**Condition Change: UC ANR contributed to improved health for all**

**Issue**

California’s rapid population growth increases pressure on community resources, presenting numerous challenges to health and safety. Adult and childhood obesity is a public health crisis for the state and nation, resulting in a range of negative health consequences. Nearly 30% of California’s youth in grades 9-12 and over 60% of California’s adults are overweight or obese, according to the Center for Disease Control and Prevention. Childhood obesity is estimated to cost the nation $14 billion per year.

**Methods**

UC ANR produces new knowledge, tools, programs, and policy-relevant research that result in healthy living for individuals.

UC Agricultural Experiment Station (AES) scientists at the UC Davis location are investigating how adolescent brains respond to low quality food, how family characteristics like socioeconomic status affect this response, and how diet and family dynamics affect brain development and the risk of depression. Understanding these three connections can provide beneficial evidence that healthy family relationships and diets extend beyond physical health (Johnna Swartz). An AES scientist at the UC Berkeley location conducts research to understand the etiology of obesity-related disorders and has made several key discoveries about mammalian fatty acid transport and metabolism pathways. This work may contribute to new treatments for important obesity-related conditions such as liver cancer (Andreas Stahl). Other AES scientists at the UC Davis location are applying modern imaging technology and mathematical modeling to understand the eating quality and digestibility of produce following its handling under different supply chain conditions. This work will specify supply chain operating parameters that will improve the eating quality of produce (Gail Bornhorst). Another UC-Davis based AES scientists’ novel work on enzymatic treatments of dairy and nut milks have been able to retain oligosaccharides that act as growth substrates for friendly gut bacteria from dairy milk while removing unwanted sugars, opening the way to low-cost, environmentally friendly processing approaches for the nutritional enhancement of dairy milk (Juliana Leite Nobrega de Moura Bell).

UC Cooperative Extension (UCCE) academics provided oversight, leadership, and guidance for the statewide implementation of the University of California 4-H Youth Development Program (UC 4-H). UC 4-H provided hands-on, experiential learning opportunities about healthy lifestyles with participation from over 24,000 4-H youth (UC 4-H). 4-H in Mendocino County partnered with Ukiah Parks and Recreation and local organizations to deliver the Ukiah Kids Triathlon, and the Lake County Cooking Academy taught youth about making healthy food choices (Car Mun Kok). 4-H academics conducted a national pilot of Mindful Me, a curriculum designed to support primary youths' socio-emotional wellness through learning and implementing mindfulness practices (Anne Iaccopucci, Kendra Lewis, and Katherine Soule).

UCCE academics provided oversight, leadership, and guidance for the statewide implementation of the CalFresh Healthy Living, UC (CFHL, UC) program in 32 counties. CFHL, UC delivered nutrition education programs such as EatFit; Eat Smart, Live Strong; and Hunger Attacks, to over 97,000 youth and adults and implemented over 2,000 healthy food tastings with over 53,000 students. CFHL, UC policy, systems, and environmental interventions such as Coordinated Approach To Child Health Early Care Education (CATCH ECE) and Shaping Healthy Choices Program were conducted to prevent overweight and obesity (CFHL, UC). UCCE academics piloted a new CFHL, UC program with local community partners in Kings County that coupled nutrition education with exercise. The 10-month pilot addressed obesity by providing collaborative activities like weekly spotlight nutrition education, Bailoterapia dance exercise lessons to parents of young children, sustainability plans, free health screenings, and childcare while parents attended dance classes (Deepa Srivastava, Vikram Koundinya, Angie Keihner, Michele Nicole Byrnes, Barbara MkNelly). Local programs utilized statewide evaluation tools to measure participant outcomes (Hawau Bojuwon; Deepa Srivastava; Anna Martin; Chutima Ganthavorn).

UCCE academics provided oversight, leadership, and guidance for the statewide implementation of the Expanded Food and Nutrition Education Program (EFNEP) statewide programs, which delivered programs such as Eating Smart Being Active; Happy Health Me; and It’s My Choice...Eat Right! Be Active! to almost 41,000 youth and adults (EFNEP). Local programs utilized statewide evaluation tools to measure participant outcomes (Marisa Neelon; Deepa Srivastava; Chutima Ganthavorn; Anna Martin).

UCCE academics provided leadership and science-based information for the statewide implementation of the UC Master Gardener Program. Volunteers delivered public education workshops and participants responded to a survey about any changes made as a result of attending (UC Master Gardener). One UCCE academic in Los Angeles County led an effort with Master Gardeners to deliver and evaluate the project, Promoting Alternatives to Citrus for Backyard and Community Gardeners in the Fight Against Asian Citrus Psyllid/Huanglongbing. Over 1,200 adults were reached by the Master Gardener volunteers and 112 completed a survey about what they learned (Rachel Surls).

Nutrition Policy Institute provides evaluation technical assistance for all agencies implementing CalFresh Healthy Living (CFHL) interventions. Findings from 2019 statewide evaluation efforts are described below (Amanda Linares).

As a result of UC ANR research and extension efforts, participants learned about and adopted healthier lifestyles. Outcomes with specific indicators follow.

**Outcomes**

**Participants changed attitudes toward and gained knowledge about healthy eating practices.**

* 4-H teen teachers in Lake County reported increased knowledge in using kitchen equipment and increased awareness of the effects of consuming vegetables, water, and sugar-sweetened beverages, as a result of participating in the 4-H Cooking Academy after school program. (Car Mun Kok)
* Youth across the state who participated in CFHL, UC healthy food tastings indicated that they are willing to eat the food again at school (71%) and willing to ask for this food at home (66%). (CFHL, UC)
  + In Tulare and Kings County schools, teachers trained by CFHL, UC adopted Youth Taste Tests with over 5,500 kindergarten and elementary students and Teacher Observation evaluation tools. Results from 116 teachers indicated that students tasted the food offered (>91%), were willing to eat that food in school again (>66%), and were willing to ask for that food at home (>62%). (Deepa Srivastava)
  + CFHL, UC evaluation outcomes in San Joaquin County of note include adult participants significantly increased, by more than a cup, their fruit and vegetable intake and reduced intake of regular soda. As for youth participants, teachers agreed that more students can now identify healthy food choices (98%) and more students are now willing to try new foods offered at school (94%).(Anna Martin)
  + CFHL, UC staff in Riverside County collected data from 37 teachers, representing 941 students in Head Start schools and found that 94% of teachers agree that more students can now identify healthy food choices and 94% agree that more students now are willing to try new foods at school. Additionally, the teachers reported that they now make their own healthier food choices a lot more often (68%). (Chutima Ganthavorn)
  + In its third year, Riverside County’s CFHL, UC Shaping Health Choices multi-component intervention program measured a statistically significant increase in nutrition knowledge between pre-implementation and post-implementation county-wide, based on 139 pre-assessment and 129 post-assessment surveys collected from two schools. (Chutima Ganthavorn)
* EFNEP received survey responses from over 4,300 youth participants across the state about their participation in a nutrition education program and 82% of youth gained knowledge or improved their abilities to choose foods according to federal dietary recommendations. (EFNEP)
  + EFNEP youth participants in Riverside and San Bernadino Counties reported improved abilities or knowledge in choosing foods according to Federal Dietary Recommendations (77% of 569). (Chutima Ganthavorn)
* Survey respondents of the UC Master Gardener Los Angeles County alternatives to citrus project gained knowledge about the importance of eating more fruits and vegetables (82%), reported intention to eat more fruits and vegetables (66%), and gained knowledge of how to access, produce, prepare, and preserve fruits and vegetables (81%). (Rachel Surls)

**Participants adopted healthy eating practices.**

* Over 500 4-H youth across the state responded to the Healthy Living common measures survey and reported eating breakfast (82%), paying attention to how much water (75%) and how many sugary beverages (74%) they drink each day, as a result of what they may have learned at 4-H. (UC 4-H)
* Over 650 CFHL, UC adult participants across the state responded to Food Behavior Checklist pre/post surveys after participating in a nutrition education program series and reported improvement in eating more than one kind of fruit (42%) and more than one vegetable (43%) each day. (CFHL, UC)
  + As a result of the partnership and implementation of CATCH ECE, UCCE in Kern County was able to increase physical and social activity of 195 children ages 3-5. A total of 12 teacher extenders trained to implement CATCH curriculum adopted what they learned and contributed 83.75 hours to NFCS program. (Hawau Bojuwon and Beatriz Rojas)
  + Evaluation data collected from 153 students enrolled in the CFHL, UC Hunger Attack program in a Riverside County high school found about one-third of students made improvements in vegetable consumption (34%), sweetened beverage consumption (33%); and tracking how much they spend on food each week (37%). (Chutima Ganthavorn)
  + In Riverside County, evaluation data collected from 805 middle school students enrolled in the CFHL, UC EatFit program found students made at least one improvement in their eating behavior (95%), improvements in fast food & snack consumption (34%), improvements in beverage consumption (34%) after participating in the program. (Chutima Ganthavorn)
  + Riverside County CFHL, UC participants indicated improvement using MyPlate (70%), thinking about healthy choices when choosing food (41%), and using Nutrition Facts labels (46%), as reported in pre/post surveys by 110 participants who received nutrition education through the Plan, Shop, Save, Cook Series or through spotlight education. (Chutima Ganthavorn)
* EFNEP received survey responses from over 3,600 adult participants across the state about their participation in a nutrition education program and 95% of adult participants met all recommended practices in diet quality and 70% met all recommended practices in physical activity. (EFNEP)
  + EFNEP in Alameda and Contra Costa Counties conducted pre/post surveys with over 1,000 students as a sample of the 6,684 students reached through educational series, with 80% reporting improvement in choosing healthy foods and 26% drinking less sugar sweetened beverages.Teachers reported that they observed students increasing their fruit and vegetable selection and consumption at lunch; brought healthier snacks to school; and that students were sharing what they learned with their families. (Marisa Neelon)
  + Of the 187 EFNEP graduates in Tulare and Kings Counties, 95% showed improvements in one or more diet quality/nutrition practices, 87% showed improvements in food safety practices, and 51.8% indicated a positive change in physical activity behaviors.(Deepa Srivastava)
  + EFNEP adult participants in Riverside and San Bernardino Counties showed improvement in one or more diet quality indicators such as eating fruits and vegetables and consuming fewer beverages with added sugar (95% of 453). (Chutima Ganthavorn)
  + EFNEP evaluation outcomes in San Joaquin County of note include: 93% adult participants showed improvement in one or more diet quality indicators and 48% in one or more food security indicators. Additionally, 76% of adult participants improved food resource management practices. (Anna Martin)
* As a result of Nutrition Policy Institute’s evaluation technical assistance, the following statewide outcomes for all statewide implementing agencies were reported. The pre/post What Does Your Child Eat? tool was able to measure the following statistically significant participant outcomes from two different CFHL evaluation projects involving 103 children: increased frequency of consumption of fruit and vegetables, more than one kind of vegetable, and low fat, fat free, and alternative milk. Furthermore, the Youth Nutrition and Physical Activity tool identified statistically significant increases in combined fruit and vegetable consumption (0.34 times/day) and decreased frequency of sweets consumption (0.25 times/day) among the 2,932 youth in the CFHL intervention group over 42 youth in the comparison groups. (Amanda Linares)

**Participants adopted healthy lifestyle and decision-making practices.**

* Over 500 4-H youth statewide reported paying attention to how active they are each day (75%) and having a growth mindset related to health and being healthy (72%) in the the healthy living and positive youth development common measures survey about what they may have learned at 4-H. (UC 4-H)
  + Over 60 4-H youth increased their physical activity by participating in the Mendocino County Kids Triathlon, for which UCCE co-organizes every year. (Car Mun Kok)
  + Outcomes from 95 Mindful Me participants who completed the entire lesson were measured with paired pre and post paired assessments. Statistical analysis revealed that primary youth experienced significant increase in each of 13 components measured in the instrument, including identifying emotions, talking about their feelings, observing their surroundings, and promoting well-being. (Anne Iaccopucci, Kendra Lewis, Katherine Soule)
* The Kings County Bailoterapia pilot resulted in the following outcomes for participants. The majority (83% of 141) of participants not already practicing the promoted healthy eating or active living behavior indicated their intention to do so within the next week. Eight participants surveyed on behavioral outcomes reported a significant increase from pre to post in the frequency of making small changes to be more active as well as non-significant, but promising increases in meeting the physical activity guidelines and muscle strengthening, and number of days they exercised for 30+ minutes. Qualitative focus groups found that community partners attributed program success to organizational capacity, expertise, and funding; program monitoring and evaluation; free childcare and health screenings; and being sensitive to participants' cultural-social norms and values. (Deepa Srivastava, Vikram Koundinya, Angie Keihner, Michele Nicole Byrnes, Barbara MkNelly)

**Participants adopted edible gardening practices and spent more time outdoors.**

* Participants of public education events led by UC Master Gardener volunteers responded to a statewide survey in 2019 and 612 participants reported starting or improving growing edible plant(s) (75%) and expanded varieties of edible plant(s) grown (62%). These behaviors are correlated with increasing consumption of fruits and vegetables. Respondents indicated that they applied knowledge gained on 772,673 square feet of food gardens as reported by 818 participants, potentially increasing their access to produce. Furthermore, 67% of 1,215 respondents spent more time gardening and outdoors, which is associated with improved individual emotional and physical health. (UC Master Gardener Program)

These measured outcomes lead to and demonstrate improved health for Californians where they learn, work, and play. Furthermore, longitudinal studies of EFNEP graduates indicate that they maintain positive behavior change 2-6 months after completing the program (Dollahite, 2014; Koszewski, 2011; Swindle, 2007). Healthy habits can prevent or reduce the detrimental effects of chronic disease and for every dollar spent on California EFNEP, there is a savings of $8.34 in health care costs (California EFNEP Impact Report, 2018). Collectively these efforts contribute to the public value of promoting healthy people and communities.