Produce Prescription as a Cross-Sector Innovation: findings on program implementation & patient utilization

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Thank you!

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"A medical treatment or preventative service for patients who are eligible due to diet-related health risk or condition, food insecurity or other documented challenges in access to nutritious foods, and are referred by a healthcare provider or health insurance plan."



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*Not all produce prescription programs require an education component **Some programs use third party evaluation

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Just What the Doctor Ordered: Produce Prescriptions are More Important—and Popular —Than Ever.

CIVIL EATS

Nationwide, programs providing chronically ill people free and discounted produce are seeing a surge of demand during the pandemic.

BY ANDY HIRSCHFELD . AUGUST 13, 2020

DONATE

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1. Food security is a social risk of critical concern.



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2. Per capita healthcare expenditures are rising. Household-level medical debt is a sizable problem with disparities in who faces this burden. (Kluender et al. 2021)

Total national health expenditures, US \$ per capita, 1970-2020



🛑 Total National Health Expenditures Per Capita 🛛 🛑 Constant 2020 Dollars

Source: KFF analysis of National Health Expenditure (NHE) data

Peterson-KFF Health System Tracker

https://www.healthsystemtracker.org/brief/the-burden-of-medical-debt-in-the-united-states/ 8

2. Per capita healthcare expenditures are rising. Household-level medical debt is a sizable problem with disparities in who faces this burden. (Kluender et al. 2021)



3. Value-based healthcare models hold promise for shifting priorities from quantity of care to quality of care. (Teisberg et al., 2020)

Value-Based Health Care Benefits



NEJM Catalyst (catalyst.nejm.org) © Massachusetts Medical Society

https://catalyst.nejm.org/doi/full/10.1056/CAT.17.0558

4. 'Social determinants of health' has achieved buzzword status.



5. There is heightened federal attention on <u>nutrition</u> security.

WHAT IS NUTRITION SECURITY?

Consistent access to nutritious foods that promote optimal health and well-being for all Americans, throughout all stages of life.



6. Growing momentum to pursue and test cross-sector solutions.

• *E.g.*, Robert Wood Johnson Foundation's Aligning Systems for Health initiative and the Centers for Medicare and Medicaid Innovation Accountable Health Communities (Alley et al., 2016; Gottlieb et al., 2017)

Produce Prescription Programming: (mini) Stateof-the-Science

Promising Signals:

- Program utilization associated with **increased fruit and vegetable intake, reduced food insecurity,** and **fewer hospitalizations**. (Aiyer et al., 2019; Forbes et al., 2019; Xie et al., 2021)
- Programs with complementary elements have potential to improve food resource management, meal planning, food purchasing practices, and quality of life. (Forbes et al., 2019; Newman et al., 2021; Slagel et al., 2021; Joseph and Seguin, 2022)

Three Key Gaps:

- **1. "Sharing data with all partners**": a key component for successful cross-sector partnerships (Schmit et al., 2019), yet few cases of how this works in practice.
- 2. Who uses them? Dearth of research on characteristics of patient users and their patterns of program utilization.
- **3.** Lack of causal inference: Few available prospective, randomized studies and none/few in which food security & health outcomes studied in tandem. (De Marchis et al., 2019)

Research Question 1

What **factors** influence the development and sustainability of data sharing in a produce referral program implemented in partnership between a community-based organization and an academic medical center?

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Methods

Study Design: In-depth case study

The Case: The Mid-Ohio Farmacy (Columbus, OH)

- Designed by the Mid-Ohio Food Collective (regional food bank) in partnership with a federally qualified health center (FQHC)
- Current partners: 3 FQHCs, 2 free clinics, 1 Medicaid managed care plan, and 1 academic medical center (OSUWMC)
- Participating health care providers screen patients for food insecurity using the Hunger Vital Sign[™]
- If food insecure AND has a qualifying condition (i.e., diabetes, hypertension, obesity) → Refer to MOF → Receive card with RxID
- Patient gets 4x more frequent access to fruits and vegetables at local network of food pantries (n=16 in greater Columbus region)

Methods

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The Case: The Mid-Ohio Farmacy (Columbus, OH)

Data Collection: Semi-structured interviews (n=31, May-Sept 2020)

- <u>OSUWMC Informants (n=20)</u>: MOF champions, data admin, privacy officers, institutional leadership, and providers in participating clinics.
- <u>Food Collective Informants (n=11)</u>: Food Collective admin, and staff from affiliated pantries.
- <u>Interview guide</u> designed to explore resources, processes, and expected outcomes reflected in the MOF evaluation logic model.
- Interviews ranged from 18-64 minutes long (mean=33 min)

Analysis: Deductive dominant approach based on program logic model

• Preliminary codebook \rightarrow Iterate, iterate \rightarrow Apply to all in NVivo

Results

Factor 2: Data Exchange Capabilities

Factor 3: Cross-sector Data Integration

Challenge	Representative comment
HIPAA rules related to exchange of data between	"Some people would tell us, 'No, don't sign a [BAA]; if possible, figure out some other way to do it. You're a community-based organization and [the BAA] further protects the health care provider more than you.' And at the same time too, on our end, we are understanding of the BAA and what it meant was that basically any kind of
covered and noncovered entities	downstream partner that we had would also have been covered by that [agreement]. So, in our mind, that was our food pantries as well. And we could not really see a way to make all of our food pantries HIPAA compliant." – Food Collective representative

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Factor 2: Data Exchange Capabilities

Challenge	Representative comment
Matching patients via a unique but non-medical record identifier storable in EHR	"This is all custom development; none of this existed in EpicThey tasked me with the responsibility of trying to come up with a mechanism to be able to document the RxID and be able to follow up, send that information to Mid-Ohio Foodbank." – OSUWMC administrator

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Factor 3: Cross-sector Data Integration

Challenge	Representative comment
	"To my knowledge, [no data are provided]On a patient
Lack of data	[by] patient level, it certainly would be helpful too. You
feedback to	know, 'Hey, I saw you got some food, how's that helped
referring	you? Can we do anything? Do you need information about
providers	how to cook?' You know what, it can lead me to do more
	things too." – OSUWMC provider

Research Question 2 What are the **characteristics** of **patients** that use (or not) a **food referral program** offered by their family medicine provider?

Methods

Study Design: Retrospective observational study

Sample: Patients referred to MOF at a participating OSUWC family medicine clinic (Sept 2019 – Nov 2020, n=339)

Data Sources: OSUMC's EHR + Food Collective's FreshTrak

Inclusion criteria: 1) 18+ years old, 2) food insecure, and 3) met clinical criteria for at least one of the following:

- Diabetes, Type 1 or 2
- Uncontrolled diabetes (i.e., HbA1c > 9%)
- Gestational diabetes
- Hypertension
- Uncontrolled hypertension (i.e., blood pressure > 140/90)
- Obesity

Results

Characteristic	Total Referred (n = 339)	Pantry Visitors (n = 164)	Non-Pantry Visitors (n = 158)	Declined (n = 17)
Mean age (SD)	51.6 (12.9)	53.5 (11.5)	49.4 (13.6)	54.6 (16.0)
Female, n (%)	261 (76.9)	130 (79.3)	119 (75.3)	12 (70.6)
Race, n (%)				
White	95 (28.0)	44 (26.8)	42 (26.6)	9 (52.9)
Black	225 (66.4)	112 (68.3)	106 (67.1)	7 (41.2)
Other	19 (5.6)	8 (4.9)	10 (6.3)	1 (5.9)
Mean household size (SD)*	2.4 (2.0)	2.9 (2.2)	1.9 (1.7)	_
Insurance, n (%)				
Medicaid	152 (44.8)	73 (44.4)	72 (45.6)	7 (41.2)
Medicare	105 (30.9)	57 (34.7)	44 (27.8)	4 (23.5)
Other**	82 (24.2)	34 (20.7)	42 (26.6)	6 (35.3)
Diabetes, n (%)	157 (46.3)	86 (52.4)	65 (41.1)	6 (35.3)
Uncontrolled diabetes, n (%)	42 (19.3)	25 (21.7)	17 (18.3)	0
Hypertension, n (%)	184 (54.3)	91 (55.5)	83 (52.5)	10 (58.8)
Uncontrolled hypertension, n (%)	93 (28.1)	32 (20.0)	53 (34.4)	8 (47.1)
Obesity, n (%)	275 (81.1)	138 (84.1)	123 (77.8)	14 (82.3)
Pregnant, n (%)	4 (1.2)	2 (1.2)	1 (0.6)	1 (5.9)
Pre-referral visitor, n (%)*	128 (39.7)	100 (60.0)	28 (17.7)	—

Table 1. Characteristics of Patients Referred to and Participating in the Mid-Ohio Farmacy Project

SD, standard deviation.

*Data not available for patients that Declined (n = 322).

**Other insurance includes patients with private insurance (n = 70), self-pay (n = 7), and unknown (n = 5).

Results

Characteristic	Marginal Effect (%)*	95% CI	P value*
Age (1-year)	0.7	0.00 to 0.01	<.001
Female	-0.2	-0.12 to 0.11	.96
Race			
White	Ref	Ref	Ref
Black	-4.6	-0.15 to 0.06	.39
Other	-8.8	-0.31 to 0.13	.43
Household size	2.6	-0.00 to 0.05	.05
Insurance			
Other	Ref	Ref	Ref
Medicaid	-2.4	-0.14 to 0.09	.69
Medicare	-5.9	-0.19 to 0.07	.39
Diabetes	11.0	0.01 to 0.21	.03
Uncontrolled diabetes	-3.0	-0.18 to 0.12	.70
Hypertension	2.8	-0.07 to 0.13	.57
Uncontrolled hypertension	-19.3	-0.30 to -0.08	<.001
Obesity	4.7	-0.07 to 0.17	.45
Pregnant	32.3	-0.16 to 0.81	.19
Pre-referral visitor	35.8	0.28 to 0.43	<.001

 Table 2. Likelihood of Visiting a Food Pantry Among Patients Participatingin the Mid-Ohio Farmacy (n = 322)

CI, confidence interval; Ref, reference.

*Average marginal effect as determined via a multivariable regression model.

Characteristic	Total Visitors (n = 164) Mean (SD)	New Visitors (n = 64) Mean (SD)	Existing Visitors (n = 100) Mean (SD)	P value*
Total visits	7.8 (9.7)	4.0 (5.6)	10.1 (10.9)	<.001
Days to first visit	51.4 (75.1)	74.8 (97.2)	36.3 (51.9)	<.001
Distance traveled (miles)	3.7 (2.7)	4.4 (2.8)	3.3 (2.6)	.015
Produce visits [†]	1.2 (3.9)	1.2 (2.7)	1.2 (4.5)	.979
Visits within 30 days post-referral	1.1 (1.5)	0.8 (0.9)	1.4 (1.6)	.012
Visits $>30 \le 60$ days post-referral	1.3 (1.9)	0.65 (1.2)	1.8 (2.2)	<.001
Visits $>60 \le 90$ days post-referral	0.9 (1.5)	0.5 (0.9)	1.2 (1.7)	.001

Table 3. Utilization of Mid-Ohio Farmacy Food Pantries by New and Existing Visitors

SD, standard deviation.

*P value estimated from t test.

[†]Produce visits are defined as those where the patient predominantly selects produce items from the food pantry as indicated in the FreshTrak system by pantry staff.

Resu	ts

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Table 4. Comparison of Use Pre- and Post-Referral Among Existing Food Pantry Visitors for Users with at Least90 Days of Post-Referral Data

Characteristic	Pre-Referral (n = 81) Mean (SD)	Post-Referral (n = 81) Mean (SD)	<i>P</i> value
Produce visits [†]	0.5 (1.2)	0.9 (2.3)	.021
Visits within 30 days pre-/post-referral	1.1 (1.6)	1.3 (1.6)	.201
Visits $>30 \le 60$ days pre-/post-referral	0.9 (1.2)	1.8 (2.2)	<.001
Visits $>60 \le 90$ days pre-/post-referral	1.0 (1.6)	1.3 (1.6)	.251

SD, standard deviation.

*P value estimated from t test.

[†]Produce visits are defined as those where the patient predominantly selects produce items from the food pantry as indicated in the FreshTrak system by pantry staff.

Conclusion & Discussion

Paper 1: Partner Implementation & Data Sharing

- Data sharing regulations, data exchange capabilities, and crosssector data integration present (surmountable) challenges to the implementation of a cross-sector produce prescription program.
- Recently proposed modifications to HIPAA attempt to clarify and codify allowances for data sharing to encourage cross-sector alignment. (Fed Regist.2021;86(12):6446-6538)
- Overcoming these challenges will also require a high level of technical skills by partners and innovative approaches to integrating data for *meaningful use* by all sectors. (Ridberg et al., 2022)

Paper 2: Patient Utilization

- While the Mid-Ohio Farmacy can connect patients to food resources, further attention needed to understand **barriers to use** among those who have not previously accessed food pantries.
- Supporting more widespread and regular utilization may require a **tailored referral**, such as adding an additional question to the food insecurity screening process that asks about prior pantry use.

Where do we go from here?

Addressing multiple nonmedical, social needs simultaneously may be one approach to increase program utilization and impact.

- *E.g.*, Referrals to the Agency for Healthcare Research and Quality's community hubs (Zeigler et al, 2014)
- *E.g.*, Integration of community health workers into clinical practice (Page-Reeves et al., 2016)

Future research needs to consider implications for health equity across rural-urban continuum.

- Need more evidence of clinical impact, but with attention to how program *design* & *implementation* influences health equity.
- Who isn't reached by these programs? Known disparities in healthcare access. (https://www.ruralhealthinfo.org/topics/rural-health-disparities)
- Most produce Rx research conducted in urban communities; what models work in rural regions? (Stroud & Sastre, 2022)
- COVID-19 exacerbated concerns about food chain fragility + Ongoing concern about rural agricultural economies = Opportunity to also integrate the agricultural sector?

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Next Step: pragmatic Randomized Trial



04/2022-03/2027, Joseph & Walker (MPI), NIH R01 (DK132403-01), LINK: Linking education, produce provision, and community referrals to improve diabetes care



"A medical treatment or preventative service for patients who are eligible due to **diet-related health risk** or condition, **food insecurity** or other documented challenges in access to nutritious foods, and are **referred by a healthcare provider** or health insurance plan."

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