*Research Brief*

# *A Culturally Specific Community Supported Agriculture (CSA) Program to Improve Diet in Immigrant Communities in Brooklyn, New York*

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Anti-Asian and anti-immigrant sentiment has surged in the country in the last 3 years. Food insecurity is also on the rise; in our local needs assessment of n = 1,270 Asian American adults in New York City, accessing food was cited as the number 1 priority among those who needed help. Finally, racial discrimination and food access are related to fear of being attacked—driving feelings of safety and therefore willingness to travel for food. To combat these narratives and leveraging pivots by our community partners, we implemented a community-supported agriculture pilot program (n = 38) to assess whether culturally appropriate food access can improve diet and foster cross-cultural learning among immigrant families in Brooklyn, NY. Over a 20-week period from June to October 2022, participants received Chinese-specific produce and nutrition education. Participants reported eating more and a greater variety of vegetables and had higher vegetable intake measured via skin carotenoid scores. This pilot may inform the adaptation of nutrition interventions to reduce inequities in chronic diseases in immigrant communities.

**Health Promotion Practice**
Month XXXX Vol. XX, No. (X) 1–6
DOI: 10.1177/15248399241234058
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***Keywords:*** diet; nutrition; community supported agriculture; vegetables; immigrant communities; health equity

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***Authors' Note:*** *The authors are grateful to all our partner organizations for their commitment to addressing the community's needs and collaboration in developing and implementing the program. This work was supported by grant numbers 1007198 from the Bristol Myers Squibb Foundation, U54MD000538 from the National Institutes of Health (NIH) National Institute on Minority Health and Health Disparities (NIMHD), and R01MD018204 from NIMHD. The contents of this publication are solely the responsibility of the authors and do not necessarily represent the official views of funders. Address correspondence to Sze Wan (Celine) Chan, Department of Population Health, NYU Grossman School of Medicine, 180 Madison Ave, New York, NY 10016, USA; e-mail: szewan.chan@nyulangone.org.*

## INTRODUCTION

Poor diet quality contributes to 45% of cardio-metabolic deaths in the United States (Micha et al., 2017). Nutrition-focused initiatives that have not centered community input from inception to implementation have led to a widening of health disparities across racial/ethnic minority groups, including Latine and Asian American individuals (McGill et al., 2015; Zhang et al., 2018). Latine and Asian American populations have the highest risk of diabetes and nonalcoholic fatty liver disease of all racial/ethnic minority groups (Anderson et al., 2015; Cheng et al., 2019; Zou et al., 2020). However, existing efforts to improve nutrition outcomes have been limited in their reach to these communities (Russo et al., 2020; Yi et al., 2021).

Community-supported agriculture (CSA) involves a community of individuals who support a farm and in return receive distributions of the farm's produce throughout the growing season. CSAs are established evidence-based models that have been demonstrated to be an effective way to increase fruit and vegetable intake, diet quality, and in some cases improve food security. However, uptake historically has been by educated White populations using an upfront payment model; this model often makes it untenable to immigrant communities with lower incomes (Berkowitz et al., 2019; Izumi et al., 2020; Vasquez et al., 2017).

A subsidized CSA program provides a solution addressing the demand in Asian American, specifically Chinese American communities for fresh and culturally specific produce, prioritizations that preclude cost even among lower-income individuals (Viladrich & Tagliaferro, 2016; Yi et al., 2020). Using successful evidence-based interventions providing fresh produce boxes (Berkowitz et al., 2019; Izumi et al., 2020) as a foundation, we applied community-engaged methods to implement the Building Access to Food through Systems and Solidarity (BASIS) produce box program, which is a subsidized CSA program that features Chinese-specific produce.

The objective of our pilot study was to assess whether culturally appropriate food access and nutrition education can improve diet quality and access to fresh produce for Chinese American immigrant families in Brooklyn, NY.

## METHOD

### *Intervention*

BASIS is a multisector partnership between NYU Grossman School of Medicine (NYU), Brooklyn Grange, the Chinese American Planning Council (CPC), The Table Food Pantry at NYU Langone (The Table), and Glynwood Regional Center for Food and Farming (Glynwood). In the wake of the rising tide of anti-Asian hate incidents and rising food insecurity during the COVID-19 pandemic, NYU conducted a local needs assessment of $n$=1,270 Asian American adults in New York City where accessing food was cited as the number 1 priority among those who needed help (Đoàn et al., 2022). CPC started hot meal deliveries and distribution of produce boxes for Chinese older adults; Brooklyn Grange grew Chinese-specific produce for The Table clients; and Glynwood made direct linkages between food pantries and small farmers. Expanding on the pivots, BASIS partners met bi-weekly to develop a systems-level program to bring a subsidized CSA model to the Chinese community in a way that is aligned with cultural values and that includes Chinese-specific produce and nutrition education.

With guidance from an eight-person community advisory board, BASIS partners implemented a pilot proof-of-concept study of the produce box program. Brooklyn Grange developed a crop plan and seed order for Chinese-specific produce based on survey feedback from The Table clients on what vegetables were of most interest to them, which they disliked, and which they did not know how to prepare. Interviews with Chinese American adults living in Brooklyn ($n$ = 19) to understand their eating and shopping behaviors, interests in CSA programs, and recommendations for education content also guided program development.

The produce box program's focus population was Chinese American immigrant families with lower incomes living in Brooklyn. However, enrollment into the program was open to all individuals aged 18 years or older who live in Brooklyn and could speak English, Mandarin, and/or Cantonese. CPC and The Table circulated flyers in English and Chinese (Figure 1) to community members for recruitment. Bilingual NYU research personnel who spoke English and Mandarin/Cantonese obtained consent over the phone or in-person at Brooklyn Grange during produce pick up.

From June to October 2022, Brooklyn Grange hosted produce pickups every Tuesday from 3 p.m. to 7 p.m. at their Sunset Park rooftop farm location for 20 weeks. Every week participants came in-person to the farm to pick up their produce box containing five to six different types of vegetables. Produce was set up market style, which allowed participants to select and/or swap their produce based on personal preference, encouraging interaction between farmers and participants and reducing food waste. Produce offered throughout the season included vegetables such as gai lan, bok choy, choy sum, celtuce, sweet potato greens, hon tsai tai, water spinach, and watercress. Participants paid $5 per week for a box


**FIGURE 1 BASIS Recruitment Flyers**
*Note.* BASIS = Building Access to Food through Systems and Solidarity.

valued at $20 per week. Participants could choose to make an upfront payment for the whole season with a credit card or pay weekly throughout the season using Supplemental Nutrition Assistance Program (SNAP)/Electronic Benefits Transfer (EBT) benefits.

Each week alongside their produce boxes, participants also received in-language health, cooking, and nutrition education in the form of a culturally appropriate recipe card. The recipe cards included vegetable preparation/storage tips, recipes, and health information. During produce pickup, participants also received nutrition education through a nutrition booth, where they could ask nutrition and health-related questions to a registered dietician.

The program was evaluated using a pre-post design. Pre was defined as the first week of the CSA, and post was defined as the last week. Surveys were completed either online or in-person. Skin carotenoid scans were completed in-person by Veggie Meter. Participants received a gift card incentive upon completion of both the survey and skin carotenoid scan. NYU research personnel were present at produce pickup to administer surveys, provide language support, and take measurements of skin carotenoids. All activities were approved by the NYU institutional review board.

### *Measures*

The outcomes we assessed were (1) self-reported improvement in diet quality and (2) skin carotenoid scores.

Improvement in diet quality was measured with self-reported pre-survey/post-survey questions on vegetable consumption. Participants were asked to select all of the vegetables they ate in the past month out of a list of 29 vegetables grown at Brooklyn Grange and for each vegetable they selected, participants were asked "how often in the past month" and "how much did you usually eat." From the list of 29 vegetables, participants were also asked to list "any that you don't know how to prepare."

Skin carotenoid scores were measured with the Veggie Meter by study team personnel during the first and last weeks of the program. The Veggie Meter is an electronic portable device that plugs into a standard USB laptop outlet and is a painless procedure with a light scan of a person's finger. It is a measure of carotenoids, a validated

marker of fruit and vegetable intake in diverse populations (Longevity Link Corporation, 2016).

We assessed differences in medians (number of different types of vegetables consumed in the past month, volume of vegetables eaten in the past month, and skin carotenoid scores) using paired Wilcoxon signed-rank tests. Analyses were conducted for all participants.

## RESULTS

A total of 38 participants were enrolled in the produce box program (Table 1). Participants were predominantly Asian (50%), followed by White (25%). Among those identifying as Asian, 64% were Chinese. The mean age of participants was 47 years.

There was high engagement during the program, with 90% attending weekly produce box pickup events. Program materials were well received with 41% of participants finding the recipe cards to be "very helpful" and 59% finding them to be "somewhat helpful" in a feedback survey ($n$ = 35).

As shown in Table 2, analysis of pre-survey and post-survey data suggests participation in the program resulted in an increase in vegetable consumption among participants. Findings showed statistically significant increases in the number of different types of vegetables consumed in the past month (baseline median number of unique vegetables = 11; follow-up median number of unique vegetables = 15) and in participant skin carotenoid scores (baseline median score = 347; follow-up median score = 407). We found an increase in the estimated volume of vegetables eaten in the past month (baseline median cups/month = 12.75; follow-up median cups/month = 16.31), but the increase was not statistically significant. Finally, results suggest increased knowledge among participants regarding how to prepare vegetables, with participants showing a statistically significant decrease in the number of vegetables they reported **not** knowing how to prepare (baseline median number of vegetables = 3; follow-up median number of vegetables = 1).

**TABLE 1**
**Self-Reported Characteristics of BASIS Participants: Brooklyn, NY, 2022**

| *Characteristic* | *M* |
|---|---|
| Age (years) | 47 |
| *Characteristic* | *n (%)* |
| Gender | |
| Female | 23 (64) |
| Male | 12 (33) |
| Nonbinary | 1 (3) |
| Race | |
| Asian | 18 (50) |
| Black or African American | 1 (3) |
| Hispanic/Latino | 4 (11) |
| White | 9 (25) |
| Multiracial | 4 (11) |
| English proficiency | |
| Very well | 19 (54) |
| Well | 7 (20) |
| Not well | 4 (11) |
| Not at all | 2 (6) |
| Don't know | 3 (9) |
| SNAP | |
| Currently participate | 11 (32) |
| No longer participate | 5 (14) |
| Never participated | 19 (54) |

*Note.* SNAP = Supplemental Nutrition Assistance Program.

## DISCUSSION

Our analysis demonstrates that a subsidized CSA program featuring Chinese-specific produce with flexible payment options may be an effective way to increase vegetable consumption and improve the diet for Chinese American immigrant families. These results are similar to other subsidized CSA studies that found an increase in vegetable consumption and diet quality (Berkowitz et al., 2019; Izumi et al., 2020). In our study, we also saw a significant increase in skin carotenoid scores for participants. This result may be due to participants consistently receiving vegetables each week, especially for Chinese participants who received culturally specific vegetables (Yi et al., 2020) that they are familiar with preparing.

Our study has limitations. This is a pilot proof-of-concept study with a small sample size, which may affect the validity of the results. Future studies should enroll a larger sample. In addition, caution should be used in extrapolating results to Chinese American immigrant communities. Although designed for the Chinese American immigrant community in Sunset Park, Brooklyn, the program also enrolled community members of different races/ethnicities including Latine immigrants.

Despite these limitations, we recorded high satisfaction with the program. In our feedback survey ($n$=35), 100% of participants indicated that they would recommend our program to others. Throughout the program,

**TABLE 2**
**Differences in Vegetable Consumption Measures and Skin Carotenoid Scores**

| *Measure* | *Median baseline (n = 37)* | *Median follow-up (n=37)* | *Wilcoxon signed-rank p-value* |
|---|---|---|---|
| Number of different vegetables consumed in the past month | 11 | 15 | .017 |
| Total vegetables consumed past cups/month | 12.75 | 16.31 | .77 |
| Number of vegetables participants did not know how to prepare | 3 | 1 | <.001 |
| Skin carotenoid score | 374 | 407 | .017 |

participants also verbally told program staff that they would be interested in participating for another year if the program continued, demonstrating potential for expansion. Another strength of this study is the usage of skin carotenoid scores as an evaluation measure. To the best of our knowledge, few studies have used the Veggie Meter to assess outcomes in CSA programs, and no studies currently exist that use the Veggie Meter in a culturally tailored CSA program.

## IMPLICATIONS FOR PRACTICE

Our experience implementing a subsidized and culturally appropriate CSA program for the Chinese American community in Brooklyn could be adapted for other immigrant populations. The program's high engagement and satisfaction from participants are attributable to our strong partnerships with trusted community organizations, formative research to understand the cultural preferences, interests, and needs of the local community, inclusion of in-language materials, and presence of bilingual research personnel—factors that should be prioritized when developing culturally relevant CSAs.

Participation of non-Chinese participants also demonstrates the interest community members have in receiving local fresh produce and the potential for fostering cross-cultural learning across racial/ethnic groups. Areas that this research can be expanded on include implementing a culturally tailored CSA with different immigrant groups or developing a CSA acceptable to multiple racial/ethnic groups.

The pilot program's success has allowed us to secure funding to continue and expand BASIS for an additional 5 years. In the next iteration of BASIS, we will be expanding the produce box program to more Chinese families as well as additional populations, including Mexican and Bangladeshi Americans ($n$ = 140), and working with an additional farm partner, Angel Family Farm, a family-owned farm growing Mexican produce.

Although the produce boxes are subsidized, BASIS partners are actively discussing and laying the foundations to implement a sliding-scale payment model. A sliding-scale payment model would allow individuals to sign up for the produce box program for different dollar amounts depending on their household income and/or ability to pay, which will improve the probability of long-term sustainability of our programming.

Improving the diet quality of racial/ethnic minority populations can help to reduce inequities in chronic diseases. Nutrition interventions that are culturally aligned with immigrant communities' values and food preferences are key to ensuring the success of such programs. BASIS presents a powerful model to improve diet in immigrant communities by addressing determinants of food access in a community-centered, culturally relevant way and by fortifying community empowerment.


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