Children's Healthy Living Program

For Remote Underserved Minority Populations In The Pacific Region

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Children's Healthy Living Program

For Remote Underserved Minority

Populations in the Pacific Region

Tinian/Rota Prevalence Survey Results

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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 – and a Food Cost Survey. 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!

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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

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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

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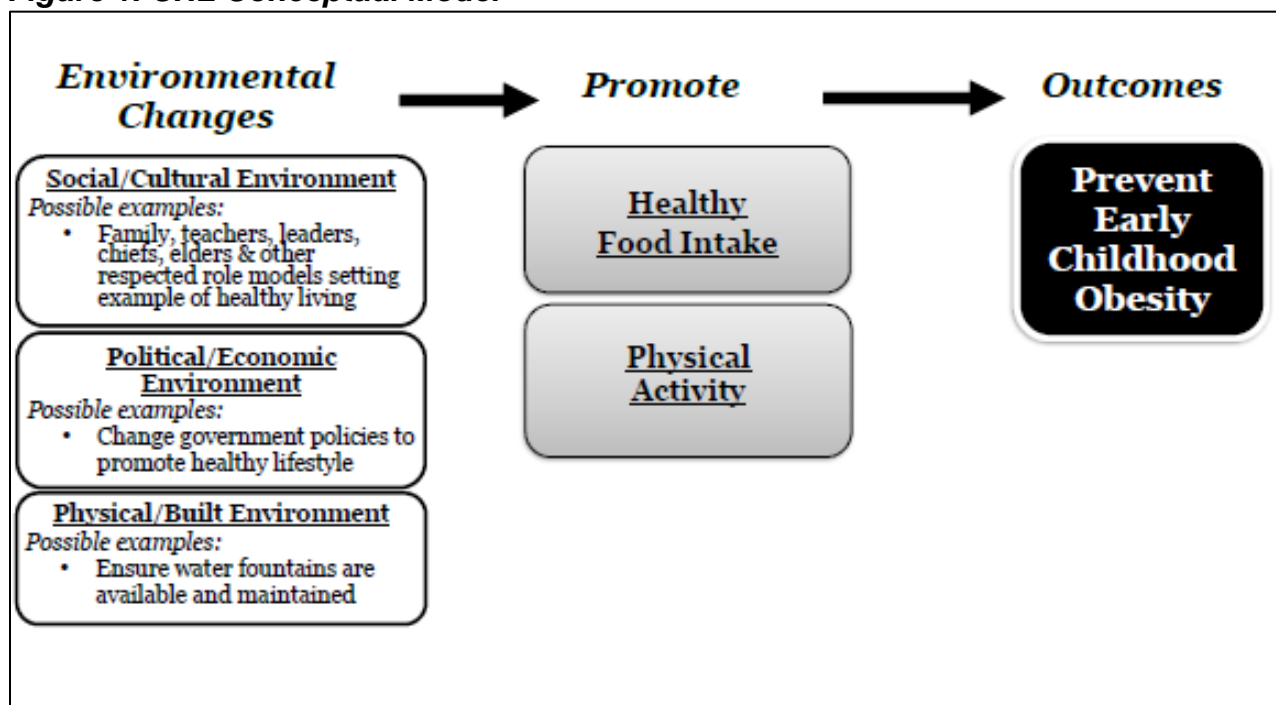
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III. The CHL Training Program

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).

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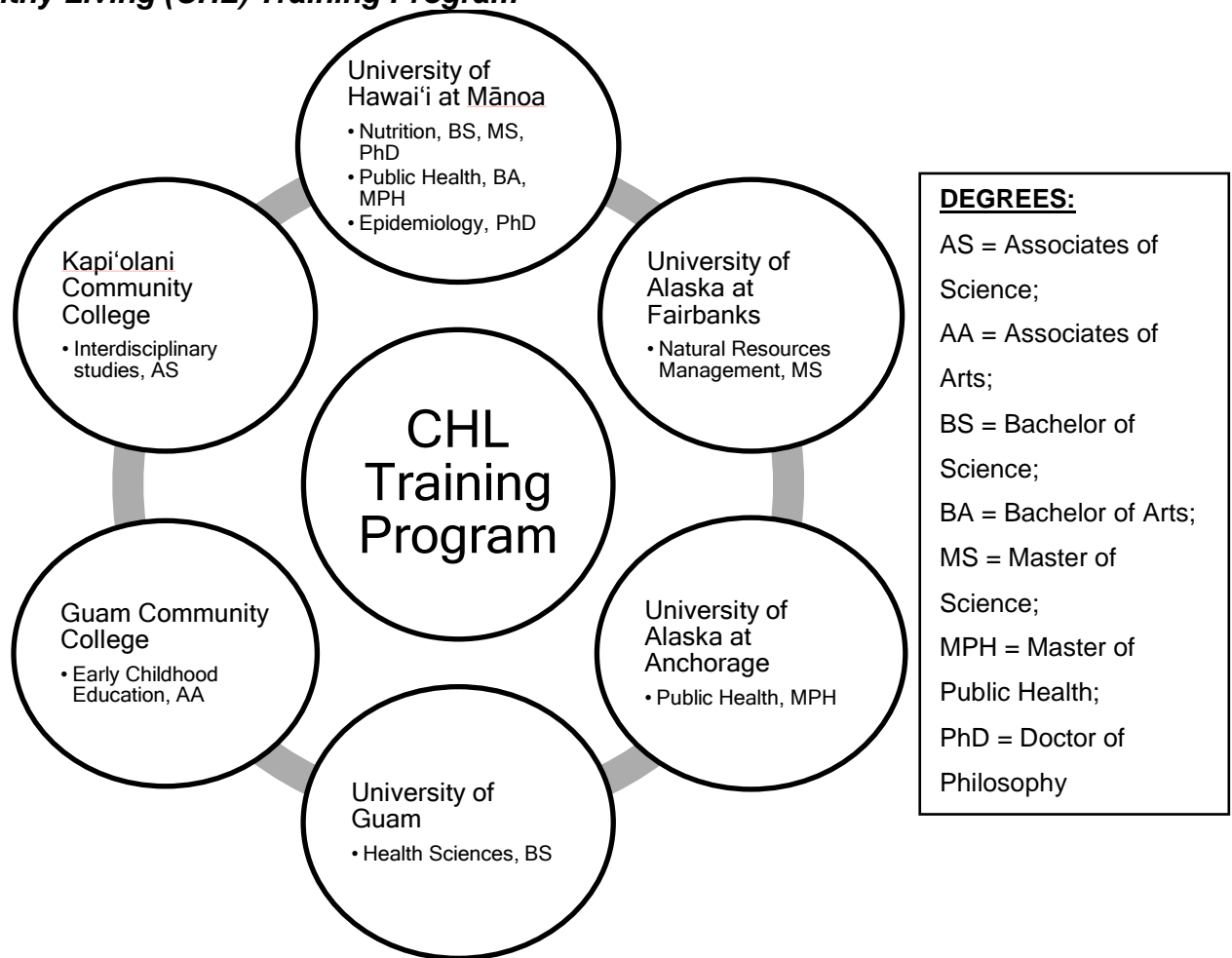
From: Fialkowski MK, et al. Indigenous Workforce Training by the Children's Healthy Living Program (CHL) to Prevent Childhood Obesity in the Underserved US Affiliated Pacific Region. J Health Care Poor Underserved. 2015; 26(2 Supplement): 83-95.

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 Hawaiʻi at Mānoa Public Health Program to allow

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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 Hawaiʻi at Mānoa and the University of Hawaiʻi 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

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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 Hawaiʻi 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 Hawaiʻi system, including the University of Hawaiʻi 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 Hawaiʻi Outreach College. The University of Hawaiʻi Outreach College allows for non-University of Hawaiʻi 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

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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

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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.

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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, Tanapag/San Roque, Tinian/Rota	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

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V. Tinian/ Rota 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. 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. The total percentage may not add up to 100 because of rounding.

Child Demographics

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Section 1. Child Demographics

A total of 157 children participated from Tinian/Rota. Parents/caregivers answered multiple questions about their child 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 157 children participated had data on sex.

Table S.1.1 Number and Percent of Participants by Sex

Sex	Number	Percent
Boys	90	57.3%
Girls	67	42.7%
Total	157	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	9	5.7%
Age 3	19	12.1%
Age 4	39	24.8%
Age 5	55	35.0%
Age 6	25	15.9%
Age 7	8	5.1%
Age 8	2	1.3%
Total	157	100%

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

Age in Years	Number	Percent
2-5 years old	122	77.7%
6-8 years old	35	22.3%
Total	157	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, and 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	90	57.7%
Asian	44	28.2%
More than one race	22	14.1%
Total	156	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
Chamorro	82	52.6%
Filipino	34	21.8%
Mixed Chamorro	19	12.2%
Asian, other	8	5.1%
Mixed, within NHPI and Chamorro	5	3.2%

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Race of child of Pacific definition	Number	Percent
Other*	8	5.1%
Total	156	100%
*Includes East Asian, Hawaiian, Mixed Carolinian, Mixed other Native Hawaiian and Pacific Islander Mixed, Mixed within Native Hawaiian and Pacific Islander and Pohnpeian, and Palauan		

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
CNMI	135	87.1%
Guam	14	9.0%
Other (including Oregon, USA, Hawaii, Virginia)	6	3.9%
Total	155	100%

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

Among the 157 children, 150 had information on this question. Among them, **133 (88.7%) lived their whole life in Tinian/Rota** and the rest, 11.3%, spent one fifth to fourth fifths of their life here.

Language Child Speaks

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

Note: Language responses may total over 157 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
English	104	66.2%
English and Chamorro	29	18.5%
English and Tagalog	13	8.3%
English and Nepali	5	3.2%
Other (Chinese, Filipino, Palauan)	6	3.8%
Total	157	100%

English was the top language spoken at home (91.7%). Other languages children in Tinian/Rota speak at home included Chamorro, Chinese, Nepali, and Tagalog. Sixty-five percent of children only speak English at home. **Thirty-four percent of the children speak English and at least one other language**.

Summary

Among the 157 children, 67 (42.7%) were girls and 90 (57.3%) were boys. Furthermore, 122 (77.7%) were of age group 2-5 years and 35 (22.3%) were of age group 6-8 years. Among the 157 children, 156 children had information on race, of which 90 (57.7%) were Native Hawaiian mixed with at least one other race group, 44 (28.2%) were Asian, and 22 (14.1%) were more than one race.

Child Anthropometric Measurement Results

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Section 2. Child Anthropometric Measurement Results

Body Mass Index

Among the 157 children who participated in Tinian/Rota, 157 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 Tinian
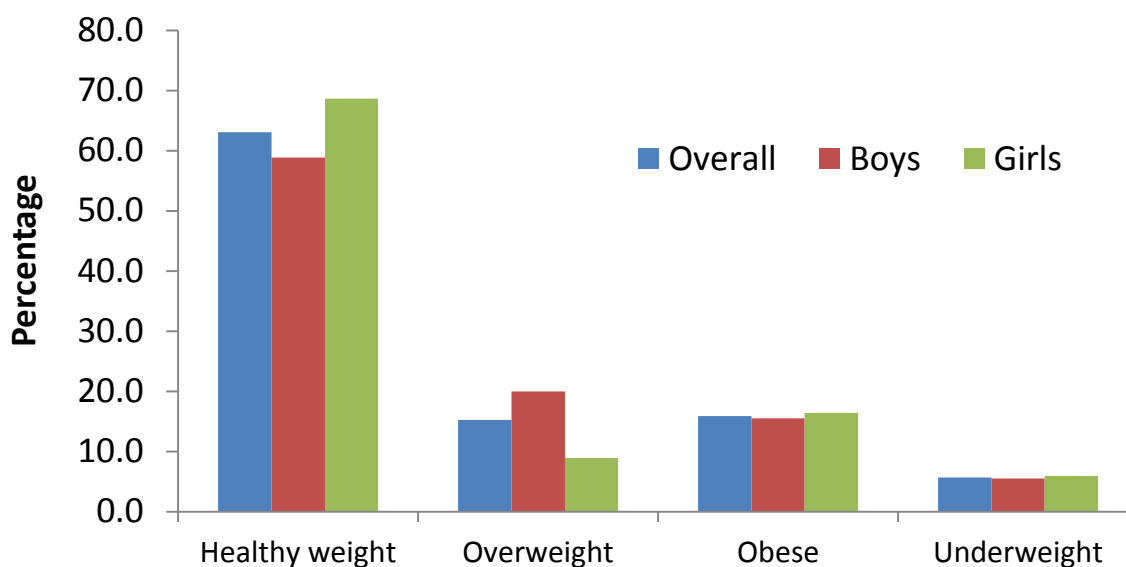
A total of 157 children were included for this analysis. Among them, 63.1% were healthy weight, 15.3% were overweight, 15.9% were obese, and 5.7% were underweight. No difference was found between boys and girls, or between children ages 2-5 and those 6-8 years old.

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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 71.47cm. 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 33 participants in **Tinian/Rota** between the ages 6-8 years, **2 (5.7%) or 4 (11.43%) of children 6-8 year olds were considered as having abdominal obesity** using either the CHL cutoff or IDF cutoff value, respectively.

Summary

Overall, 31% of children measured in Tinian/Rota 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.

Sleep

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Section 3. **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-hour 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.3.1. 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	9	100%
Less than 9 hours	1	11.1%
9 hours to less than 11 hours	3	33.3%
11 hours or more (to 13.5 hours)	5	55.6%
3 – 5 year olds	108	100%
Less than 8 hours	8	7.4%
From 8 hours to less than 10 hours	48	44.4%
From 10 hours to 13.5 hours	52	48.2%
6 – 8 year olds	35	100%

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Hours of sleep in 24 hours at night and in naps (on average and from parent / caregiver report)	Number	%
Less than 7 hours	1	2.9%
From 7 hours to less than 9 hours	16	45.7%
From 9 hours to 13.5	18	51.4%

Table S.3.2. 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	5	55.6%
Three to five year olds met recommendation of 10 – 13 hours of sleep	52	48.2%
Six to eight year olds met recommendation of 9 – 11 hours of sleep	18	51.4%

Summary

Among the 117 two to five year olds, 49% met the age-appropriate national recommendation of sleep daily. Of the 35 six to eight year olds, 51% met the national recommendation of sleep, nine to eleven hours daily. This is an opportunity for both parents and educators to intervene to help children get more sleep.

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Medical

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Section 4. Medical

Parents answered the question: Does your child have any current medical conditions diagnosed by a doctor? Among the 155 children, 19 (12.3%) reported that their child had a medical conditions diagnosed by a doctor. The top medical condition was asthma (12, 7.6%).

Early Life & Feeding Of A Child

Section 5: Early Life and Feeding of Child

Birth Weight

Among the 157 children participated from Tinian/Rota, a total of 101 had information on birth weight. The distribution of birth weight into three groups is summarized in the following table.

Table S.5.1. Number and Percent of Children by Birth Weight

Birth Size	Number	%
Low birth weight < 2500 g	12	11.9%
Healthy birth weight (2500 – 4000 g)	78	77.2%
High birth weight > 4000 g	11	10.9%

Among the 101 children participated in Tinian/Rota, a total of 36 had information on birth length. Among the 36 children, 4 (11.1%) had birth length below 5th percentile using the CDC 2000 reference data, which is at 45.57 cm.

Early Feeding Pattern

Among the 157 children participated in Tinian/Rota, a total of151 had information on breastfeeding. Among the 151 children, 112 (74.2%) of children were reported to be ever breastfed.

Table S.5.2. Number and Percent of Children Ever Breastfed or Fed Breast Milk

Child ever Breastfed or fed Breastmilk	Number	%
Yes	112	74.2%
No	39	25.8%
Total	151	100%
If Yes, about children who were ever breastfed		
Mean age child stopped breastfeeding or being fed breast milk (months) (n=98)	11.1 months (sd=11.3)	

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Among the 151 children participated in Tinian/Rota, a total of 150 had information on formula feeding. Among those 150 children, 126 (84%) of children were reported to be ever formula fed. Mean age of children started formula feeding or stopped formula feeding is reported in the following table.

Table S.5.3. Number and Percent of Children Ever Fed Formula

Child ever fed formula	Number	%
Yes	126	84.0%
No	24	16.0%
Total	150	100%
If Yes, about children who were fed formula		
Mean age child first fed formula (months) (n=112)	2.9 months (sd=4.2)	
Mean age child completely stopped drinking formula (months) (n=93)	19.7 months (sd=11.3)	

A total of 126 out of the 157 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 is 7.9 months (sd=4.8).

Household Demographics & Measures

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Section 6. 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 caregiver participant to the child is summarized in the following table.

Table S.6.1. Number and Percent of Caregiver's Relationship to Child

Relationship	Number	Percent
Biological mom	110	70.1%
Birth dad	27	17.2%
Legal guardian, caregiver, other	12	7.6%
Grandmother	4	2.5%
Other (including adoptive mom, adoptive dad, step dad)	4	2.5%

Marital Status

A total of 156 out of the 157 participants had marital status information of the respondent (see the following table).

Table S.6.2. Frequency and Percent of Caregiver's Marital Status

Marital Status	Number	Percent
Married	83	53.2%
Single and living with boyfriend, girlfriend, or partner	46	29.5%
Single and not living with boyfriend, girlfriend, or partner	15	9.6%
Separated	6	3.9%
Other (including divorced, widowed, or not specified)	6	3.8%

Household Size and Multi-generation Households

All 157 children had information on the number of people who lived in the same household and their relationship to the child. Among them, 25 (15.9%) are from multi-

generation households.

Mean size of household is 4, with the minimum of 2 and maximum of 8.

Education

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

Table S.6.3. Number and Percent of Caregiver's Education Level

Education	Number	Percent
Never attend school or only kindergarten	1	0.6%
Grades 1 up to 8 (elementary to middle)	2	1.3%
Grades 9 to 11(some high school)	14	8.9%
Grades 12 or GED (high school graduate)	61	38.9%
College or technical school 1 to 3 years	50	31.9%
College 4 years or more	29	18.5%
Total	157	100%

Employment Status of the Caregiver Participants

Among the 157 children participated in Tinian/Rota, all had information on whether the respondent is employed for wages/salary, whether he/she is self-employed, whether he/she is out of work for more than a year or less than a year, whether the respondent is a homemaker, a student, unable to work, and on whether the respondent has more than one job.

Table S.6.4. Number and Percent of Caregiver's Employment Status

Employment	Number	%
Employed for wages / salary	85	54.1%
Self-employed	13	8.3%
Out of work (less than 1 year)	10	6.4%
Out of work (more than 1 year)	10	6.4%
Homemaker	24	15.3%
Student	1	0.6%

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Retired	8	5.1%
Unable to work	10	6.4%
More than one job	10	6.4%

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

Household Income Level

Among the 157 children participated in Tinian/Rota, 127 had information on annual Household income from all sources over the past 12 months. The following table summarizes this information.

Table S.6.5. Number and Percent of Caregiver's Household Income Level

Annual household income in the past 12 months	Number	Percent
Under $10,000	30	23.6%
From $10,000 to less than $20,000	48	37.8%
From $20,000 to less than $35,000	36	28.4%
From $35,000 to less than $60,000	10	7.9%
From $60,000 to less than $75,000	2	1.6%
$75,000 or more	1	0.8%
Total	127	100%

Religion

Among the 157 children, a total of 154 had information on family's religious affiliation. Out of the 154, 3 (2.0%) reported no religious affiliation. Among the 151 with any type of religious affiliation, the distribution of different religious affiliations is presented in the following table. A total of 79 had information on how often they engage in religious activities. The mean number of times per month attending religious activities is 5 among those participants.

Table S.6.6. Number and Percent of Respondents' Religious Affiliation

Religion Affiliation	Frequency	Percent
Catholic	128	84.8%

Other (including Buddhist, Hindu, Jehovah's Witness)	9	6.0%
Christian, denomination not specified	4	2.7%
Pentecostal	3	2.0%
Baptist	2	1.3%
Muslim	2	1.3%
Protestant	2	1.3%
Evangelical Covenant	1	0.7%
Total	151	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 utility runs out before the end of the month. Among the 157 children participated in Tinian/Rota, a total of 145 had information on whether money for food runs out or not and a total of 144 had information on whether money for utility runs out or not. The following table presents the answers.

Table S.6.7. Number and Percent of Caregiver's 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	46	31.7%
Seldom	18	12.4%
Sometimes	44	30.3%
Most times	21	14.5%
Always	16	11.0%

Money for household utilities (water, fuel, etc.) runs out before the end of the month.		
Never	43	29.9%
Seldom	24	16.7%
Sometimes	38	26.4%
Most times	23	16.0%
Always	16	11.1%

A total of 153 children had information on whether they received assistance to pay food. Among those 153 children, 120 (78.4%) reported they did receive assistance. The following table summarizes different types of benefits their households have received.

Table S.6.8. Number and Percent of Caregiver's Who Receive Food Assistance

Food Assistance Benefits received for those who obtained food assistance	Number	%
EBT/ SNAP / NAP (formerly called Food Stamps)	62	51.7%
Food Assistance (Food Bank / Food Pantries or Commodity foods)	7	5.8%
WIC benefits	94	78.3%
Free or reduced cost breakfast or lunch at school	31	25.8%

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

Community Assessment Results

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VI. Community Assessment Results

Food Cost Survey (FCS)

The CHL Food Cost Survey (FCS), adapted from the Alaska Food Cost Survey, was conducted in all of the CHL jurisdictions in March 2014. Given the link between childhood obesity and food security, particularly in low income households, CHL conducted this survey of communities in the CHL jurisdictions. Three stores in Tinian were assessed to determine the cost and availability of market foods in Tinian.

The FCS is based on a meal plan, in particular, the USDA Thrifty Food Plan (TFP). The Thrifty Food plan, based on a national survey of dietary habits, is designed to meet the nutritional needs at low cost for a family of four with school age children (USDA, 1999). It assumes that the food items are bought at a store and are prepared at home. This menu is made of foods in 10 categories. The categories include fruits, vegetables, meats, legumes, dairy, egg, fats / oils, grain, sweets / beverages, and spices. Included in the report is the percent of each category towards the Thrifty Food Plan cost. The TFP is also used as the basis for determining food assistance levels provided in programs such as school lunch.

If a particular item was missing in a local area/ jurisdiction, we used the cost of a similar item as a substitute for the item that was on the national menu. However, in some cases, items were unavailable and no obvious substitutes were available.

Portland, Oregon serves as a general indicator of and reference point for the price series in a somewhat comparable mainland/lower 48 city and its food costs have been collected using the same survey as that was used by CHL. The weekly food cost for a family of four with two adults and two young school- age children in Portland was $142.37.

It is important to note that the Thrifty Food Plan menu was developed based on diets and food availability in the contiguous U.S. Further work is necessary to document local diets and food availability and to examine how they may be incorporated into an

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adjusted thrifty food menu for use in Tinian, and its effect on community food costs.

<u>Results for Tinian</u>

Food Cost Survey, Costs of Food at Home ($) based on the Thrifty Food Plan and USDA adjustments.

In Tinian, the following three foods had no price information: orange juice from frozen concentrate, enriched plain bagels, cottage cheese (any variety), mozzarella cheese (whole milk), molasses, and Italian herb seasoning. The weekly food cost for the Thrifty Food Plan menu for a family of four in Tinian was $222.26. In the CHL region, the average cost was $215.18, with a minimum of $173.97 and a maximum of $286.30. The cost in Portland, USA was $142.37. Tinian's costs for the same or comparable food items of the Thrifty Food Plan are 156.1% of their cost in Portland, Oregon.

Table 1. Weekly and Monthly Food Cost to Eat According to the U.S. Thrifty Food Plan in Tinian

Age, Groups	Weekly	Monthly
INDIVIDUALS		
Child, 6-8 years	$46.58	$201.85
Child, 9-11 years	$55.27	$239.52
Male, 20-50 years	$62.93	$272.68
Female, 20-50 years	$57.48	$249.08
FAMILY		
Family of 2, 20-50 years	$132.47	$574.05
Family of 4 , Couple, 20-50 years and children, 6-8 and 9-11 years	$222.26	$963.13

* Ratio used to calculate cost of family of other size and individuals are based on Center for Nutrition and Policy and Promotion (CNPP)'s Official USDA Alaska and Hawaii Thrifty Food Plans at http://www.cnpp.usda.gov

Thrifty Food Plan, Weekly Food Costs: By Food Category

Cost and percent of each food category was presented in the following table (Table 2), in the order from most expensive to least expensive.

Table 2. Weekly Thrifty Food Plan Costs for a Family of 4 by Food Category in Tinian

Food Group	Cost	Percent
Grain	$54.37	24.5%
Meat	$42.38	19.1%
Fruit	$36.46	16.4%
Dairy	$28.25	12.7%
Vegetable	$24.93	11.2%
Sweets and Beverages	$15.25	6.9%
Fats and Oils	$8.07	3.6%
Spice	$4.90	2.2%
Egg	$3.83	1.7%
Legume	$3.82	1.7%

Thrifty Food Plan, Weekly Food Costs: Top 10 Most Expensive Foods

The top 10 most expensive foods in Tinian were presented in Table 3.

Table 3. Top 10 Most Costly Food Items in Tinian

Food	Food Group	Price	Percent
Hamburger buns, enriched	Grain	$23.66	10.6%
Beef, ground, lean (16 to 23% fat)	Meat	$19.08	8.6%
Milk, 1% milk fat	Dairy	$17.76	8.0%
Orange juice, frozen concentrate	Fruit	$11.66	5.2%
Potatoes, any variety	Vegetable	$11.29	5.1%
Milk, whole	Dairy	$7.89	3.6%
Oranges, any variety (bagged or loose)	Fruit	$7.45	3.4%
Bagels, plain, enriched	Grain	$7.42	3.3%
Fruit drink, refrigerated, any flavor	Sweets/Beverages	$6.00	2.7%
Margarine, stick	Fats/Oils	$5.54	2.5%
Total		$117.75	53.0%

Summary

The CHL food cost survey found the cost of food for a family of four, using the TFP, to be $222.26 per week which is 156.1% higher than the weekly food cost for a family of four in Portland, Oregon. In comparison to the average CHL region ($215.98), the

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weekly food cost in Tinian was 2.9% higher.

<u>Results for Rota</u>

Food Cost Survey, Costs of Food at Home ($) based on the Thrifty Food Plan and USDA adjustments.

In Rota, the weekly food cost for the Thrifty Food Plan menu for a family of four in Tinian was $286.30. In the CHL region, the average cost was $215.18, with a minimum of $173.97 and a maximum of $286.30. The cost in Portland, USA was $142.37. Rota's costs for the same or comparable food items of the Thrifty Food Plan are 201.1% of their cost in Portland, Oregon.

Table 4. Weekly and Monthly Food Cost to Eat According to the U.S. Thrifty Food Plan in Rota

Age, Groups	Weekly	Monthly
INDIVIDUALS		
Child, 6-8 years	$60.00	$260.00
Child, 9-11 years	$71.20	$308.53
Male, 20-50 years	$81.06	$351.26
Female, 20-50 years	$74.04	$320.84
FAMILY		
Family of 2, 20-50 years	$170.64	$739.46
Family of 4 , Couple, 20-50 years and children, 6-8 and 9-11 years	$286.30	$1240.63

* Ratio used to calculate cost of family of other size and individuals are based on Center for Nutrition and Policy and Promotion (CNPP)'s Official USDA Alaska and Hawaii Thrifty Food Plans at http://www.cnpp.usda.gov

Thrifty Food Plan, Weekly Food Costs: By Food Category

Cost and percent of each food category was presented in the following table (Table 5), in the order from most expensive to least expensive.

Table 5. Weekly Thrifty Food Plan Costs for a Family of 4 by Food Category in Rota

Food Group	Cost	Percent
Meat	$58.63	20.5%
Fruit	$50.23	17.5%
Grain	$48.81	17.1%
Vegetable	$42.58	14.9%
Dairy	$41.01	14.3%
Sweets and Beverages	$19.63	6.9%
Spice	$8.68	3.0%
Fats and Oils	$5.82	2.0%
Egg	$5.57	1.9%
Legume	$5.34	1.9%

Thrifty Food Plan, Weekly Food Costs: Top 10 Most Expensive Foods

The top 10 most expensive foods in Rota were presented in Table 6.

Table 6. Top 10 Most Costly Food Items in Rota

Food	Food Group	Price	Percent
Milk, 1% milk fat	Dairy	$26.64	9.3%
Potatoes, any variety	Vegetable	$20.72	7.2%
Beef, ground, lean (16 to 23% fat)	Meat	$20.32	7.1%
Orange juice, frozen concentrate	Fruit	$16.89	5.9%
Milk, whole	Dairy	$11.21	3.9%
Oranges, any variety (bagged or loose)	Fruit	$10.92	3.8%
Bagels, plain, enriched	Grain	$10.78	3.8%
Fruit drink, refrigerated, any flavor	Sweets/Beverages	$9.39	3.3%
Chicken, thighs	Meat	$7.19	2.5%
Bread, white, enriched	Grain	$6.61	2.3%
Total		$140.67	49.1%

Summary

The CHL food cost survey found the cost of food for a family of four, using the TFP, to be $286.30 per week which is 201.1% higher than the weekly food cost for a family of four in Portland, Oregon. In comparison to the average CHL region ($215.98), the weekly food cost in Rota was 24.6% higher.

Summary of Prevalence Study

VII. Conclusion / Summary of Prevalence Study

The purpose of this report is to inform the community of the CHL research that was conducted in Tinian/Rota during 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 polices that increase the health and well-being of young children in Tinian/Rota.

A total of 157 children were included for this analysis. Among them, 63.1% were healthy weight, 15.3% were overweight, 15.9% were obese, and 5.7% were underweight. No difference was found between boys and girls, or between children ages 2-5 and those 6-8 years old.

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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