Hospital-Based, Community Teaching Kitchen Integrates Diabetes Education, Culinary Medicine, and Food Assistance: Case Study During the COVID-19 Pandemic

Jacob P. Tanumihardjo, MPH[1], Heidi Davis, MSW[2], Jill Christensen, MD, MPH[2], Rachel A. Smith, MPH[3], Sonya Kauffman-Smith, MPH[3], and Kathryn E. Gunter, MPH, MSW[1]

[1]Section of General Internal Medicine, University of Chicago, Chicago, IL, USA; [2]Community Teaching Kitchen, Providence Milwaukie Hospital, Providence Health & Services, Milwaukie, OR, USA; [3]Community Health Division, Providence Health & Services, Portland, OR, USA.

BACKGROUND: Recent USDA Economic Research Service Population Survey cites a stabilization of food insecurity overall in the USA between 2019 and 2020, but Black, Hispanic, and all households with children cited increases — underscoring that the COVID-19 pandemic caused severe disruptions to food insecurity for historically disenfranchised populations.
AIM: Describe lessons learned, considerations, and recommendations from the experience of a community teaching kitchen (CTK) in addressing food insecurity and chronic disease management among patients during the COVID-19 pandemic.
SETTING: The Providence CTK is co-located at Providence Milwaukie Hospital in Portland, Oregon.
PARTICIPANTS: Providence CTK serves patients who report a higher prevalence of food insecurity and multiple chronic conditions.
PROGRAM DESCRIPTION: Providence CTK has five components: chronic disease self-management education, culinary nutrition education, patient navigation, a medical referral-based food pantry (Family Market), and an immersive training environment.
PROGRAM EVALUATION: CTK staff highlight that they provided food and education support when it was needed most, leveraged existing partnerships and staffing to sustain operations and Family Market accessibility, shifted delivery of educational services based-on billing and virtual service considerations, and repurposed roles to support evolving needs.
DISCUSSION: The Providence CTK case study provides a blueprint for how healthcare organizations could design a model of culinary nutrition education that is immersive, empowering, and inclusive.

Prior Presentations *Teaching Kitchen Collaborative Best Practices Webinar, "Teaching Kitchen Interventions to Address Food Insecurity." February 2021. National Center for Complex Health and Social Needs Featured Webinar, "Urban Health System and Cross-Sector Strategies to Address Food Insecurity During COVID-19." May 2021.*

Received April 1, 2022
Accepted November 1, 2022
Published online March 2, 2023

J Gen Intern Med 38(Suppl 1):S33–S7
DOI: 10.1007/s11606-022-07931-5

INTRODUCTION

Recent USDA Economic Research Service Population Survey cites a stabilization of food insecurity overall in the USA between 2019 and 2020, but Black, Hispanic, and all households with children cited increases from the previous year — underscoring that the COVID-19 pandemic caused severe disruptions to food insecurity for historically disenfranchised and vulnerable populations.[1] Food insecurity disproportionately impacts other racialized and historically marginalized populations, low-income populations, and individuals with chronic conditions.[2] Persistent, and inequitable, structural forces (e.g., structural racism, poverty) limit access to food for many Americans. Food security, access to healthy food, and complementary nutrition education are important factors for chronic disease self-management.[3] Integrating medical and social care has been effective at addressing basic needs like food for patients with chronic conditions.[4,5]

Healthcare organizations, especially those with existing partnerships across health and social service sectors, are uniquely positioned to address food insecurity and mitigate food access barriers.[6] Community teaching kitchens (CTK) offer an innovative clinical model to screen for food insecurity, link patients to food, offer on-site nutrition and culinary education, and connect patients to resources for other unmet social needs.[7] Guided by the principle of "food as medicine," the CTK at Providence Milwaukie Hospital opened in 2016 in Portland, OR. Visionary staff established the Providence CTK as a "no wrong door" single site for patients to access multidisciplinary services (e.g., medical nutrition therapy, behavioral health, self-management education, food market). This required fundraising, grant writing, and engagement with clinical and community leaders to construct a dedicated CTK facility with an array of services.

This design and implementation study describes the Providence CTK and the impact of the COVID-19 pandemic on its mission to support access to healthy food and culinary nutrition education. We describe responsive operational changes to the Providence CTK during the pandemic to sustain access to healthy food, adapt access to diabetes and nutrition education, and augment critical resources for community members.

SETTING AND PARTICIPANTS

Providence Health & Services (Providence) is a grantee of the Merck Foundation initiative, *Bridging the Gap: Reducing Disparities in Diabetes Care*. As one of many system-level approaches to integrating medical and social care, the CTK's mission is to inspire hope, health, and healing in a patient-centered environment. The CTK was designed to serve the nutritional, physical, and social aspects of the community's health by integrating an educational cooking environment with a hospital-based, family food market. The CTK supports diverse cultural and linguistic needs as well as community members who may lack the ability to pay for services (e.g., diabetes education, medical nutritional therapy). CTK services are available to the community (via medical, self, or community-based referrals), and staff are trained to assess patients' needs and initiate referrals based on clinical diagnoses, educational needs, or social factors. Table 1 describes CTK patient demographic and clinical characteristics.

Table 1 Demographic Characteristics of Community Teaching Kitchen Participants Between 2016 and 2021

Total population, *N*=4112	Pre-COVID-19, *n*=2523 *N* (%)	During COVID-19, *n*=1826 *N* (%)
Gender		
Female	1655 (65.6)	1180 (64.6)
Male	865 (34.3)	643 (35.2)
Other/unknown	3 (0.1)	3 (0.2)
Age		
<18 years	77 (3.0)	127 (7.0)
18 to 44 years	842 (33.4)	743 (40.7)
45 to 64 years	1010 (40.0)	656 (35.9)
≥65 years	617 (24.5)	305 (16.7)
Unknown	2 (0.1)	2 (0.1)
Race/ethnicity		
White	1991 (78.9)	1285 (70.4)
Hispanic or Latino (of any race)	179 (7.1)	183 (10.0)
Asian	70 (2.8)	72 (3.9)
Black or African American	62 (2.5)	77 (4.2)
American Indian and Alaska Native	37 (1.5)	27 (1.5)
Native Hawaiian and other Pacific Islander	17 (0.7)	20 (1.1)
Some other race	57 (2.3)	65 (3.6)
Unknown/refused	95 (3.8)	67 (3.7)
Predominant chronic conditions		
Obesity	1106 (43.8)	773 (42.3)
Hypertension	1079 (42.8)	644 (25.5)
Dyslipidemia	979 (38.8)	576 (22.8)
Type 2 diabetes	676 (26.8)	445 (17.6)
Cardiovascular disease	222 (8.8)	119 (4.7)
Chronic kidney disease	222 (8.8)	119 (4.7)
Heart failure	173 (6.9)	96 (3.8)
Patients with 3 or more chronic conditions	761 (30.2)	451 (17.9)
Patients with no chronic conditions	720 (28.5)	609 (24.1)
Insurance type		
Medicare	847 (33.6)	433 (23.7)
Medicaid	631 (25.0)	677 (37.1)
Commercial/other	950 (37.7)	653 (35.8)
Uninsured/self-pay	95 (3.8)	63 (3.5)

PROGRAM DESCRIPTION

The staff roles and responsibilities necessary to implement and maintain the Providence CTK are described in Appendix. Clinical and operational staff with a community of volunteers provides necessary infrastructure for successful implementation of the teaching kitchen model. There are five critical CTK components:

Chronic Disease Self-management Education

Multi-week class series led by registered dietitians/certified diabetes educators (CDEs) have the goal of developing a safe space to discuss challenges around behavior change and set personal goals. The diabetes education classes utilize a curriculum accredited by the Association of Diabetes Care and Education Specialists.

Culinary Nutrition Education

Nutrition programs that include cooking instruction have been shown to help people adhere to a healthier diet, eat smaller portions, and lose weight.[8–10] These benefits are consistent across racially and socioeconomically diverse populations.[10] The CTK integrates medical nutritional therapy (MNT) and culinary instruction (e.g., cutlery skills, food safety, nutrition label reading) into their immersive curriculum.

Patient Navigation

Integrating roles like patient navigators and community resource desk (CRD) specialists in the CTK provides opportunities to address medical and social needs (Table 2). Providence and social care collaborator, Impact NW, developed the CRD to assess for social needs and navigate referrals to community and clinical-based programs.[11] CTK providers and navigators work collaboratively with CRD specialists to identify social needs and coordinate referrals.

Family Market

The Family Market, a food pantry in the CTK, uses a grocery store shopping model. Food access is tailored according to individual medical and social needs (e.g., barriers to transportation, lack of food storage or access to kitchen, insecure housing, low-sodium and diabetic-friendly diets). The Family Market stocks nutrient-dense food and healthy ingredients patients need to prepare recipes taught during culinary nutrition classes. Dietitians provide hands-on nutrition education while patients shop in the Family Market.

Immersive Training Environment

The CTK is an education hub for nascent medical professionals and a welcoming site for volunteers who support CTK programs and operations. Since the inception of the CTK, volunteers have supported operations and enhanced the educational environment (Table 2). The CTK is adjacent to the Providence Milwaukie Family Medicine Clinic, a training site for family medicine residents and other medical professionals. Rotating medical students, behavioral health therapists, social workers, and dietitians learn the CTK's social needs screening workflow (e.g., tools, resources available) and patient-centered approaches to communication about food insecurity, and infuse their training with a foundation of nutrition education focused on improving food security.

PROGRAM EVALUATION

Patient education, navigation, and demographic data for the Providence CTK was collected between January 2016 and December 2021. Quantitative metrics were categorized into three areas (e.g., Patient Engagement and Education, Patient Navigation and Social Needs, Training Environment) to monitor program growth and evaluate adaptations. Operational considerations and necessary program adaptations due to the COVID-19 pandemic are also described.

CTK Implementation Considerations and Adaptations During the COVID-19 Pandemic

Provided Food and Education Support When It Was Needed Most. Food insecurity was a prevalent social need for patients served by the CTK 2018–2021 (Table 2). Family Market visits and patients served increased incrementally during the first 4 years of implementation and reached an all-time high during the first year of the pandemic. Food insecurity rates among CTK participants reached historic levels during pandemic years (Table 2). The CTK prioritized serving as a food bank first and foremost during the pandemic. CTK staff were granted essential worker identification to ensure Family Market services continued while volunteer activity halted due to pandemic-related restrictions. Prolonged pandemic issues (e.g., reduced staffing) impacted sustained increases in volume and patients served in 2021. CTK staff consistently initiated referrals to the CRD between 2018 and 2021 for support with unmet social needs; CRD staff achieved encouraging successful referral closure rates (Table 2). During the pandemic, patients were more often younger and non-White, and had less comorbidities than pre-COVID (Table 1). The

Table 2 Utilization and Evaluation Metrics of Community Teaching Kitchen Patients Between 2016 and 2021

	2016	2017	2018	2019	2020	2021
Patient engagement and education						
Unique patients served	478	515	733	720	1136	530
Patients highly engaged (e.g., 3 or more visits with DSME and MNT)	27%	19%	30%	29%	24%	29%
Diabetes education (units)						
Individual visits (30 min)	N/A	N/A	N/A	242	433	313
Group visits (30 min)	N/A	N/A	N/A	328	165	4
Medical nutrition therapy (units)						
In-person visits (15-min)	2561	3413	5174	2993	2068	1493
Virtual visits (15-min)	N/A	N/A	N/A	N/A	478	712
Initial visit to follow-up visit ratio	1.36	1.25	0.85	0.63	0.79	0.36
Group classes (30-min, instructor-based)	N/A	N/A	9	651	564	2480
Patient navigation						
Family market						
Patients and community members served	462	695	2074	2336	2633	1981
Food donations (lbs)	8411	23792	52181	68732	70477	55320
Community resource desk						
Community Teaching Kitchen patients referred to community resource desk	N/A	N/A	84	51	73	70
Referrals successfully closed by resource desk staff	N/A	N/A	43 (51.2)	40 (78.4)	45 (61.6)	47 (67.1)
Needs support by community resource desk staff	N/A	N/A	1) Food 2) Housing 3) Utilities	1) Food 2) Utilities 3) Dental	1) Food 2) Housing 3) Utilities	1) Utilities 2) Food 3) Housing
Food insecurity and transportation						
Prevalence of food insecurity among Community Teaching Kitchen patients	40.0%	37.4%	34.9%	36.4%	52.1%	43.9%
Prevalence of food insecurity in the state of Oregon†	12.9%	12.9%	9.2%	9.2%	9.2%	N/A
Individuals served by food deliveries	N/A	N/A	N/A	N/A	427*	655
Miles travelled by ride connection staff	N/A	N/A	N/A	N/A	7581*	4027
Training environment						
Volunteer hours	1084	2398	1841	2144	432	100
Medical resident elective hours	N/A	36	47	25	95	81
Behavioral health intern hours	N/A	N/A	167	179	301	381

*Partial year data (4/2020–12/2020)

†USDA Economic Research Service. (2022) State Fact Sheet: Oregon. https://data.ers.usda.gov/reports.aspx?StateFIPS=41&StateName=Oregon&ID=17854

demographic shifts observed during the pandemic mirror the USDA findings that ethnic and racial minorities as well as households with children were more severely impacted by food insecurity than their White counterparts. The Providence CTK has also historically served a community that reports food insecurity more often than the rest of the state of Oregon (Table 2), especially during the pandemic.

Leveraged Existing Partnerships and Staffing to Sustain CTK Operations and Family Market Accessibility. The Providence CTK observed rapid growth in unique patients served and MNT visit volume between 2016 and 2018 (Table 2). MNT units provided and patients served stabilized before the pandemic; the pandemic impacted provision of education services in 2020–2021. Table 2 highlights early success in establishing MNT services with a peak reached in 2018. MNT visit composition changed in 2019 as visits shifted toward follow-up rather than initial encounters. After early implementation successes and challenges in 2016 and 2017, patients who were highly engaged in DSME and MNT services (e.g., 3 or more visits) reached relatively high levels in 2018 and 2019 until the pandemic initially impacted engagement (Table 2).

To address growing needs, CTK navigators contacted patients for food preferences and tailored food boxes for contactless pick-up and delivery. The CTK and their transportation partner, Ride Connection, adapted an existing partnership to respond to evolving community needs during the pandemic. They created a direct link between CTK patient navigators and Ride Connection mobility specialists. Drivers accommodated deliveries when shelter-in-place orders were enacted. In 2020, the food delivery program was implemented quickly and aimed to reach as many patients as possible regardless of distance travelled for drivers. In 2021, CTK and Ride Connection staff discussed a strategy that would reduce the service area but improve overall costs and sustainability. The distance travelled decreased by nearly half but the total individuals served remained relatively consistent (Table 2).

Shifted Delivery of Educational Services Based On Billing and Virtual Service Considerations. CTK dietitians, CDEs, and behavioral health staff transitioned to telehealth visits after non-emergency services were halted during the initial wave of the pandemic. Although virtual CTK visits exceeded targets and improved show rates, CTK leaders re-evaluated reimbursement options for some services (e.g., group MNT). In lieu of offering separate culinary-focused classes at no-cost to the community, CTK staff began to integrate culinary education into their existing, reimbursable diabetes self-management education (DSME) curriculum.

After DSME and MNT providers navigated early reimbursement issues, virtual services were integral to expanding access to culinary nutrition and chronic disease education during the pandemic (Table 2). CTK staff focused on individual DSME visits and group MNT education due to billing considerations. Individual DSME was piloted in 2019 and the CTK observed increases in education units provided during the first year of the pandemic; education units stabilized during the second year. Although group MNT services were difficult to coordinate in the first year of the pandemic, encounters increased in 2021 with a record number of patient education sessions (Table 2).

Repurposed Roles to Support Evolving Needs. The CTK relied on an engaged volunteer network who support operations (Supplementary Table 3). After the CTK was established in 2016, the Providence CTK had established high volunteer hours during pre-pandemic years (Table 2). The immersive training environment offered by the CTK evolved during the years of implementation which included establishing medical resident electives in 2017 and behavioral health intern services in 2018.

With in-person navigation severely limited during the pandemic, patient navigators supported the Family Market and facilitated socially distant, food pick-ups. Patient navigators previously conducted Family Market volunteer trainings, but during the pandemic, navigators instead filled roles previously supported by volunteers (Table 2). CRD staff began conducting virtual, comprehensive social need screenings during the pandemic. After additional safety protocols, CTK and CRD staff ensured that an in-person CRD specialist would be available. The hybrid in-person/virtual CRD model ensured community members had access to medical and social needs support via their preferred contact method.

During the pandemic, the CTK adapted the learning environment to maintain immersive training experiences by shifting roles for medical residents (e.g., involved in virtual program development, class co-facilitation) and changing service delivery for behavior health interns (e.g., virtual and phone-based outreach). These adaptations are reflected in Table 2 where medical resident and behavioral health intern hours increased significantly during the pandemic while volunteer hours decreased.

DISCUSSION

The pandemic forced health systems to adopt novel workflows, implement health information technologies, and adopt new services and programs to ensure continuity in healthcare services (e.g., telehealth appointments, virtual diabetes education groups).[12–15] The Providence CTK case study provides a blueprint for how healthcare organizations could design a model of culinary education that is immersive, empowering, and inclusive. The implementation staff at the CTK provide three considerations for those implementing a teaching kitchen model:

Build and Foster Buy-in

It took time to foster health system and organizational support to pilot and sustain the CTK model, but that support has been critical. The CTK earned buy-in from community organizations and volunteers who share a mission to support unmet food insecurity needs. CTK staff cited the years to establish and grow as a program that allowed for success during the pandemic. Providence's leadership now recognizes the barrier that food insecurity represents for the communities they serve and how the CTK addresses that barrier.

Adapt Programming to Meet Evolving Needs

During early implementation, CTK staff restricted unhealthy food donations and purchases for the Family Market and were conscientious of medical, cultural, and dietary considerations when organizing food distributions. CTK staff also ensure there are ready-to-eat foods for patients who prefer the option. These efforts instill compassion and dignity in how staff work with the community, striving to provide meals that meet needs while also honoring preferences.

Achieve Financial Sustainability Through Perseverance

Dedication to proactive care that responds to patients' medical and social needs has historically been overwhelmed by lack of revenue to offset expenses. CTK staff continually consider programmatic and billing strategies to increase the use of reimbursable services due to evolving nature of billing requirements and available program-level reimbursement. Individual strategies (e.g., ensuring virtual DSME reimbursement, establishing MNT reimbursement through claims and contracts) alone cannot guarantee financial sustainability. In addition to reimbursement, CTK staff cultivate relationships with mission-driven donors and philanthropic organizations who make these programs possible. The ability to evolve and strategically consider other resources and funding streams is a necessity.

The pandemic underscores that the safety net many rely on is fragile and insufficient. Holistic and comprehensive programs like the Providence CTK are needed to address chronic needs among patients due to poverty, food insecurity, and other challenges to accessing health and social care.

Corresponding Author: *Jacob P. Tanumihardjo, MPH; Section of General Internal Medicine, University of Chicago, Chicago, IL, USA (e-mail: jtanumihardjo@uchicago.edu).*

Supplementary Information *The online version contains supplementary material available at https://doi.org/10.1007/s11606-022-07931-5.*

Acknowledgements *The authors would like to thank Helen On for her support with data extraction and processing, Charlotte Navarre for her implementation insights and dissemination experience, Dr. Monica Peek for her support with messaging and evaluation methods, and for the many teaching kitchen staff and volunteers who made this work possible.*

Funding *JT, HD, RS, SKS, and KG acknowledge funding from the Merck Foundation's initiative Bridging the Gap: Reducing Disparities in Diabetes Care. HD and the Providence CTK acknowledge funding from the Providence Milwaukie Hospital Foundation.*

Declarations:

Conflict of interest: *The authors declare that they do not have a conflict of interest.*

REFERENCES

1. **USDA**. Economic Research Service, using data from the Current Population Survey Food Security Supplement, 2001 – 2020.
2. **Charkhchi P, Fazeli Dehkordy S, Carlos RC**. Housing and food insecurity, care access, and health status among the chronically ill: an analysis of the behavioral risk factor surveillance system. *J Gen Intern Med.* 2018;33(5):644-650.
3. **Peek ME, Cargill A, Huang ES**. Diabetes health disparities: a systematic review of health care interventions. *Med Care Res Rev.* 2007;64(5 Suppl):101S-156S.
4. **Alderwick HAJ, Gottlieb LM, Fichtenberg CM, Adler NE**. Social prescribing in the U.S. and England: emerging interventions to address patients' social needs. *Am J Prev Med.* 2018;54(5):715-718.
5. **Gottlieb LM, Alderwick H**. Integrating social and medical care: could it worsen health and increase inequity? *Ann Fam Med.* 2019;17(1):77-81.
6. **Tanumihardjo JP, Gunter KE, Peek ME**. As they take on food insecurity, community-based health care organizations have found four strategies that work. In: Health Affairs; 2021.
7. **Musicus AA, Vercammen KA, Fulay AP, et al.** Implementation of a rooftop farm integrated with a teaching kitchen and preventive food pantry in a hospital setting. *Am J Public Health.* 2019;109(8):1119-1121.
8. **Polak R, Phillips EM, 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):61-68.
9. **Aspry KE, Van Horn L, Carson JAS, et al.** Medical nutrition education, training, and competencies to advance guideline-based diet counseling by physicians: a science advisory from the American Heart Association. *Circulation* 2018;137(23):e821-e841.
10. **Pooler JA, Morgan RE, Wong K, Wilkin MK, Blitstein JL**. Cooking matters for adults improves food resource management skills and self-confidence among low-income participants. *J Nutr Educ Behav.* 2017;49(7):545-553.e541.
11. **Tanumihardjo JP, Gunter, Kathryn E., Peek, Monica E.** Integrating technology and human capital to address social needs: lessons to promote health equity in diabetes care. In. Vol 32: Journal of Health Care for the Poor and Underserved; 2021:241-261.
12. **Zachrison KS, Yan Z, Schwamm LH**. Changes in virtual and in-person health care utilization in a large health system during the COVID-19 pandemic. *JAMA Netw Open.* 2021;4(10):e2129973.
13. **Ahn DT**. The COVID-19 Pandemic: a "tech"-tonic shift toward virtual diabetes care. *J Diabetes Sci Technol.* 2020;14(4):708-709.
14. **He X, Shelden D, Kraftson A, Else T, Auchus RJ**. A virtual teaching clinic for virtual care during the COVID-19 pandemic. *Clin Diabetes Endocrinol.* 2020;6:25.
15. **Hsu H, Greenwald PW, Laghezza MR, Steel P, Trepp R, Sharma R**. Clinical informatics during the COVID-19 pandemic: lessons learned and implications for emergency department and inpatient operations. *J Am Med Inform Assoc.* 2021;28(4):879-889.