	1	93	0
23	Pu'apu'a Primary	11	11	0	100	0
24	Puleia Primary	21	16	5	76	0
25	Sa'asa'ai Primary	23	22	1	96	0
26	Sacred Heart - Safotu	11	11	0	100	0
27	Safotu Primary	18	17	1	94	0
28	Safotulafai Primary (Fusi)	15	12	3	80	0
29	Safune Primary	20	18	2	90	0
30	Sagone Primary	20	20	0	100	0
31	Saipipi Primary	18	16	2	89	0
32	Salailua Primary	34	32	2	94	0
33	Saleaula Primary	15	15	0	100	0
34	Salelavalu Primary	33	32	1	97	1
35	Salelologa Primary	63	54	9	86	0
36	Samalaeulu Primary	27	23	4	85	1
37	Samata-i-tai Primary	22	22	0	100	0
38	Samata-i-uta Primary	17	17	0	100	0
39	Samauga Primary	26	25	1	96	0
40	Sapapalii Primary	28	26	2	93	0
41	Sasina Primary	25	20	5	80	1
42	Sataua/Fagasa Primary	21	21	0	100	0
43	Satupaitea Primary	54	52	2	96	0
44	Sili Primary	38	31	7	82	0
45	Siufaga Primary - SDA	13	12	1	92	0

46	St. Theresa's School - Fusi	12	10	2	83	0
47	Tafua Primary	15	13	2	87	0
48	Taga Primary	24	22	2	92	0
49	Tufutafoe Primary	14	14	0	100	0
50	Tutaga Primary	25	23	2	92	0
51	Vaipua & Fogasavai'i Primary	17	14	3	82	2
52	Vaiola Primary	17	17	0	100	0
53	Vaisala Primary	8	8	0	100	0
		1193	1098	95	92	5

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