

Assessing Garden and Nutrition Education Programs in Santa Clara County



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Executive Summary

The Santa Clara County Public Health Department (SCCPHD) is seeking to find which organizations are providing nutrition and garden education programs throughout the county and if they are following evidence-based educational guidelines. One such educational program is the Supplemental Nutrition Assistance Program-Education (SNAP-Ed), which operates nationwide. The CalFresh Healthy Living (CFHL) program is California's SNAP program and also provides assistance to low-income households. CalFresh uses an evidence-based curriculum and is required to follow the Dietary Guidelines for Americans (DGA). SCCPHD operates CFHL and follows SNAP-Ed guidelines for determining whether a curriculum is evidence-based or not. Evidence-based nutrition education is a way of learning that is designed to encourage healthy eating habits, food choices, and other nutrition-related behavior.

Evidence-based nutrition education contributes to a reduction in environmental impact by encouraging the consumption of fruits, vegetables, and appropriate protein portions. It works best when grounded in collaborative partnerships between the organizations that teach it and the community they serve. This is necessary to meet the specific needs of underserved populations using evidence-based and culturally responsive approaches.

Although SNAP-Ed is an extremely extensive program, malnutrition is still prevalent within low-income communities due to an inability to access fresh, nutritious foods. In 2014, SCCPHD found that just 18% of adults reported eating five or more servings of fruits and vegetables the previous day. Lack of access to these foods couples with insufficient education about how to obtain food that aligns with a healthy lifestyle.

SCCPHD aims to discover which nutrition and garden education organizations follow an evidence-based curriculum and if they sufficiently meet the needs of the community they serve. We aim to evaluate the current nutritional programs based on their educational guidelines, identify gaps in the programs, build a network of community organizations that share a common vision, and make informed recommendations to SCCPHD based on our findings.

Research Questions:

1. To what extent are nutrition and garden education programs in SCC following evidence-based curricula?
2. Are these programs sufficiently accessible to their targeted communities?
3. How can the Santa Clara County Public Health Department build a network of community organizations in order to expand and improve garden and nutrition education programs?

To answer these questions, we began by using a mixed-methods and community-based participatory research approach to assess nutrition and garden education programs in the county. Through a literature review, we researched the benefits of nutrition, gardening, and climate education in regard to their impact on food security across the county. We received a list from SCCPHD with contact information for all the garden and nutrition education programs in the county. We contacted individuals working for Santa Clara County-based organizations and then conducted 20 interviews with key professionals in the area. Most were conducted over Zoom and lasted an average of 18 minutes and 43 seconds. We recorded these interviews, and then transcribed them using Microsoft Word, listening for accuracy. After the interviews, we performed two assessments to identify the degree of evidence-based curriculum based on a

newly developed rubric. We coded the interviews according to eight separate codes, defining accessibility in terms of categories including language, modality, and price. This analysis gave us greater insight into common themes that arose throughout the interviews. Lastly, we communicated our results to SCCPHD through recommendations and other deliverables.

We found the majority of programs do not follow the evidence-based guidelines originally set out by the county. Instead, most programs create their own curriculum based on community feedback and team knowledge. **We identified 13 of 18 programs that do not align with the SNAP-Ed Checklist for Evidence-Based approaches and 7 interviewees expressed that their organization does not follow any specific or established curriculum.** Our informant interviews provided vital information regarding the accessibility of each organization's programs including language, modality, and cost. There is also a lack of language accessibility, as most programs are taught in English and/or Spanish. Traditional Chinese, Vietnamese, or other languages important to the area would be beneficial to include in programs. This data was useful in determining the degree to which each program was developed with its target audience in mind and if the programs were sufficiently accessible to its community. Most of the programs were lacking in communication with each other and tended to teach similar content with different lessons. We also found that most educational programs in the county were willing to join a network of nutrition and garden education programs in order to share resources and better serve the community. **A frequent theme that arose in the interviews included the belief that a network to address gaps and share resources would be helpful to the organization, especially as only 3 of 18 interviewees explicitly claimed their organization provided information about other programs operating in the county.**

These findings ultimately produced **four critical recommendations.**

We Recommend SCCPHD:

1. Uses a more dynamic set of criteria and categorization when assessing curricula, allowing for collaborative partnerships between organizations and constituents.

During our analysis of interviews and assessment of curricula using the SNAP-Ed Checklist for Evidence-Based Approaches, we identified deficiencies in the original checklist due to its strict nature and incongruence with community-based approaches. Most organizations we interviewed were deeply rooted in constituent feedback and/or created by trained professionals, and the SNAP-Ed guidelines were not able to accurately reflect the fact-based, scientific curricula in use at the organizations. Therefore, SCCPHD may choose to build upon our classification system to create guidelines that work better for these dynamic organizations. This will allow for more collaborative partnerships between organizations and constituents.

2. Holds a monthly meeting where key informants of nutrition and garden programs can meet and assess program deficiencies in terms of lack of translation, modality of programs, and appropriate collaboration relative to communities served.

Funding a forum so programs can continue networking after this project to remedy gaps in lack of communication would prove to be beneficial.

3. Assists in the creation and approval of a county-wide curriculum for both nutrition and

garden programs in order to establish complete educational standards.

Organizations should collaborate and pool resources including lesson plans and curricula to create a more robust educational system. This county-wide curriculum can be approved by SCCPHD, so organizations are all teaching approved lessons and there is no unnecessary work being done to create lesson plans when one has already been made on a subject.

Future research on this topic should be conducted to further understand language accessibility such as what written curriculum is offered. Language accessibility is important to ensure that all clients in the county are able to receive the education they need to implement healthy lifestyles. A map should also be created to properly visualize the scope of reach for all organizations and the programs they offer. Organizations can add themselves and their constituent base to the map, showing who is served by what organization. Finally, organizations should collaborate on community-based research to generate a county-wide curriculum for garden and nutrition education programs.

Introduction

The Santa Clara County Public Health Department (SCCPHD) is seeking to find which organizations are providing nutrition and garden education programs throughout the county and if they are following evidence-based dietary guidelines. A nationwide educational program that adheres to these guidelines is the Supplemental Nutrition Assistance Program (SNAP), which is the nation's largest and most important federal food assistance program. It provides food benefits to 42 million individuals in 2022 (USDA, 2021), about 12.6% of the total population. In order to qualify for SNAP, households must meet universal eligibility requirements regarding family income and assets (Hoynes, et. al., 2019), as well as citizenship. Two examples of these eligibility requirements include households' monthly income at or below 130% of the poverty line and unemployment. Students can receive benefits if they are enrolled in an institute of higher learning more than "half-time," work less than 20 hours a week, and receive financial aid or cash assistance. Ultimately, the goals of SNAP are to "improve food security among low-income households, reduce hunger, and increase access to a healthful diet" (Hoynes, et. al., 2019). Though being implemented as a statewide initiative, the CalFresh Healthy Living (CFHL) program is California's SNAP program in that it "provides monthly benefits to assist low-income households in purchasing the food they need to maintain adequate nutrition levels" (CalFresh, n.d.). CalFresh is federally mandated and is only available in California. It is a state-supervised and county-operated program, whereas SNAP operates on a national and federal level. CalFresh uses an evidence-based curriculum and is required to follow the Dietary Guidelines for Americans (DGA) when providing nutrition education.

Santa Clara County is situated in the southern part of the San Francisco Bay Area. It is the most populous county in the Bay Area and is home to many of the world's leading technology companies. The county has a rich history of immigration and a diverse population with a wide range of cultural backgrounds, perspectives, and experiences. Santa Clara County is the sixth most populous county in California with a population of 1,932,022 as of the 2021 American Community Survey (Cubit, 2022). According to the U.S. Census Bureau, the median household income is \$140,258 compared to California's average of \$84,097. As of 202, 10,082 individuals are unhoused in Santa Clara County, with 25% of respondents citing a loss of employment for their housing status.

The Santa Clara County Public Health Department (SCCPHD) seeks to find which organizations are providing nutrition and garden education programs throughout the county and if they are following evidence-based dietary guidelines. One educational program is the Supplemental Nutrition Assistance Program-Education (SNAP-Ed). CFHL uses an evidence-based curriculum and is required to follow the Dietary Guidelines for Americans. SCCPHD follows SNAP-Ed guidelines for determining whether a curriculum is evidence-based or not.

Although SNAP is an extremely extensive program, malnutrition is still prevalent within low-income communities due to an inability to access fresh, nutritious foods (Manjulatha et. al., 2013). In 2014, SCCPHD found that just 18% of adults reported eating five or more servings of fruits and vegetables the previous day. Lack of access to these foods couples with insufficient education about how to obtain food that aligns with a healthy lifestyle. In Santa Clara County, SCCPHD found that in 2014, 65% of Latinx adults reported that they could "often" or "always" find high-quality, affordable produce in their neighborhood, while 90% of white residents could. It has been found that nutrition is taught in some schools, but is largely neglected by

schoolteachers and school curricula due to factors such as instructional time barriers and unrelated subject matter (Jones & Zidenberg-Cherr, 2015).

Evidence-based nutrition education is a way of learning that is designed to encourage healthy eating habits, food choices, and other nutrition-related behavior. Nutrition education works best when it is grounded in collaborative partnerships between the organizations that teach it and the community they serve. This is necessary to meet the specific needs of underserved populations using evidence-based and culturally responsive approaches (Leng et. al., 2021). In addition, garden education creates opportunities for people to learn about food systems and agriculture while providing a communal space in which people may increase their nutritional and environmental awareness and develop vital life skills. Community gardens have led participants to consume more fruits and vegetables, and become more likely to participate in civic relationships and events (Hume et. al., 2022).

Through encouraging more appropriate protein portions as well as increasing fruit and vegetable consumption, the DGA nutrition education funded by CFHL aims to reduce environmental impacts including decreasing land use pressure and greenhouse gas emissions. For example, while animal production accounts for 12% of all ground and surface water used for irrigation, a plant-based diet may have the greatest potential for reduced global water consumption while also being more energy efficient in terms of land use, transportation, packaging, and distribution (Chai, et.al., 2019). While not inherently striving for vegetarian or vegan diets in their programs, by encouraging vegetable and fruit consumption, CFHL helps to lessen these negative environmental impacts resulting from our dietary habits.

SCCPHD is one of four organizations in the county operating CFHL. However, SCCPHD is largely unaware of other organizations throughout the county that may be implementing different nutrition and garden education services that do not follow an evidence-based curriculum. Additionally, SCCPHD is unclear if programs sufficiently meet the needs of the community they serve. **We aim to evaluate the current nutritional programs based on their educational guidelines, identify gaps in the programs, build a network of community organizations that share a common vision, and make informed recommendations to SCCPHD based on our findings.**

Partner Organization

We are a team of students in a senior capstone class in Santa Clara University's Department of Environmental Studies and Sciences that has partnered with the Santa Clara County Public Health Department (SCCPHD). SCCPHD is one of four organizations in the county operating the CalFresh Healthy Living (CFHL) program. The organizations in the county are uninformed of what education their neighboring programs are offering to their community. Connecting these organizations would allow them to learn from one another on how to better address the county's needs and share lesson plans, guidance, and other resources. Furthermore, SCCPHD is unsure who these organizations may be serving and what curriculum each follows in order to provide education about these topics. Additionally, SCCPHD is also unclear if said curricula are following evidence-based practices that reduce environmental impact and/ or sufficiently meet the needs of the community they serve.

Our main partner is Celeste Cordeiro-Vera. She is part of the Public Health Department CalFresh Healthy Living Program. Celeste has also facilitated coordination with Joanne Seavey and Jennifer Gacutan. SCCPHD is ultimately seeking to find other educational programs that exist in the county and what curriculum they are following, as well as the accessibility, audience,

and aid of each. The overall goal of our project is to critically evaluate existing gaps in nutritional and garden education programs in Santa Clara County.

There are several gaps regarding the role of the county and public health support for food systems. The main gap is the lack of coordination and integration between the different divisions involved in food systems. There is a need for greater collaboration and communication between farmers, public health officials, and other stakeholders in the industry. This would ensure that the food produced is safe, healthy, and available to the whole county. There are also relevant gaps in research and data on the links between food systems and public health outcomes, such as chronic disease and food insecurity.

Research Questions

We aim to evaluate the current programs based on their nutritional and environmental guidelines, identify gaps, build a network of community programs that share a common vision, and make informed recommendations based on our findings.

1. To what extent are programs in SCC following evidence-based curricula?
2. Are these programs sufficiently accessible to their targeted communities?
3. How can the Santa Clara County Public Health Department build a network of community organizations in order to expand and improve garden and nutrition education programs?

According to the list provided by SCCPHD, nine organizations were confirmed to provide garden education services and seventeen provide nutrition education throughout Santa Clara County. We are expecting to find at least that number within the list of 37. We will test their qualifications based on the code sheet additionally provided to us by SCCPHD.

It is also expected that through interviews and previous research, we will be able to discover if these programs are following a specific curriculum, if they have created their own curriculum, or if they follow any curriculum at all. It is anticipated the majority of programs will be following a specific curriculum which we will then analyze to determine if they are evidence-based according to SNAP guidelines. A second analysis will compare the curriculum to our set standards. Additionally, it is expected that these programs have a specific target population and many will have a specific focus on those communities most at risk for food insecurity. Similarly, it is anticipated that there will be gaps in the education services these programs are providing and what the community expects in not only their curriculum but also in terms of the accessibility of the program. Finally, we expect to find minimal communication between the current garden and nutrition education programs in the county, and through our involvement with these organizations, we will be able to create a network with a shared mission for food justice.

Literature Review

This literature review will integrate findings from previous studies on the topic of nutrition and garden education and their effects. It aims to provide a synopsis of existing literature in this field, and is organized into five sections: nutrition education, garden education, climate education, chronic disease, and food security. Nutrition and garden education is integral to a healthy society and climate. Optimal nutrition education is taught both in and out of schools, accompanied by garden education so that participants will be taught about food systems, healthy

eating, and environmental awareness. Proper education in these spaces has the potential to slow climate change, decrease the amount of chronic disease present in a community, and increase food security.

Nutrition Education

Nutrition education is a way of learning that is designed to encourage healthy eating habits, food choices, and nutrition-related behavior. Nutrition education works best when it is grounded in collaborative partnerships between the organizations that teach it and the community they serve. This is necessary to meet the specific needs of underserved populations using evidence-based and culturally responsive approaches (Leng et. al., 2021). Cultural sensitivity is also beneficial to proper nutrition education, as certain communities have higher risks for certain diseases or health outcomes, or have different abilities to access healthy foods. Lastly, collaborative partnerships between university researchers and community organizations are necessary to meet the specific needs of underserved populations using evidence-based and culturally responsive methods. More of these partnerships are needed to develop and evaluate effective nutrition education interventions for these populations, as well as more literature to identify the strengths and challenges of these relationships (Leng et. al., 2021).

Many teachers are unaware of the nutrition education available to them. Interventions such as targeted nutrition education must be facilitated by school staff and guardians, in actions such as school lunch offerings and options in vending machines (Meiklejohn et. al., 2016). In addition, teachers could further broaden their teachings with the inclusion of community gardens and other resources (Jones & Zidenberg-Cherr, 2015). For example, programs can be used to improve knowledge of proper nutrition and willingness to consume fruits and vegetables, as well as decrease BMIs in schoolchildren when paired with garden learning (Scherr et. al., 2017).

Throughout the current literature, gaps exist in regard to location and usage. Nutrition education, including the environmental impacts of food, in Santa Clara County, has not been studied across both public health and independent nonprofit organizations. In addition, the organizations that we will be interviewing exist outside of regular schooling and are available to adults.

Garden Education

Garden education creates opportunities for people to learn about food systems and agriculture, while also often providing a communal space in which people may increase not only their nutritional and environmental awareness but also develop various vital life skills.

Community gardens have led participants to not only consume more fruits and vegetables but also become more likely to participate in civic relationships and events (Hume et. al., 2022). Additionally, participants also tend to become more knowledgeable about harvesting and preparing produce aligned with their personal and cultural preferences, often affirming their identity and fostering a sense of belonging. After incorporating various educational aspects into garden programs, such as highlighting the importance of vitamins and minerals, backyard gardens in India were also seen to increase the consumption of nutritious foods per household as well as provide another source of reliable income, improving these participants' overall well-being and autonomy (Manjulatha et. al., 2013). While providing promising results, it is not understood if the researchers of this specific study based their education materials on an evidence-based curriculum which is a recurring issue in garden education programs. Further, while other models, such as the Garden Resources, Education, and Environment Nexus (GREEN) tool, use evidence-based practices to understand how to successfully establish,

integrate, and sustain gardens into school curriculums, the applicability for this framework in other settings, like community gardens, is unknown and could be expanded upon (Burt & Koch, 2017). The importance of utilizing the school administration, teachers, garden coordinators, students, and parent volunteers were also highlighted in learning to sustain these school gardens (Hazzard, E. L. et. al., 2011).

Overall, despite these spaces providing opportunities for teaching demonstrations, exchanging of information, and self-directed learning, it appears there are gaps in the understanding and availability of evidence-based curriculums in gardens outside of schools. As gardens provide a communal space for cognitive, emotional, and physical learning, a review of how evidence-based garden education is currently being implemented throughout the county would be advantageous for improving the availability of environmental, nutritional, and general health education (Walter, 2013).

Climate and Chronic Disease Considerations

Little is currently known about how climate considerations are incorporated into nutrition programming. This is important information because climate information has the potential to assist in targeting at-risk populations, in terms of this study it would be those with a chronic disease and/or increasing climate disturbances. A study done in 2022 proposed a roadmap for the development of nutrition and climate education programs (Nissan et. al., 2022). This included research aimed at understanding the ways in which climate influences diet, identifying entry points for the inclusion of climate information in the decision-making process of nutrition programs, and training public health officials with the knowledge and motivation to comfortably incorporate climate resilience into nutrition education programs. It is key to further fill the gaps in this knowledge to better comprehend climates' influence on nutrition education programs.

Chronic disease is another nutrition-related concept. It is a condition that lasts more than a year, requires ongoing medical attention, and limits daily living activities. Common chronic diseases include diabetes, obesity, heart disease, and cancer. Important disparities in diets and nutrition-related diseases persist. Those with a low socioeconomic status suffer greatly from a lower intake of healthy foods contributing to a poor diet. They are also at a higher risk of becoming obese or contracting another chronic health condition (Seguin et. al., 2017). Adults with diabetes can have hypoglycemic reactions, a serious medical event where the individual experiences blurred vision, anxiety, agitation, and even in severe cases may fall into a coma or have a seizure, due to an inability to afford food (Laira, 2013). Supplemental Security Income (SSI) is a program administered by Social Security that pays benefits to disabled individuals, those with a chronic disease often fall under this criteria. Up until June 2019, SSI beneficiaries were unable to receive SNAP benefits. A study was conducted following the implementation of this rule and found that SNAP uptake rates were very high and programs that support adults with disabilities to enroll in SNAP benefits actively improve health outcomes (Wang et. al., 2021). This is critical information because it showcases that the administration of garden and nutrition education programs can positively impact the lives of those with chronic diseases. There is an even greater impact when these organizations are targeting those with chronic conditions.

Food Security

Understanding food security is a relevant and growing priority as many suffer from food insecurity or a lack of consistent access to enough food for every person in a household to live an active, healthy life (USDA). There are many approaches to combat food insecurity on the

federal, state, and local level so we sought to investigate the key findings of research regarding these kinds of programs. Nationally, Supplemental Security Income like Supplemental Nutrition Assistance Program Education (SNAP-Ed) program is proven an effective way to improve food insecurity (Rivera, et al., 2019). In California specifically, evidence from surveys suggests that SNAP reduces food insecurity and makes recipients less likely to use free food programs (Wang, et al., 2021). In Santa Clara County, Community Food Security (CFS) programs (specifically urban gardens) were shown to produce enough organically grown vegetables to fulfill the federal nutritional recommended amount for one adult's daily cups of vegetables (Diekmann, et al., 2018). Furthermore, the urban garden Community Food Programs increased access to healthier food they couldn't have afforded to purchase at a store (Diekmann, et al., 2018).

While the existing literature provided us with insights into the current relationship between relevant government food assistance programs and food insecurity, there is still research to be done to better understand the content and delivery of nutrition and garden-based education. A majority of the literature reviews how larger Supplemental Security Income (SSI) plays a role in addressing food insecurity but fails to directly focus on and evaluate smaller-scale mission-driven food pantry programs that are not related to SSI. This is a gap in the research that we hope to investigate in our project as some of the community partners in SCC are not affiliated with SNAP. Another notable gap in the existing literature is a critical examination and synthesis of the best methods to combat food insecurity using food waste. Understanding the relationship between food insecurity and food waste is an important aspect of combating food security in densely populated urban settings like Santa Clara County moving forward.

Synthesis

The literature review provided us with credible and vital information for our examination of garden and nutritional programs in Santa Clara County. Our analysis of existing literature surrounding food security, chronic disease, climate education, garden education, and nutritional education provided a significant and extensive background for our research. Literature focused on nutrition education suggested that nutrition is under-taught in schools for a variety of reasons, such as the difficulty of meeting the needs of underserved populations through evidence-based and culturally responsive methods (Leng et. al., 2021). It also suggested that nutrition education grounded in collaborative partnerships is proven to be successful. The review of garden program literature suggests that teachers could fill out their curricula with the inclusion of community gardens (Jones & Zidenberg-Cherr, 2015). These garden programs, if and when they exist, help lead to a deeper understanding of environmental issues and positive change in consumption habits and levels of civic engagement (Hume et. al., 2022). Additionally, our literature revealed that there is a significant lack of research surrounding relevant climate education programs. Furthermore, the literature surrounding chronic disease complements the understanding that SNAP benefits and the administration of garden and nutrition education programs can positively impact the lives of those with chronic disease (Wang et. al., 2021). Finally, various levels of government can help facilitate programs to improve food insecurity in places like Santa Clara County (Wang, et al., 2021; Diekmann, et al., 2018). All of these findings are significant in their own right, but more importantly, they work in conjunction with one another to help us paint a clearer picture of the issue and location we are addressing as researchers in this project.

There are gaps within this literature. Further research is needed to better understand the most effective methods for using food waste management strategies to address food insecurity. More data is also required to fully comprehend how nutrition education and garden programs can

be optimized to confront the unique challenges posed by different climates, communities, and environmental contexts. **Contrary to previous research, this includes small-scale, mission-focused nonprofits.**

Our primary research question encompasses all of the topics we have discussed in the literature review in some way. Each aspect of the literature review focused on a relevant issue as it relates to our research goal of evaluating the current nutrition and garden-based educational programs based on nutritional and environmental guidelines, identifying gaps in the current programs, building a network of community programs who share a common vision, and making informed recommendations based on our findings. Many of the sources helped us identify existing and potential gaps across programs and within them. Each section of the literature review serves to connect the broader theme of our study due to the complex and interpersonal nature of garden and nutritional programs in places like Santa Clara County. Moving forward we will incorporate and look back on our literature review to help guide us in making a strong project guided around central themes.

Methods

This study uses exploratory and participatory mixed methods and data sources to evaluate garden and nutrition education programs in Santa Clara County. Santa Clara County is at the heart of Silicon Valley, which is home to many startup and global technology companies. The concentration of wealth in the county is mostly due to this technology industry making it the most affluent county on the West Coast of the United States. Although there are many wealthy individuals in the area, there are residents from each socioeconomic standing, including a large homeless population. This contextualizes Santa Clara County as a place of wealth inequality among a large population. Having established the county's reputation as a region plagued by wealth disparities, it is pertinent to explore approaches towards scrutinizing garden and nutrition initiatives in this area. Given this context, we devised methods to examine garden and nutritional programs in Santa Clara County.

Given the demographics of Santa Clara County's population, we examined various food measurements pertaining to garden and nutrition education programs. This was done by using multiple government data sources. Aside from the literature review, we gathered quantitative data from Feeding America, SNAP, Santa Clara County, and The GREEN Tool amongst other sources to paint a clear picture of the provided programs in the area. This part of our methods focused on contextualizing various key metrics of food education programs prior to qualitative data collection so we could better interpret our findings.

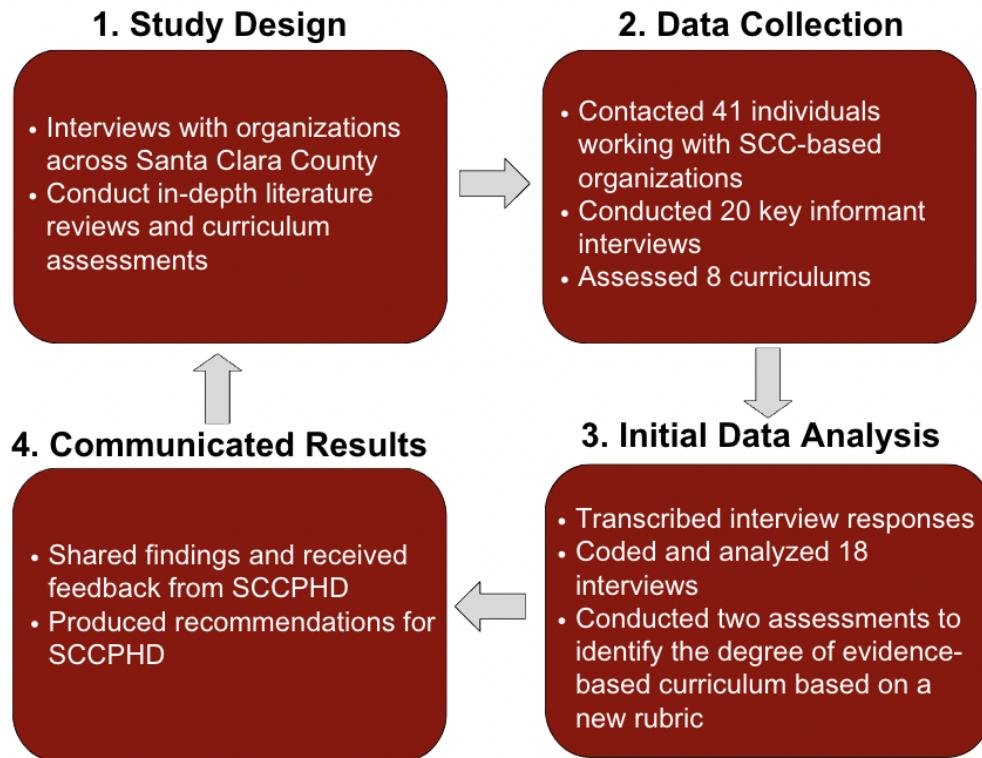


Figure #1: Conceptual Diagram of Mixed Methods Approach.

Informant Interviews

To evaluate the extent to which nutrition and garden education programs in SCC are following evidence-based guidelines, we conducted key informant interviews with community partners who provide nutrition and garden education in Santa Clara County. We obtained our interviewees based on a list given to us by the Santa Clara Public Health Department. These interviewees are employees of various other organizations operating throughout the county. The majority of these interviews were conducted over Zoom. Before beginning the interview, we received informed consent from each of our participants. Participants were aware that they could opt out of the interview at any time. The interviews were recorded and uploaded to our shared Google Drive and deleted from our devices. We then transcribed these interviews for subsequent data analysis and coding throughout our report. The purpose of these interviews was to gain insight into the content that is being taught and presented in other programs. These questions were open-ended to allow these individuals to expand on their experiences and give us all the relevant information we need. To determine accessibility to targeted communities, the questions focused on understanding the organization—programs offered, communities served, and curriculum basis. On average, the interviews lasted 18 minutes and 43 each. We obtained these interviewees through an introduction email with our community partner, followed by an email from our team discussing our study and asking these organizations to participate.

Qualitative Coding and Data Analysis

We developed a code sheet and then analyzed reports, websites, and interview transcripts to assess the degree to which each curriculum is evidence-based. We utilized the SNAP-Ed Checklist for Evidence-Based Approaches as our guide. These findings will allow the SCCPHD

to view what gaps are present in the curriculum as well as what their clients want further education on. This information can be used to implement stronger and more effective nutrition and garden education programs. We compiled this data into an organized list of each program and what they offer, creating a network of community partners. This network, along with our analysis and recommendations, will be given to the SCCPHD and our community partners.

The code sheet includes eight categories, including age, modality, price, population income, population race, program location, whether it aligns with SNAP Evidence-Based guidelines, and our ruling on the evidence presented based on an additional approaches guideline that we created. These codes define data surrounding demographics to help support data visualized in the GIS maps.

Table #1: Coding Themes Defined and Described.

Code	Definition
Language	Which language(s) is the program offered in? If language is an aspect of the organization (ie signage or website features in other languages) outside of programming, make a note of this.
Age	What age group(s) does the program/organization serve? Mentions of the target audience and attendees in the interview should go here.
Modality	Are the programs offered in person, online, or in a hybrid format (if so to what extent is the hybrid program offered)?
Price	Is there a price associated with participation in the program? If so, what is the price to participate?
Population Income	Is there a particular income level required or preferred for members of the community to participate in the program?
Population Race	What racial group(s) does the program serve? Mentions of the target audience and attendees in the interview should go here.
Program Location	Where is the program headquarters? Where are program sites located?

Evidence-Based	Does it follow SNAP evidence-based guidelines?
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We created a new rubric based on the SNAP-Ed requirements for evidence-based programs to assess the different programs. The SNAP-Ed requirements are not flexible enough for participatory programming because many of the organizations interviewed for this study are deeply rooted in constituent feedback. Therefore, we believe a more specific and redefined classification of programs is necessary. We developed a revised evidence-based assessment based on the SNAP-Ed Checklist for Evidence-Based Approaches to include new definitions and standards for more accurate categorization. A revised and more comprehensive guide is a valuable resource for the growing network of programs as a tool by which programs can be evaluated. We first assessed programs using the SNAP-Ed requirements, and then with our revised evidence-based curricula assessment.

Table #2: Revised Evidence-Based Approaches Defined and Described.

Evidence-Based Approaches	Description
Peer-reviewed	This category is the highest level of evidence-based programming. Such programming is explicitly approved by and held to the standard of certain widely accepted scientific standards and government agencies. This includes basing teachings on scientific journals and from a limited list of government agency-approved curricula.
Field-tested	This category is based on research and experiences from program organizers and participants in the field. Materials such as best practices, innovative technology or teachings, and case studies that have shown positive results are classified in this category.
Research-Informed	This category includes programs that are led by qualified and accredited individuals in their fields without strictly basing curricula on any specific government-approved guidelines.

Source: Modified from SNAP-Ed Checklist for Evidence-Based Approaches.

We first assessed programs with a rapid scan based solely on interviews. **Next, we conducted a rapid scan of curricula without a full view of all of them due to time restrictions.** In our first scan, we assessed the curriculum according to the SCCPHD and SNAP-Ed curriculum guidelines. In our second scan, we applied our own rubric and evidence-based scale. There is room for improvement with this approach as we were not given every piece of the curriculum. We also did not witness the curricula in practice.

While we believe that the SNAP-Ed evidence-based program and practice requirements have relevant evaluation criteria, a more specific and redefined classification of programs is beneficial for our purposes and would be helpful for future research. These new definitions and standards seek to provide relevant definitions for programs addressing public health and nutrition education in Santa Clara County. We believe a new comprehensive guide could be a valuable resource for the growing network of programs. This rubric is a tool by which programs can evaluate themselves for the reference and betterment of the public health sphere.

Secondary Data and Quantitative Analysis

Secondary data was collected throughout our research project to supplement our initial data analysis and to provide a clearer picture of our study location. This data included program websites, curriculum, and census data. Often, interviewees redirected the research team to the website of their organization for supplemental information regarding their garden or nutrition programs. Additionally, the curriculum or lesson plans were also often posted on these websites and available for free. We conducted a review of these sources to obtain a deeper understanding of the types of programs these organizations were offering and how they were being implemented.

Additionally, interviewees often shared resources, such as their specific curricula, with our research team. Follow-up emails were sent after the interviews in order to receive these resources and to thank individuals for participating. Interviewees were reminded that any materials sent to our team would remain confidential. These resources were vital in understanding the scientific validity of the education services being provided to the community and were specifically useful in determining the degree to which their curriculum was evidence-based. The Santa Clara County Public Health department can use this data, along with everything aforementioned, to begin building a network of nutrition and garden education services in the county.

Finally, data from the American Community Survey (ACS) was primarily used to visualize demographic information throughout Santa Clara County. The ACS is a demographic survey conducted by the U.S. Census Bureau and includes variables including household income, household size, language, education levels, health insurance coverage, and more. Using RStudio, variables from the 2021 and 2022 ACS were visualized in map format to better understand the demographics of the population in Santa Clara County. More specifically, these maps are vital in visualizing any disparities among the population and in specifying any geographic areas that may require more resources. The variables studied include the median income, the percentage of the population speaking English less than ‘very well’, and the percentage of the population utilizing SNAP benefits. Ultimately, this secondary data helps to assess if the nutrition and garden education programs provided in Santa Clara County are addressing the needs of their targeted population, as well as visualizing any potential gaps in the available programs.

Results/ Findings

Upon completion of both qualitative and quantitative data collection, we were able to synthesize key findings that addressed our original research questions. Our first research question was: “To what extent are nutrition and garden education programs in SCC following evidence-based curricula?” Based on our semi-structured interviews and in-depth curriculum

assessment, we found that **only 5 out of 18 programs could be defined as using Evidence-Based Curriculum according to USDA Governments Standards**. The results of Assessment 1 are visualized below in Figure #2.

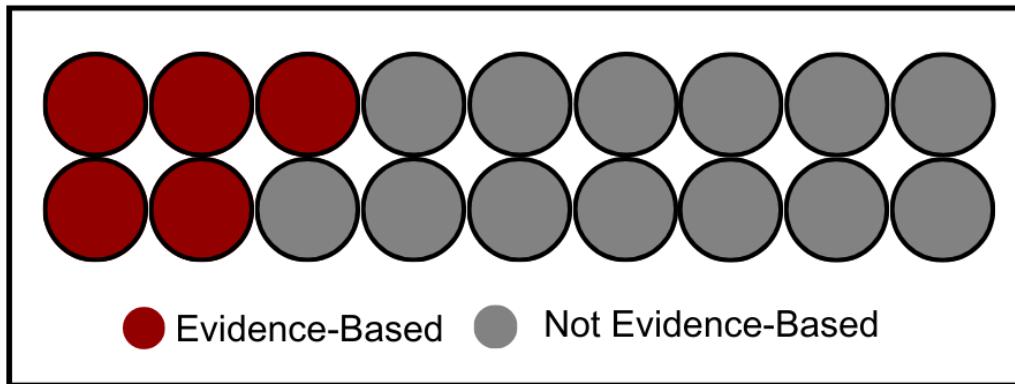


Figure #2: Education programs that meet SNAP standards in Santa Clara County based on Assessment 1.

Figure #2 indicates that only 27.77% of the current education programs meet the USDA and SNAP-Ed requirements for evidence-based curriculum. However, our second curriculum assessment with redefined guidelines provided more specific results describing to what extent programs in Santa Clara County are evidence-based. Assessment 2, visualized in Figure #3, provides a more in-depth analysis of the type of evidence-based approach each program employs rather than simply indicating whether or not it meets SNAP-ed requirements. Each curriculum category was defined by specific characteristics (see Table #2: Revised Evidence-Based Approaches for more information).

The revised curriculum assessment was designed to be clear and unambiguous regarding the criteria for each category. Despite this, specific programs could have been placed in another category based on certain factors. For example, a peer-reviewed curriculum may be led by a qualified and distinguished educator (one major criterion for curriculums defined as research-informed) but would still be defined as peer-reviewed if they employ specific and government-approved curricula in their programming. Additionally, field-tested programs may employ best practices and methods deemed successful by participants or instructors. However, if these methods are not explicitly defined as meeting the requirements set forth by government guidelines then the program would not qualify as peer-reviewed. This distinction between peer-reviewed and field-tested is particularly applicable to garden programs as many garden programs do not rely on specific government-approved curricula but rather on the knowledge of the instructor. As a result, there is an overlap between garden education programs that meet the field-tested curriculum requirements and why field-tested is situated between the peer-reviewed level and research-informed level on the rubric.

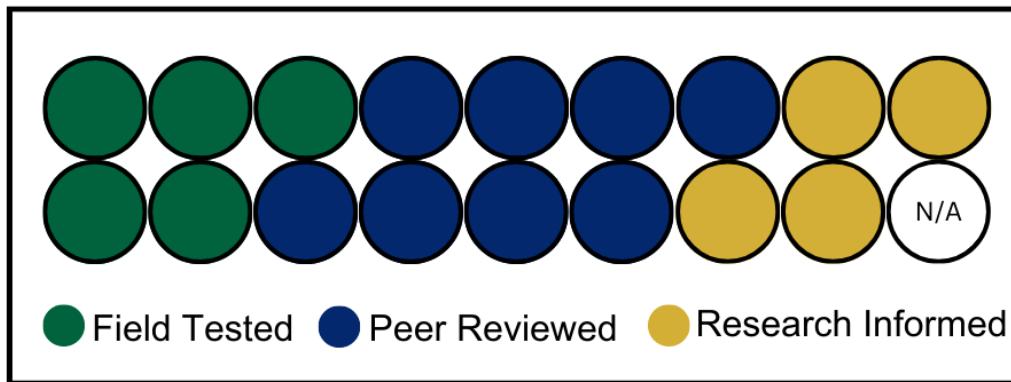


Figure #3: Education programs that meet revised researcher standards in Santa Clara County based on Assessment 2.

The second assessment based on the revised curriculum provided clear results. **Figure #3 indicates that 8 out of 18 (44.44%) met the requirements for the peer-reviewed criteria.** Additionally, 5 of 18 (27.77%) were best defined as field-tested with another 5 of 18 (27.77%) being best defined as research-informed. Additionally, 1 of the 18 programs did not fit into any of the new categories for evidence-based curriculum as it was a distribution network rather than an education program. Assessment 2 findings are also visualized in Figure #4 as a bar graph.

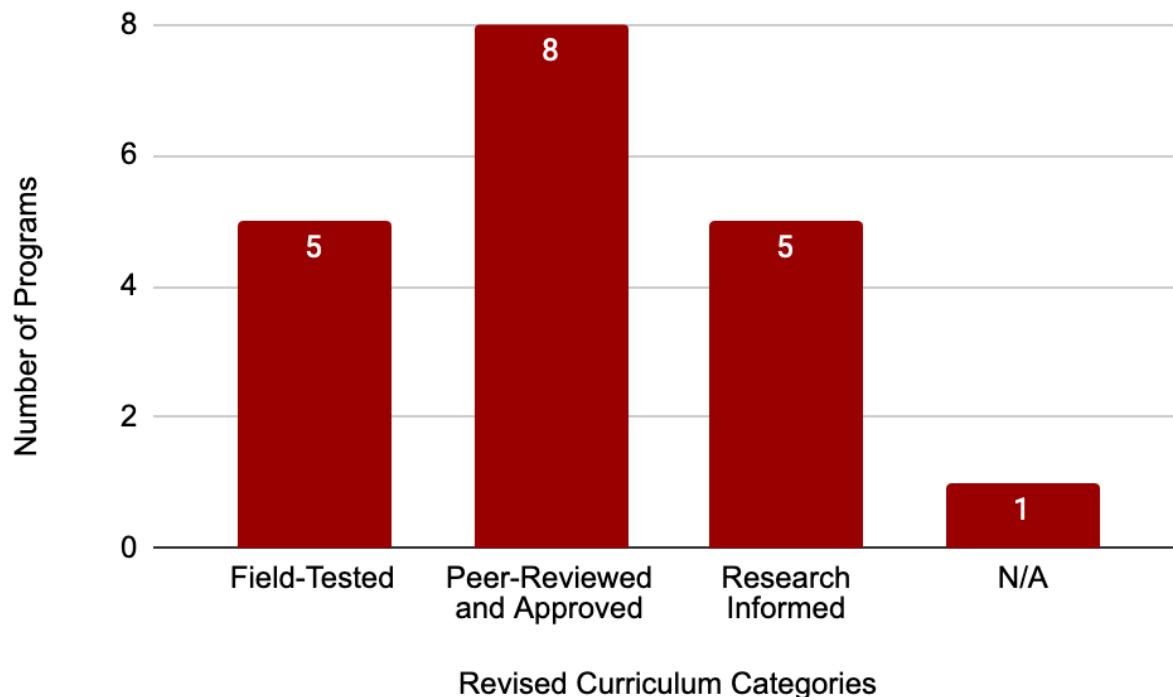


Figure #4: Education programs that meet revised researcher standards in Santa Clara County based on Assessment 2 visualized as a bar graph.

Another research question was, “Are these programs sufficiently accessible to their targeted communities?” As a result, we focused on gathering and visualizing relevant data regarding accessibility. One major aspect of program accessibility is whether programming is offered in person or online. Figure #5 helps visualize key findings regarding program modality. Most notably, 8 out of 18 programs (44.44%) offer exclusively in-person programming with an additional 6 out of 18 programs (33.33%) of programs offering an in-person option.

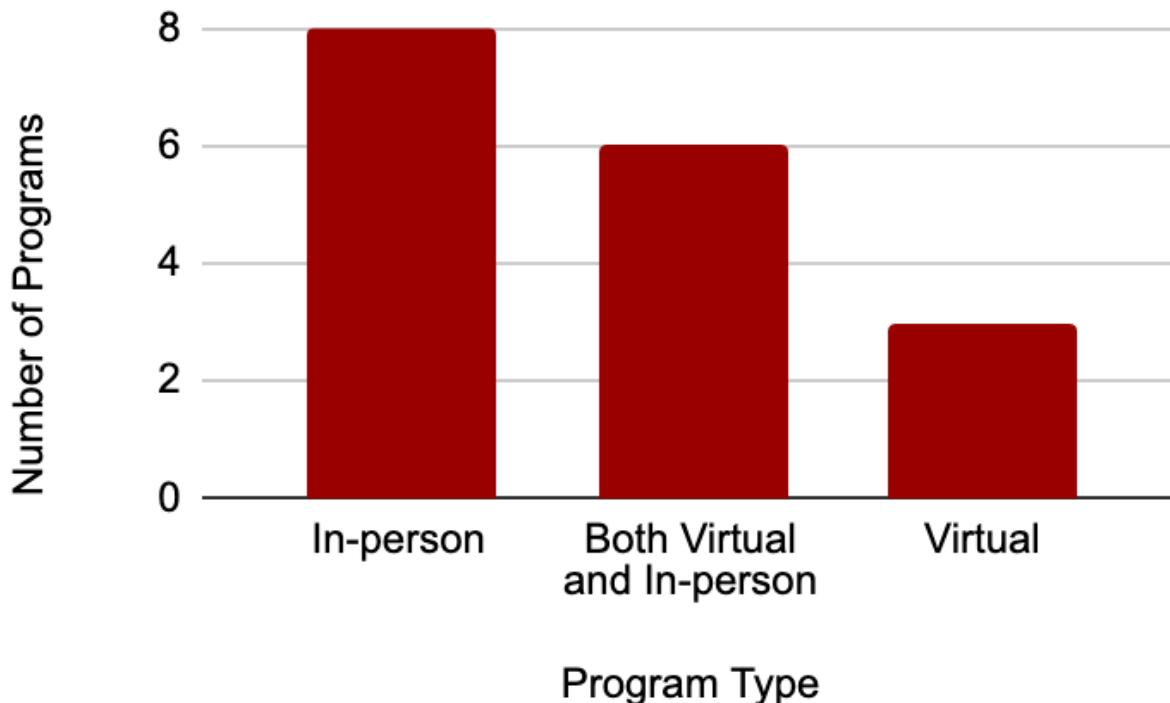


Figure #5: Count of modalities offered by organizations interviewed. Source: Interview data from key informants.

The interviews revealed that most organizations offer their programs in person. Key informants expressed that this was mainly attributed to the connection built with face-to-face communication. Some organizations demonstrated the need for in-person modality for events such as meal handouts or garden education. Organizations also found that it was more difficult to teach hands-on garden programs virtually because participants are not actively gardening together. The targeted communities of these programs explained that it was easier to learn when someone is engaging in person. Additionally, some participants do not always have access to the internet so virtual programs can create barriers. Those offering in-person and virtual programs usually held different events for each modality. The organizations described the relevancy of virtual learning during the pandemic, but they are now in the process of transitioning back to exclusively in-person programming. Notably, specific programs that dealt with immunocompromised or at-risk populations continue to meet virtually out of an abundance of caution for the ongoing public health crisis relating to COVID-19. One program did not provide education services, only activities such as grocery handouts.

Additionally, accessibility relates to potential financial barriers or requirements for program participation. Figure #6 indicates that 17 out of 18 programs were available at no cost to participants.

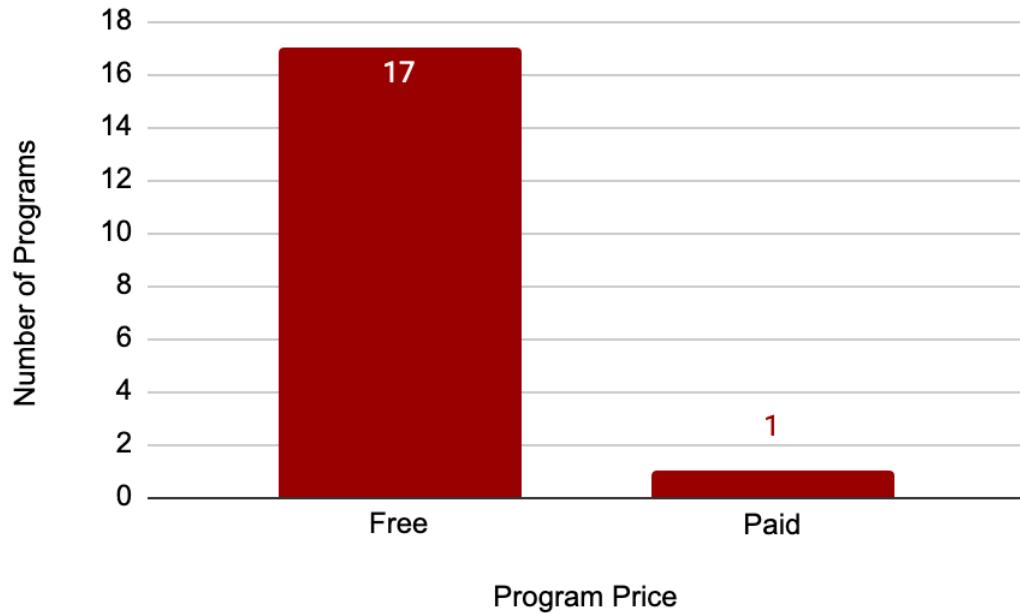


Figure #6: Number of free and paid programs. Source: Interview data from key informants.

All but one organization provides free programs. 94.4% of programs interviewed provide their services for free. Hidden Villa is a paid program that offers classes, workshops, and field trips for \$25.00 a person. Free programs are instructions and services that do not come at a cost to participants as these free services rely largely on government funding or in specific cases, college funding. The free programs provide access to educational tools and resources as well as access to public gardens and free meals. The ability to provide free services is important for these organizations as they usually serve low-income communities. Additionally, multiple interviews expressly revealed that their programs were only available to low-income families that met certain requirements such as a family income greater than 185% of the poverty line. While interview data was not explicitly clear about the extent to which programs targeted particular income levels for participants, at least 5 out of the 18 programs indicated that they primarily focus on low-income participants. Visualizing income levels throughout Santa Clara County is useful to identify potential gaps in the accessibility of these programs, as seen in Figure #7.

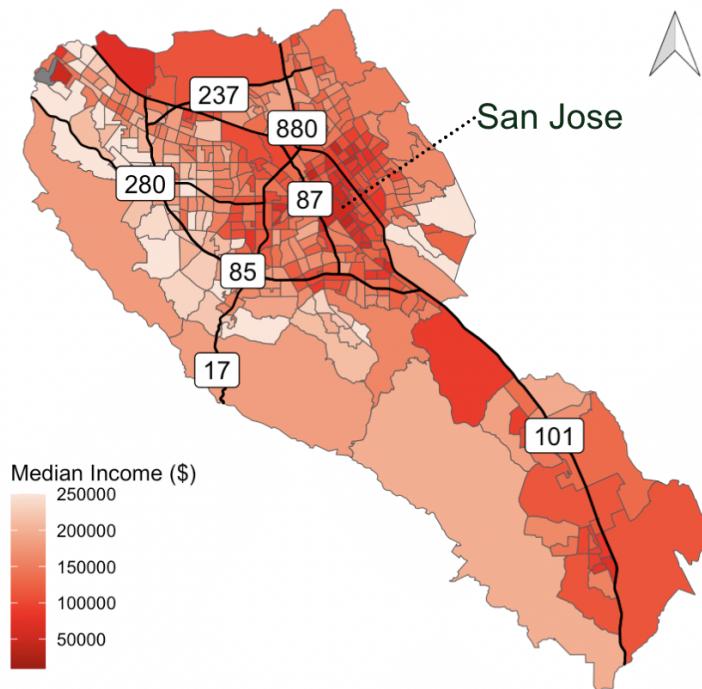


Figure #7. Median Income (\$). Source: 2021 1-year ACS, US Census Bureau.

Figure #7 displays a pattern in which the census tracts with the smallest median incomes tend to be located around San Jose, CA. In identifying geographic regions that may be more likely to utilize free or reduced associated costs for nutrition or gardening education programs, organizations throughout the county may focus resources to create financially accessible programs for certain populations. As income and ability to receive SNAP benefits are also related, the percent of the population receiving SNAP benefits is also visualized in Figure #8.

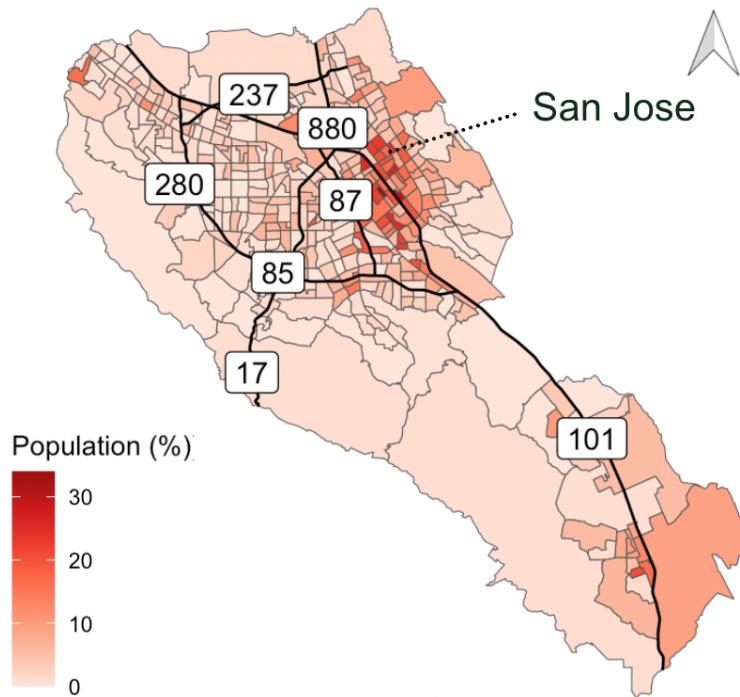


Figure #8. Percent of Population Receiving SNAP Benefits in 2021. Source: 2021 1-year ACS, US Census Bureau.

This map displays that the majority of the Santa Clara County population that uses SNAP is located in the San Jose area. This highlights a need for more accessible food programming, which may also include garden programming and displays that these communities should have access to nutrition education as well as food support.

Program accessibility may also be measured through the language of instruction. The shared language between educational materials and participants is an important component of ensuring understanding. Based on our interviews, curriculum evaluations, and coding we were able to visualize key language findings in Figure #9.

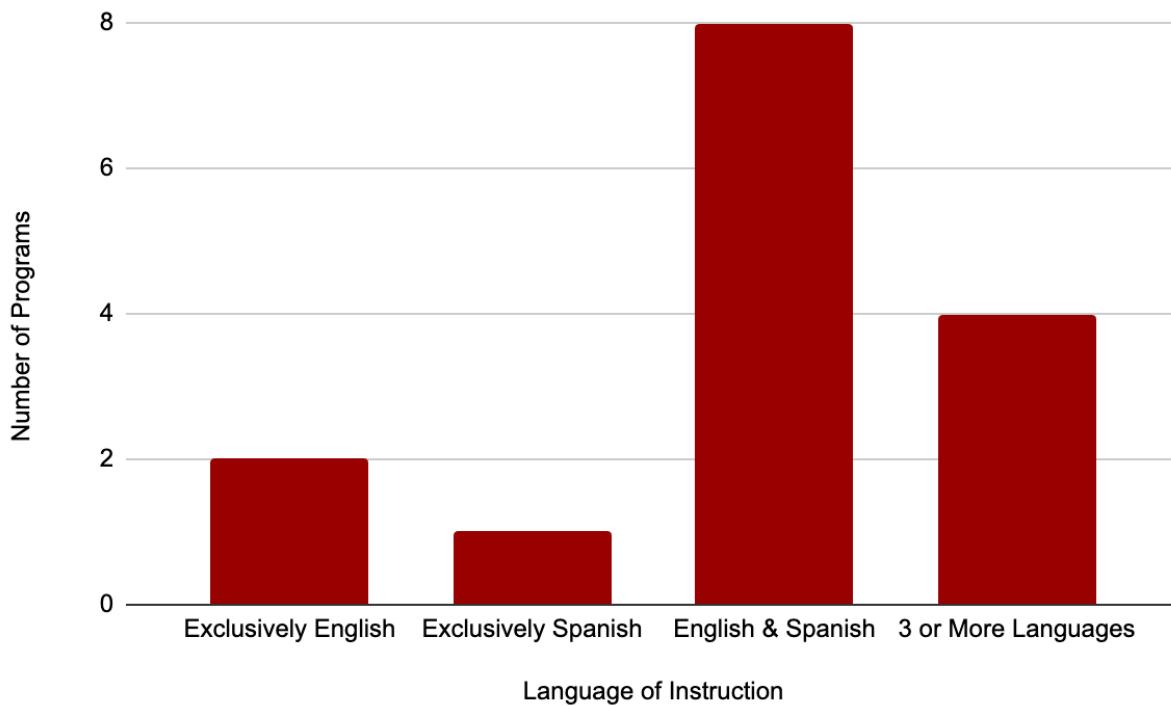


Figure #9: Number of programs educating in English, Spanish, and/or other languages.
Source: Interview data from key informants.

Figure #9 demonstrates the languages offered for spoken services. Some organizations offered written directions in other languages. A majority of organizations provide their services in both English and Spanish while 60% of garden programs are only taught in English. Instruction in both languages helps properly address the needs of the community. Vietnamese and Chinese are the next most prevalent languages offered. In addition, Amharic and Dari are offered by the SCCPHD. Additionally, an examination of the locations of programs and the language of instruction may further indicate gaps in accessibility. Figure #10 visualizes the spatial relationship of language ability in Santa Clara County.

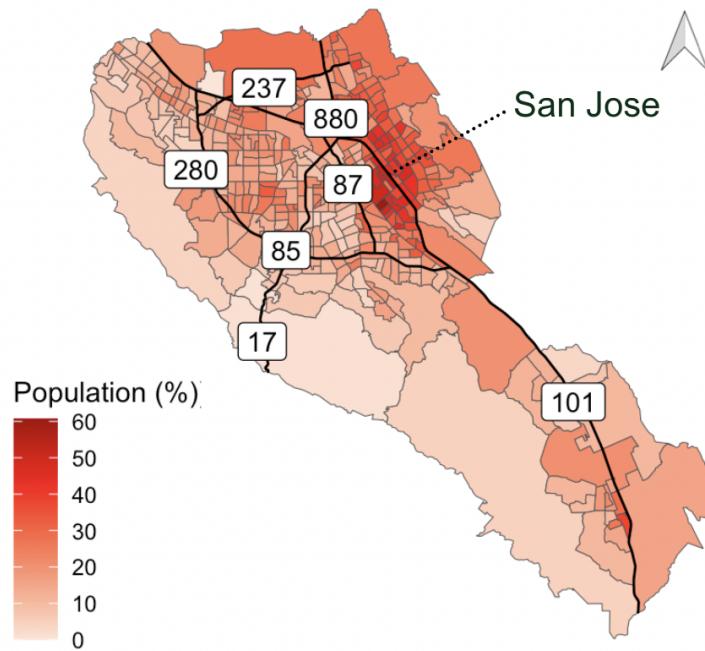


Figure #10. Percent of the Population Speaking English Less Than 'Very Well'. Source: 2021 1-year ACS, US Census Bureau.

This visualization may specifically help to address the question if these programs are sufficiently accessible to their targeted populations. This map shows the majority of the population who feel as though they speak English less than 'very well' are located primarily in the San Jose area. This is an important measurement as it displays a potential gap in which curriculums need to be offered in multiple languages to be sure they are meeting the specific needs of the community they intend to serve.

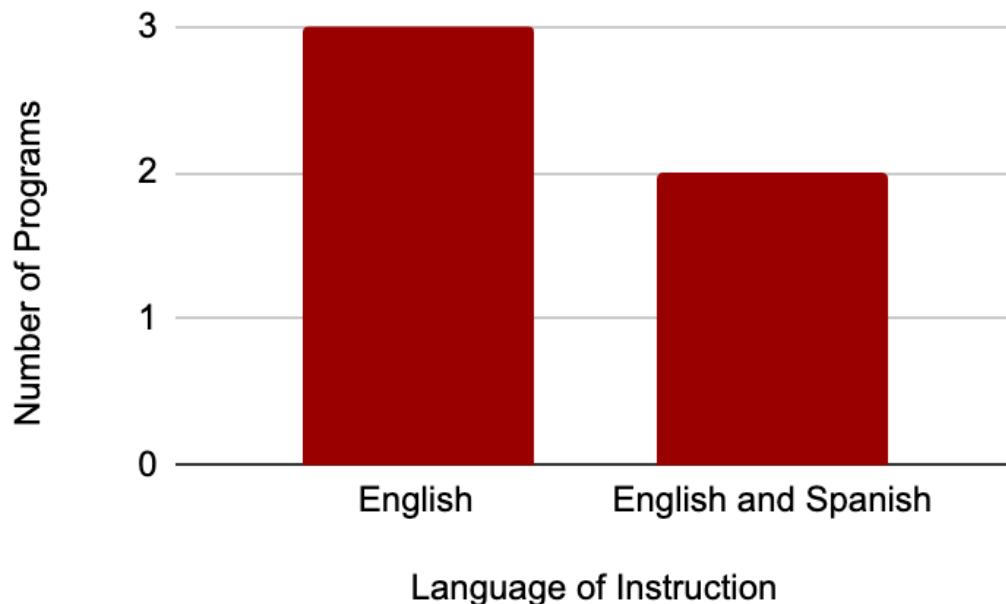


Figure #11: Languages offered for garden programs. Source: Interview data from key informants.

2 of the 5 garden organizations interviewed stated that they provide translation services into Spanish. Compared to the nutrition education programs, garden education is lacking in translation and language inclusivity. Nonetheless, it is noteworthy that some programs are working to improve language inclusivity by providing translators and more language translations on their signage. Specific improvements to signage and accessibility include the translation of garden signage into Vietnamese. Multiple garden programs expressed that additional improvements could include the translation of virtual resources such as events calendars to increase accessibility for non-English-speaking communities. This suggests the need for garden education programs in languages other than English and Spanish.

Program accessibility was also evaluated based on the age of the target audience. Given that the evaluated organizations are social programs, it is important to clearly highlight what age groups are being served and where gaps may exist. Specifically, Figure #12 highlights the primary target audience for each program based on age.

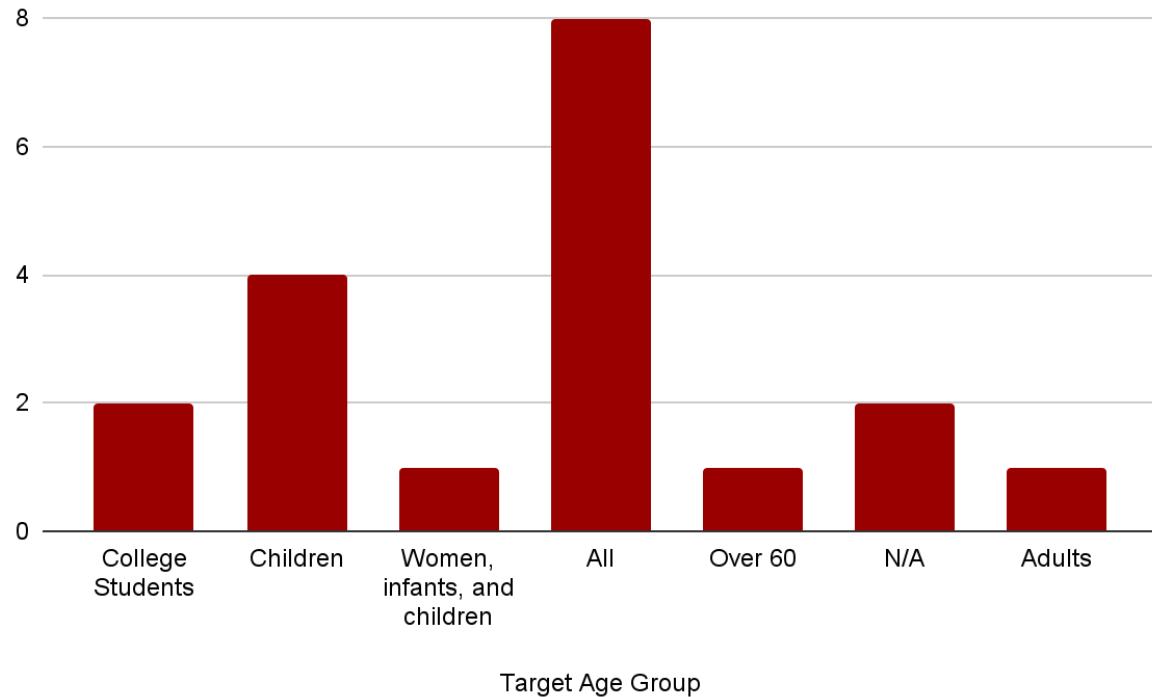


Figure #12: Targeted audience for nutrition and garden programs. Source: Interview data from key informants.

There was a vast array of communities targeted by nutrition and garden programs in SCC. The most frequent, with 7 programs, was the general population. These organizations do not have a specific audience they are reaching out to and are working to provide for the entire county. Several programs were based out of schools, making up the children's age group segments. Additionally, there was only one program that explicitly targeted individuals over the age of 60. The only programs that explicitly targeted college students were garden programs. Additionally, a specific evaluation of garden education programs showed that students (kindergarten through college) were the primary target audience.

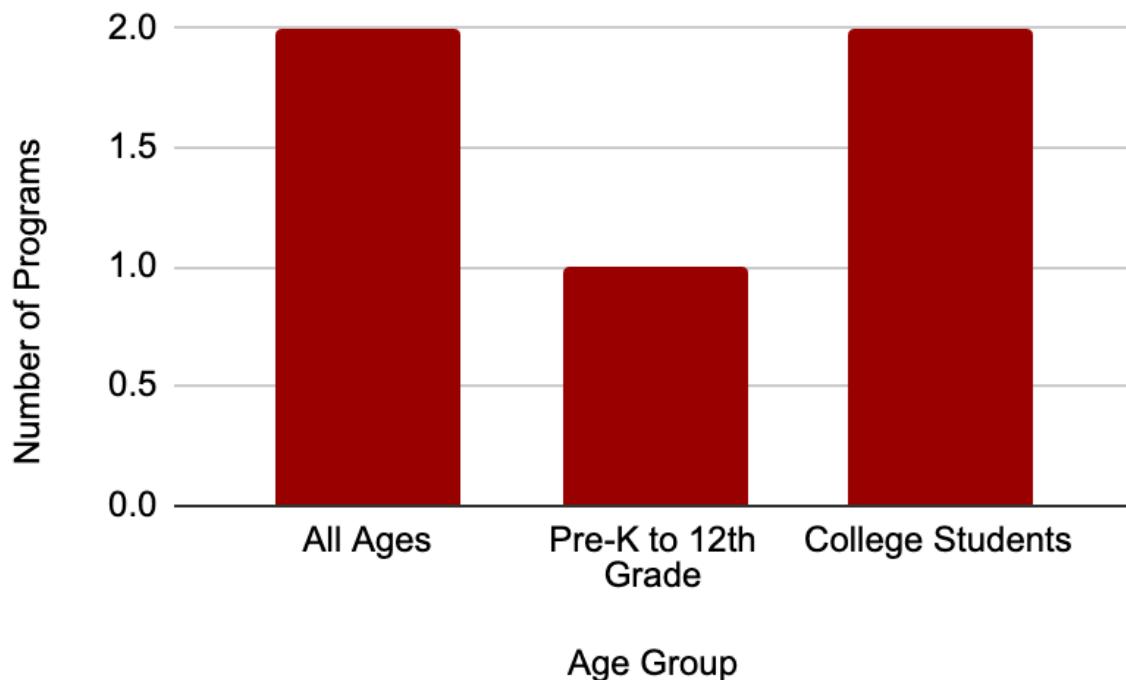


Figure #13: Targeted audience for garden programs. Source: Interview data from key informants.

The targeted audience for garden programs is quite diverse, and the programs serve many different ages. This indicates that there is not much of a gap in the current age groups being served. However, there is no garden program that focuses primarily on older adults and/or senior citizens. This could be beneficial to those who live alone and have less mobility, as garden education organizations could implement virtual, home-growing education programs. In addition, they could bring these community members to the garden and teach them there.



Figure #14: Most frequent themes derived from interviews conducted by team members in February and March 2023

Finally, the findings above help provide insights into existing gaps in the current nutrition and garden program landscape within Santa Clara County. Figure #13 also highlights overarching themes and ideas echoed by multiple interviewees. Most notably, 13 organizations found that a network of community organizations would be helpful while only 3 organizations explicitly provide information about other programs to their participants. This indicates enthusiasm for a network and a current lack of information sharing between programs. As a result of the key findings above, Santa Clara County Public Health Department will be better positioned to build a network of community organizations that can expand and improve garden and nutrition education programs.

Discussion

Originally, we anticipated that the majority of programs would be following a specific curriculum. Our results proved that most programs create their own curriculum based on community feedback and the knowledge of their team. Additionally, it was expected that these programs would have a specific target population, many with a focus on communities most at risk for food insecurity. Most organizations do have a target audience for their garden and nutrition education programs, but only a few of these focus on those most at risk for food insecurity, such as low-income families. Similarly, it was anticipated that there would be gaps in the education services these programs are providing and what the community expects in not only their curriculum but also in terms of accessibility. Several programs explained the want to provide outside resources for other education services in the county. The need for increased accessibility regarding language for programs in SCC was showcased in our graphs. It was also expected that minimal communication was occurring between garden and nutrition education programs in the county. This was correct as our research proved that there is a gap in communication between garden and nutrition education programs throughout SCC. Our involvement with SCCPHD and these organizations has assisted in the creation of a network with a shared mission for food justice.

There were several limitations of this study, the first being time constraints. We were conducting this research within a 10-week quarter but were given even less time due to the IRB approval process. If we were able to see curricula in action, we would be better equipped to judge them based on evidence-based guidelines. Instead, we had to take what the interviewees said at face value—if they forgot to mention something, for example, they could have been inputted into the wrong category. We were also unable to see every piece of the curriculum due to time and privacy limitations. Some organizations did not want to share their entire curriculum with us, and others simply did not have it and only gave us a piece. We also faced issues with time in terms of scheduling interviews and the participants' availability. In addition, several organizations did not wish to participate which limited our data collection. This creates gaps in results because the study is not reaching all organizations in the county.

Overall, it is clear that Santa Clara County could benefit from a more in-depth study on this topic. Nutrition education is extremely important to a healthy lifestyle, especially education that is evidence-based.

Conclusion and Recommendations

From our data collection methods and assessment, we found that the majority of the garden and nutrition education programs in SCC do not follow a set curriculum that abides by Evidence-Based SNAP-Ed guidelines. Often, organizations establish their own curriculum based on the knowledge of their team and the needs of the community. There are gaps within organizations as they wish they could offer more assistance to their community on other nutrition and garden education topics. This is due to a lack of funding and available resources as well as

limited communication between organizations. Organizations in the community are unaware of other nutrition and garden services available throughout the county.

From our data analysis, we recommend SCCPHD:

1. Uses a more dynamic set of criteria and categorization when assessing curricula, allowing for collaborative partnerships between organizations and constituents.

During our analysis of interviews and assessment of curricula using the SNAP-Ed Checklist for Evidence-Based Approaches, we identified deficiencies in the original checklist due to its strict nature and incongruence with community-based approaches. Most organizations we interviewed were deeply rooted in constituent feedback and/or created by trained professionals, and the SNAP-Ed guidelines were not able to accurately reflect the fact-based, scientific curricula in use at the organizations. Therefore, SCCPHD may choose to build upon our classification system to create guidelines that work better for these dynamic organizations and to create a way of evaluating educational content from organizations. This will allow for more collaborative partnerships between organizations and constituents. Further assessment and categorization would be beneficial to organizations in the area.

2. Holds a monthly meeting where key informants of nutrition and garden programs can meet and assess program deficiencies in terms of lack of translation, modality of programs, and appropriate collaboration relative to communities served.

Funding a forum so programs can continue networking after this project to remedy gaps in lack of communication would prove to be beneficial. Face-to-face meetings, whether in-person or virtual, are invaluable to collaboration and proper and honest assessment of need, lack, or excess.

3. Assists in the creation and approval of a county-wide curriculum for both nutrition and garden programs in order to establish complete educational standards.

Organizations should collaborate and pool resources including lesson plans and curricula to create a more robust educational system. This county-wide curriculum can be approved by SCCPHD, so organizations are all teaching approved lessons and there is no unnecessary work being done to create lesson plans when one has already been made on a subject.

Future research on this topic should be conducted to further understand language accessibility such as what written curriculum is offered. Language accessibility is important to ensure that all clients in the county are able to receive the education they need to implement healthy lifestyles. A map should also be created to properly visualize the scope of reach for all organizations and the programs they offer. Organizations can add themselves and their constituent base to the map, showing who is served by what organization. Finally, organizations should collaborate on community-based research to generate a county-wide curriculum for garden and nutrition education programs. This curriculum can be given back to the SCCPHD and approved for use by all organizations.

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Appendix A

Interview Questions

1. Name and position title?
2. What city in Santa Clara County does your organization serve and operate in?
3. Could you walk us through a sample week at your organization?
4. Are you providing nutrition and/or gardening services and education?
5. If so, please describe the extent of these programs.
6. Do you have a certain curriculum that you follow to provide education on these topics? If so, which one?
 - a. Would we be able to see a copy of your curriculum?
7. What is the curriculum based on? Is it informed by peer-reviewed data and science on nutrition and climate change?
8. Does your current programming focus on nutrition, and healthy living, and have an emphasis on climate change?
9. Is your current programming sensitive to the needs of the community?
10. What is your target audience for this educational program?
 - a. Demographic information—age, population, etc.
11. When and where are these programs offered?
 - a. Virtual, self-paced, in-person
 - b. How long are they?
 - c. Single-standing or series?
 - d. Group or individual?
12. Are they accessible?
 - a. Cost, language, location, address special-needs learners
13. What gaps in your curriculum need to be addressed?
 - a. What do you wish was included?
 - b. What do you hear that your community wishes were included?
14. What aspects of environmental justice do you want to know more about?
 - a. Food waste, nutrition's connection to climate change, etc.
15. Do you have any questions for us or anything else you would like to add/discuss about your organization?
16. Where do the educational programs take place?

Thank you for your cooperation in our study. Do you have any questions? We appreciate your time completing this interview.