Children's Healthy Living for Remote Underserved Minority Populations of the Pacific (CHL) Program- A multilevel multicomponent (MLMC) child obesity program in 11 jurisdictions of the US Affiliated Pacific Region

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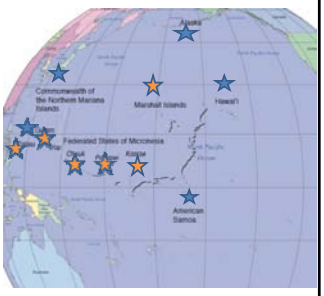
- CHL Community Engagement
  - 11 Pacific jurisdiction collaborative, with US affiliation since 1989– land grant colleges
  - MLMC intervention part of larger Integrated Research, Training (funded 21 degrees) and Outreach Program
  - 5 jurisdictions in MLMC intervention trial
    - Hawaii – University of Hawaii
    - Guam – University of Guam
    - Alaska – University of Alaska at Fairbanks
    - American Samoa – American Samoa Community College
    - Commonwealth of the Northern Mariana Islands – Northern Marianas College



United States Department of Agriculture, National Institute of Food and Agriculture, Grant 2011- 68001-30335 (Novotny PI)

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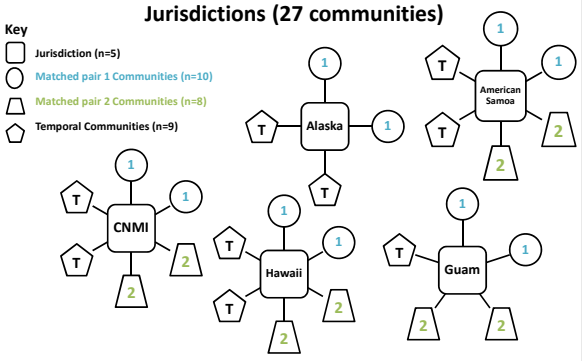
CHL MLMC Community Selection Criteria

- 27 communities were selected in 5 jurisdictions (in 2011)
  - 2000 US census data were used to inform selection of communities to be
    - >25% of the population of indigenous/native descent of each jurisdiction
    - >10% of the population under age 10 years, our target group
    - >1000 population size
    - Relatively accessible locations
- Communities were matched and randomized to intervention and control (community randomized)
- Some communities were also selected temporal assessment (BMI and waist)

Yap

CHL Community-Randomized Intervention Design in 5 Jurisdictions (27 communities)



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CHL MLMC
Engagement of the Randomized Communities

Table 1. Steps and Activities in the ANGELO Model as Modified by the Children's Healthy Living (CHL) Program

Step	Activities
Step 1. Engage communities to identify and prioritize preferred intervention strategies	A local advisory committee was established in each jurisdiction.
	Multiple key informant meetings were held to learn about community-specific resources targeting young children, to help develop a shared vision of CHL's community involvement, and to guide work with the communities.
	Four community meetings were held in each of five jurisdictions to identify community-preferred intervention strategies. These strategies were collated by jurisdiction.
	Three inventories (programs, data, and policies) were compiled for each of four communities in each jurisdiction.
	Collated lists of preferred intervention strategies and inventory findings were shared in a second series of community meetings in each jurisdiction. Strategies on these lists were prioritized by community participants based on their perceived importance and feasibility.
Step 2. Review scientific literature	Intervention team conducted a systematic literature review of effective environmental strategies to prevent and control childhood obesity.
Step 3. Merge findings from the community and literature	CHL Coordinating Center merged findings from the community meetings and literature.
	The intervention team reviewed, discussed, and finalized the intervention activity grid.
Step 4. Formulate CHL multilevel intervention	The region-wide CHL intervention was formulated at week-long annual meeting with representatives from all jurisdictions.
	Jurisdiction-specific meetings were held to plan how the CHL intervention would be specifically operationalized in the jurisdiction's communities.

Braun et al. (2014)

CHL MLMC Intervention Template: 4 Cross-Cutting Functions, 19 Activities & 6 Behavioral Targets	↓ SSB	↑ F/V	↑ PA	↑ Water	↓ Screen	↑ Sleep
Policy: Review Assessment Data for Policy & Physical Environment related to the 6 CHL behaviors						
a. Review preschool wellness policy assessment data to identify training needs	X	X	X	X	X	X
b. Review community assessment data to identify areas for advocacy	X	X	X	X		
Environment: Community Partnership and Advocacy for Environmental Change						
a. Work with coalitions to advocate for						
i. Better access to parks that are safe & inviting			X			
ii. Better access to clean water	X			X		
iii. Safer environments for walking & biking			X			
iv. Better food placement in stores	X	X		X		
v. Gardens & hydroponics		X	X			
b. Partner with existing entities to purchase or obtain sponsorship for						
i. Water in the preschools	X			X		
ii. Gardening supplies for preschool kids		X	X			
iii. Sports equipment for preschool kids			X			
iv. Campaigns & messages	X	X	X	X	X	X
Messaging: Promote the CHL Message to Community						
a. Support role models to deliver CHL messages in various venues	X	X	X	X	X	X
b. Enhance existing social marketing campaigns related to 6 CHL behaviors	X	X	X	X	X	X
c. Advertise CHL or other activities that promote 6 CHL target behaviors	X	X	X	X	X	X
Capacity Building: Train the Trainers /Role models						
a. Train individuals to promote gardening in preschools & communities	X	X	X	X	X	X
b. Train individuals to lead interactive, hands-on, & family-based sessions	X	X	X	X	X	X
c. Train preschool providers on wellness policies	X	X	X	X	X	X
d. Train preschool providers in curricula related to 6 CHL target behaviors	X	X	X	X	X	X
e. Train role models (community champions, role celebrities, role models)	X	X	X	X	X	X

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CHL MLMC Process Data Components: Monthly Intervention Implementation Grid

Table 2 - Community Activity Ratings

	Acceptability	Reach	Likelihood of Effectiveness	Adoption	Sustainability	Feasibility	Total
1. Review Assessment Data for the Policy and Physical Environment related to the 6 CHL behaviors							
a. Review preschool wellness policy assessment data to identify training needs	3	3	3	3	2	3	17
b. Review CAT (community assessment toolbox) data re1ated to the physical environment to identify areas for advocacy	3	1	2	1	1	3	11
2. Partner and Advocate for Environmental Change							
a. Work with existing community organizations and coalition and/ form new coalitions to advocate							
i. Better access to parks that ar safe and inviting					3	1	14
ii. Better access to clean water					1	1	7
iii. Safer environments for walkin biking, etc (e.g., bike lanes/ra sidewalks, greenways)					2	1	11
iv. Better food placement in store					1	2	8
v. Gardens and Hydroponics					1	2	10
b. Partner with existing entities to purchase or obtain sponsorship							
vi. Gardening supplies for presch kids					1	1	8
vii. Sports equipment for presch kids					1	1	7
viii. Campaigns and messages					1	1	6

Talura Elementary, American Samoa, April 2013

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MLMC Fidelity

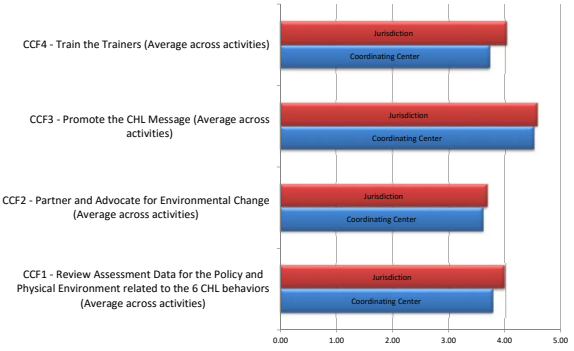
"Adherence to Protocols & Processes"

Butel et al Assessing intervention fidelity in a multi-level, multi-component, multi-site program: the Children's Healthy Living (CHL) program. Butel et al. Translational and Behavioral Medicine 2015.

Fidelity assessment conducted once about halfway through intervention (Feb – May 2014)

Part 1	**Completed by the jurisdiction intervention team**
Step 1	List each initiative/activity for each subcategory within each cross cutting function.
Step 2	Randomly select 10% of individuals involved in each of 19 activities in 4 cross-cutting functions for each intervention community. Provide contact person/information for each selected individual and send to coordinating center.
Step 3	Interview each selected individual using the "QA Implementation" rubric to evaluate extent to which activity was implemented.
Step 4	Send completed evaluation to CHL coordinating center.
Part 2	**Completed by the CHL Intervention leads**
Step 1	Review each jurisdiction's "QA Implementation" contact file.
Step 2	Schedule and conduct site visits and separately complete "QA Implementation" rubric. Those initiatives/activities requiring phone calls may be done prior to the site visit. Those initiatives/activities requiring observation will be done at the site visits along with the assessment of intervention adaptations.
Step 3	Compare the local team and the site coordinating center team "QA Implementation" findings and discuss any items with discrepant scores >1 point on 5-pont scale.
Step 4	Collaborate with jurisdiction intervention team to brainstorm and come up with ways to improve intervention quality where indicated.

CHL Fidelity of Implementation by the CHL 4 Intervention Cross-Cutting Functions (CCF)



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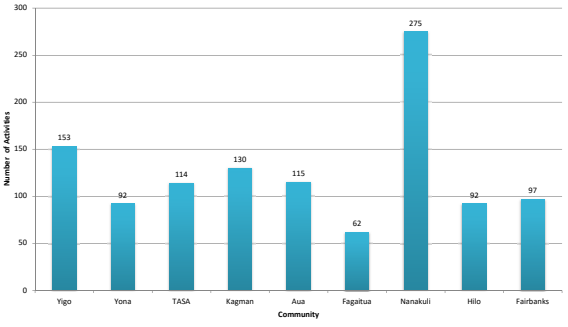
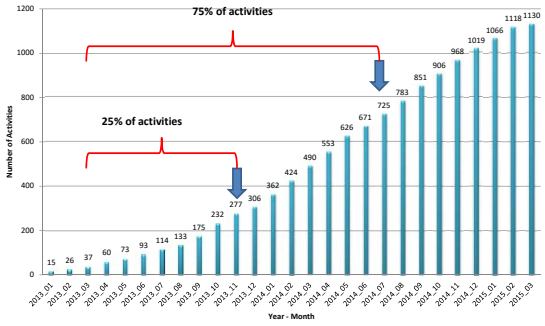
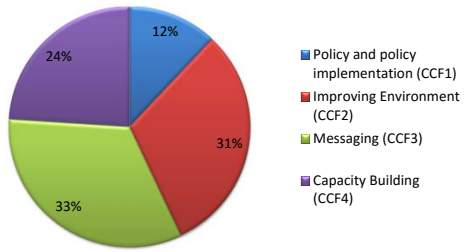
CHL MLMC
Number of Activities Implemented by Intervention Community, CHL-Wide



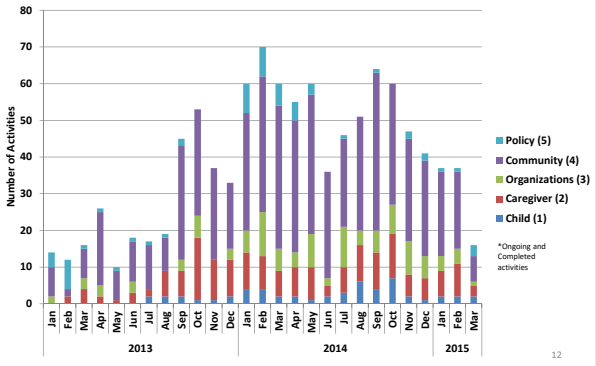
CHL MLMC
Number of Activities over time, CHL-wide



CHL MLMC
Percent of Intervention Activities Implemented by Cross Cutting Function (Component) of Intervention



CHL MLMC Intervention Activities* by Social Ecologic Model Level until June 2015



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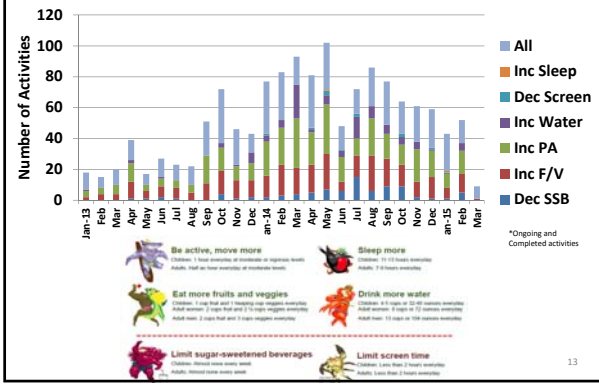
CHL MLMC Intervention Activities* by Target Behavior (Outcome) until June 2015



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CHL Dose and Reach Measurement

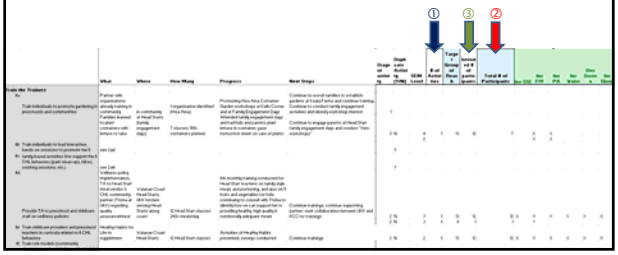
"How much of the intervention components were delivered"

(1) Activity Dose *= Number of times activity was conducted x Potential impact x Reach*

Potential Impact = Rating of potential of activity to change behavior – *low, medium, and high with score of .33, .66, and 1, respectively*

Reach – Number of actual participants (**2**) divided by the intended number of participants (**3**)

Community Dose *= The sum of* ***activity dose*** *for all activities*



CHL Overall Impact Analysis

- Mixed Model testing each outcome (BMI, waist and each of 6 target behaviors) accounting for Clustering (Communities) in a Group (Community) Randomized Trial.

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CHL Impact Measures by MLMC Level

- Individual Children - 2-8 yo, child race/ethnicity
  - **Anthropometry (Height, Weight, and Waist)**
  - **Acanthosis Nigricans (Back of the neck)**
  - **Accelerometry (6 days)**
  - **Food and Activity logs (2 days)**
  - **Sleep Questionnaire**
  - **Screen Time**
- Parent/Caregiver - Acculturation, Household SES
- Community – Readiness (Leaders), **Environment (Store, Park, Walkability)**
- Jurisdiction - Food & Utility cost survey & World Bank Income Level

Height measurement, Palau

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CHL Hypothesized Impact Measures

(6 behavioral outcomes, 3 health outcomes)

Primary

1. Sleep by 15 min/day
2. Moderate to Vigorous Physical Activity by 10 min/day
3. Fruit & Vegetable intake by 1 serving/day (1/2 c/day)
4. Water intake by ½ cup/day
5. **Sedentary behavior (screen time) by 10 min/day**
6. Sugar Sweetened Beverage intake by ½ cup/day

1. Prevalence of obesity by 8% (0.10 kg/m^2, BMI z-score)
2. Waist circumference by 2% (1.12 cm)

Secondary

3. Acanthosis nigricans by 5%

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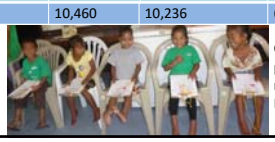
CHL INDIVIDUAL LEVEL SAMPLE
Child Enrollment & Measurement

Jurisdiction	Consented	Anthropometry	FAL*	Acticals*
Guam – 24 month	908	858	705	404
CNMI – 24 month	1,011	1,001	653	485
Am. Samoa – 24 month	950	950	569	360
Hawaii – 24 month	1,034	1,016	423	408
Alaska – 24 month	782	741	340	247
24 Month Intervention Total	**4,685**	**4,566**	**2,690**	**1,904**
Baseline Intervention Total	**4,488**	**4,443**	**2,614**	**2,032**
FAS Prevalence Study	1,287	1,227	1,149	554
CHL Total	10,460	10,236	6,454	4,490

*target was 150 for FAL (food and activity log) and 100 for Actical accelerometers per community



Children wait to participate in CHL measurements in Palau

Maintenance of Intervention at 6 month follow-up
Top activity sustained in each cross cutting function

		Alaska	American Samoa	CNMI	Guam	Hawaii	Total	%
Review Assessment Data on Policy and the Physical Environment related to the 6 CHL behaviors								
1bIII	Improve CAI indicated physical activity environments	√			√√	√√	5	56%
Partner and Advocate for Environmental Change								
2av	Gardens and hydroponics		√√		√√	√√	6	67%
Promote the CHL Message								
3c	Advertise CHL or other activities that promote CHL target behaviors	√	√√	√	√√	√	7	78%
Train the Trainers								
4d	Provide TA to preschool and childcare staff on wellness policies			√√	√√	√√	6	67%

- **18 of the 19 activities were sustained by one or more communities**
- **8 activities were sustained by 5 or more communities**

CHL Lessons Learned – Data Analysis of MLMC

- **Primary Analysis**
  - Randomized Community Trial degrees of freedom adjustment is too conservative
    - Methods for adjusting to an "effective sample size"
      - Develop random bootstrap comparison group as alternative
  - Transformations needed for some variables
    - Difficult to interpret
  - Use Categorical outcomes
    - BMI category, Meeting PA and diet compared to recommendations
- **Secondary Analysis**
  - Examine change among communities that have need for change
  - Identify activities influencing change where change occurred overall (SSB, Water, Sleep changed in intervention and control)
  - Look at exposure to intervention where change occurred overall

Ready for Waist Circumference Measurement, Yap

CHL Lessons Learned - MLMC Intervention

- Establish **relationships** with Land Grant institutions and with community partners were critical
- Build on **strengths of community** and **supporting established activities** to implement intervention activities – positive deviance – for acceptability, empowerment & sustainability
- Staff **and** community members **need training** on intervention implementation and reporting
- An intervention template allows for **adaptation** of activities
- **Overlap in activities** makes reporting murky
- Spread of intervention into control communities may have occurred due to reporting issues or due to situation analysis activity, measurement activity and island geography; and due to similar activities by other groups
- Exposure - **difficult to distinguish CHL from other activities, by design, for sustainability** - to build on existing efforts and support them
- Supporting Non Communicable Coalitions for sustainability

Hawaii

Visit us at:
http://www.chl-pacific.org/