

TEACH Kitchen: A Chronological Review of Accomplishments

Jung Hee Chae¹, Benjamin E. Ansa, MD, MSCR², Selina A. Smith, PhD, MDiv³

¹Medical College of Georgia, Augusta University, Augusta, GA, ²Institute of Public & Preventive Health, Augusta University, Augusta, GA and ³Department of Family Medicine, Medical College of Georgia, Augusta, GA

Corresponding author: Benjamin E. Ansa • CJ-2300 1120 15th Street Augusta, GA • 706-721-6141 • bansa@augusta.edu

ABSTRACT

Background: The Eating and Cooking Healthy (TEACH) Kitchen was founded at the Medical College of Georgia in 2015 as a nutrition-based intervention to combat the high prevalence of obesity and obesity-related chronic diseases in the area of Augusta, Georgia. Despite the importance of diet in the management of chronic diseases, inadequate nutrition education among patients and healthcare providers presents a barrier. The purpose of TEACH Kitchen is to address this gap.

Methods: TEACH Kitchen is as a student-led initiative that promotes healthy cooking among medical students and patients with chronic diseases. Healthy nutrition and cooking classes are held during the academic year. Participants spend four weeks on each of four modules: obesity, hypertension, hyperlipidemia, and diabetes mellitus. Data collection, which began in January 2017, is currently on going. TEACH Kitchen has collaborated with Augusta University, Sodexo, and Kohl's.

Results: Currently, TEACH Kitchen has enrolled 14 patients and 6 children. Anticipated results include measurements of pre- and post-intervention changes in knowledge, attitudes, beliefs, and competence in nutrition, as well as differences in clinical indicators, including body mass index, blood pressure, lipid profile, and HbA1c.

Conclusions: TEACH Kitchen is the first medical school-based nutrition/cooking education initiative in Augusta, Georgia. It provides patients and medical students with hands-on healthy nutrition/cooking experience with the goal of decreasing the prevalence and improving the outcome of obesity-related diseases.

Key words: nutrition; cooking kitchen; chronic disease; obesity; hypertension; hyperlipidemia; diabetes mellitus

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INTRODUCTION

The Eating and Cooking Healthy (TEACH) Kitchen at the Medical College of Georgia (MCG) at Augusta University was founded in 2015 to address the high prevalence of obesity and obesity-related chronic diseases in the Augusta area of Georgia (GA). GA ranks 19th in the US in obesity rates, with 30.5% of adults and 12.7% of adolescents recorded as being obese in 2014 (Levi et al., 2015; CDC, 2014). More than 35% of adults are obese in Richmond County, GA (the site of TEACH Kitchen). This is higher than the national and state averages (CDC, 2015). The burden of obesity is a public health concern because of its associated risk for several chronic illnesses, including hypertension, cardiovascular and cerebrovascular diseases, diabetes mellitus, and some cancers (Malnick et al., 2006). GA ranks 12th in hypertension and 10th in diabetes (Levi et al., 2015). In 2013, 35.5% of Georgians had hypertension, and about 11% had diabetes mellitus (CDC, 2013; 2014). The healthcare costs associated with obesity-related diseases are also of concern. Generally, increased body mass index (BMI) correlates with increased healthcare costs, including medical claims and sick-day absences from employment. Obese adults spend 42% more on healthcare than adults at a healthy BMI (Levi et al., 2015).

Various interventions address obesity and obesity-related chronic diseases; however, a barrier faced by many people of lower socioeconomic status is lack of nutrition education (Murray et al., 2016). Traditional nutrition education typically involves medical nutrition therapy (MNT) led by a registered dietitian (RD). RD-led MNT programs have higher attrition rates (Meffert et al., 2010; Cui et al., 2015; Norris et al., 2002). Recent research has explored innovative approaches to nutrition education through hands-on food preparation, a more effective approach for affecting lifestyle changes (Murray et al., 2016; Raber et al., 2016; Curtis et al., 2012). For children, cooking education is expected to promote healthy food choices, which is relevant because adulthood obesity often begins as childhood obesity (Ratner et al., 2016; Levi et al., 2015; Murray et al., 2016; Hersch et al., 2014).

Despite the need for nutrition-based interventions, most medical school curricula do not include sufficient nutrition education (Jacob et al., 2016). Only two of five medical schools require the minimum 25 hours of nutrition education, which is a standard recommendation by the National Academy of Sciences (Monlezun et al., 2015). Only 22.2% of graduating medical students report readiness to offer adequate nutrition education to patients (Mogre et al., 2017). Furthermore, about 70% of surveyed medical students reported dissatisfaction with the amount of

nutrition education received in medical school (Mogre et al., 2017). Hands-on nutrition education can bridge this gap between medical knowledge and clinical application (Jacob et al., 2016; Monlezun et al., 2015; Leong et al., 2014; Levine et al., 2015).

The Goldring Center for Culinary Medicine (GCCM) at Tulane University School of Medicine was the first medical school-based teaching kitchen for underserved communities. GCCM incorporates the teaching kitchen for patients, with a four-year longitudinal curriculum for medical students (Monlezun et al., 2015). Patients who participated in GCCM had reductions of HbA1c ($p=0.575$), diastolic blood pressure ($p=0.037$), and total cholesterol ($p=0.044$) compared to the control group, who participated in RD-led MNT (Monlezun et al., 2015). These results are promising advances in health outcomes. Medical students who participated in GCCM were more likely to report higher proficiency in counseling patients about nutrition ($p=0.012$), weight loss ($p=0.021$), and aerobic exercise ($p=0.001$) (Birkhead et al., 2014). Several other teaching kitchens have now been established (Polak et al., 2015).

Obesity and obesity-related chronic diseases are a public health concern in GA. Traditional nutrition education may not be an effective approach for translating nutrition principles to healthy lifestyle changes. In this context, TEACH Kitchen was founded as the first culinary medicine program at MCG. The purpose of this report is to present a chronological review of the development and implementation of TEACH Kitchen.

METHODS

Setting: The setting for TEACH Kitchen is the MCG at Augusta University in Augusta, GA. Cooking sessions are held at the Terrace Dining area, located on the second floor of the Augusta University Medical Center (AUMC).

Community, participant characteristics, and recruitment: The community includes residents of Augusta,

GA, and surrounding areas. Adult participants are patients diagnosed with obesity, diabetes mellitus, hyperlipidemia, or hypertension, and are receiving care at AUMC. Adolescent participants are the children of adult participants in the study. Patients are recruited to TEACH via referral from healthcare providers (primary care physicians in the departments of Family Medicine, Internal Medicine, and Cardiac Rehab). Patients are also referred from student-led clinics (Clinica Latina, Equality Clinic, 8th Street Clinic, Asian Clinic, FaithCare, and Women's Clinic) (White et al., 2016).

Processes, interventions, and comparisons: TEACH investigators developed nutrition educational materials and planned recipes for the cooking sessions corresponding to obesity, diabetes mellitus, hyperlipidemia, or hypertension. The intervention is participation in TEACH cooking sessions. Each cooking session is structured in three parts. The session begins with nutrition education (20 minutes), in which participants learn about foods to include and exclude in their diet, and how to read nutrition labels. This is followed by the hands-on cooking session (60 minutes), in which participants learn food preparation techniques. Lastly, there is a guided post-cooking discussion (40 minutes), in which participants discuss principles such as portion size, healthy shopping techniques, and meal planning. Each session lasts 2 hours and is held weekly for 4 weeks. TEACH facilitators are presently analyzing pre- and post-intervention data. These data include clinical metrics such as HbA1c, lipid profile, blood pressure, weight and BMI. The data also include psychometric assessments of pre- and post-intervention attitudes and competence regarding healthy cooking.

Timeline: TEACH Kitchen started in October 2014, and, presently, patients from the Augusta University Health are being educated through cooking sessions about managing their chronic diseases through healthy eating. A chronological review of TEACH is presented below (Figure 1).

Figure 1. Timeline of TEACH Kitchen, organized by cohort

	October 2014	Nov – Dec 2014	January 2015	February – March 2015	April – May 2015
Cohort 1	1. Conceptualization of TEACH Kitchen 2. Literature review	1. Identification of primary mentor for TEACH 2. First meeting with TEACH mentors and co-investigators	1. Identification of research mentor 2. Meeting with all TEACH co-investigators 3. Preliminary planning for TEACH protocol	1. Institutional approval 2. Designation of the nutrition educational materials 3. Meeting with the Executive Chef and establishing relationship with Sodexo	1. Enrollment of participants for first practice cooking session 2. First practice cooking session (no data collected), Facebook feature 3. TEACH wins SAIL Award
	June – July 2015	August 2015	September 2015	Oct – Nov 2015	December 2015
Cohort 2	1. Transition to second TEACH cohort 2. Conference call with GCCM	1. First meeting with second cohort TEACH mentors and co-investigators 2. Menu planning	1. TEACH logo design 2. Development of TEACH protocol 3. Develop website, marketing strategies	1. Continuation of TEACH protocol development 2. Preparation of IRB application 3. Training with Sodexo chef, dietitian	1. Protocol submission to IRB 2. Patient recruitment via Family Medicine, Internal Medicine departments 3. Collaborate with Clinical Nutrition department to develop nutrition education curriculum
	January 2016	February 2016	March 2016	April 2016	May – July 2016
	Second practice cooking session (no data collected)	Revisions to IRB application	1. Finalize recipes, menu and nutrition education 2. Find new kitchen location in Terrace Dining	Third practice cooking session (no data collected)	1. Transition to third TEACH cohort 2. Planning for next year
Cohort 3	August 2016	November 2016	December 2016	January – February 2017	March 2017
	First meeting with third cohort TEACH mentors and co-investigators	TEACH Protocol approved by IRB	1. Patient recruitment from Cardiac Rehab Center 2. Development of educational materials for hypertension cooking sessions	1. Cooking sessions on hypertension 2. Collection of data begins	1. Completion of hypertension sessions 2. Data collection continues 3. Plan for cooking sessions beginning in April 2017

The inspiration for founding a hands-on teaching kitchen began with a seminar at the 2014 APAMSA National Conference entitled “Hey Doc, what should I eat? How to Talk About Food with Your Patients in a Clinical Setting,” by Dr. Ben Leong, who leads the cooking kitchen at GCCM. Preliminary meetings to pursue a cooking kitchen at MCG began in late 2014 with our faculty mentor, Dr. Selina Smith,

PhD, MDiv, Director of the Institute of Public and Preventive Health (IPPH). We also started discussions about potential research questions with Dr. Benjamin Ansa, MD, a senior research associate at the IPPH. Initial meetings consisted of formulating the mission statement and consideration of logistics and estimated costs (Figure 2).

Figure 2. Estimated budget for the first 2 years

Support Needed & Costs	
Healthy Eating Initiative Draft Budget	
Year 1 (2015-2016)	
<i>One Time Start Up Costs</i>	
Mobile Cooking Units (6 @ \$3000)	\$18,000
Cookware and Utensils (6 sets @ \$500)	\$ 3,000
Mobile Pantry	\$ 2,000
Refrigerator	\$ 1,000
	\$24,000
<i>Ongoing Costs – per Semester</i>	
<i>Year 1 Spring Semester (2- four week sessions)</i>	
Pantry Staples	\$ 600
Food / Perishables (\$200/wk, 8 wks)	\$ 1,600
	\$ 2,200
Total First Year Cost (1 semester)	\$26,200
Year 2 (2016-2017)	
<i>Ongoing Costs – per Semester</i>	
<i>Year 2 Fall and Spring Semesters (4 four week sessions)</i>	
Pantry Staples	\$ 1,200
Food / Perishables (\$200/wk, 16 wks)	\$ 3,200
	\$ 4,400
Total Second Year Cost (2 semesters)	\$ 4,400
Total Budget (Years 1 and 2)	\$30,600

At MCG, TEACH was officially registered as a student organization at six months after conceptualization. During this time, TEACH coordinators created nutrition educational materials, planned for the first practice cooking session (pilot session), and established relationships with Sodexo, a

company that manages the university’s food services. Considering the patient population in Augusta, GA, we focused the cooking sessions on four chronic diseases: obesity, hypertension, hyperlipidemia, and diabetes mellitus.

For the pilot session, we planned to spend the first 15-20 minutes reviewing a “Hypertension nutrition therapy” handout, with tips on limiting sodium intake. After this educational component, we planned to begin cooking based on a menu planned by Sodexo executive chef David Moulton and dietitian Pam Brisky. The recipes included chicken fajitas with salad. Ingredients such as onion, tomato,

and chicken were pre-sliced to ease the transition into the cooking component. As a first step in establishing a new relationship with patients in our community, the pilot session ran on April 21, 2015. The session was featured on the MCG Facebook page (Figure 3). Shortly afterwards, TEACH Kitchen was recognized by the university and awarded “Organization of the Year.”

Figure 3. TEACH pilot study featured on MCG Facebook



Several MCG students are working with colleagues from the GRU Institute of Public and Preventive Health, GRHealth dietary services, and campus’s own Sodexo food services, to teach people how to eat better. They’re calling the effort “TEACH - The Eating and Cooking Healthy - Kitchen,” and it will include access to healthy recipes that they actually prepare and eat with patients.

They want to establish an interactive discussion among patients, medical students, chefs, and nutritionists and give patients personalized suggestions on dietary changes that can help manage chronic conditions like diabetes, hypertension, and high cholesterol. They also figured it’s a great way to address the rising obesity rates in Augusta – all with the hope that patients will gain the knowledge, motivation, and support needed to make lasting changes to their diet and lifestyle. There’s a benefit for student, too. They hope to gain a better understanding of their community and how to counsel patients on behavioral change and healthy eating. Sounds like a win-win.

The idea came to them after second year students, Alex Pan, Jennifer Chae and Jeffrey Ahn attended the Asian Pacific American Medical Student Association National Conference and saw a presentation from a family medicine resident who established a teaching kitchen at Tulane University while he was in medical school there. “I thought this idea would be highly applicable in our community, which ranks below the state average in terms of obesity,” Pan says.

During the first year, the coordinators comprised non-selected medical students who were interested in building TEACH. After the founding of TEACH, coordinators were selected based on an application and voting process. The application used to select the second cohort of coordinators consisted of four points:

- 1) Describe your previous leadership experience.
- 2) List any cooking experience that you have.
- 3) What experience do you have working with patients?
- 4) Why would you like to be a coordinator for TEACH Kitchen at MCG?



We were interested in selecting students with either cooking experience or a passion for changing lifestyles through healthy cooking and eating. All applicants had leadership experience from college or medical school, and all had a personal history of cooking experience. Many expressed a fondness for cooking various cuisines, or cooking with their family and friends. Figure 4 is a table of excerpted applicant responses to personal cooking experience. In regard to the question of why the applicants were applying for the position, a common theme was the desire to unite two interests: cooking and community service. Figure 5 presents applicant responses to interest in being a TEACH coordinator.

Figure 4. Selected applicant responses to “List any cooking experience that you have”

Applicant	Response
1	I have been cooking all of my life and I enjoy healthy cooking and finding new ways to make healthy food taste great.
3	Educating myself on what to eat and how to cook it is a big source of enjoyment for me. In essence, cooking and nutrition are a big part of my life and passing on an enthusiasm for food and healthy eating is something I would love to do.
6	I grew up around my mom who is a wonderful cook and have picked up many cooking skills from her. I make my own meals and rarely eat out.
11	I frequently cook at home. I enjoy trying new recipes and trying to find ways to make my favorites new, exciting, and healthier.
12	I am a cooking fanatic...I'm constantly trying new recipes and I am obsessed with trying to make all of my recipes easier, faster, and healthier. I'm pretty proud of my extensive list of go-to-healthy recipes, which include stuffed bell peppers, spicy shrimp tacos, knockoff/healthier “Chipotle” burrito bowls, dill egg salad, low-carb lasagna and vegetable quinoa salad.

Figure 5. Selected applicant responses to “Why would you like to be a coordinator for TEACH Kitchen at MCG”

Applicant	Response
1	I have always been a strong believer that one of the most important ways to stay healthy is by eating healthy...It is important as future doctors that we remember that helping patients goes beyond addressing the issues that they are in the clinic for. It also involves teaching our patients how to live a healthy life.
2	I witnessed my dad lose over 100 pounds strictly through healthy diet and exercise. He had multiple health problems beforehand and with this change in his lifestyle, he is successfully managing all of his health conditions without the use of medication... It was and still is amazing to me that simply eating right and exercising can help us manage many of our health problems.
4	I was a Health and Exercise Science major...and I am extremely passionate about health and nutrition... Especially with the obesity epidemic, the medical field needs to helping people prevent metabolic syndrome and obesity related diseases and not just treating them after the fact, and I think that a program like TEACH is a big step in the right direction.
8	I love cooking. It's my creative outlet. I also think the idea of giving back to patients by teaching them how to help themselves live happier and healthier lives is wonderful... maybe the best thing that we can do for these patients is simply to teach them how to live healthier lives, and help themselves get better. By showing them that eating healthy and cooking healthy meals isn't difficult and can still taste good, I believe that we will touch their health outcomes for a lifetime.

In July 2015, the second cohort of TEACH coordinators communicated with Dr. Timothy Harlan of GCCM on a conference call. In regard to funding, TEACH Kitchen established relationships with Sodexo, the IPPH, and Kohl’s Department Store. Funding from Kohl’s allows TEACH to incentivize and reward patient attendance of cooking sessions: a \$25 gift card is provided to each adult participant upon completion of a 2-hour session, and children participants are presented Kohl’s Healthy Kids Kitchen products (t-shirt, chef’s hat, spatula, and measuring cup).

During the fall semester, the TEACH logo was designed with the Augusta University Division of Communications and Marketing (Figure 6), and nutrition educational materials with the official logo were created. Figure 7 is a handout that reviews healthy versus unhealthy foods, providing examples in each category as well as recommended servings.

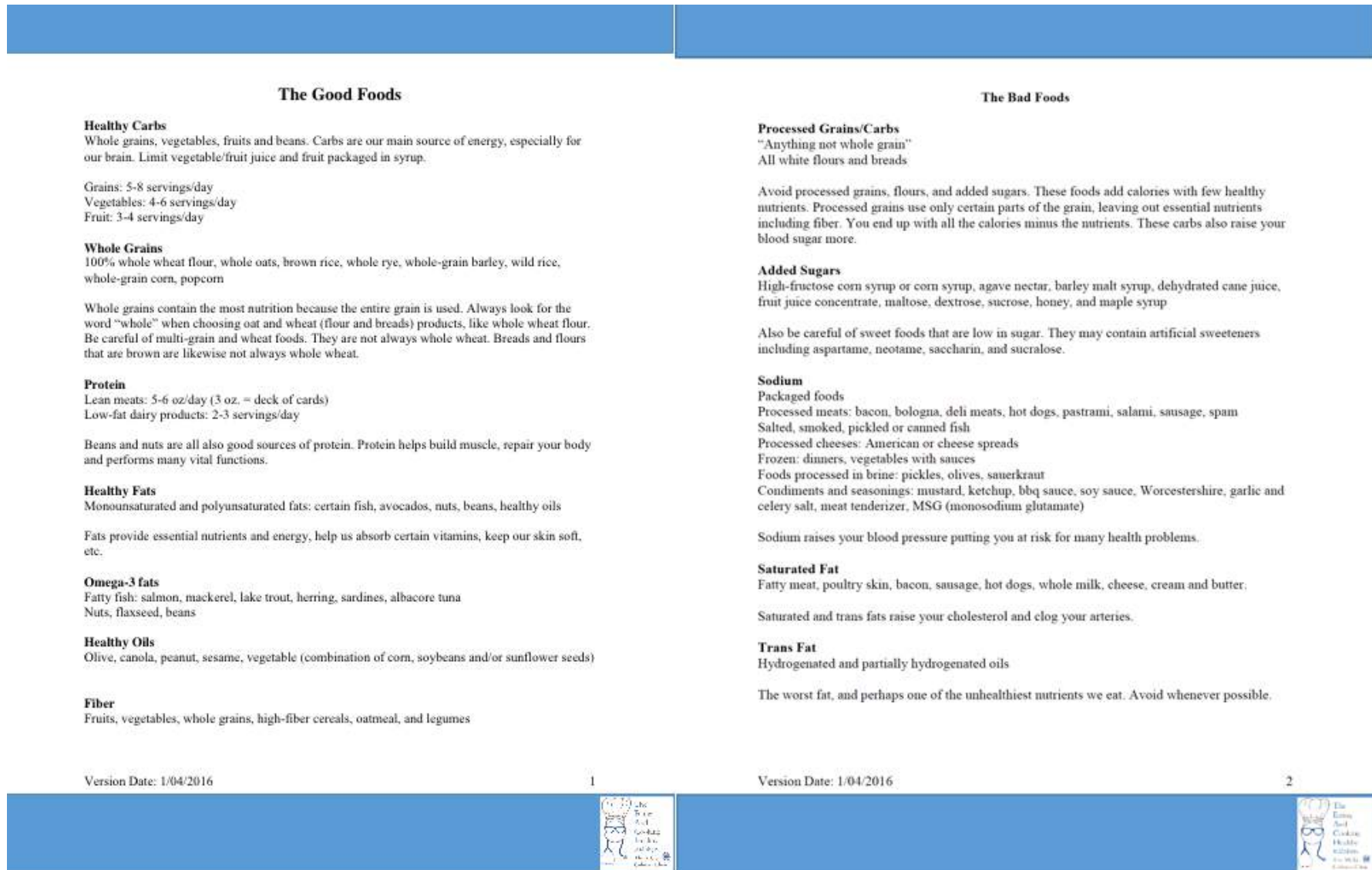
TEACH coordinators researched healthy diet guidelines, and collaborated with nutrition experts to create educational

materials. Healthy eating tips were taken from the Dietary Guidelines for Americans, which is published every 5 years by the US Department of Health and Human Services and the US Department of Agriculture (USDA). These guidelines reflect the most current state of nutrition science. Healthy diet guidelines published by the World Health Organization were reviewed as well.

Figure 6. TEACH logo



Figure 7. “The Good Foods vs The Bad Foods” nutrition educational handout



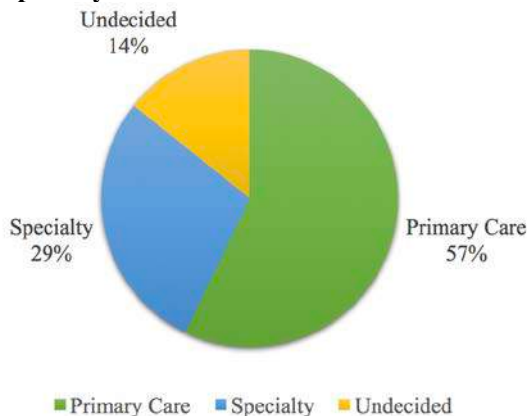
TEACH coordinators also worked with Dr. Ansa to develop a research protocol for submission to the IRB at Augusta University. The proposed study gathers data with baseline and post-intervention surveys (see Appendix for full questionnaire) that assess differences in participants' pre- and post-intervention knowledge, attitudes, and beliefs related to healthy eating. A protocol for TEACH Kitchen was submitted to the Institutional Review Board in December 2015 and was published in the fall of 2016 (White et al., 2016) after being approved in November 2016.

Currently, the TEACH study is underway. The cooking sessions on hypertension began in January 2017. Nine

patients completed the four cooking sessions on this module. The next module begins in April 2017.

At present, the first cohort of TEACH coordinators have been matched into residency programs. This provides an insight into what kind of students are attracted to being involved in medical school-based teaching kitchens. Among 7 students, 4 are entering a primary care field (Internal Medicine), 2 have chosen a specialty field, and 1 is undecided. Thus, more than half of the first cohort of TEACH coordinators are entering a primary care field in which physicians face the challenges of effective nutrition counseling (Figure 8).

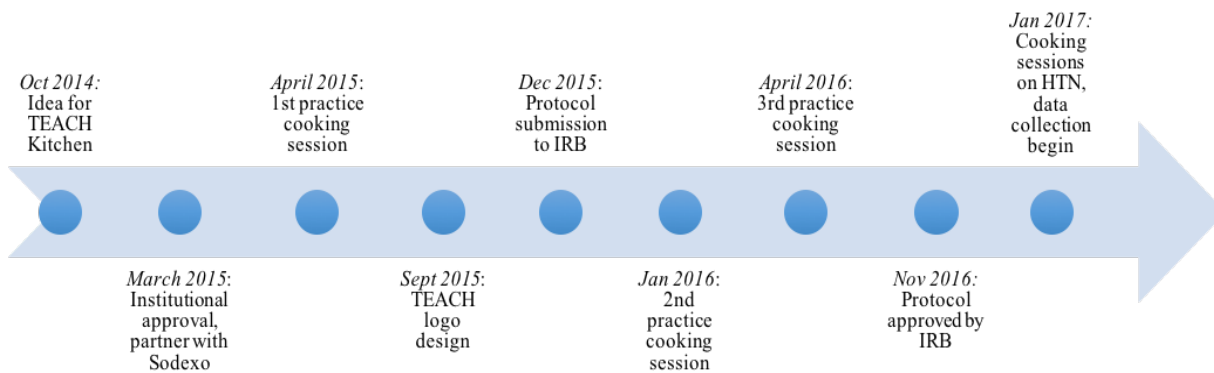
Figure 8. Specialty choice for first cohort of TEACH coordinators



Interestingly, a survey of the second and third cohort of TEACH coordinators revealed that a majority (75%) are interested in a specialty field.

In summary, TEACH Kitchen has grown from an idea to a full-fledged, IRB-approved study to examine how nutrition interventions may lead to healthier lifestyles and improved health outcomes. Figure 9 summarizes milestones in the timeline of TEACH Kitchen.

Figure 9. TEACH Kitchen milestones



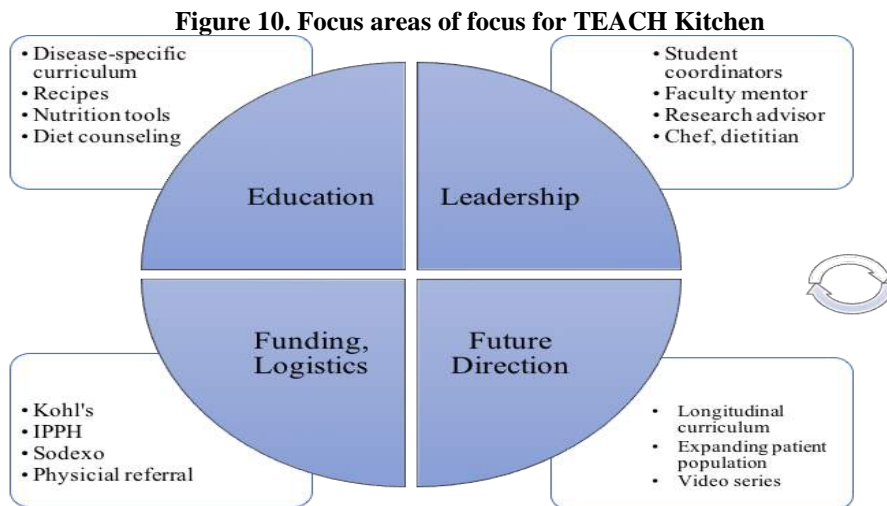
RESULTS

The anticipated results of TEACH Kitchen are promotion of healthy eating in the Augusta community, prevention of obesity-related complications of chronic disease, and decreased prevalence of obesity for adolescents in the community. To date, 14 patients and 6 children have enrolled in TEACH Kitchen cooking classes. Approximately 99% of patients complete the entire module. Two areas of potential improvement are recruitment and

retention of enrolled patients. Some rationales for why it is difficult to recruit patients include persisting inability to impress on patients the importance of healthy nutrition and cooking, lack of transportation, and lack of awareness of our program. We intend to address these issues by strengthening our partnerships with physicians and student-led clinics in the community, increased advertising, and continuing to grow our reputation as a patient-centered and patient-friendly healthy nutrition and cooking class in the Augusta area. Rationales for why it is difficult to retain patients

include lack of transportation, loss of interest in the curriculum, or patient non-compliance for other socio-economic factors. We hope to address these issues by recruiting more volunteers to lower the student-teacher ratio, so that patients feel like they have a more one-on-one learning experience. Transportation issues could potentially be addressed by setting up a TEACH Kitchen bus schedule through the university in the future. Our efforts to grow TEACH Kitchen over the past few years have involved several components. First, we planned and created the education component of the program. Education materials

included a disease-specific curriculum (related to obesity, hypertension, hyperlipidemia, and diabetes mellitus), nutrition handouts, lectures, and healthy recipes. Second, we coordinated our efforts with the faculty, university, and other healthcare and food professionals. We also established relationships with various institutions and companies for funding, which is essential to our mission. In summary, there are four components that make TEACH Kitchen possible: education, leadership, funding and logistics, as well as plans for future direction. Figure 10 highlights these four areas of focus.



DISCUSSION

Our goals are to continue building the program and enhancing its reputation in the Augusta community. We intend to involve students from other healthcare professions such as physician assistants, nursing, and dentistry. Involving other healthcare schools at Augusta University would also expand our potential pool of patients. Since MCG has campus locations outside of Augusta (Savannah, GA; Albany, GA; and Rome, GA), TEACH Kitchen may be able to expand to these satellite sites. Coordinators have communicated an interest of incorporating TEACH into the medical student curriculum. To reach patients who are unable to attend TEACH cooking sessions due to transportation issues, we are planning to develop an online video to be available to the public.

To determine the direction of future research, we plan to assess process, outcome, and impact evaluations. Evaluation of the process focuses on procedures implemented during TEACH, such as patient referrals, marketing to the student body and university, recruitment of study coordinators and volunteers, and funding. Process evaluation data are collected with pre- and post-intervention questionnaires related to student attitudes and beliefs.

Outcome evaluation provides data on the effectiveness of TEACH Kitchen. These data measure pre- and post-intervention changes in patients’ attitudes, clinical history, and dietary habits. Clinical variables such as BMI, HbA1c,

blood pressure, and total cholesterol are compared (White et al., 2016). Impact evaluation assesses the long-term effect of participating in the TEACH program, and long-term impact is measured by repeating the outcome evaluation at three months post-intervention. These data will allow us to determine if the intervention leads to lasting lifestyle changes, rather than to transient modifications in behavior.

IMPLICATIONS FOR PUBLIC HEALTH

TEACH Kitchen, a promising addition to the Augusta community, presents a method of combating the high prevalence of obesity and obesity-related chronic diseases in Georgia. Medical schools do not provide substantial education on nutrition, and the time constraints faced by practicing physicians may limit nutritional counseling, especially if physician attitudes and competence about nutrition education are low. Medical school-based cooking kitchens present a solution to this problem. Programs like TEACH Kitchen allow medical students to become familiarized with the community and acquaint them with giving nutrition advice. By practicing these behaviors, students are more likely to counsel patients more effectively in the future. Participation in the cooking sessions also raises awareness of special circumstances faced by those in the community. TEACH Kitchen can have a meaningful impact on improving public health by providing opportunities for patients to develop nutrition proficiency, and for future physicians to improve competence in nutrition counseling.

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References


- Birkhead A, Foote S, Monlezun DJ, et al. Medical Student-Led Community Cooking Classes: A Novel Preventive Medicine Model That's Easy to Swallow. *Am J Prev Med.* 2014; 46(3):e41-e42.
- Centers for Disease Control and Prevention (CDC), Division of Nutrition, Physical Activity and Obesity. Data, Trends and Maps 2014. Available online: URL: https://nccd.cdc.gov/NPAO_DTM/LocationSummary.aspx?statecode=61. Accessed April 1, 2017.
- Centers for Disease Control and Prevention (CDC), U.S. Department of Health and Human Services. Community Health Status Indicators 2015. Available online: URL: <https://www.cdc.gov/CommunityHealth/profile/currentprofile/GA/Richmond/15>. Accessed April 1, 2017.
- Centers for Disease Control and Prevention (CDC), Division for Heart Disease and Stroke Prevention: Data Trends & Maps 2013. Available online: URL: <https://www.cdc.gov/dhdsp/maps/dtm/index.html>. Accessed April 1, 2017.
- Centers for Disease Control and Prevention (CDC), Division of Diabetes Translation: State and County Data 2014. Available online: URL: <https://gis.cdc.gov/grasp/diabetes/DiabetesAtlas.html#>. Accessed April 1, 2017.
- Cui Z, Seburg EM, Sherwood NE, Faith MS, Ward DS. Recruitment and retention in obesity prevention and treatment trials targeting minority or low-income children: a review of the clinical trials registration database. *Trials.* 2015;16(1):564.
- Curtis P, Adamson A, Mathers JC. Effects of nutrient intake of a family-based intervention to promote increased consumption of low-fat starchy foods through education, cooking skills and personalized goal setting: the Family Food and Health Project. *Br J Nutr.* 2012, 107, 1833-44.
- GCCM. The Goldring Center for Culinary Medicine. Available online: URL: <https://culinarymedicine.org/index.php/information-for-medical-students/elective-options/>. Accessed March 20, 2017.
- Hersch D, Perdue L, Ambroz T, et al. The Impact of Cooking Classes on Food-Related Preferences, Attitudes, and Behaviors of School-Aged Children: A Systematic Review of the Evidence, 2003-2014. *Prev Chronic Dis.* 2014;11:E193.
- Jacob M, Stewart P, Walpole A, et al. A culinary laboratory for nutrition education. *Clin Teacher.* 2016; 13: 197-201.
- Leong B, Ren D, Monlezun D, et al. Teaching Third and Fourth Year Medical Students How to Cook: An Innovative Approach to Training Students in Lifestyle Modification for Chronic Disease Management. *Med Sci Educ.* 2014, 24:43.
- Levi J, Segal L, Rayburn J. The State of Obesity: Better Policies for a Healthier America. *Obesity Policy.* Aug 2015. Available online: URL: <http://stateofobesity.org/files/stateofobesity2015.pdf>. Accessed April 1, 2017.
- Levine D, Vasher S, Beller J, et al. Medical student nutrition and culinary training. *Med Educ.* 2015; 49: 513-41.
- Malnick SD, Knobler H. The medical complications of obesity. *QJ Med.* 2006, 99(9): 565-79.
- Meffert C, Gerdes N. Program adherence and effectiveness of a commercial nutrition program: The Metabolic Balance Study. *J Nutr Metab.* 2010;2010: 197656.
- Mogre V, Stevens F, Aryee P, Scherpbier A. Nutrition in Medicine: Medical Students' Satisfaction, Perceived Relevance and Preparedness for Practice. *Health Professions Education.* 2017, <http://dx.doi.org/10.1016/j.hpe.2017.02.003>.
- Monlezun D, Leong B, Joo E, et al. Novel Longitudinal and Propensity Score Matched Analysis of Hands-on Cooking and Nutrition Education versus Traditional Clinical Education among 627 Medical Students. *Adv Prev Med.* 2015;2015:656780
- Monlezun D, Kasprovicz E, Tosh K, et al. Medical school-based teaching kitchen improves HbA1c, blood pressure, and cholesterol for patients with type 2 diabetes: Results from a novel randomized controlled trial. *Diabetes Res Clin Pract.* 2015;109(2):420-6.
- Murray D, Mahadevan M, Gatto K, et al. Culinary efficacy: an exploratory study of skills, confidence, and healthy cooking competencies among university students. *Perspect Public Health.* 2016;136(3):143-51.
- Norris S, Nichols P, Caspersen C, et al. Increasing diabetes self-management education in community settings: a systematic review. *Am J Prev Med.* 2002;22 (4 Suppl):39-66.
- Polak R, Phillips E, Nordgren J, et al. Health-related Culinary Education: A Summary of Representative Emerging Programs for Health Professionals and Patients. *Glob Adv Health Med.* 2016;5(1):61-8.
- Raber M, Chandra J, Upadhyaya M, et al. An evidence-based conceptual framework of healthy cooking. *Prev Med Rep.* 2016; 4:23-8.
- Ratner E, Folkens S, Snika S. An Experiential Cooking and Nutrition Education Program Increases Cooking Self-Efficacy and Vegetable Consumption in Children in Grades 3-8. *J Nutr Educ Behav.* 2016;48(10):697-705.
- USDA. Dietary Guidelines. Available online: URL: <https://health.gov/dietaryguidelines>. Accessed July 14, 2017.
- White S, Alva-Ruiz R, Chen L, et al. The Eating and Cooking Healthy (TEACH) Kitchen: A Research Protocol. *J Ga Public Health Assoc.* 2016; 6(2): 331-6.

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APPENDIX

Questionnaire used in TEACH study to assess pre- and post-intervention knowledge, attitudes and beliefs about nutrition, as well as healthy eating and cooking.

TEACH Kitchen
 Participant ID (to be filled out by TEACH staff) _____
 Date ____/____/____



AUGUSTA UNIVERSITY

Institute of Public and Preventive Health

INSTRUCTIONS TO PARTICIPANTS:

Thank you for participating in The Eating And Cooking Healthy Kitchen or TEACH Kitchen. We want to find out about your knowledge of nutrition. There are no right or wrong answers. This survey is voluntary, which means you can refuse to answer some or all of the questions. Everything you tell us is completely confidential. We will not tell anyone your answers or comments--including Augusta University staff and TEACH Kitchen volunteers. We will not use your name in any reports or documents, nor will your name be written anywhere on this form. Do you have any questions before we begin?

ELIGIBILITY QUERY

1. Have you been diagnosed with any of the following?

01 Diabetes (mon/year of diagnosis _____)

02 Hyperlipidemia (mon/year of diagnosis _____)

03 Hypertension (mon/year of diagnosis _____)

DEMOGRAPHICS CHARACTERISTICS

1. To which ethnic group do you belong? (choose the best answer):

01 African American/Black

02 Hispanic/Latino

03 Caucasian

04 Southeast Asian

05 East Asian

06 Other _____
(Please Specify)

5. What is your religious preference?

01 African Methodist Episcopal

02 United Methodist

03 Baptist

04 Pentecostal

05 Catholic

06 Muslim

07 Presbyterian

08 Jewish

09 Non-Denominational

10 Other _____
(Please Specify)

2. What is your date of birth? ____/____/____
mo day yr

3. What is the highest level of education you have completed?

01 Elementary/Primary

02 High School

03 Technical/Vocational School

04 Some College

05 College

06 Graduate/Post Graduate

4. What is your marital status?

01 Married or equivalent

02 Single

03 Divorced

04 Widowed

6. Are you currently...(check all that apply)

01 Employed for wages

02 Self-employed

03 Out of work for more than 1 year

04 Out of work for less than 1 year

05 A Homemaker

06 A Student

07 Retired

08 Unable to work

7. What is your annual household income from all sources?

01 \$0-\$15,000

02 \$15,000-\$20,000

03 \$20,000-\$25,000

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- 04 \$25,000-\$35,000
- 05 \$35,000-\$50,000
- 06 \$50,000-\$75,000
- 07 More than \$75,000

8. What is your insurance coverage?

- 01 No insurance coverage
- 02 Medicare
- 03 Medicaid
- 04 Health Insurance/HMO

KNOWLEDGE, ATTITUDES AND BELIEFS

Nutrition Beliefs

1. Compared to what is healthy, do you think your diet is too low, too high, or just about right in terms of the food groups?

	Too Low	Too High	About Right	Don't Know
a. Fruits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Vegetables	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Milk, Yogurt and Cheese	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Bread, Cereal, Rice and Pasta	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Meat, Poultry, Fish, Dry Bean & Eggs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. How important is it to you to.....

	Very Important	Somewhat Important	Not Too Important	Not At All Important	Don't Know
Use salt or sodium only in moderation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Choose a diet low in saturated fat?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Choose a diet with plenty of fruits and vegetables	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use sugars only in moderation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Choose a diet with adequate fiber?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eat a variety of foods?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Maintain a healthy weight?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Choose a diet low in fat?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Choose a diet low in cholesterol?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Choose a diet with low in breads, cereals, rice and pasta?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eat at least two servings of dairy products daily?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Food and Nutrition Attitudes

3. Do you agree or disagree with the following statements?

	01 Strongly Agree	02 Agree	03 Disagree	04 Strongly Disagree
a. I ate a lot of fruit when I was a child.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. I ate a lot of vegetables when I was a child.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. I enjoy trying new foods.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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d. I eat at restaurants at least two times a week.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. I follow a list when I go grocery shopping.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. I eat breakfast most days of the week.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. I like to snack throughout the day.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Fruits and vegetables are too expensive.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Information I hear about healthy eating is confusing.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Nutrition: Food Servings

4. Do you agree or disagree with the following statements?

	01 Strongly Agree	02 Agree	03 Disagree	04 Strongly Disagree
a. Trans-fats are unhealthy.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Whole grains are healthier than processed grains.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Polyunsaturated fats are healthy.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Fruits, vegetables, and whole grains are rich in fiber.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. I am confident that I can choose the foods that are healthiest for me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Processed grains and sugars add calories to your diet with little nutritional benefit.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. How many servings of grains should you eat per day? 5-8				
h. How many servings of vegetables should you eat per day? 4-6				
i. How many servings of fruits should you eat per day? 3-4				
j. How many serving of protein should you eat per day? 2-3				

