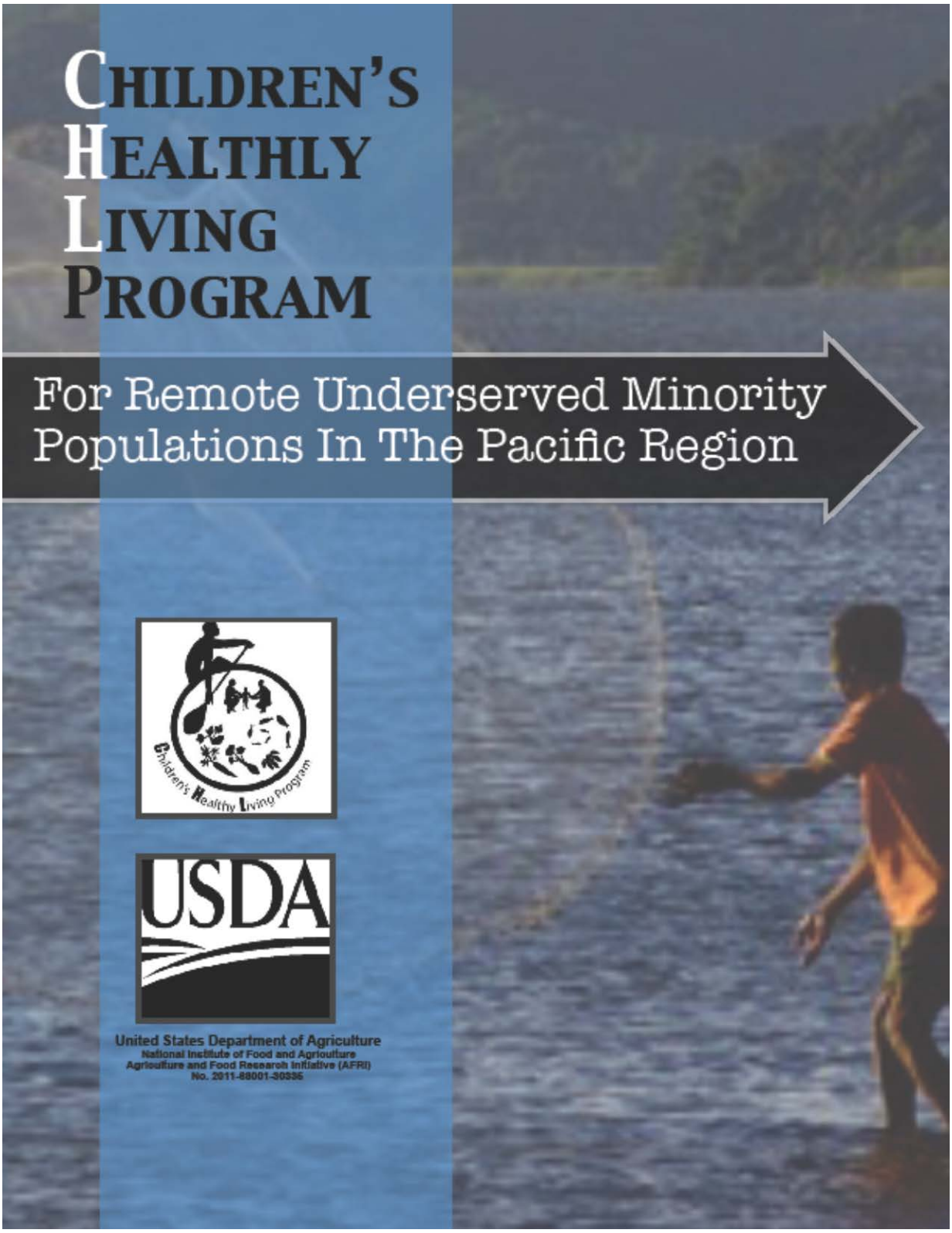
CHILDREN'S HEALTHLY LIVING PROGRAM

For Remote Underserved Minority Populations In The Pacific Region



United States Department of Agriculture
National Institute of Food and Agriculture
Agriculture and Food Research Initiative (AFRI)
No. 2011-68001-30335

Children's Healthy Living Program For Remote Underserved Minority Populations in the Pacific Region

Tafuna Prevalence Survey Results

United States Department of Agriculture
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Executive Summary

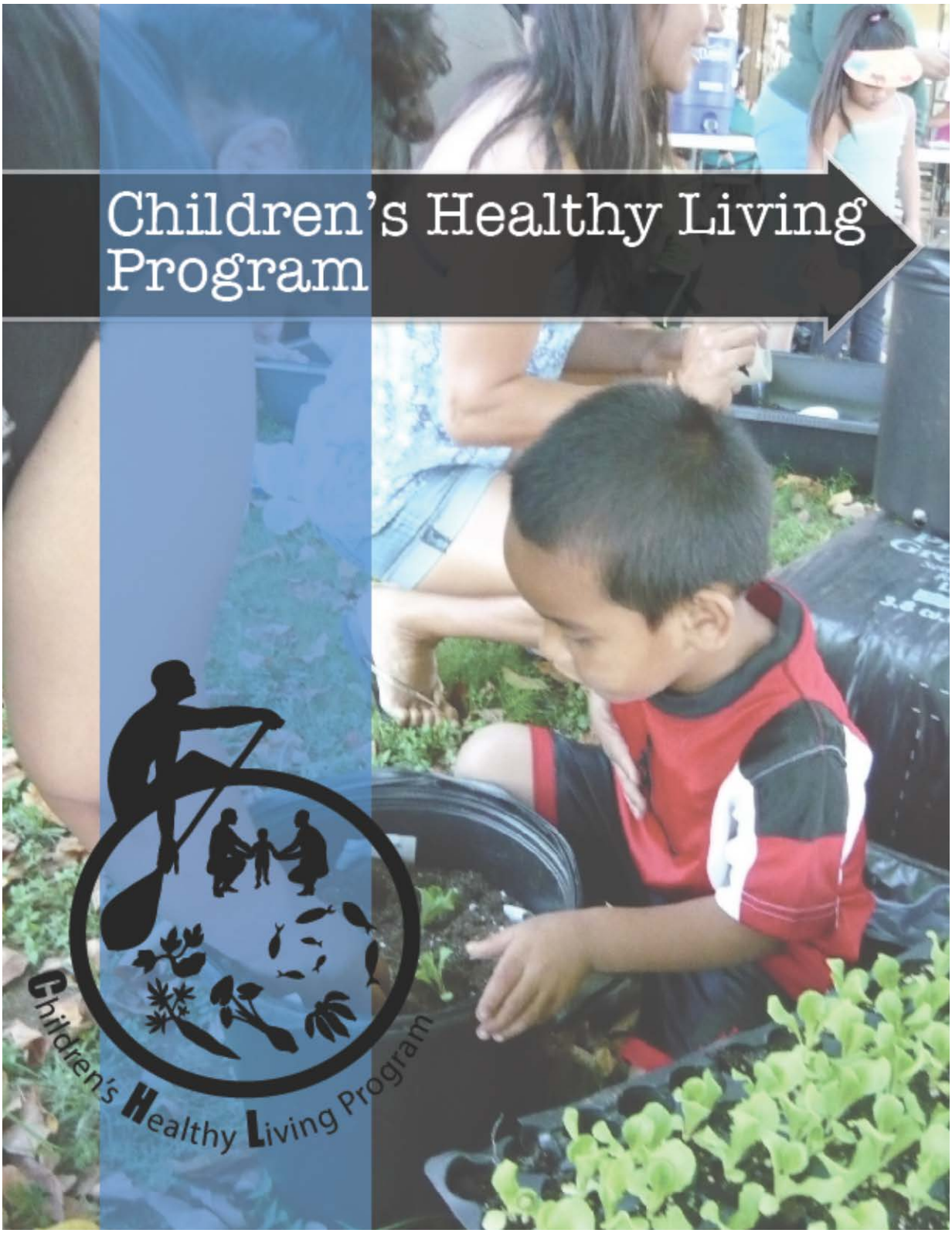
I. Executive Summary

Introduction to the Report

The CHL program utilizes three major strategies towards its goals: 1) training, 2) extension – outreach, and 3) research - intervention. The purpose of this document is to report on the measures of these three strategies in your community. It includes information about CHL training, outreach and sustainability activities, and the research descriptive results of the Children's Healthy Living Program Survey at the individual and household level and the results of the community level assessment. The community level assessment utilizes the Community Assessment Toolkit (CAT) – which comprises of assessments about the availability of food resources, parks, play spaces, and walkable streets. Results of the intervention trial will be presented in a separate report following this one.

If you have any questions about this report, please contact *Rachel Novotny at novotny@hawaii.edu or 808-956-3848.*

Thank you for your interest and efforts for children's health!


Children's Healthy Living Program
Children's Healthy Living Program

II. Children's Healthy Living Program (CHL)

The Children's Healthy Living Program for Remote Underserved Minority Populations in the Pacific Region (CHL) is a partnership among the remote Pacific jurisdictions of Alaska; American Samoa; Commonwealth of the Northern Mariana Islands (CNMI); the Federated States of Micronesia (FSM), the Republic of the Marshall Islands (RMI), the Republic of Palau; Guam; and Hawaii to study childhood obesity among Pacific children, ages two to eight years old.

The program is funded by the United States Department of Agriculture (USDA), National Institute of Food and Agriculture, Agriculture and Food Research Initiative (Grant no. 2011-68001-30335). CHL is coordinated from the Department of Human Nutrition, Food and Animal Sciences in the College of Tropical Agriculture, at the University of Hawaii at Mānoa with contracts to the University of Guam, University of Alaska Fairbanks, American Samoa Community College, Northern Marianas College, and fees for nutrition analysis services conducted at the University of Hawaii Cancer Center.

The goal of CHL is to help to create a social, cultural, political, economic, and physical environment in the Pacific Region that supports active play, physical activity, and eating healthy food, in order to promote health. In partnership with participating communities, our mission is to elevate the capacity of the region to build and sustain a healthy food and physical environment to help maintain healthy weight and prevent obesity among young children in the Pacific region.

CHL strived for the following behavior targets:

1) Lower prevalence of excess weight and waist circumference for height

2) Increased sleep

3) Reduced consumption of sugar-sweetened beverages (SSB)

4) Higher fruit and vegetable intake

5) Higher water intake

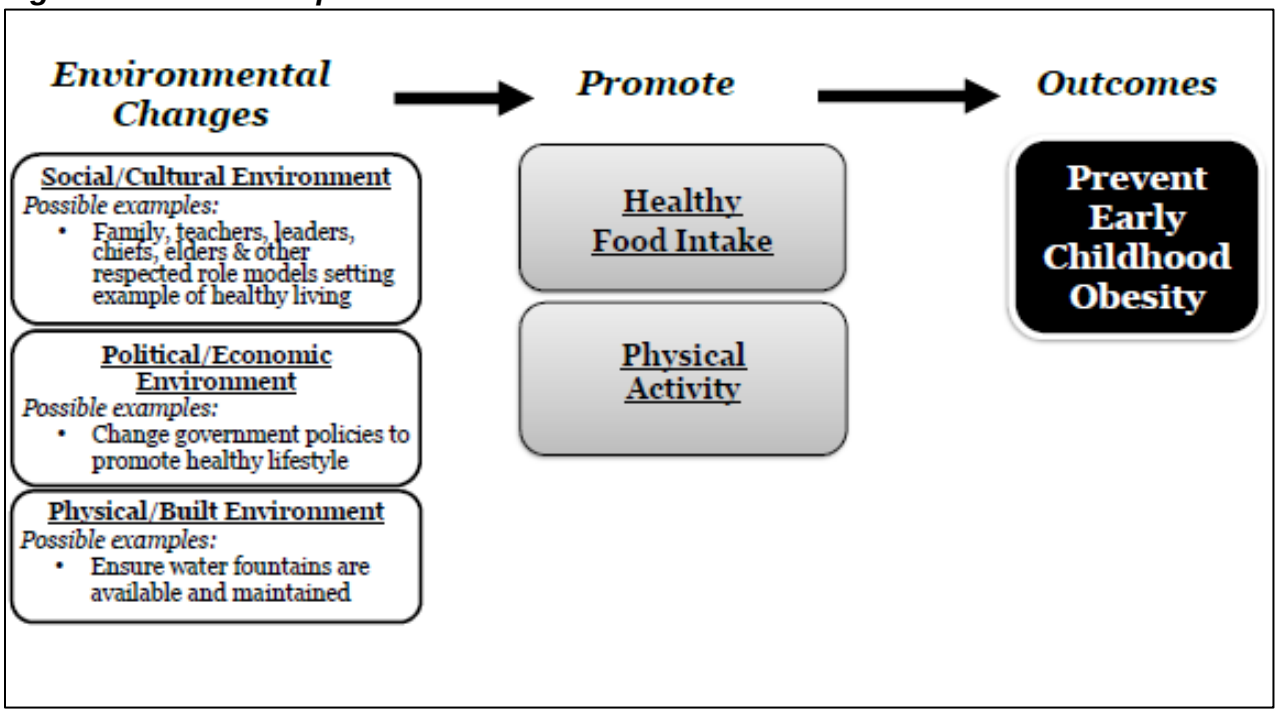
6) Reduced TV/video viewing

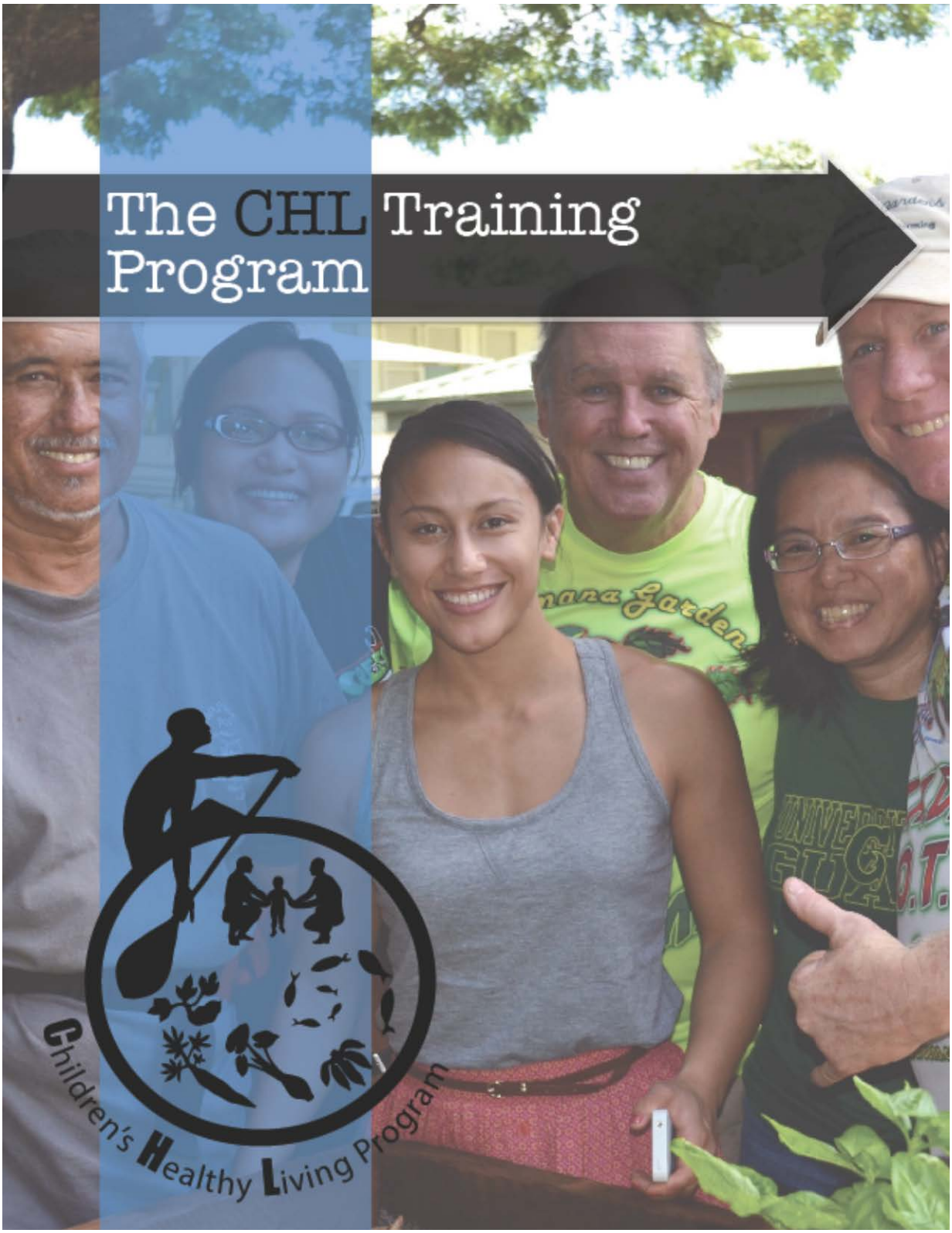
7) Increased physical activity

8) Lower prevalence of acanthosis nigricans (AN)

Figure 1 illustrates CHL's model to influence multiple aspects of the environment to promote healthy food intake and physical activity in young children ages two to eight years old (Braun et al., 2014).

Figure 1. CHL Conceptual Model




The CHL Training Program
Children's Healthy Living Program

III. The CHL Training Program

Training Program Objectives

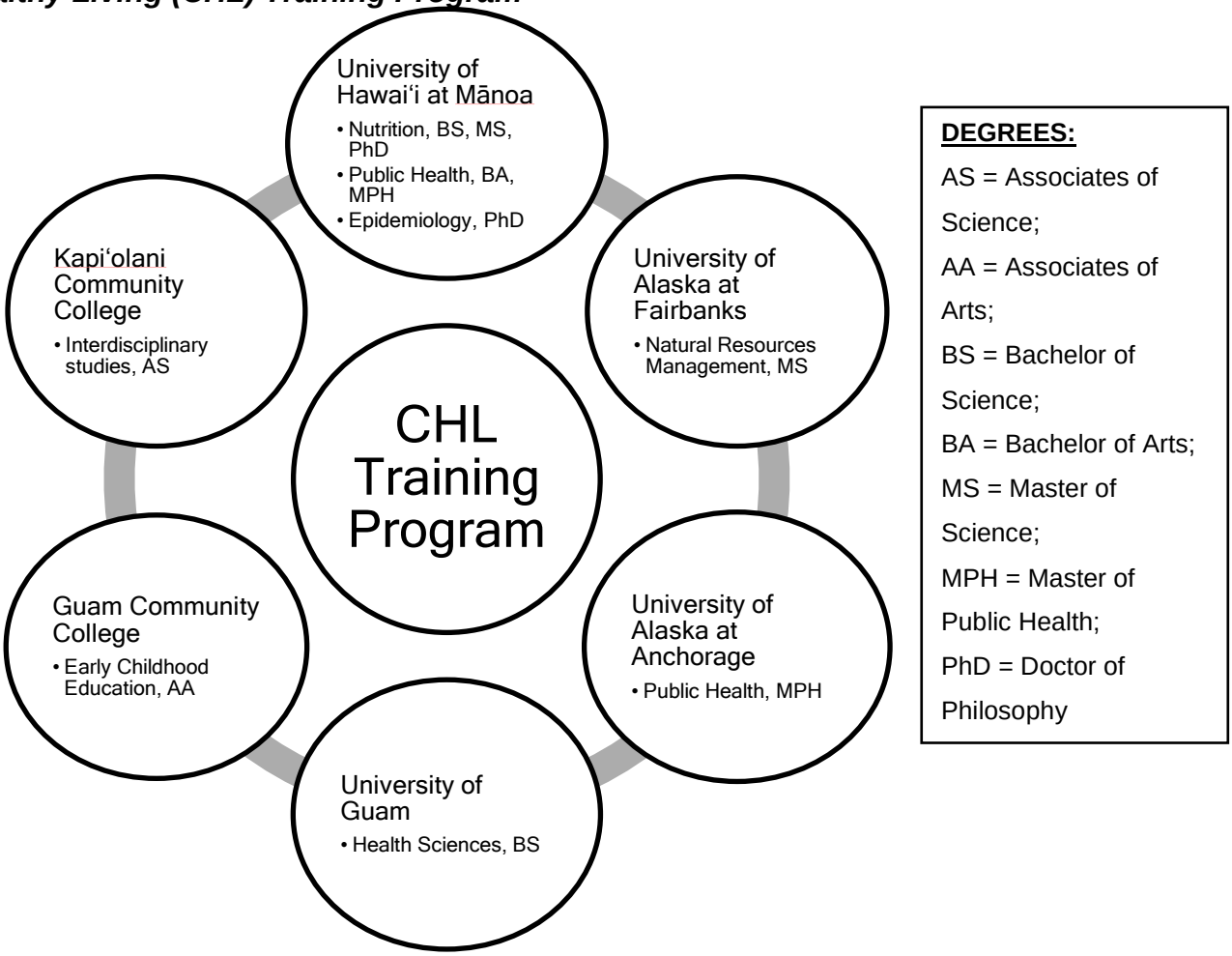
The development of the CHL Training Program (CHL-TP) is an essential component of CHL's multilevel approach to prevent childhood obesity. Approximately, one third of the program's resources are invested in training. The CHL-TP's first objective is to train 22 United States Affiliated Pacific Region students in child obesity prevention through selected academic degree programs. A second objective is to enhance the students' academic education with training on childhood obesity prevention strategies and tools, through the offering of culturally appropriate and regionally relevant obesity prevention-related courses and programs.

Training Program Partnerships

The CHL-TP is a collaborative effort with institutions across the Pacific. Students selected for the program have attended courses at the University of Hawai‘i at Mānoa, the University of Guam, Guam Community College, Kapi‘olani Community College, and the University of Alaska at Fairbanks and Anchorage (Figure 2).

Partner jurisdictions created selection committees who screened and interviewed student applicants and identified the top candidates for the scholarship awards. Two students from each of Alaska, American Samoa, CNMI, Chuuk (FSM), Guam, Hawai‘i, Kosrae (FSM), Pohnpei (FSM), the Republic of the Marshall Islands, the Republic of Palau, and Yap (FSM) were selected for a scholarship to enroll in a degree program at one of the partner institutions (Table 1).

Figure 2. Institutions, Academic Program Areas and Degrees in the Children's Healthy Living (CHL) Training Program



From: Fialkowski MK, et al. Indigenous Workforce Training by the Children's Healthy Living Program (CHL) to Prevent Childhood Obesity in the Underserved US Affiliated Pacific Region. J Health Care Poor Underserved. 2015; 26(2 Supplement): 83-95.

Training Program Accomplishments

The CHL-TP developed a series of six 1-2 credit seminars that addressed the multiple causes of obesity and provided evidenced-based strategies for childhood obesity prevention. Conducting seminars using an online collaborative approach provided an opportunity for all the CHL trainees to engage in distance learning together while strengthening their bond as a cohort and their ties to CHL and the region. The CHL-TP also partnered with the University of University of Hawai'i at Mānoa Public Health

Program to allow CHL Trainees to take an indigenous health seminar as a part of their CHL seminar experience.

In addition to the CHL-TP seminar curriculum, CHL modified curriculum for the Food Science and Nutrition (FSHN) course, The Science of Human Nutrition (FSHN 185), offered both through the University of Hawai‘i at Mānoa and the University of Hawai‘i Outreach College. FSHN 185 utilizes an online platform, which allows for flexible and adaptive nutrition education delivery across the vast region of the Pacific and beyond. The modifications broadened the curriculum to reflect the unique environment and cultural diversity of the Pacific region. New modifications incorporate nutrition education with aspects of commonly consumed food and their significance in societal structure. To further support this Pacific adapted introductory nutrition course, a Pacific Food Guide was developed to help students enrolled in FSHN 185, to better connect the traditional foods of the Pacific with concepts of nutrition.

Other curriculum and education materials developed by the CHL-TP included a comprehensive workshop to provide standardized measurement training to staff and field workers conducting measurements in anthropometry, dietary intake, physical activity, and acanthosis nigricans. The measurement training workshops conducted by CHL were successful in standardizing over 100 measurers in 5 years across the Pacific region from Alaska to Micronesia. Workshop materials will continue to be utilized for standardization of educators and staff conducting regional measurements such as Head Start staff and community workers and will be part of future curriculum being planned.

Students accepted into the CHL-TP conducted a CHL project in their home jurisdictions that supported childhood obesity prevention. Students at the graduate level blended these projects with their final theses and dissertations. All trainees presented their projects and budgets to a selected project committee for approval prior to implementation. Upon completion of their project all students submitted a formal write up and conducted an oral presentation. Examples of projects completed by graduates of the CHL-TP are outlined in Table 1.

24 students participated in the CHL-TP. Two Trainees dropped out of the program after their first year, due to personal reasons. The two vacant scholarship positions were offered to two other qualified Trainees from those respective jurisdictions. Two Trainees were released from the program due to poor performance. To date, 6 students (5 graduate and 1 undergraduate) have completed the CHL-TP and attained their degrees (Table 1). Two graduate-level Trainees from CNMI and Alaska are expected to complete their MPH degrees in the Spring of 2016 while 2 graduate level Trainees from American Samoa and CNMI, working towards a PhD in Epidemiology and an MPH, respectively, are expected to complete their degrees in Summer of 2016. Three undergraduate Trainees from American Samoa, Chuuk, and Kosrae are expected to graduate in Spring 2016 with Bachelor's degrees in Public Health (2) and Nutrition (1), respectively. One undergraduate Trainee from Yap is expected to graduate with a Bachelor's degree in Nutrition in Summer 2016. Four undergraduate Trainees from Pohnpei, Palau, Chuuk, and the Marshall Islands are expected to graduate in Fall 2017 with Bachelor's degrees in Health Science (3) and an Associate degree in Early Childhood Education (1), respectively.

Table 1. CHL Training Program Graduates by Jurisdiction, Degree Type, and Project Description

Student Name	**Jurisdiction**	**Degree Name/Type**	**Project Description**
Tanisha Aflague	Guam	PhD, Nutrition	To examine the willingness to try fruit and vegetables (F&V) and F&V intake among children, 3-12yrs, attending a cultural immersion camp compared to children from a camp without cultural immersion
Monica Esquivel	Hawaii	PhD, Nutrition	To build evidence on the effectiveness of Child Care Center wellness policies that promote intake of nutrient-dense food, healthy eating habits and nutrition education to improve child diet intake and prevent childhood obesity in Hawaii
Lenora Matanane	Guam	MS, Nutrition	To test whether access and availability to fruits and vegetables in food stores is associated with childhood overweight/obesity prevalence in selected

			Guam communities
Ashley Morisako	Hawaii	MPH, Native Hawaiian and Indigenous health	To outline the community engagement process instilled to effectively implement and evaluate a garden-based learning curriculum targeted for preschoolers in Hawaii in order to reduce and prevent childhood obesity
Ron Standlee-Strom	Alaska	MS, Natural Resource Management	To determine factors mediating the delivery of effective nutrition education as perceived by educators and Alaskan program participants
Trisha Johnson	Pohnpei	BS, Food Science and Human Nutrition	To determine traditional fruits and vegetables consumed by young children in Pohnpei, Federated States of Micronesia

PhD = Doctor of Philosophy; MS = Master of Science; MPH = Masters of Public Health; BS = Bachelor of Science

Long-term Plans

The CHL program is committed to exploring other funding opportunities for Trainees who will not complete their degree programs within the life of the CHL grant. The CHL-TP will also continue to serve as a source for professional collaboration and career networking for all of the Trainees. The CHL-TP plans to do long-term follow-up of the Trainees to gather information on the career trajectory of graduates.

Curriculum developed by the CHL-TP will continue to be offered through multiple venues. The Pacific adapted online FSHN 185 has been included as one of the options offered to students at the University of Hawai‘i at Mānoa in the Fall, Spring, and Summer semesters. This class has also been designated as meeting the Hawaiian, Asian, and Pacific Issues General Education Focus area for the University of Hawai‘i system, including the University of Hawai‘i Outreach College. The nutritional education resource, the Pacific Food Guide, has also been developed into a web resource available for free at www.manoa.hawaii.edu/ctahr/pacificfoodguide

The series of seminars developed for the CHL Trainees on the causes of childhood obesity and evidenced-based strategies for childhood obesity prevention are currently being adapted into a comprehensive distance-learning platform so that it may be offered through a CHL Summer Institute. The online platform of the CHL Summer Institute will

allow for a wider audience to benefit from its unique and important content. The CHL Summer Institute will offer various courses and modules for credit and non-credit though the University of Hawai‘i Outreach College. The University of Hawai‘i Outreach College allows for non-University of Hawai‘i students to access this unique training opportunity at in-state tuition rates.

For further information on the CHL Training Program please see the following resources:

- Fialkowski MK, et al. Indigenous Workforce Training by the Children’s Healthy Living Program (CHL) to Prevent Childhood Obesity in the Underserved US
- Affiliated Pacific Region. J Health Care Poor Underserved. 2015; 26(2 Supplement): 83-95.
- CHL Training Program available at: http://www.chl-pacific.org/trainingeducation/program-overview

CHL Research Activities
Children's Healthy Living Program

IV. Research Activities

CHL Research Aims and Design

CHL measured two to eight year-old children to identify young child overweight and obesity, acanthosis nigricans, and health behavior information about sleep, physical activity, screen time, eating of fruits and vegetables, and consumption of sugar-sweetened beverages and water.

Research Methods

Study Design

The cross-sectional CHL study design collected data on body size, functional outcomes of obesity (acanthosis nigricans), food intake, physical activity, lifestyle behavior which included screen time, and demographics (baseline or prevalence). These were measured through anthropometry (height, weight, and waist circumference), Food and Activity Logs, questionnaires, accelerometry, and visual inspection (of the neck).

Data were collected between October 2012 and September 2013 in American Samoa, Alaska, Commonwealth of the Northern Mariana Islands (CNMI, Guam and Hawaii, and between October 2013 and June 2015 in FAS.

This CHL research includes the data from the Federated States of Micronesia (Yap, Chuuk, Kosrae, and Pohnpei), the Republic of the Marshall Islands, and the Republic of Palau; referred to collectively in CHL as the Freely Associated States (FAS), and all other CHL jurisdictions -- Alaska, American Samoa, CNMI, Guam, and Hawaii.

Selection of Communities

Communities were identified in Alaska, American Samoa, CNMI, Guam and Hawaii using the 2000 U.S. Census tract data (U.S. Census Bureau). In the FAS, 2010 country census data were used to inform selection of sites. The community eligibility criteria included population size of >1000 (except for FAS), >25% of the population of indigenous/native descent (except 15% in Alaska due to no targeted census tract within the CHL catchment area with a population of more than 1000 having more than 25%

indigenous /native), and >10% of the population under age 10 years. Additional selection criteria included adequate settings for measuring children (e.g., schools), reasonable accessibility for the CHL team, and geographic representation for FAS.

Longitudinal Study

For the study of the effectiveness of the CHL intervention in American Samoa, CNMI, Guam and Hawaii, communities were selected as matched pairs. Four communities were selected (two matched-pairs). Two communities were selected (1 matched-pair) in Alaska. The matching included similar criteria as above, as well as community characteristics such as access to food stores and ethnic distribution. In each pair, one community was randomly assigned to intervention and the other to a delayed optimized intervention (community will receive intervention at the end of the main study). Two additional non-matched communities (third and fourth for Alaska and fifth and sixth for other jurisdictions) were selected from the eligible list of communities to serve as temporal indicators.

A second round of measurement occurred around 24-months from the baseline in Alaska, American Samoa, and Commonwealth of the Northern Mariana Islands (CNMI), Guam, and Hawaii to examine if CHL intervention activities in those jurisdictions were effective. Smaller amounts of data were collected from the “temporal” communities. The temporal communities served to show changes in BMI over time, in communities that did not have any CHL activities.

This report includes only the baseline data and a few questions that were not in the baseline survey that were collected at a second data collection period in some jurisdictions. The results of the CHL-wide intervention study examining changes between baseline and 24-month data will be available later in a separate report.

Selection of Participants

Recruitment activities involved schools and other community venues and activities. Recruitment took place at Head Start sites, preschools, day care centers, kindergartens, WIC sites, community health centers and other appropriate venues (e.g., parks and community recreation centers). Recruitment efforts, led by CHL staff in each jurisdiction, involved close collaboration with community liaisons (e.g., teachers, school staff, program directors, matai, mayors) to enhance participation. The teams in all jurisdictions tailored the recruitment strategies to work effectively with the stakeholder organizations while meeting recruitment goals of CHL.

NOTE: The following numbers are based on consented, rather than those who completed the measures.

Table 1: Number of Participants Consented in each Jurisdiction for CHL Research

Number of Participants Consented in each Jurisdiction for CHL Research	
Jurisdiction- Communities	**Number Consented**
Alaska- Anchorage, Fairbanks, Kenai, Mat-Su Valley	713
American Samoa Fagaitua/Pagai/Amaua/Auto/Utusia, Leloaloa/Aua,Onenoa/Tula/Alao, Aoloau/Aasu	978
CNMI - Koblerville/San Antonio, Oleai, Kagman, San Roque, Saipan, Village	924
Guam- Yigo, Yona, Agat, Sinajana	885
Hawaii - Nanakuli, Waimanalo, Hilo, Wailuku, Kauai, Molokai	988
CHL Intervention Study Data (total)	4,488

Freely Associated States	
Jurisdiction- Communities	**Number Consented**
Pohnpei *Nett, Mand, Sekere, Wenik*	**212**

Republic of the Marshall Islands *Majuro, Ebeye (Kwajalein atoll), Ailinglaplap*	**218**
Palau *Koror, Ngaraard, Melekeok, Airai*	**214**
Yap *Rull, Tomil, Weloy, Ulithi*	**205**
Kosrae *Tafunsak, Lelu, Sansrik, Malem, Utwe/Walung*	**207**
Chuuk *Weno (Sapuk, Iras), Tol, Tonoas, Uman*	**231**
FAS Prevalence Data (total)	**1,287**
CHL Total (CHL Intervention + FAS Prevalence)	**5,775**

Community Report
Children's Healthy Living Program

VI. Tafuna Community Report

The total number of responses for each question may not match the total number of consented participants. Parents identified their children as eligible (including age eligible) and consented, upon which children participated in the study. In data analysis, upon calculation of age by study metrics, some children were outside the defined age range and were excluded from the analysis. In addition, not all who consented to participate in the study completed all parts or all items of all the questionnaires, so the results for each item reflect only those who answered that question or whose data were available at the time of this report. Finally, potential outliers with extreme values (defined as those with a value of 3 standard deviations (SD) above or below the mean) were also excluded from this report. Total percentage may not add up to 100 because of rounding.

Child Demographics

Section 1. Child Demographics

A total of 161 children participated from Tafuna. Parents / caregivers answered multiple questions about each of their children participating in the CHL research program. The following section reports some of that information collected, including child's sex, age, race and ethnicity.

Sex: All 161 children participated had data on sex.

Table S.1.1. Number and Percent of Participants by Sex

Sex	Number	Percent
Boys	83	51.6%
Girls	78	48.5%
Total	161	100%

Age: Child's age was calculated between age in years elapsed between child's date of birth and the date when anthropometry was measured. The distribution of age of the children is shown below.

Table S.1.2. Number and Percent of Participants by Age

Age in Years	Number	Percent
Age 2	3	1.9%
Age 3	30	18.6%
Age 4	37	23%
Age 5	41	25.5%
Age 6	32	19.9%
Age 7	18	11.2%
Age 8	0	0%
Total	161	100%

Table S.1.3. Number and Percent of Participants by Age Group

Age in Years	Number	Percent
2-5 years old	111	68.9%

6-8 years old	50	31.1%
Total	161	100%

Racial and Ethnic Heritage

The data collection questions used in this section and for the household demographics came from various sources. Some items were generated by CHL staff; some came from The Center for Alaska Native Health Research Demographic and Medical Screening Questionnaire, the Behavioral Risk Factor Surveillance System 2011 survey, the 2011 Middle School Youth Risk Behavior Survey.

Table S.1.4. The Distribution of Race of the Children Using the U.S. Office of Management and Budget (OMB) Definition

Race of child of OMB definition	Number	Percent
Native Hawaiian or other Pacific Islander	155	96.3%
More than one race	5	3.1%
Black	1	0.6%
Total	161	100%

Table S.1.5. The Distribution of Race/Ethnicity of the Children Using the CHL Pacific Definition Which Prioritize the Indigenous Ethnic Groups in the Jurisdiction (CHL Pacific)

Race of child of Pacific definition	Number	Percent
Samoan	136	84.5%
Native Hawaiian mixed with Samoan	18	11.2%
Samoan mixed with other race group	5	3.1
Black	1	0.6%
Other	1	0.6%
Total	161	100%

Child's Birth Place

Parents or caregivers responded to the question: "In what city or country was your child born?"

Table S.1.6. Child's Place of Birth

Birth Place	Number	Percent
American Samoa	145	90.1%
West Samoa	6	3.7%
Hawaii	3	1.9%
USA (other than Hawaii)	7	4.4%
Total	161	100%

Parents responded to the question about residence: "How many years has your child lived here?"

Among the 161 children, 158 had information on this question. Among them, **144 (91.1%) lived their whole life in Tafuna** and the rest, 8.9%, spent one fifth to three quarters of their life in Fafaitua.

Language Child Speaks

The language distribution of the children in the survey is listed in the following table.

Note: Language responses may total over 161 and 100% because some respondents could speak more than one language.

Table S.1.7. Top Languages Child Speaks

Top languages child speaks	Number	Percent
Samoan	81	50.3%
English and Samoan	77	47.8%
Other (including Samoan, Tongan)	3	1.8%
Total	161	100%

Samoan was the top language spoken at home (83.9%). Other languages children in Tafuna spoke at home included English, Tongan, and Tuvaluan. **Fifty percent of the children spoke English and at least one other language**.

Summary

Among the 161 children, 78 (48.5%) were girls and 83 (51.6%) were boys. Furthermore, 111 (68.9%) were of age group 2-5 years and 50 (31.1%) were of age group 6-8 years. Among the 161 children, all had information on race, of which 155 (96.3%) were Native Hawaiian mixed with at least one other race group, 5 (3.1%) were more than one race, and 1 (0.6%) was Black.

Child Anthropometric Measurement Results

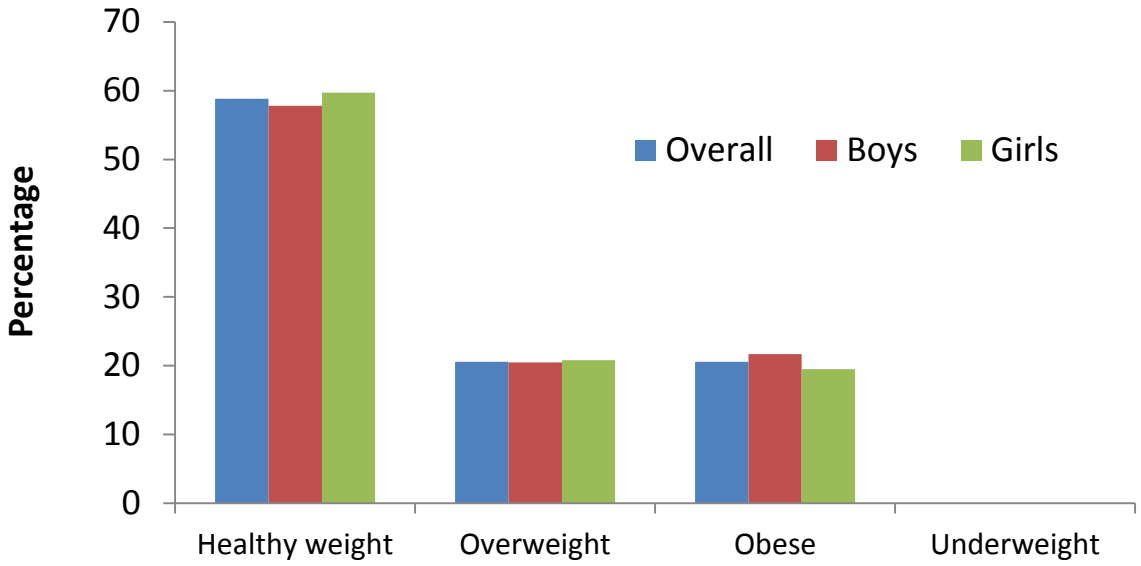
Section 2. Child Anthropometric Measurement Results

Body Mass Index

Among the 161 children who participated in Tafuna, 160 had valid measurements of Body Mass Index (BMI).

Overweight was defined as the 85th - 94th percentile for BMI (weight, kg/(height, m^2)) and obesity was defined as greater than or equal to the 95th percentile for BMI (Centers for Disease Control and Prevention, 2000).

Prevalence of Overweight and Obesity of Study Children in Tafuna



A total of 160 children were included for this analysis. Among them, 59% were healthy weight, 21% were overweight, 21% were obese, and none were underweight. No difference was found between boys and girls, or between children ages 2-5 and those 6-8 years old.

Abdominal Obesity

The International Diabetes Federation (IDF) suggests that children 6 years or older with a waist circumference equal or greater than the 90th percentile be considered as having abdominal obesity (Zimmet et al., 2007). For children younger than 6 years of age, currently there is insufficient information for such classification. Using children ages 6-8

years in the CHL data set as the reference data, the 90th percentile cutoff value is 71.47 cm. The 90th percentile cutoff value reported from the IDF, which uses “a nationally representative sample” of boys and girls, is 67.65 cm for 7-year olds.

Among the 50 participants in Tafuna between the ages 6-8 years, using the CHL cutoff was **five (10.0%) of 6-8 year olds were considered as having abdominal obesity.** Using the IDF cutoff value, **six (12.0%) of 6-8 year olds were considered as having abdominal obesity**.

Screen Time

Children's Healthy Living Program

Section 3. Screen Time

The following set of questions was adapted from Buckworth, J., & Nigg, C. (2004); Nigg, C. R. (2005); Haas, S., & Nigg, C. R. (2009).

Parents were asked, "On usual weekdays (Monday to Friday), how many hours a day does your child spend watching Television and/or videos/ DVD?" They were asked the same question about the weekend days.

Among the 161 children participated in Tafuna, **time spent on TV watching per day was 1.8 hours/day** (sd=1.3 hour) overall, 1.7 hours/day (sd=1.3) on weekdays, and 2.0 hours/day (sd=1.7) on weekends. The following table summarizes the distribution of duration of TV watching.

Table S.3.1. Hours per day of TV Watching

Hours per day child watches TV (n=156)	Percent of children		
	Per Day (adjusted for weekday and weekend)	Per Weekday	Per Weekend day
1/2 hour or less	20.5%	26.1%	26.1%
More than ½ hour up to 2 hours	41.6%	47.2%	38.5%
More than 2 hours up to 4 hours	31.1%	24.2%	26.1%
More than 4 hours up to 6 hours	6.2%	1.9%	7.5%
More than 6 hours up to 7 hours	0.6%	0.6%	1.9%
Total	100%	100%	100%

INACTIVE Video Games (Per day, Per Weekday, and Per Weekend day)

Parents were asked, “On a usual weekdays (Monday to Friday), how long on average a day does your child spend playing INACTIVE video games (DS, Play station, XBOX, Wii computer games, etc.)?” They were asked the same question about the weekend days.

Among the 161 children participated in Tafuna, all had data on the overall time spent on inactive video games. The **overall average among those 161 children was 1.0 hour/day** (sd=1.1 hour). All 161 children had data on weekday inactive video time. The average inactive video time on weekdays was 0.9 (sd=1.2). A total of 160 children had data on weekend inactive video time and average inactive video time on weekends was 1.0 hour/day (sd=1.3). The following table summarizes the distribution of duration of inactive video playing time.

Table S.3.2. Hours per day of Inactive Video Games

Hours per day child spent on inactive video games	Percent of children		
	Per Day (adjusted for weekday and weekend)	Per Weekday	Per Weekend day
1/2 hour or less	49.1%	57.1%	55.6%
More than ½ hour up to 2 hours	32.9%	29.8%	26.9%
More than 2 hours up to 4 hours	18.0%	13.0%	16.3%
More than 4 hours up to 6 hours	0.0%	0.0%	1.3%
Total	100%	100%	100%

ACTIVE Video Games (Per day, Per Weekday, and Per Weekend day)

Parents were asked, “On a usual weekdays (Monday to Friday), how long on average a day does your child spend playing ACTIVE video games (DS, Play station, XBOX, Wii computer games, etc.)?” They were asked the same question about the weekend days.

Among the 161 children participated in Tafuna, a total of 160 had data on the overall time spent on active video games. The **overall average among those 160 children was 1.0 hour/day** (sd=1.2 hour). A total of 157 children had data on weekday active video time. Average active video time on weekdays was 0.9 hours/day (sd=1.2). A total of 159 children had data on weekend active video time. Average active video time on weekend was 1.1 hours/day (sd=1.4). The following table summarizes the distribution of duration of active video playing time.

Table S.3.3. Hours per day of Active Video Games

Hours per day child spent on active video games	Percent of children		
	Per Day (adjusted for weekday and weekend)	Per Weekday	Per Weekend day
1/2 hour or less	48.1%	56.7%	52.2%
More than ½ hour up to 2 hours	33.1%	29.9%	29.6%
More than 2 hours up to 4 hours	16.9%	12.7%	15.1%
More than 4 hours up to 6 hours	1.9%	0.6%	3.1%
Total	100%	100%	100%

Screen Time - Overall

This variable was created by adding the hours for watching TV and DVDs, the hours playing active video games, and the hours playing inactive video games. The overall mean is a weighted average of weekday and weekend hours.

Among the 161 children participated in Tafuna, all had data on the overall screen time, which averaged 3.8 hours (sd=2.6). A total of 161 had data on weekday screen time, which averaged 3.6 hours (sd=2.7). A total of 161 had data on weekend screen time, which averaged 4.2 hours (sd=3.5). The following table summarizes the distribution of duration of screen time.

Table S.3.4. Hours per day of Screen Time

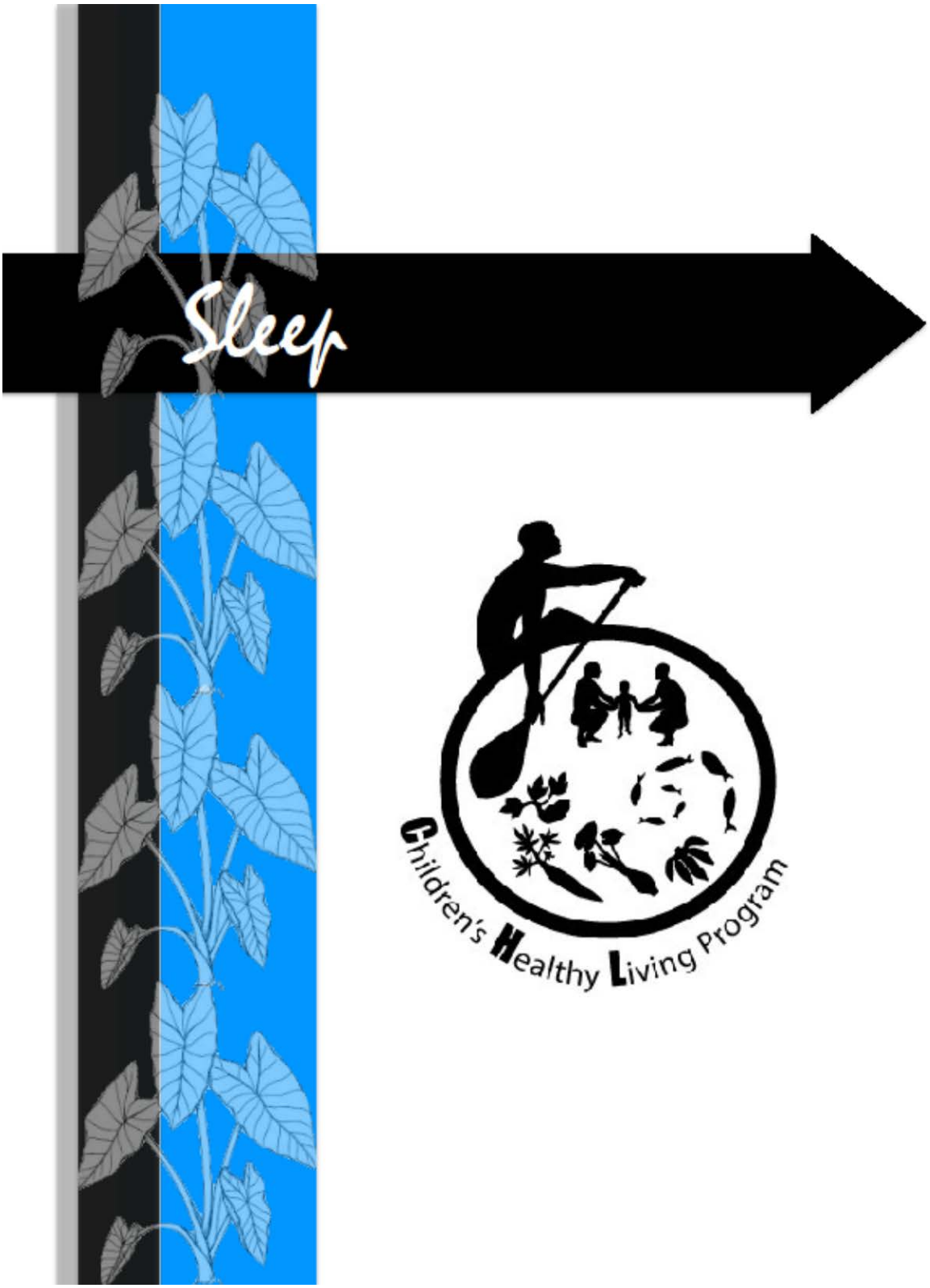
Hours per day child spent on screen time	Percent of children		
	Per Day (adjusted for weekday and weekend)	Per Weekday	Per Weekend day
1/2 hour or less	10.1%	14.3%	16.2%
More than ½ hour up to 2 hours	22.4%	24.8%	21.7%
More than 2 hours up to 4 hours	22.4%	22.4%	19.3%
More than 4 hours up to 6 hours	26.1%	24.2%	19.3%
More than 6 hours up to 7 hours	18.6%	14.3%	23.6%
Total	100%	100%	100%

Summary

A total of 161 children were included in the analysis of screen time. Among them, average screen time such as watching TV, video games, or DVD, or playing active or inactive video games was 3.8 hours. No difference was observed between the averages of boys and girls, or between those ages 2-5 and those ages 6-8 years old.

While the national recommendation is for each child to spend 2 or less hours of screen time every day, **only 53 (32.9%) of our study children met this recommendation**. No difference was found between boys and girls, or between those ages 2-5 and those ages 6-8 years old. A vast majority (67.1%) of children appear to be spending too much

time watching screens! This is an opportunity for both parents and educators to intervene to help children spend less screen time.



Children's Healthy Living Program

Section 4. Sleep

The National Sleep Foundation **recommends** for 2 year olds: 11-14 hours of sleep/night; for 3 to 5 year olds: 10-13 hours/night; and for 6 to 8 year olds: 9-11 hours/night. The National Sleep Foundation also gives a **range** that may be appropriate for an individual child which is a bit wider with 9-16 hours for 2 year olds; 8-14 hours for 3 to 5 year olds; and 7-12 hours for 6 to 8 year olds.

Parents were asked, "How many hours of sleep on average does your child get in a 24-period (at night and in naps)?" The respondents were asked to choose from 0 hours to over 13 hours in half hour increments. For those who chose over 13 hours, 13.5 hours was assigned instead; hence, the maximum hours are at 13.5 hours.

Some participants misunderstood the question but put down child's nap time or hours sleep on the previous night instead of average sleep duration. Therefore, observations where sleep duration was less than 3.5 hours were removed from this report as those values are more or less considered as biologically implausible values.

Table S.4.1. Number and Percent of Children's Average Hours of Sleep per Day by Age

Hours of sleep in 24 hours at night and in naps (on average and from parent / caregiver report)	Number	%
2 year olds	3	100%
Less than 9 hours	1	33%
9 hours to less than 11 hours	1	33%
11 hours or more (to 13.5 hours)	1	33%
3 – 5 year olds	74	100%
Less than 8 hours	9	12.2%
From 8 hours to less than 10 hours	21	28.4%
From 10 hours to 13.5 hours	44	59.5%
6 – 8 year olds	42	100%

Hours of sleep in 24 hours at night and in naps (on average and from parent / caregiver report)	Number	%
Less than 7 hours	1	2.4%
From 7 hours to less than 9 hours	8	19.1%
From 9 hours to 13.5	33	78.6%

Table S.4.2. Number and Percent of Children Meeting Recommended Hours of Sleep

Met recommended hours of sleep	Number	%
Two year olds met recommendation of 11 – 14 hours of sleep	1	33%
Three to five year olds met recommendation of 10 – 13 hours of sleep	44	59.5%
Six to eight year olds met recommendation of 9 – 11 hours of sleep	33	78.6%

The following questions were modified from The Tayside children's sleep questionnaire (McGreavey, Donnan, Pagliari, & Sullivan, 2005).

Table S.4.3. Number and Percent of Minutes to Fall Sleep

How long after going to bed does your child usually fall asleep?	Number	%
0 to less than 15 minutes	40	24.8%
15 to less than 30 minutes	59	36.7%
30 to less than 45 minutes	31	19.3%
45 to less than 60 minutes	12	7.5%
60 minutes and more	19	11.8%
Total	161	100%

Table S.4.4. Number and Percent of Children with Difficulty Getting to Sleep

The child has difficulty getting to sleep at night (and may require a parent to be present)	Number	%
This sleep behavior never occurs	81	50.3%
The behavior occurs once or twice a month	28	17.4%
Occurs one to two times a week	17	10.6%
Occurs between three and five nights a week	4	2.5%
The sleep behavior happens every night	31	19.3%
Total	161	100%

Table S.4.5. Number and Percent of Children Not Falling Asleep in Own Bed

Child does not fall asleep in his or her own bed.	Number	%
This sleep behavior never occurs	83	51.9%
The behavior occurs once or twice a month	19	11.9%
Occurs one to two times a week	27	16.9%
Occurs between three and five nights a week	5	3.1%
The sleep behavior happens every night	26	16.3%
Total	160	100%

Table S.4.6 Number and Percent of Children Difficulty Falling Asleep After Wakening

After waking up in the night, child has difficulty falling asleep again by him or herself.	Number	%
This sleep behavior never occurs	92	57.1%

The behavior occurs once or twice a month	27	16.8%
Occurs one to two times a week	20	12.4%
Occurs between three and five nights a week	5	3.1%
The sleep behavior happens every night	17	10.6%
Total	160	100%

Table S.4.7. Number and Percent of Children that Sleep Some of the Night in Parent's Bed

Child sleeps in the parent's bed at some time during the night	Number	%
This sleep behavior never occurs	54	33.5%
The behavior occurs once or twice a month	34	21.1%
Occurs one to two times a week	34	21.1%
Occurs between three and five nights a week	10	6.2%
The sleep behavior happens every night	29	18.0%
Total	161	100%

Table S.4.8. Number and Percent of Children Needing Parent to Replace a Comforter After Waking in Night

If child wakes, he or she uses a comforter (e.g. pacifier or binky) and requires a parent to replace it.	Number	%
This sleep behavior never occurs	127	79.4%
The behavior occurs once or twice a month	13	8.1%
Occurs one to two times a week	13	8.1%
Occurs between three and five nights a week	1	0.6%
The sleep behavior happens every night	6	3.8%

Total	160	100%

Table S.4.9. Number and Percent of Children Wanting a Drink during the Night

Child wants a drink during night (including breast or bottle-feed)	Number	%
This sleep behavior never occurs	78	48.5%
The behavior occurs once or twice a month	36	22.4%
Occurs one to two times a week	27	16.8%
Occurs between three and five nights a week	6	3.7%
The sleep behavior happens every night	14	8.7%
Total	161	100%

Table S.4.10. Number and Percent of Children with Sleeping Difficulties

Do you think your child has sleeping difficulties?	Number	%
No	142	88.2%
Yes	19	11.8%
Total	161	100%

Medical

Section 5. Medical

Parents answered the question: Does your child have any current medical conditions diagnosed by a doctor? Among the 159 children, 16 (10.1%) reported that their children had a medical conditions diagnosed by a doctor. The top medical condition was asthma (13, 8.1%).

Early Life & Feeding Of A Child

Section 6. Early Life and Feeding of Child

Birth Weight

Among the 161 children participated from Tafuna, a total of 130 had information on birth weight. The distribution of birth weight into three groups is summarized in the following table.

Table S.6.1. Number and Percent of Children by Birth Weight

Birth Size	Number	%
Low birth weight < 2500 g	4	3.1%
Healthy birth weight (2500 – 4000 g)	103	79.2%
High birth weight > 4000 g	23	17.7%

Among the 161 children participated in Tafuna, a total of 23 had information on birth length. Among the 23 children, 9 (39.1%) had birth length below the 5th percentile using the CDC 2000 reference data, which is at 45.57 cm.

Early Feeding Pattern

Among the 161 children participated in Tafuna, a total of 147 had information on breastfeeding. Among the 147 children, 125 (85%) of children were reported to ever have breastfed.

Table S.6.2. Number and Percent of Children Ever Breastfed or Fed Breast Milk

Child ever Breastfed or fed Breastmilk	Number	%
Yes	125	85.0%
No	22	15.0%
Total	147	100%
If Yes, (about children who were ever breastfed)		
Mean age child stopped breastfeeding or being fed breast milk (months) (n=102)	13 months (sd=11.3)	

Among the 161 children participated in Tafuna, a total of 140 had information on formula feeding. Among those 140 children, 102 (72.9%) of children were reported to have ever formula fed. Mean age of children started formula feeding or stopped formula feeding is reported in the following table.

Table S.6.3. Number and Percent of Children Ever Fed Formula

Child ever fed formula	Number	%
Yes	102	72.9%
No	38	27.1%
Total	140	100%
If Yes, (about children who were fed formula)		
Mean age child first fed formula (months) (n=83)	5.4 month (sd=5.5)	
Mean age child completely stopped drinking formula (months) (n=66)	15.8 month (sd=8.8)	

A total of 122 out of the 161 children had information on age when the child was fed anything other than breast milk or formula (juice, cow's milk, sugar water, baby food, or anything else, even water). The mean age of this was 7.7 months (sd=4.8).

Household Demographics & Measures

Section 7. Household Demographics and Measures

Parents and other caregivers brought their children to participate in the CHL measurement study. The following section summarizes the participant's relationship to the child, the parent or caregiver's marital status, educational achievement, employment status, family income, and family structure.

Relationship

Relationship of the participant to the child is summarized in the following table.

Table S.7.1. Number and Percent of Respondents' Relationship to Child

Relationship	Number	Percent
Biological mom	110	68.3%
Legal guardian, other	12	7.5%
Grandmother	3	1.9%
Birth dad	19	11.8%
Adoptive mom	4	2.5%
Grandfather	3	1.9%
Grandparents	1	0.6%

Marital Status

A total of 161 out of the 161 participants had marital status information of the respondent (see the following table).

Table S.7.2. Frequency and Percent of Respondents' Marital Status

Marital Status	Number	Percent
Married	131	81.4%
Single and living with boyfriend, girlfriend, or partner	7	4.4%
Single and not living with boyfriend, girlfriend, or partner	14	8.7%

Divorced	4	2.5%
Separated	3	1.9%
Other	2	1.2%

Household Size and Multi-Generation Households

All of the 161 children had information on the number of people lived in the same household and their relationship to the child. Among them, 67 (41.6%) are from multi-generation households. Mean size of household was 7, with the minimum of 2 and maximum of 31.

Education

The education levels of the participants – (the parents or guardians) are shown below.

Table S.7.3. Number and Percent of Respondents' Education Level

Education	Number	Percent
Never attended school or only kindergarten	5	3.1%
Grades 1 up to 8 (elementary to middle)	8	5%
Grades 9 to 11 (some high school)	13	8.1%
Grades 12 or GED (high school graduate)	99	61.9%
College or technical school 1 to 3 years	18	11.3%
College 4 years or more	17	10.6%
Total	160	100%

Employment Status of the Caregiver Participants

Among the 161 children participated in Tafuna, all had information on whether the respondent was employed for wages/salary, whether he/she was self-employed, whether he/she was out of work for more than a year or less than a year, whether the

respondent was a homemaker, a student, or unable to work. All 161 had information on whether the respondent had more than one job.

Table S.7.4. Number and Percent of Respondents' Employment Status

Employment	Number	%
Employed for wages / salary	46	28.6%
Self-employed	8	5.0%
Out of work (less than 1 year)	9	5.6%
Out of work (more than 1 year)	13	8.1%
Homemaker	74	46%
Student	12	7.5%
Retired	8	5%
Unable to work	11	6.8%
More than one job	15	9.3%

*Note: responses may total over 100% because respondents could select more than one category.

Household Income Level

Among the 161 children participated in Tafuna, 136 had information on annual Household income from all sources over the past 12 months. The following table summarizes this information.

Table S.7.5. Number and Percent of Respondents' Household Income Level

Annual household income in the past 12 months	Number	Percent
Under $10,000	87	64.0%
From $10,000 to less than $20,000	34	25.0%
From $20,000 to less than $35,000	8	5.9%
From $35,000 to less than $60,000	3	2.2%
From $60,000 to less than $75,000	3	2.2%
$75,000 or more	1	0.7%
Total	136	100%

Religion

Among the 161 children, a total of 153 had information on family's religious affiliation. Out of the 153, none reported any religious affiliation. Among the 153 with any type of religious affiliation, the distribution of different religious affiliations is presented in the following table. A total of 4 had information on how often they engage in religious activities. The mean number of times per month attending religious activities was 11.5 among those participants.

Table S.7.6. Number and Percent of Respondents' Religious Affiliation

Religion Affiliation	Frequency	Percent
Christian denomination not specified	9	5.9%
Catholic	13	8.5%
Mormon/Latter-day Saints	20	13.1%
Baptist	8	5.2%
Protestant	60	39.2%
Pentecostal	37	24.2%
Jehovah's Witness	6	3.9%
Total	153	100%

Food Security / Resource Availability

Food security and availability was included in the demographic questionnaire, to help understand the support services used by participants in our geographically varied jurisdictions. The food security questions were adapted from questions used by USDA to Assess Household Food Security (USDA, 2008). NHANES (cdc.gov/nchs/data/nhanes/nhanes_11_12/fsq_family.pdf).

Participants were asked, in the past 12 months, how often money for food or money for utilities runs out before the end of the month. Among the 161 children participated in Tafuna, a total of 143 had information on whether money for food runs out or not and a total of 141 had information on whether money for utility runs out or not. The following table presents the answers.

Table S.7.7. Number and Percent of Respondents' Money for Food and Utilities

Food Insecurity and Utilities in past 12 months	Number	%
Money runs out for food before the end of the month.		

Never	22	15.4%
Seldom	30	21.0%
Sometimes	68	47.6%
Most times	18	12.6%
Always	5	3.5%
Money for household utilities (water, fuel, etc.) runs out before the end of the month.		
Never	20	14.2%
Seldom	38	27%
Sometimes	64	45.4%
Most times or always	12	8.5%
Always	7	5.0%

A total of 158 children had information on whether they received assistance to pay food. Among those 158 children, 145 (91.8%) reported they received assistance. The following table summarizes different types of benefits their households received.

Table S.7.8. Number and Percent of Respondents' who Receive Food Assistance

Food Assistance Benefits received for those who obtained food assistance	**Number**	**%**
EBT/ SNAP / NAP (formerly called Food Stamps)	33	22.8%
Food Assistance (Food Bank / Food Pantries or Commodity foods)	4	2.8%
WIC benefits	120	82.8%
Free or reduced cost breakfast or lunch at school	44	30.3%

**Note: responses may total over 100% because respondents could select more than one category.*

Culture

The degree of participants' own group's cultural and U.S. mainland cultural identifications were assessed using an acculturation questionnaire originally designed for use with Native Hawaiians (Kaholokula, Grandinetti, Nacapoy and Chang, 2008). The following tables summarize responses to those questions.

Table S.7.9. Number and Percent of Caregiver's Knowledge of Traditional Culture and Lifestyle

Knowledge of traditional culture & lifestyle	Number	Percent
Very knowledgeable	58	36.0%
Somewhat knowledgeable	89	55.3%
Neutral or no response	6	3.7%
Somewhat not knowledgeable	5	3.1%
Not at all knowledgeable	3	1.9%

Table S.7.10. Number and Percent of Caregiver' Involvement with Traditional Culture and Lifestyle

Involved with traditional culture & lifestyle	Number	Percent
Very involved	37	23.3%
Somewhat involved	81	50.9%
Neutral or no response	19	12.0%
Somewhat not involved	8	5.0%
Not at all involved	14	8.8%

Table S.7.11. Number and Percent of Caregiver's Feelings Toward Traditional Culture and Lifestyle

Feel towards traditional culture & lifestyle	Number	Percent
Very positive	73	45.3%
Somewhat positive	57	35.4%
Neutral or no response	15	9.3%
Somewhat negative	11	6.8%
Very negative	5	3.1%

Table S.7.12. Number and Percent of Caregiver's Association with Traditional Culture and Lifestyle

How often associate with people of your traditional culture & lifestyle	Number	Percent

Most of the time	44	27.5%
Somewhat often	73	45.6%
Neutral or no response	23	14.4%
Very little of the time	5	3.1%
Not at all	15	9.4%

Table S.7.13. Number and Percent of Respondents' Knowledge of U.S. Mainland/Lower 48 Culture and Lifestyle

Knowledge of U.S. Mainland / Lower 48 culture and lifestyle	Number	Percent
Very knowledgeable	26	16.4%
Somewhat knowledgeable	91	57.2%
Neutral or no response	11	6.9%
Somewhat not knowledgeable	16	10.1%
Not at all knowledgeable	15	9.4%

Table S.7.14. Number and Percent of Caregiver's Involvement in U.S. Mainland/Lower 48 Culture and Lifestyle

Involvement with U.S. Mainland / Lower 48 culture and lifestyle	Number	Percent
Very involved	17	10.7%
Somewhat involved	72	45.3%
Neutral or no response	30	18.9%
Somewhat not involved	11	6.9%
Not at all involved	29	18.2%

Table S.7.15. Number and Percent of Caregiver's Feelings toward U.S. Mainland/Lower 48 Culture and Lifestyle

Feeling towards U.S. Mainland / Lower 48 culture and lifestyle	Number	Percent
Very positive	21	13.1%
Somewhat positive	81	50.6%
Neutral or no response	27	16.9%
Somewhat negative	9	5.6.%
Very negative	22	13.8%

Table S.7.16. Number and Percent of Caregiver's Association with U.S. Mainland/Lower 48 Culture and Lifestyle

How often associate with U.S. Mainland / Lower	Number	Percent

48 culture and lifestyle		
Most of the time	13	8.1%
Somewhat often	79	49.1%
Neutral or no response	30	18.6%
Very little of the time	9	5.6%
Not at all	30	18.6%

Summary of Prevalence Study

Children's Healthy Living Program

VIII. Conclusion / Summary of Prevalence Study

The purpose of this report is to inform the community of the CHL research that was conducted in Tafuna during 2012 and 2013. It is a “snapshot” of the community during this time period. It is hoped that this comprehensive report will help the community in designing programs, allocating resources, and advocating for policies that increase the health and well-being of young children in Tafuna.

Overall, 41% of children measured in Tafuna were overweight or obese. Strategies that have found to be effective in the prevention of childhood obesity include: (1) A healthy lifestyle, which encourages children to move more, sleep more and spend less screen time. (2) A healthy diet, which encourages children to drink more water, eat more fruit and vegetables and consume fewer sugar sweetened beverages.

The CHL team would like to express our gratitude and appreciation to all the children, parents, caregivers, teachers, community members and partners who assisted in the collection of this information. Without the support and participation of the community this report would not exist.

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