Intent of the Intervention

"Mi Cocina, Su Cocina" is a culinary medicine program that serves the patients of San-Luis Walk-In Clinic, Inc., a rural health clinic subsidiary of the Regional Center for Border Health, Inc, located on the U.S.-Mexico border. By providing culinary training and nutrition education, patients will have increased access to health care and health education by learning how to use food as medicine during different life stages and health states. This is a culturally competent, financially accessible culinary medicine program that will offer classes in English and Spanish.

Overview

Culinary medicine is a novel, emerging, evidenced-based approach that combines the art of cooking and meal preparation with the science of nutrition and medicine in order to promote health.[1-3] Culinary medicine also acknowledges important pharmacologic components of foods that may be used to support health, as well as treating, managing, and preventing disease, while not isolating certain foods or food ingredients as disease panaceas.[2,4] Culinary medicine supports positive behavior change, improve eating habits, and empowers patients to use food as medicine. The goal is that patients will be able to make healthful informed medical decisions about foods and meals, such that health is supported or restored and disease is prevented or treated.[1-5]

This goal of culinary medicine is achieved through nutrition and health education combined with practical culinary skills training, which includes teaching about shopping, meal planning and preparation, and food storage.[2,4] Culinary medicine is targeted to specific patients' and patient populations' needs.[6] Culinary medicine may be used by all patients since it utilizes foods from all racial/ethnic backgrounds and for all socioeconomic states, educational levels, or culinary skills.[6] Education focuses on promoting patient's active participation in learning and implementing nutrition, medical, and culinary interventions.[4] The synergy of these combined teaching modalities that directly impact at-home changes and interventions allows culinary medicine to have a profound, sustainable, and beneficial impact on health and wellbeing.[6]

Culinary medicine first became integrated into US medical schools in the early 2000s at SUNY-Upstate as a cooking and nutrition elective.[5] In 2013 the first culinary medicine center in a US medical school opened at Tulane, and as of 2016, at least 10 US medical schools provide culinary medicine training to their students, and there are multiple options for live in-person and online continuing medical education courses.[5]

The increasing rise in participation of culinary medicine training stems from an urgent and necessary need for sustainable, effective dietary interventions due to the rapidly growing rate of chronic disease and chronic disease-related deaths and disabilities.[3,6] Chronic diseases, such as heart disease and diabetes, are defined as diseases that necessitate ongoing medical treatment for greater than 1 year and limit activities of daily living.[3] As of 2019, chronic diseases were the leading cause of death and disability.[6] Approximately 60% of American adults in 2019 had at least one chronic disease and 40% had two or more chronic diseases; if these rates continue, it is estimated that >83 million people will have multiple chronic conditions by 2030.[3] The Hispanic/Latino, African-American, and Native American/American Indian and Pacific Island populations disproportionately suffer from earlier onset and/or faster development of chronic diseases and may be contributed to economic adversity and poor social conditions.[7]

Utilizing food as medicine has been shown to improve disease management, particularly diabetes and cardiovascular disease, as well as reduce complications.[12] Additionally culinary medicine is associated with decreased cardiometabolic diseases, overall cancer risk, and breast cancer risk.[2,4] Culinary medicine plays an important role in dietary intervention adherence.[6] Culinary medicine has even be demonstrated to improve pregnancy health-related outcomes.[13]

Lifestyle behavior change for all racial and ethnic populations is recognized as the main catalyst for chronic disease prevention and underscores the necessity of increased access to lifestyle intervention programs, such as culinary medicine, for disease prevention.[6] It is estimated that almost 80% of chronic diseases could be avoided through lifestyle interventions, with a special focus on promoting and maintaining healthy dietary patterns, since unhealthy dietary patterns drive inflammation, negatively impact cardiometabolic health, and promote disease.[6]

Culinary medicine programs provide patients with culturally sensitive, financially accessible health tools.[6] This promotes beneficial health outcomes, increased disease prevention, improved quality of life and extension of life.[4] It is important to note that while medications can help treat chronic disease, nutrition and lifestyle changes are the only interventions known to date that can reverse chronic disease.

In Yuma County, heart disease was the leading cause of death in 2017.[9] The rate of diabetes has increased over the past decade in the county, is above Arizona and US rates, failed to meet the Health People 2020 objective, and is higher among Hispanic residents.[9] In 2019, 27.8% of the adults in Yuma county reported eating five or more servings of fresh fruits and vegetable which is less favorable than the national percentage.[9] Only 20.5% regularly meet physical activity recommendations in 2019 and South County residents or low-income residents are less likely to meet recommendations.[9] Further in 2019, there has been an increase in adults who are overweight or obese, with a higher prevalence in South County residents.[9]

A key informant input through an online survey in 2019 for Yuma county reported that there is a general lack of nutrition education among adults and children/adolescents and cultural barriers exist in Hispanic/Latino and Native American populations. Culinary medicine programs and education can help to overcome these barriers. These programs are demonstrated to increase confidence in meal preparation for Latino populations and may improve cardiometabolic health.[7] It has also been proposed to empower Hispanic/Latino and Native American populations through incorporating their culture into their health, via nutrient intake which promotes positive lifestyle change.[10 -12]

The goal of “Mi Cocina, Su Cocina” would be to fill in the education gaps through nutrition education, resource development, and culinary training, increasing the Yuma border region’s health literacy rate. It would also work to overcome cultural barriers through incorporation of training on how to prepare culturally traditional foods according to national healthy guidelines, which promotes sustained behavior change. “Mi Cocina, Su Cocina” would also contribute towards improved health outcomes across life stages and health states, including pediatric, adult, and prenatal. It would fill an essential role to empower patients in taking an active role in their health through diet and lifestyle choices, which would support healthy living, reduce chronic disease rates, and improve chronic disease management in the community.

Goals and Outcomes

The goal of this program is to increase patients' health knowledge and culinary skills to use food as medicine in their daily lives thereby improving their confidence and abilities in making sustainable diet and lifestyle modifications, with the overall goal of reducing their risk of chronic disease and/or improving health outcomes during different life stages and health states.

After interactive participation and successful complication of this 4-week culinary medicine program, patients are expected to have:

- Greater nutrition-related knowledge about how to practically use food as medicine
- Increased self-efficacy in planning and preparing healthful meals that are culturally competent and financially appropriate
- New and/or expanded culinary skills in preparing food products
- Improved anthropometric measurement(s) and/or laboratory biomarker(s)
- Improved diet quality, particularly increased fruit, vegetable, and whole-grain intake

Organization and Communities Involved

"Mi Cocina, Su Cocina" will be offered through the Regional Center for Border Health, Inc. (RCBH), a not-for-profit organization, founded in 1986 that serves the border communities of Yuma, La Paz, and Mohave counties. It will be offered at RCBH's subsidiary the San Luis Walk-In Clinic, Inc., (SLWIC), a primary care rural health center, with a focus on people with chronic disease, adolescents and their families, and pregnant women. Former Arizona State Senator, Amanda Aguirre, MA, RD, presently serves as the President and CEO. RCBH's mission is to improve the quality of life of the residents along the U.S.-Mexico border by increasing accessibility to quality training and affordable healthcare. The vision of the organization is to ensure access to quality healthcare and training opportunities for rural and border communities.

In addition to SLWIC, RCBH agencies include the College of Health Careers, Family Behavioral Integrated Health Sciences, Center for Children with Special Needs and Autism, and La Cocina by Main Street Cafe. It also coordinates the Binational Health and Environmental Council and Yuma County Community-Based Paramedic Program. RCBH runs the WellWoman HealthCheck Program (WWHP), part of the National Breast and Cervical Cancer Early Detection Program. RCBH created CAPAZ-MEX, a private medical discount network to help uninsured and underinsured residents of Yuma County receive healthcare on both sides of the border. RCBH houses the Western Arizona Health Education Center (WAHEC), an Area Health Education Center funded (AHEC) by the U.S. Department of Health and Human Sources (HHS), Health Resources and Service Administration (HRSA), through the University of Arizona Health Science Center (UAHS). RCBH has important partnerships with the Arizona Department of Health Services, University of Arizona's College of Medicine-Tucson (COM-T), College of Medicine-Phoenix (COM-P), School of Nutritional Sciences and Wellness (SNSW), and Mel and Enid Zuckerman College of Public Health (MEZCOPH).

SLWIC has clinics in the cities of Yuma, San Luis, Somerton, Parker, and Lake Havasu. SLWIC departments include internal and family medicine, obstetrics and gynecology, pediatrics, dentistry, and behavioral health. The team of medical providers include medical doctors, nurse practitioners, pharmacists, dentists, speech language pathologists, social workers, and registered dietitian/nutrition professionals.

The culinary medicine program, “Mi Cocina, Su Cocina” will be offered in the San Luis Medical Mall’s Wellness Center. San Luis Medical Mall is one of the newest locations to open, in operation since 2020. It was created to meet the growing needs of the expanding diverse communities of Yuma County. It provides the community a medical home or “one-stop shop” for many medical services including an urgent care, outpatient surgery center, pharmacy, specialty and diagnostic center. Patients can also access integrated behavioral health services and receive medical care at the family medicine and wellness center and women’s health center.

Amanda Aguirre, MA, RD, President and CEO, with more than 35 years in health care and administration, leads the nutrition and wellness initiatives and programs at RCBH. Programs offered include the national Diabetes Prevention Program (DPP) and national Your Heart, Your Life program. Services provided include diabetes prevention, management and care, weight loss control and management, prenatal nutrition. Targeted education is provided with the goal of increasing awareness about cholesterol, hypertension, and nutrition with the goal of disease prevention and management through lifestyle interventions. She works with her interprofessional nutrition, public health, and health education team to expand nutrition programs both towards the patient population and public community.

Once implemented, the culinary medicine program “Mi Cocina, Su Cocina” would fill an important role as a hands-on, patient-centered, medical and nutrition collaborative program. It also provides opportunities for University of Arizona students from other health disciplines (ex: medicine, nursing, nutrition) who currently complete rotations to gain valuable experiences in the novel field of culinary medicine through participation in culinary medicine classes for the population the San Luis Walk-In Clinic, Inc., serves in Yuma County. This is in line with the organization’s vision of increasing access to quality healthcare training opportunities in a rural, border community. Even in metropolitan areas, experiential learning in culinary medicine is very limited and this would provide opportunities for students across healthcare disciplines to not only become well versed in the theory and didactics of culinary medicine, but engage in the practice of culinary medicine in a rural, traditionally underserved community.

Most importantly, the program would fill an urgent need for increased access to community nutrition programs targeting disease prevention and management or care for diverse life stages and health states. In 2017, there were 204, 280 people living in Yuma County; 19.7% of live below federal poverty line, which is above the national percentage.[9] About 28.4% of the population do not have a high school education, higher than state and national percentages.[9] 21.9% of residents have a low health literacy rate, which is reported more significantly in male and Hispanic residents.[9] 20.5% of the population in have at least one chronic condition, 14.3% have two chronic conditions, and 47.9% have three or more chronic conditions.[9] Heart disease was the leading cause of death in 2017.[9] The rate of diabetes in Yuma County is above Arizona and US rates and is higher for Hispanics.[9] The primary cause of nutrition problems seems rooted in a lack of education related to nutrition and physical activity, due largely to limited local, culturally sensitive, nutrition and dietetic professionals and resources.

Community Alignment and Health Equity Considerations

The culinary medicine program, “Mi Cocina, Su Cocina" would help promote the mission of the organization to increase the quality of healthcare of residents along the U.S.-Mexico border, as

these classes would be open to both the sister cities' communities and provide them with access to enhanced medical care. Culinary medicine is an evidence-based practice that helps to enhance patient's care. It promotes sustainability of lifestyle interventions that are recommended and taught by medical practitioners at the clinic. It has great synergistic energy to serve as the liaison between nutrition and medicine with the overall goal of promoting long-lasting health and wellness to a diverse population.

Populations particularly at-risk are those with chronic disease, pediatrics, and pregnant women. They will receive targeted nutrition education through these culinary medicine classes. Opportunities for collaboration also exist with the currently offered CDC approved Diabetes Prevention Program, which focuses on diabetes prevention in populations with pre-diabetes hemoglobin A1C levels. Combined this will help meet the organization's mission and program's goals to increase healthcare through providing collaborative medical and nutrition education and care to both prevent and treat disease, while optimizing an individuals' health through whatever life stage or health state they are in.

Policies exist in the United States and Arizona that would help to overcome these health disparities. Of recent note, is the culinary-medicine policies proposed and funding described from the 2022 White House Conference on Hunger, Nutrition, and Health. The Regional Center for Border Health is slated to participate in the Novo-Nordisk Culinary Medicine Initiative that is being conducted at the University of Arizona-School of Nutritional Sciences and Wellness. This will not be initiated until early 2023, however, such initiatives will contribute to the success and sustainability of "Mi Cocina, Su Cocina" at RCBH.

"Mi Cocina, Su Cocina" will also help to promote a recruiting diverse participant population for the program potentially through financial support and resource support. One of the main target populations for this intervention in the community would be Hispanic residents of Yuma County and have the ability to positively impact residents of Yuma's sister city in San Luis, Rio Colorado, Mexico. These are traditionally medically underserved populations in the United States. There is a targeted effort to ensure that culturally appropriate recipes and food choices are used to ensure that participants can use traditional food as medicine. Additionally, based on the information from a recent community health assessment, a significant percentage of the community population also are low-income and/or have a low health literacy rate. And, as aforementioned, other vulnerable population groups defined for targeted nutrition interventions include pregnant patients, adolescent patients, and patients with chronic disease.

To ensure equal accessibility to the program, these classes will be offered free to the public. There will also be a participation incentive for program participants to attend classes and continue implementing practices taught in class at home. Participants will receive a culinary medicine start-up tote which will include a 3-piece knife set, 4-piece measuring spoon set, 4-piece measuring cup set, and journal to record recipes and/or daily intake. Raffle prizes will also be offered each week of the program to promote attendance. Examples include a manual chopper and dicer, manual chop and whip, single-serve blender, and spice organizer. These giveaways are also coordinated with the classes' theme to help promote sustainability of interventions that promote healthy cooking and eating. As the program progresses, other opportunities for financial

incentives will be explored, as well as the ability to have insurance cover this preventive medicine treatment.

Increasing access to nutrition interventions that are targeted towards the Hispanic population and populations identified at nutritional risk will help to lower healthcare costs related to chronic disease management and increase the health status and health literacy rates of the community. "Mi Cocina, Su Cocina" would help fill this gap, with a focus on the identified vulnerable populations' access to care, and improve the health literacy rate, since culinary medicine is an established culturally appropriate, financially-sustainable, evidence-based intervention.

Core Elements of the Intervention

These components of the intervention are integral to the program. They are essential for the intervention's effectiveness and should be kept intact when the intervention is implemented or adapted.

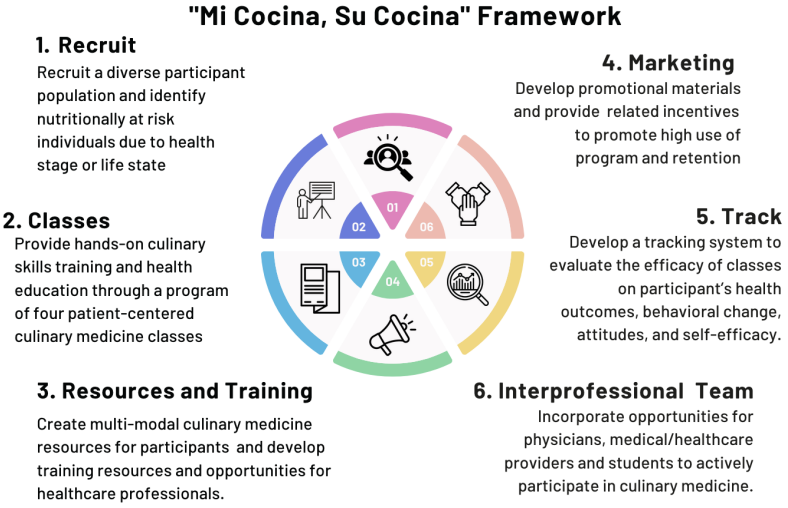


Figure 1.

1. Identify nutritionally at-risk (based on life stage or health state) individuals to participate in the program based on needs and interests. Work with rural health clinics, health departments, and community organizations to **recruit a diverse population** representative of the community.

Representation of diverse populations is essential for achieving equity in healthcare and appropriately advancing scientific research.[14] Diversity is a key element of our culture and health conditions. To achieve accurate diversity in this program, the focus will be on the Hispanic population while recruiting participants from all life stages and health states.

2. Provide hands-on culinary skills training and health education through a program of **four patient-centered culinary medicine classes** that cover key culinary medicine concepts for home throughout the year. Themed classes will also be offered as a way to draw interest. These classes will be focused on providing culturally appropriate and financially sustainable recommendations. Resources will also be offered to participants about healthy eating, shopping, and preparing food as well as recipes that highlight how to use food as medicine.

Patient-centered care is essential for both better health outcomes for patients and practical improvements for healthcare systems.[15] Culinary medicine offers an excellent opportunity to provide patient-centered care, since it provides individualized evidenced based recommendations for lifestyle interventions, culinary training and health education, These recommendations are adapted to an individuals' culture, racial/ethnic background, socioeconomic status.

3. Create **multi-modal culinary medicine resources** for participants; includes a bi-lingual culinary medicine handbook with educational sheets and recipes, recorded food demonstration videos and adaptation of pre-existing program curriculum to include culinary elements.

Multi-modal education resources are key for optimizing participation from a diverse population.[16] Implementing multi-modal nutrition and health education helps to increase the efficacy of education and improve attitudes and practices across different populations towards nutrition and health changes.[16-18] Multimodal resources include brochures, lessons, interactive culinary classes, and videos.[16] These resources will be a vital part of this program.

4. Create and maintain program manuals with culinary medicine **training** materials, including session breakdowns, highlight important teaching points, chemistry of food involved, and share important resources. Offer classes for **healthcare professionals and community partners.**

Training is particularly vital for promoting and maintaining culinary medicine programs as there are few guides for implementation and few medical providers have nutrition education and/or culinary training.[19] Providing multidisciplinary culinary medicine training improves professionals' self-efficacy in motivational interviewing, nutrition counseling, enhanced nutrition knowledge and interprofessional experience, which increases quality of care.[20-21]

5. Design **marketing** materials, including promotional flyers and food videos as well as direct communication with participants who participate in community nutrition classes or 1:1 visits with a registered dietitian nutritionist. Promote **incentives** and culinary medicine start-up bags to ensure high use of programs and retainability rates.

Marketing includes promotional flyers in clinic's offices, which serves two purposes: increase awareness about the program and improve the health literacy responsiveness.[22] A particular focus is on developing visually appealing, colorful flyers and videos which further promote patient engagement with marketing. Incentives are often used for program retention and can improve adherence to interventions.[23] Culinary-medicine related incentives will be used for this program.

6. Develop a **tracking** system to evaluate the efficacy of classes on participant's health outcomes, including anthropometrics, biochemical data, and clinical diagnoses. Also measure participant's diet quality, stages of behavioral change, reported attitudes, and self-efficacy regarding culinary skills, meal preparation, eating with a food as medicine viewpoint.

Tracking is key to ensuring continuous quality improvement for the program. Tracking markers were based on the Academy of Nutrition and Dietetics' nutrition care process.[24] It focuses on

food and nutrient intake outcomes, physical signs and symptom outcomes, and patient/client-centered outcomes, comparing current findings with previous statuses.[24]

7. Incorporate opportunities for **interprofessional collaboration** with physicians, medical and healthcare providers, as well as healthcare students to learn about the program and gain practical experience in culinary medicine.

Interprofessional collaboration leads to increased awareness of healthcare team members' type of knowledge, and skills, which improves communication, promotes synergy between professions, and increases quality of care to the patient, improves clinical effectiveness, and job satisfaction.[25] Culinary medicine offers a unique opportunity for multiple disciplines to be involved in targeted patient-centered care. Interprofessional collaboration will be a key element of the program.

Program Evaluation

Routine program evaluation is vital to the "Mi Cocina, Su Cocina" culinary medicine program's success, sustainability and community impact. Program evaluation is an systematic tool to examine the effectiveness and efficiency of programs and promote continuous program improvement.[26] Evaluation will be used to determine if the "Mi Cocina, Su Cocina" program is effective in increasing patients' health knowledge and culinary skills to use food as medicine in their daily lives thereby improving their confidence and abilities in making sustainable diet and lifestyle modifications. The overall goal is to reduce participants' risk of chronic disease and/or improving health outcomes during different life stages and health states.

Assessment will include both **process evaluation** (efficacy of operational and implementation aspects of the program) and **outcome evaluation** (extent program successes in achieving goals and objectives). Findings will help to improve the "Mi Cocina, Su Cocina" program by assessing what components are most and least effective in order to ensure that the program is continuously evolving and improving. Data collected from participants will be used in order to produce generalizable knowledge and examine efficacy of interventions in the participant population.

Participants will be recruited both from the community and from direct referrals from SLWIC, Inc. medical providers. The initial step would be to assess the *efficacy of marketing for participants* from the community through newspaper advertisements, social media posts, and educational/promotional flyers and food videos in clinic waiting rooms. It will also assess marketing to medical providers through presentations and continuing medical education events in order to promote referrals. These outlined marketing strategies of physician referrals, traditional media, and internal marketing are considered effective for marketing a healthcare practice in the healthcare field.[27] Efficacy of marketing will be internally assessed using surveys of participants during culinary classes and as part of the continuing medical education post survey assessments. These findings will help increase the efficacy of program reach.

Another area of interest for process evaluation is the *efficacy of recruiting participants (both professionals and students) from other disciplines* to engage with the "Mi Cocina, Su Cocina" culinary medicine program. Rates will be tracked when at least one other member of a healthcare discipline (ie. medicine, nursing, pharmacy, social work, etc) participates . Individuals may be asked to complete a pre/post-workshop survey to assess their perceived ability and skill to

interact, measure culinary medicine related knowledge, and understand how that profession can be involved in culinary medicine and nutrition/health education. This will help promote a sustainable multidisciplinary approach during program implementation.

The process evaluation will also assess the *usability of the RCBH culinary medicine program manual and educational materials*. Surveys will be provided to the individuals who have been involved in the program's implementation and an internal review will assess readability of the manual, accessibility of the resources shared, and ease of use during program implementation. Edits will be made on a routine basis in order to ensure the manual develops at a commensurate rate with program development and additional program support.

All culinary medicine workshops' content and duration will also be examined. Assessment will be conducted for participants and program facilitators in order to ensure that both parties involved are satisfied with the culinary medicine program. Session facilitators/coordinators will track the duration of each workshop in order to ensure that workshops are correctly scheduled. Participants will also be asked if workshop duration meets their expectations and if it is feasible for their lifestyles. This information will be used for improvement of workshop structure.

Participant retention rate in the programs will also be assessed by evaluating participant's engagement during sessions and ability to complete culinary activities. Questions will be asked by program facilitators throughout the session in order to gauge interest and ability to continue. These findings will be reported in post-session clinical notes for each patient. These will then be monitored by program coordinator and other RCBH clinical staff as part of continuous quality improvement in order to further improve workshops' structure.

The **outcome evaluation** will measure the efficacy of classes on participant's health outcomes, including *anthropometrics, biochemical data, and clinical diagnoses.* The participant's *diet quality, stages of behavioral change, reported attitudes,* and *self-efficacy* regarding culinary skills, meal preparation, eating with a food as medicine viewpoint will also be measured. These tracking markers were developed in alignment with the program's objectives. These markers are based on the Academy of Nutrition and Dietetics' nutrition care process regarding food and nutrient intake outcomes, physical signs and symptom outcomes, and patient/client-centered outcomes, and recommendations for assessing current findings with previous health statuses.[24]

An initial participant assessment will be conducted by clinic staff to collect anthropometrics, biochemical data, and medical history/clinical diagnoses. It will also collect participant's age, sex, race/ethnicity, language, educational status, and socioeconomic status. Anthropometrics will be assessed at each workshop and monitored in the electronic health system used by SLWIC, Inc. Biochemical data and clinical diagnoses will also be monitored for participants who are patients of the clinic at 1 month and 3 months after program completion. Diet quality will be assessed using a mix of 24-hour recalls and 1-week food logs. In the future, participants who are willing to participate in follow-up protocols will be monitored long-term by the clinic in order to assess the efficacy of the program and progression/remission/complication of health and life states.

For adults with diabetes, important data to monitor include diagnoses of common diabetes complications and markers of glycemic health. Pregnant participants monitoring includes checking for diagnosis of gestational diabetes and other pregnancy complications, as well as watching important biomarkers such as serum blood glucose and blood pressure. Pediatric patients will be monitored regarding diagnosis of chronic disease and other relevant biomarkers highlighted in referral, if applicable.

Patient's stages of behavioral change will be monitored by program facilitators. Questionnaires will be used to assess participants' health literacy, attitudes, and self-efficacy regarding culinary skills, meal preparation, eating with a food as medicine viewpoint with the opportunity for participants to report both qualitative and quantitative data.

Data from both process and outcome evaluations will be used to continuously improve the program in order to promote participant's health and program sustainability. These will be monitored by both program staff and community stakeholders. Other potential for data includes expanding culinary medicine programs and contributing to the research regarding culinary medicine in the United States, with a focus on the Hispanic population.

Potential Public Health Impact

The **"**Mi Cocina, Su Cocina" culinary medicine intervention has a high potential for sustainable and reasonable public health impact.

Reach: The potential for reach is high due to the targeted wide-spread approach to recruiting participants for the culinary medicine program. This bilingual culinary medicine program is intended for all members of the Yuma border region, with a focus on populations who are traditionally considered medically underserved and/or considered at high nutrition risk: adults with chronic disease, pediatric patients with diabetes/obese, pregnant patients. This program will also invite family members of these patients to join, thereby improving program reach. While the program's main goal is to provide a series of culinary medicine workshops to equip community members, there will also be a wide-spread dissemination of materials (flyers, videos, classes) across the rural health clinics focused on improving culinary medicine awareness and opportunities for classes. It also aims to engage partnerships with community based organizations and academic institutions to increase its potential for reach.

Effectiveness: While the evidence of the "Mi Cocina, Su Cocina" program's direct impact on nutritional status, behavior change, and health literacy is limited, proposed benefits are evidence-based and reasonable to believe will be achieved. The culinary medicine program will also address multiple evidence-based strategies to improve nutrition status, diet quality, food self-efficacy, and health literacy. Targeted efforts will be made to reduce complications of disease in patients with pre-existing chronic diseases and reverse disease progress. Additionally, "Mi Cocina, Su Cocina" will focus on reducing risk for developing diseases or health complications in pregnant patients and adolescent patients. The reach of this program to also include family members will help increase effectiveness of this program and sustainability of interventions. Combining efforts between this culinary medicine program and other culinary medicine initiatives will enhance the program's potential impact, promote interprofessional care, and increase awareness of nutrition and culinary education in other health disciplines.

Adoption: The "Mi Cocina, Su Cocina" program will be adopted by the Regional Center for Border Health, Inc., at its subsidiary the San Luis Walk-In Clinic, Inc., primarily in the San Luis Medical Mall Wellness Center. RCBH employees will be the main facilitators of this program, however collaboration may exist between University of Arizona's College of Agriculture and Life Sciences, College of Medicine-Tucson, and College of Medicine-Phoenix. It is important to note that this program will be offered through a rural health clinic and may increase ability for program adoption and collaboration with organizations in local and state rural areas with limited financial and community resources.

Implementation: This program is projected to offer quarterly 4-week culinary medicine programs and monthly themed culinary medicine classes. It will be offered to community participants and there is potential for bi-annual culinary medicine presentations for medical providers. Not including infrastructure provided by the RCBH (Wellness Center built previously), the cost of starting up this program was less than $5000.00 to provide full equipment for facilitators and participants. Budgets for each meal are <$10 for each participant to keep the class financially accessible for participants. The program will seek partial to full reimbursement through collaborative culinary medicine grants. Technical assistance (program manual and resources) and training will be provided to all culinary medicine facilitators and/or volunteer co-facilitators. Successful implementation depends on the involvement of state, local, and community partners.

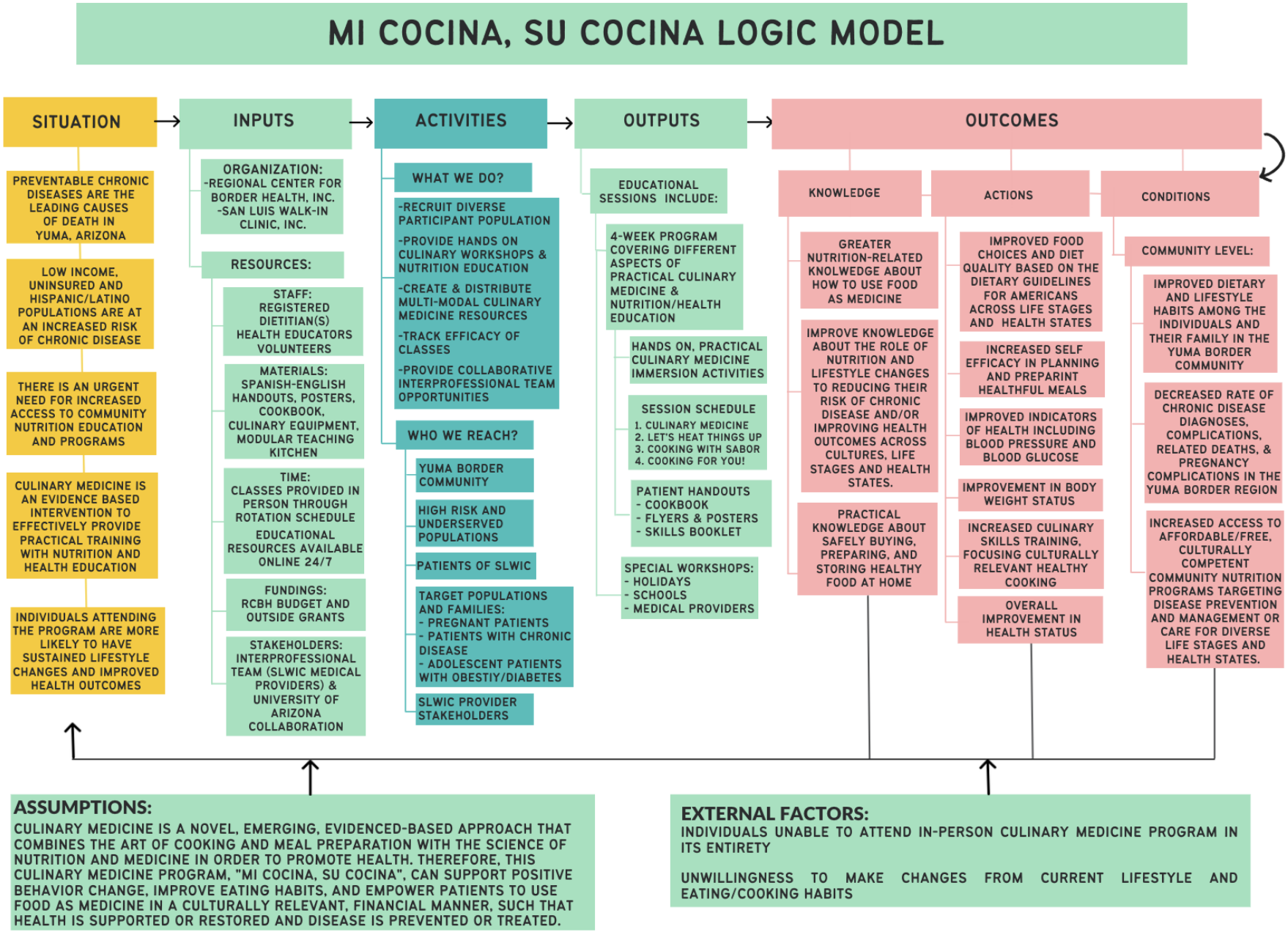
Maintenance: The program will begin November 2022 with potential for long term operation. Results will be regularly collected and shared with community partners annually. The staff and skill capacity necessary to sustain the program is currently available for the reach, however, more dedicated work is needed to continue for program growth and development. The cost of maintaining fiscal capacity for the program will need to be subsidized by grants.

Program Sustainability

The proposed program will be initially self-sufficient (start-up costs, printing, marketing, food and equipment), however, outside funding is being sought to promote program sustainability. The University of Arizona, College of Agriculture and Life Sciences, School of Nutritional Sciences and Wellness, will assume a supporting role in sustaining this program through partnerships from the Novo Nordisk Culinary Medicine Initiatives. Other UofA's colleges may also be involved if the RCBH's Wellness Center becomes an externship spot for medical students to obtain community culinary medicine experiences. Program coordinator will also be responsible for identifying, applying, and obtaining grant funding through government grants and private not-for-profits. This program may in future become entrepreneurial, in that insurance may reimburse, with the growing movement towards medically-tailored-meals and food as medicine initiatives. These however are likely not to be available for several years and organization and grant funding will be necessary for program sustainability.

Appendix:

Logic Model



Resources and Materials Required:

Staffing and Training

1. The "Mi Cocina, Su Cocina" program will require one **culinary medicine coordinator** to oversee the development and implementation of this program. A part-time employee or full-time employee may meet this staffing requirement granted they are able to independently facilitate all culinary medicine workshops (including quarterly 4-week program and monthly culinary medicine events), participate in program development through continuous quality improvement, and represent the Regional Center for Border Health, Inc. through event and conference participation, as well as program outcome presentations at the local, state, and national level. *Minimum qualifications: Bachelors in Nutritional Sciences or related healthcare field, greater than 1 year experience in culinary medicine. Preferred qualifications: Masters in Nutritional Sciences or related healthcare field and Registered Dietitian Nutritionist or healthcare provider.*

2. Depending on the reach of the program, as needed, participation from at least **one nutrition and/or health education staff member** with prior agreement will be needed to help coordinate and implement culinary medicine special events and workshops.

3. **Volunteers** (healthcare professionals or students) are welcome to participate in facilitating this program. Preference will be given to students in programs with pre-existing collaboration agreements with RCBH. A maximum of 4 volunteers per class and unlimited volunteers to help with operational aspects of the program.

Training will be provided for all staff or volunteers prior to participation:
1. Volunteers will be provided orientation to the organization based ont company policies.
2. Employees new to the program and volunteers will be provided with the program manual and provided 30min-1hr minute culinary medicine specific training which will include tour of site, overview of workshops, discussion of results, and tracking requirements.

Additional Materials and Support

- Resources and Educational Materials: Spanish-English Culinary Medicine Booklet for 3 Targeted Patient Populations*, Culinary Medicine Program Manual*, Recipe Cards*, Recorded Food Demonstrations and Culinary Skills
- Promotional materials including flyers*, posters*, and social media campaigns
- Participant Incentives such as Measuring Spoons, Measuring Cups, Aprons, Kitchen Equipment,Giveaway Prizes

*These materials will need to be printed and projected price incorporated into the budget

Funding: Initially, "Mi Cocina, Su Cocina" will be funded by the Regional Center for Border Health's allocations. An evolving partnership is developing between the University of Arizona's College of Agriculture and Life Sciences to be a community partner in the one-time Novo Nordisk Culinary Medicine Initiative which may provide supporting funds. Other funding sources may exist but need to be strategically identified and approved.

Other Costs: Key employees involved in offering this culinary medicine program may incur travel, professional organization memberships, and continuing education costs in order to seek additional training and networking in the novel and evolving field of culinary medicine. A budget will also be developed for each workshop to project the additional costs of food ingredients needed and are expected to range between $50-80/class.

Abstract

Culinary medicine is a novel, emerging, evidence based approach that combines the art of cooking with the science of nutrition and medicine in order to promote positive behavior change, improve eating habits, and empower patients to use food as medicine. “Mi Cocina, Su Cocina” is a bilingual culinary medicine program that serves the patients of the San-Luis Walk-In Clinic, Inc., a rural health clinic subsidiary of the Regional Center for Border Health, Inc., located on the U.S.-Mexico border. There is a special focus on populations who are considered medically underserved and/or at high nutrition risk: adults with chronic disease, pediatric patients with obesity, and pregnant patients. The goal of this program is to increase participant’s health literacy and improve their culinary skill abilities so they can use food as medicine to make informed medical decisions about food in their daily lives in order to reduce the risk of chronic disease and/or improve health outcomes across life stages and health states. To achieve this goal, a 4-week interactive culinary workshops with supporting educational resources will be offered to provide culturally appropriate and financially sustainable recommendations for participants to use food as medicine when they eat, shop, and prepare meals. A process evaluation will be conducted to evaluate the marketing, recruitment, implementation, and retention effectiveness. An outcome analysis will measure participant’s changes in knowledge, self-efficacy, anthropometric measurements, laboratory biomarkers, and diet quality. These evaluations will provide insight into the efficacy and sustainability of “Mi Cocina, Su Cocina.”

References

1. Puma J. Culinary Medicine and Nature: Foods That Work Together. *Am J Lifestyle Med*. 2020;14(2):143-146. Published 2020 Jan 7. doi:10.1177/1559827619895149

2. Parks K, Polak R. Culinary Medicine: Paving the Way to Health Through Our Forks. *Am J Lifestyle Med*. 2019;14(1):51-53. Published 2019 Sep 11. doi:10.1177/1559827619871922

3. Irl B H, Evert A, Fleming A, et al. Culinary Medicine: Advancing a Framework for Healthier Eating to Improve Chronic Disease Management and Prevention. *Clin Ther*. 2019;41(10):2184-2198. doi:10.1016/j.clinthera.2019.08.009

4. LeBlanc-Morales N. Culinary Medicine: Patient Education for Therapeutic Lifestyle Changes. *Crit Care Nurs Clin North Am*. 2019;31(1):109-123. doi:10.1016/j.cnc.2018.11.009

5. La Puma J. What Is Culinary Medicine and What Does It Do?. *Popul Health Manag*. 2016;19(1):1-3. doi:10.1089/pop.2015.0003

6. Mauriello LM, Artz K. Culinary Medicine: Bringing Healthcare Into the Kitchen. *Am J Health Promot*. 2019;33(5):825-829. doi:10.1177/0890117119845711c

7. Villalona S, Ortiz V, Castillo WJ, Garcia Laumbach S. Cultural Relevancy of Culinary and Nutritional Medicine Interventions: A Scooping Review. *Am J Lifestyle Med*. 2021;20(10):1-9. https://journals-sagepub-com.ezproxy4.library.arizona.edu/doi/full/10.1177/1559827621100634. Accessed August 29, 2022.

8. Gallaway MS, Aseret-Manygoats T, Tormala W. Disparities of Access, Use, and Barriers to Seeking Health Care Services in Arizona. *Med Care*. 2022;60(2):113-118. doi:10.1097/MLR.0000000000001665

9. 2019 Community Health Needs Assessment Report. YumaRegional.org. Published September 2019. Accessed August, 29, 2022. https://www.yumaregional.org/EmergeWebsite/media/Yuma-Documents/2019-Community-Health-Needs-Assessment.pdf

10. Nguyen C, Noshirvan A, Tong J, Blanks J, Wu BL, Chhay M, Marquez M, Juarez A, Talamantes E, Itoh CY. Culturally Sensitive Cooking Classes to Increase Healthy Cooking Confidence in the Latino Community. Harvard Public Health Review. Published 2019. https://www-jstor-org.ezproxy3.library.arizona.edu/stable/pdf/48546768.pdf?refreqid=excelsior%3Acb5ee72b99f43cf66bc10db26db696de&ab_segments=&origin=&acceptTC=1

11. Neffa-Creech D, Clarke P, Evans SH, Glovinsky J. "Food is something everyone should participate in": A positive deviance approach to understanding the use of a food and nutrition app in low-income, Latino homes. *SAGE Open Med*. 2020;8:2050312120934842. Published 2020 Jun 25. doi:10.1177/2050312120934842

12. Downer S, Berkowitz SA, Harlan TS, Olstad DL, Mozaffarian D. Food is medicine: actions to integrate food and nutrition into healthcare. *BMJ*. 2020;369:m2482. Published 2020 Jun 29. doi:10.1136/bmj.m2482

13. Taylor RM, Wolfson JA, Lavelle F, et al. Impact of preconception, pregnancy, and postpartum culinary nutrition education interventions: a systematic review. *Nutr Rev*. 2021;79(11):1186-1203. doi:10.1093/nutrit/nuaa124

14. Webber-Ritchey KJ, Aquino E, Ponder TN, et al. Recruitment Strategies to Optimize Participation by Diverse Populations. *Nurs Sci Q*. 2021;34(3):235-243. doi:10.1177/08943184211010471

15. Sladdin I, Ball L, Bull C, Chaboyer W. Patient-centered care to improve dietetic practice: an integrative review. *J Hum Nutr Diet*. 2017;30(4):453-470. doi:10.1111/jhn.12444

16. Choosing effective patient education materials. Medlineplus.gov. Reviewed October 2, 2019. https://medlineplus.gov/ency/patientinstructions/000455.htm

17. 1.Li YF, Zhang LX, Xiao X et al. Multimodal Nutrition Education for Cancer Patients. *Nutr Oncol.* 2021;6(2),57-63. http://www.nutroncol.com/magazine/2021-07-29/Multimodal%20Nutrition%20Education%20for%20Cancer%20Patients.pdf

18. 1.5 strategies for providing patient education. Woltserkluer.com. Published August 23 2017. Accessed May 2, 2022. https://www.wolterskluwer.com/en/expert-insights/5-strategies-for-providing-effective-patient-education

19. Sicker K, Habash D, Hamilton L, Nelson NG, Robertson-Boyd L, Shaikhkhalil AK. Implementing Culinary Medicine Training: Collaboratively Learning the Way Forward. *J Nutr Educ Behav*. 2020;52(7):742-746. doi:10.1016/j.jneb.2019.12.009

20. Kumra T, Rajagopal S, Johnson K, Garnepudi L, Apfel A, Crocetti M. Patient Centered Medical Home Cooking: Community Culinary Workshops for Multidisciplinary Teams. *J Prim Care Community Health*. 2021;12:2150132720985038. doi:10.1177/2150132720985038

21. Hynicka LM, Piedrahita G, Barnabic C, Rambob I, Berman BM, D'Adamo CR. Interprofessional Culinary Medicine Training Enhanced Nutrition Knowledge, Nutrition Counseling Confidence, and Interprofessional Experience. *J Integr Complement Med*. 2022;28(10):811-820. doi:10.1089/jicm.2022.0573

22. Jansen CJM, Koops van 't Jagt R, Reijneveld SA, van Leeuwen E, de Winter AF, Hoeks JCJ. Improving Health Literacy Responsiveness: A Randomized Study on the Uptake of Brochures on Doctor-Patient Communication in Primary Health Care Waiting Rooms. *Int J Environ Res Public Health*. 2021;18(9):5025. Published 2021 May 10. doi:10.3390/ijerph18095025

23. Michielutte R, Bahnson J, Dignan MB, Schroeder EM. The use of illustrations and narrative text style to improve readability of a health education brochure. *J Cancer Educ*. 1992;7(3):251-260. doi:10.1080/08858199209528176

24. Academy of Nutrition and Dietetics. Nutrition Monitoring and Evaluation. NutritionCareManual.org. Accessed October 20, 2022. https://www.nutritioncaremanual.org/topic.cfm?ncm_category_id=11&lv1=64571&lv2=267442&ncm_toc_id=267442&ncm_heading=Resources

25. Busari JO, Moll FM, Duits AJ. Understanding the impact of interprofessional collaboration on the quality of care: a case report from a small-scale resource limited health care environment. *J Multidiscip Healthc*. 2017;10:227-234. Published 2017 Jun 10. doi:10.2147/JMDH.S140042

26. Center for Disease Control and Prevention. Program Performance and Evaluation Office. Reviewed July 1, 2022. https://www.cdc.gov/evaluation/

27. Purcarea VL. The impact of marketing strategies in healthcare systems. *J Med Life*. 2019;12(2):93-96. doi:10.25122/jml-2019-1003