

UNIVERSITY OF HAWAII CANCER CENTER CONNECTION

Pacific Tracker (PacTrac) Version 3.1 Diet and Physical Activity Assessment Tool for the Pacific Region

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Abstract

The Pacific Tracker (PacTrac) is a web-based diet and physical activity assessment program created to analyze dietary recall or dietary record data from the Pacific region. Version 3.1 modifications make the tool available for public use (under check it out) to enter, analyze, view and print out data; and for research use, for saving and downloading of multiple entries in a research mode. PacTrac 3.1 (<https://nappactrac31.ctahr.hawaii.edu/default.htm>) is managed through the Children's Healthy Living Center of Excellence (CHL Center) at the College of Tropical Agriculture and Human Resources at the University of Hawai'i, in collaboration with the University of Hawai'i Cancer Center.

Keywords

Diet, Physical Activity, Nutritional Assessment, Pacific Islander, Children

Introduction

Our purpose is to describe the Pacific Tracker version 3.1 (PacTrac 3.1) and its evolutionary history. PacTrac 3.1 is an online diet and physical activity assessment application that can be used to evaluate dietary and physical activity recall or dietary record data for the Pacific region. The discontinuation of the US Department of Agriculture (USDA) Supertracker application on June 30, 2018 has created a void of publicly and professionally available tools to evaluate diet and physical activity for adults and children.¹ The Supertracker web-based application allowed for free 24-hour dietary assessment and tracking. This void is accentuated by the lack of both public and professional resources that contain foods consumed in the Pacific region. The Pacific Tracker (PacTrac), developed at the University of Hawai'i, aims to fulfill this deficit.

The United States (US) federal government has not collected dietary data in Hawai'i since the Nationwide Food Consumption Survey (NFCS) of 1977-78, and never in the broader US-Affiliated Pacific (USAP) Region.² The National Health and Nutrition Examination Survey (NHANES), which succeeded

NFCS, has not surveyed in Hawai'i nor in the Pacific region jurisdictions with US political affiliations: the state of Alaska bordering the Pacific Ocean; the Pacific island US territories of Guam and American Samoa; the Commonwealth of the Northern Mariana Islands (CNMI); and Palau, Marshall Islands and the Federated States of Micronesia which are Pacific Island nations that are in a compact of free association relationship with the US. This has resulted in no federal record of dietary intakes in the region, and a lack of the Pacific region's foods in the USDA database; if foods are not identified in the NFCS or, at present, in the NHANES, they are not eligible for nutrient analysis in federal laboratories.³ These same national food databases are also those used for deriving US dietary patterns underpinning US Dietary Guidelines and related food programs and policies. Thus, nutrient-dense regional foods are not recognized or encouraged, which also may promote greater reliance on importation of recognized foods into the region. While the core of the PacTrac tools derive foods and methodologies from the USDA databases, composition data from foods identified in our studies, predominantly on children, have been added from published food composition data from other laboratories that follow national and international guidelines for food composition analysis and database development.⁴ For example, South Pacific work on food composition tables for the Oceania region produced a useful database that has been incorporated into the PacTrac.⁵

Only a few studies previously analyzed children's diets in the USAP. The first studies implemented proprietary tools of USDA data from the 48 contiguous states, from which foods substitutions were made to approximate local foods.^{6,7} since then versions of the PacTrac have been used in these studies.^{7,8}

PacTrac was initially developed from MyPyramid Tracker, the USDA's Center for Nutrition Policy and Promotion, which was an online interactive dietary-assessment tool designed for use by the public.⁹ PacTrac was initially established for the Healthy Living

in the Pacific Islands (HLPI), Healthy Pacific Child Program to analyze dietary intakes of children in the CNMI and Hawai‘i.¹⁰ PacTrac Version 2 involved adding the first Pacific Island foods, including the University of Hawai‘i Cancer Center’s Nutrition Shared Support and Biostatistics Shared Resources foods and recipes specific to the diets of the Pacific Islands’ populations.¹¹ This food composition table (FCT) includes a wide range of items, including indigenous Pacific Island and Alaskan foods, as well as the American and Asian foods that are commonly eaten in the region. The database for PacTrac 2 consisted of 2,737 foods from Nutrition Support Shared Resource (NSSR), plus 85 recipes from Guam, 40 recipes from CNMI, and 41 foods from Hawai‘i that were consumed by children. PacTrac 2 was initially employed in the Pacific Kids DASH for Health (PacDASH) study where the addition of an “Expert System” provided targeted diet and physical activity guidance and was used in an intervention study that provided clinical guidance.¹² PacTrac 2 is not currently in use.

PacTrac Version 3 was developed for the Children’s Healthy Living Program for Remote Underserved Minority Populations of the Pacific (CHL) program data collection and data entry of Food and Activity logs from across the US affiliated Pacific Region, adding more foods and recipes, especially indigenous ones for children.¹³ The tool computes daily dietary components upon saving of the dietary record or recall. PacTrac 3 also allowed entry of activities performed while eating, such as watching TV or riding in the car. The dietary portion of PacTrac 3 generates two data tables that were used for data analysis. The input table contains the names of the foods and beverages recorded with 1

data row per food/beverage entered and associated with a user ID, record date, record time, portion size, and other relevant variables. The output table includes derived food component groupings based on the input data. The output file has 1 record per day per user ID, including the date of the record. For the physical activity assessment, children’s physical activity metabolic equivalents were added from Ridley, Ainsworth and Olds;¹⁴ 178 children’s physical activities were incorporated. Two tables are generated for physical activity. The input table includes times of activity and the intensity group. The output table includes METs (metabolic equivalents of activity) and minutes in each activity level per day per user ID.

The PacTrac 3 was used to enter 210,395 food items on 13,673 food records for the CHL Program. Wrappers, labels and packages of foods were collected during the CHL program and used to aid in entry of the food records.¹⁵ The dietary component analyses created from PacTrac 3 for CHL are being used in study publications.

PacTrac Version 3.1 made the tool available publicly available for individual day analysis as well as for professional use, allowing data analysis and saving of multiple dietary recalls or dietary records. The publicly available online dietary and physical activity assessments provide comparisons to guidelines for diet and physical activity, and provides related nutrition and physical activity messages, and links to nutrient and physical activity information. To provide individuals a better understanding of her/his diet or physical activity over time, data can be tracked for up to a year. Figure 1.



Figure 1. The PacTrac 3.1

Pacific Tracker Version 3.1 (PacTrac 3.1) was modified with the CHL Center of Excellence. The software was upgraded with Microsoft Visual Studio. Net2012, and related frameworks. The FCT was enhanced to add new 344 Pacific foods from the CHL Program plus alcoholic items, which had not been included in the child only studies.

PacTrac 3.1 was developed to modify PacTrac version 3 for a range of public and professional purposes. The tool has a public use function for entry, analysis, view and printing of data. For professional use, the tool allows registration of a research study, entry and analysis of data and, as a new feature for end users, download of Excel or ASCII data sets. The PacTrac 3.1 program is available on the web¹⁶ and is managed through the CHL Center at the College of Tropical Agriculture and Human Resources at the University of Hawai‘i, in collaboration with the University of Hawai‘i Cancer Center.

PacTrac 3 and 3.1 are concurrently in use. PacTrac 3 for CHL research and PacTrac 3.1 will continue to be available to the public and professional use for new studies. Dietary output of food components (nutrients and food groups) reflect US Dietary Guidelines and the Healthy Eating Index (HEI) from 2005.¹⁷ While updating of the HEI may be possible with new resources, each five-year update of the HEI has been found equally valid and reliable for assessing diet quality¹⁸ for ages 2 and above. On the other hand, the physical activity output of PacTrac was designed for CHL and targets children’s physical activity needs.

Discussion

The Pacific Tracker 3.1 is comparable in features to the ASA24 software, which is most commonly used in the United States.¹⁹ Importantly, the PacTrac 3.1 databases have been expanded with indigenous foods from other chemically analyzed data sources and from recipes provided by regional study participants for adults and children for use in analyzing diets from Pacific Island food cultures. For example, “banana” generates 22 matches in PacTrac 3.1, including BANANA GINGERBREAD (From DASH of Aloha), BANANA LUMPIA (GUAMANIAN), BUNELLOS AGA (BANANA DOUGHNUTS) (GUAMANIAN), and MADROYA (FRIED BANANAS) (GUAMANIAN). Database entries and recipe calculations align with Food Composition table development guidance used by USDA and INFOODS food composition developers.

Dietary output from PacTrac 2.0 was shown to be associated with child blood pressure.¹¹ Further study to validate analysis of dietary records and dietary recalls using the PacTrac 3.1 tool with biomarkers would be a valuable endeavor, as has been recently done with the ASA24.²⁰

Creation of the PacTrac database has involved the work of the many collaborators, including the HLPI Initiative, the Pacific Kids DASH for Health program, and the CHL program. These contributors include programmers, statisticians, nutritionists and physical activity experts to create a tool to analyze diet and physical activity of children and adults in the USAP Region. This core information is needed for association of diet with health and disease to advance science and develop program and policy guidance.

Conclusions and Implications for Practice

Dietary and physical activity assessments for the US that include Native populations and children’s foods and activities found in the USAP region are now possible using the PacTrac 3.1. This tool can be used by consumers, dietitians, and researchers to analyze the diet and physical activity of children and adults in the Pacific region. Availability of PacTrac 3.1 provides an instrument to identify healthy local cultural foods and food patterns, to be incorporated into program and policy guidance.

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