Background:

- Childhood cancer survivors are at high risk for nutrition-related disease
- Carotenoid intake is associated with a number of beneficial health outcomes for survivors and the general population
- Cooking education is-popular and has the potential to improve diet
- Most cooking programs focus on fresh produce, but the majority of carotenoids in the US diet come from processed foods

Objective: The objective of this study is to examine the relationship between practices commonly taught in community cooking classes and the carotenoid content of prepared meals.

Methods:

- The Healthy Cooking Index (HCI) quantifies the quality of home cooking practices and is based on extant evidence
- The HCI practices are commonly used in community cooking programs for cancer survivors
- Parents with one CCS or non-CCS school-aged child were recruited for an observational study
- Participants prepared meals in their homes while observers took notes on their cooking behaviors and meal content
- HCI scores and prepared meal nutrition, including total and individual carotenoid content was assessed

Results:

- 40 dyads (Table 1) participated. Most children were under 14 and Hispanic White or non-Hispanic White
- Prepared meals could be categorized into 11 main types (Fig 1)
- Meals of the same type varied widely in carotenoid content (Fig 2)
- 46% of produce used by participants was considered carotenoid-rich (tomatoes, dark yellow/orange, dark green)
- Carotenoid content was not associated with HCI score (r= -0.244) or total produce usage (r= .142)
- Carotenoid content was associated with carotenoid-rich produce usage (r = .553**)
- Higher carotenoid meals tended to use canned vegetables and tomato products
- Carotenoid content was associated with total meal sugar (r= .324*) and refined grains(r= .497**) Table 2

** Correlation is significant at the 0.01 level (2-tailed).
*Correlation is significant at the 0.05 level (2-tailed).

The **carotenoid content** of home-prepared family meals is **not associated** with **healthier cooking practices** or **total fruit & vegetable content.**

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Table 1 Participant Demographic and Meal Carotenoid Characteristics % (n=40)

Child Age (years)	5 to 8	42.5 (17)
	9 to 13	45 (18)
	14 to 18	12.5 (5)
Child Race / Ethnicity	White	40 (16)
	Hispanic	27.5 (11)
	Black	17.5 (7)
	Other	10 (4)
	Asian	5 (2)
F/V servings per serving of prepared meal mean +/- SD (range)		2.74 +/- 2.07 (0-9.47)

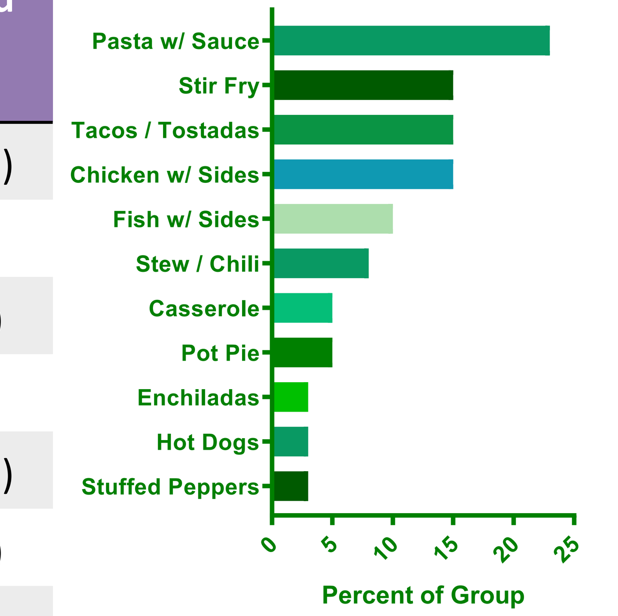
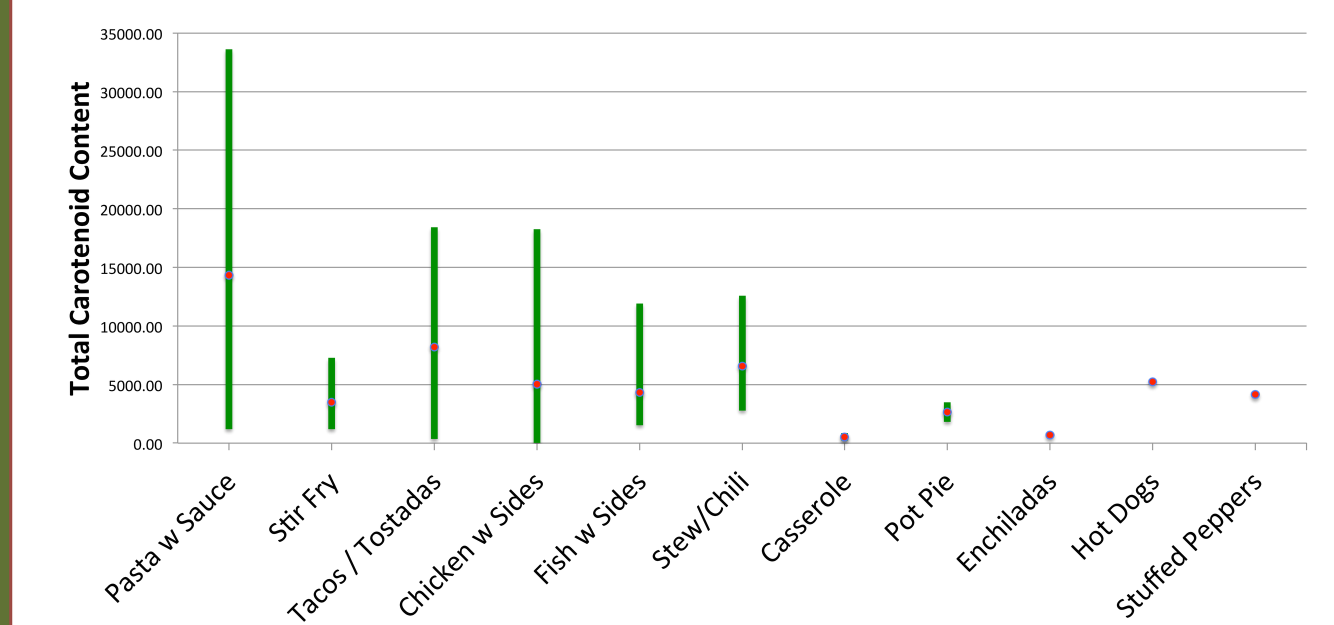


Figure 1 (above): Bar chart showing main types of dishes prepared by participants (n=40). **Figure 2** (below) Chart showing mean and range of carotenoid content by meal type.

Table 2: Associations between nutrient variables and total carotenoids content, carotenoid-rich fruit/vegetables and fruit/vegetables (Pearson correlation)

Nutrition Variable	Total Carotenoids	Total Carotenoid Rich F/V	Total F/V[a]
Total Carotenoids	-	0.55**	0.14
Energy Density (calories/ grams)	-0.235	-0.278	-0.592**
Sugar (g)	0.324*	0.127	0.462**
Fiber (g)	0.149	0.032	0.580**
Meal Servings of Refined Grains	0.497**	0.199	-0.081
Meal Servings of Sweets	0.449**	0.087	0.163
Calcium (mg)	0.041	-0.120	0.450**
Iron (mg)	0.658**	0.258	0.388*
Copper (mg)	0.303	0.408**	0.577**
Selenium (mcg)	0.373*	-0.020	0.082
Potassium (mg)	0.293	0.168	0.783**
Choline (mg)	-0.108	-0.199	0.347*

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).
[a] Includes potatoes
[b] Total Retinol Activity Equivalents



Recommendations:

- To increase carotenoid intake among survivors, cooking education programs could include use of processed tomato/vegetable products and focus on carotenoid rich produce.
- Curricula should highlight using low sugar/salt versions of processed foods and alternatives to refined grain products

References:
Reicks, 2018 JNEB; Raber, 2016 PMR; Raber, 2019 PHN

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Healthy cooking practices are not associated with the carotenoid content of home-prepared meals: implications for food preparation interventions among childhood cancer survivors and their families.

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