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Missoula Prescription Produce Program: Lessons Learned 2015-2017

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THE MISSOULA PRESCRIPTION PRODUCE PROGRAM: LESSONS LEARNED 2015-2017

By

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Abstract:

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Missoula Prescription Produce Program: Lessons Learned 2015-2017

Josh Slotnick, Chair

The Missoula Fruit and Vegetable Prescription Produce program (MFVPP) started in 2015 as a partnership between Garden City Harvest (a Missoula, MT food-security non-profit) and the Providence Endocrinology Center (a local health clinic focused on diabetes care). MVFPP allows physicians, physician assistants, and dieticians to prescribe fresh produce to their patients. Patients must be of low income and suffer from chronic disease. The purpose of this paper is to evaluate the effectiveness of the MFVPP to lead to improved biometric measurements for patients. This paper also discusses the program's limitations and complications and aims to chart a path forward for program stakeholders. Patients received $20 each month in the form of vouchers to spend at MFVPP market stands, and in exchange, enrolled in the 18-week program. The MFVPP addressed food access issues for patients by subsidizing the cost of produce these patients could obtain through the program. Patients met at market stands on Monday and Thursday evenings (4:30-6:30PM) from June 6th-October 5th, 2017. Most weeks, two MFVPP staff were present at each farm stand. Patients provided contact information and were measured for biometric variables (height, weight, blood pressure, and waist circumference) and filled out a demographic survey as time allowed. The biometric data we collected was inconclusive as to the MVFPP effectiveness in improving specific health measures.

Forty patients enrolled in the MFVPP. We tracked patient participation and retention information. In addition, I interviewed some of the participants at the end of the program to learn about their experiences. I coded the interview data and analyzed for common themes. Forty patients enrolled in the MFVPP. The Interview results showed the MFVPP did not entirely eliminate barriers to accessing fresh produce, but did reduce some barriers, such as cost, during the farming season. Participants also reported trying new produce as a result of the program, and they described positive interactions with their health care providers as a result of the program.

After interacting with MFVPP patients and providers for 20 weeks, and analyzing the data from interviews with patients, I recommend the program recruit additional providers and provider networks, establish a cohort model of enrollment, increase their program inputs, and hire a program coordinator.

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Acronyms:

Missoula Fruit and Vegetable Prescription Program (MFVPP)

Prescription Produce (PP)

Garden City Harvest (GCH)

Providence Garden (PG)

Executive Summary:

During the summers of 2016 and 2017, I have helped plan, coordinate, and evaluate the Missoula Fruit and Vegetable Prescription Program (MFVPP). The MFVPP team brought me into the fold additionally to research and present findings on the challenges and benefits of the program. Originally, our focus was quantitative, biometric data, though gradually it shifted towards a more holistic interpretation of the program's efficacy.

Due to the short nature of the program (18 weeks), rolling participant enrollment, low participant attendance rates, insufficient staffing at the stands, and challenging timing and placement of the farm stands themselves, the data gathered on the quantitative, biometric variables was insufficient to draw accurate conclusions. I address these challenges in the recommendations below, with detailed explanations in the full paper.

Despite the challenges to collecting the quantitative data, our qualitative program evaluation yielded some promising insights. The act of being prescribed fruits and vegetables was well-received by the majority of the participants, and in interviews participants mentioned the following as benefits to the program: cost alleviation, increased access to high quality produce, trying new fruits and vegetables, learning new ways to prepare and preserve new foods, and an enjoyable atmosphere at the stand .

Through 300 hours of participant interaction, interviews with participants in the MFVPP as well as with coordinators of similar programs throughout the country, and my graduate coursework focused on successful community health programming, I feel that I am in a unique position to help the MFVPP group move forward. My recommendations contain the four steps I see as most crucial to the program's growth and success.

Recommendations:

- **1. Recruit additional providers and provider networks, in order to have more participants.**

  Expanding the number of patients who can receive a prescription for produce, and providers who can offer those prescriptions, will grow the program. If the program is equipped logistically to handle then growth, researchers can explore the quantitative outcomes of a nutrition incentive program more effectively.

- **2. Establish a cohort model.**

  Prescription Produce programs elsewhere have increased their retention by enrolling participants in a cohort model. While this requires additional work for program staff at the outset, it has shown to be an effective way to build accountability and commitment among participants. For the MFVPP, I suggest monthly sign-up sessions at a community center. The "cohort" would be the enrollees of that month. Offering information about the program at these sessions would also save time at the market stands.

- **3. Increase program inputs:**

  Through the evaluation of the 2017 MFVPP program, convenience was clearly an issue for a number of participants. The value of vouchers offered did not overcome the difficulty of getting to a stand with limited hours. Increase the value of our programs benefits and expanding access for places to redeem those benefits can help overcome this barrier.

  - ▶ Double the monthly benefits (for a total of $40 per participant).
  - ▶ Add days and times for voucher redemption. Extend the intervention to additional sites- local grocers, farmers markets, etc.
  - ▶ Make the intervention available year-round with monthly, not weekly, biometric data collection

- **4. Hire a program coordinator**

  Hiring a program coordinator is in my opinion the best way to manage the operation and growth of the program. The extra time required to incorporate the above recommendations could easily fill a part-time role. In addition to staffing the farm stands and devoting sufficient time to program evaluation, the program coordinator could take on the following roles:

  - Improve outreach to participants: developing a strategy for involving participants and clinicians including the creation of promotional materials, working with health care managers at Providence clinics, and calling past participants. Initiating outreach efforts for new and returning participants to the program year-round. Establishing a system for clearer and more frequent communication between participants and program staff.
  - Establish a clear organizational structure for the Partners and Participants of MFVPP.
  - Diversify funding sources: assisting with grant writing, exploring ways to fundraise such as community events or donation drives.
  - Connect with community resources: reaching out to local grocers, farmers market managers, university programs, and other health- or food-affiliated groups to explore avenues of collaboration.

Introduction:

This professional paper is presented for Missoula Fruit and Vegetable Prescription Program stakeholders, and is primarily geared towards program evaluation. Throughout the paper, I interject with comments, challenges, and suggestions. For example, our Methods called for collecting biometric data on participants once they officially enrolled in the program. Participants generally visited between 4:30pm and 5:00pm, meaning that I was the sole staff member on site able to collect that data since Providence providers had a weekly meeting that went until 5:00pm. I was also tasked with taking down participant contact information, going over consent forms, and administering and keeping track of vouchers. As a result, I often neglected biometric data collection in favor of farm stand efficiency.

First, I will briefly provide a bit of program background and history. I will then explore the literature on nutrition as it relates to diet-related chronic disease and food security. I will also discuss existing prescription produce programs. As this project began as primarily a quantitative research effort, I will describe our research methods. In the data analysis, I cover the quantitative and demographic findings first. Tables and figures are attached where necessary. Then, I present the interview results and associated themes. Both the quantitative and qualitative findings appear in the discussion section that follows. From the discussion, I move to the limitations of this study and close with my recommendations.

At the outset, the MFVPP team's main focus was answering the research question: Does offering a "prescription" for fresh produce result in patients making positive changes to their diets, and do those changes result in improvements in measurable health outcomes such as weight, blood pressure, BMI, or waist circumference? The answer remains inconclusive. The data gathered on these quantitative, biometric variables is insufficient to yield reliable conclusions. In addition to being short staffed, quantitative data was difficult to collect and not substantial enough to generate defensible inferences.

The short nature of the program (18 weeks), rolling participant enrollment, and low participant attendance rates limited our ability to definitively answer the research question with the available data. These and other challenges inform an expanded recommendations section.

Conversely, our qualitative program evaluation yielded some promising results. The act of being prescribed fruits and vegetables was well-received by the majority of the participants, and participants mentioned cost alleviation, increased access to high quality produce, trying new fruits and vegetables, learning new ways to prepare and preserve new foods, and an enjoyable atmosphere at the stand all as benefits of the program. Following a discussion of the data and limitations of this study, I expand on the recommendations from the executive summary.

A Brief Program History:

The Missoula Fruit and Vegetable Prescription program (MFVPP) started in 2015 as a way to engage patients from the Providence Endocrinology Center in improving their diets. Dr. Katy Brown, a local physician, enrolled 8 of her patients in the new program. Dr. Brown and her patients met weekly at the Providence Garden to learn more about cooking and nutrition while getting subsidized access to fresh produce for the patients. To do this, Dr. Brown wrote "prescriptions" for fresh produce for her clients. These prescriptions were actually vouchers for fresh produce. The clients could redeem these prescription vouchers at a produce stand set up at the Providence garden—a community-garden site operated in partnership with the Missoula non-profit, Garden City Harvest (GCH). A participants "prescription" was good for $10 each month. This $10 was in the form of $1 vouchers, and the produce was subsidized and specifically priced in dollar amounts to make the purchasing process easy. Garden City Harvest handled the growing of the food, and they also managed the subsidy (for example, a bunch of carrots at the stand was $2 where a farmers market bunch of the same size would be $3, or a head of

lettuce for $2 that would cost $4 at the market, etc.) and they sent invoices to the Providence Endocrinology Center who matched the amount of voucher spending with their research funds.

In 2016 Dr. Brown and the Providence Center expanded the program. They allowed additional health care providers to refer patients, and they invited the Missoula Veterans Association to join as a partner. The group moved the weekly stands to a bigger site, GCH's Orchard Gardens farm. More participants enrolled as a result, and as a graduate student I was asked to help with outreach, survey design and administration, data collection, and week-to-week operations. In 2017, the partnership expanded once again with the addition of the International Heart Institute as well as community clinics affiliated with St. Patrick's Hospital (St. Pats and the Providence Center are part of the same organization). Together these groups created the Missoula Fruit and Vegetable Prescription program (MFVPP). Determining the effectiveness of the program was a strong interest of the partners. The group's goal was to create a more effective program and explore the efficacy of prescription produce. This paper builds the framework for a process of improvement and targets future research.

My involvement with the MFVPP was a natural progression from courses I took in my time in the Environmental Studies program. In the Spring of 2016, I enrolled in a social science research methods course and my semester project was on Prescription Produce programs. I interviewed program directors of 7 different sites across the country to hear their thoughts on the benefits patients received, the challenges and successes they had in growing their programs, and the future viability of their interventions. When the MFVPP was looking to expand that summer, my advisor (one of the founders of Garden City Harvest) pointed them to my work and they invited me to collaborate.

Since joining this group in May of 2016, I have spent nearly 300 hours interacting with patients of the Providence Center and the Missoula Veterans Association. Many participants from 2016 came back in 2017, giving them a lot of time to establish relationships and trust with the program and staff. It

was common for participants to stay after their weekly check-in and voucher administration to share their experiences with the program and spend time with staff.

In the 2017 season, we operated two stand locations—one at Orchard Gardens and one at the Providence Garden—and nearly quadrupled the amount of produce that was “prescribed”. Seeing the program grow has been exciting, but it came with challenges. Orchestrating a population-based research project that strives to collect and analyze biometric data and attribute that data to the project is inherently challenging. Even as the MFVPP program faced these challenges, a relatively inflexible structure hampered data collection.

Literature Review:

In order to contextualize our research, this section covers (1) how proper nutrition is associated with diet-related chronic disease, (2) what socio-economic or other (education, preference, perceptions of efficacy, etc.) barriers prevent people from following proper nutrition guidelines and how those barriers are related to diet-related chronic disease, and lastly (3) what programs have been tried and where our proposed study overlaps and differs from them.

Why Prescription Produce?

A study published by Berkowitz et al. (2017) economically analyzed the Supplemental Nutrition Assistance Program (SNAP) benefits and the associated health care cost reductions. Results showed statistically significant reductions in health care costs roughly equivalent to the amount of benefits received. This alone should justify the existence and compel a public commitment to funding these types of programs. If SNAP can reduce health care spending equal to its input costs, there is reason to expect that health care cost reductions from prescription produce – a program tailored to a health care-specific environment, paired with nutritional education and information, and offering consistent engagement with a dietary change program—might even yield cost reductions greater than the price of the program.

Nutrition and Diet-related chronic disease

An extensive body of literature connects food and health. Studies have shown proper fruit and vegetable intake to be a protective factor against cardiovascular disease, high cholesterol, diabetes, stroke, and cancer (Campbell 1999; Joshipura et al. 2001; Ness and Powles 1997). As a way to relate this information to the American public, The “5 A Day Program” was launched in 1991 and is a public-private partnership of the National Cancer Institute, the Produce for Better Health Foundation (a non-profit consumer education foundation representing the fruit and vegetable industry), United States

Department of Agriculture, Center for Disease Control, the American Cancer Society and other national health organizations" (USDA 2017). The existing literature also explores the challenges of accessing nutritious fruits and vegetables. The list of challenges consistently includes price, proximity to grocery stores, availability of options at these stores, familiarity with the produce being sold, knowledge of how to cook it, and taste (Buyuktuncer et al. 2014; Kearney et al. 2005; Treiman et al. 1996; Yeh et al. 2008).

Social Factors and Diet-related Chronic Disease

Socio-economic status also influences the challenges to accessing fresh produce. Poor and rural communities have more limited access to grocery stores, less income to clear price barriers, less education on, and access to, the services that might help them, and less knowledge of how to cook fresh produce. They also face higher exposure to heavily processed foods and advertising (George et al. 2015; Kloek et al. 2004; Lyson 2014).

Food insecurity is also highly correlated with diet-related chronic diseases. Food insecurity, defined by the USDA, is when "access to adequate food is limited by a lack of money and other resources" (USDA ERS 2015). This phenomenon is not black-and-white; many families will experience food insecurity intermittently, with varying degrees of severity and frequency (Berkowitz et al. 2014; Liping et al. 2012; Seligman et al. 2010).

When participants in studies had longer term exposure to chronic disease, they were also more likely to experience food insecurity. There is an extensive body of literature connecting disease and food insecurity that views the issue at a community level (Berkowitz et al. 2014; Liping et al. 2012; Seligman et al. 2010; Yeh et al. 2008). Less research exists on the links between food security and disease and the effects on individual people and families. A study titled "Treat or Eat" explored the connections between food insecurity and self-imposed medication limits. Patients often had to choose between providing healthy food for their families and purchasing their necessary medications (Berkowitz et al. 2014).

Researchers asked specific questions related to skipping medications. This built a template for incorporating the issue of food security into clinical care, much like prescription produce programs now aim to incorporate improved nutrition into clinical care. Researchers asked participants to provide feedback on the questions they were asked about their family's food security. The responses revealed that questions about a patient's home environment were welcome additions to a clinical visit.

In a Robert Wood Johnson Foundation (2011) physicians survey, an overwhelming majority felt that social problems were inextricably linked to good health (85%), with 64% specifically naming access to nutritious food as one of the challenges their patients faced. If general questions relating to food security and access to nutritious foods were embedded in the clinical visit, much like questions of tobacco exposure and sexual activity, a brief discussion between patients and providers on food access could be a fast way for health care providers to assess the social barriers their patients may face.

While identifying the socio-economic barriers involved with access to adequate nutrition is important, researchers and caregivers must act on that knowledge. Again, a majority of surveyed physicians in the Robert Wood Johnson study expressed an interest in being able to "prescribe" cures to those societal ills, though only 1 in 5 felt confident that they had the tools to do so (2011). This poses a dilemma. Nutrition education will remain necessary for the physicians and caregivers, but without a stronger commitment to preventive health from hospital systems and insurance providers, these efforts are unlikely to move past a truncated "clinical counseling" approach to patient wellness. Many physicians are yearning for better ways to address these challenges. Gathering food security and food access information through patient visits would be useful for referrals to programs like the Missoula Prescription Produce program, and could accumulate the data necessary to push health insurance companies to cover the cost of these interventions.

Food insecurity primarily affects households with low income levels, though other factors contribute (Berkowitz et al. 2014; Liping et al. 2012; Seligman et al. 2010). The USDA's "Access to Affordable and Nutritious Food: Measuring and Understanding Food Deserts and Their Consequences" 2009 report shows that over 23 million Americans live in "food deserts," or places that have a limited capacity to provide fresh food (USDA ERS 2009). These are places where long distances, often 30 or more miles, separate residents and stores that can provide healthy, nutritious food. Another factor that influences food security is whether or not someone has an adequate level of education. Without the knowledge of how to budget for food or how to prepare it properly, people can find themselves in situations where they feel unsure of whether or not they can afford fresh food.

Clinical approaches to addressing food insecurity

Some instances of incorporating a clinical approach to nutritional access have shown to be helpful. In the Yeh study (2008), researchers found that consistently, the clinician or physician holds a lot of weight in the patient's perceptions of medical and nutritional advice. It seems then, that the idea of enabling doctors to provide "prescriptions" for adequate nutrition is hypothetically a vital step towards accessing this food (Robert Wood Johnson Foundation 2011; Yeh 2008). Not only would a food prescription offer a needed financial boost, it would build patient rapport by validating the connection between home-life environments and health, as well as offer an opportunity for the patient to receive nutritional information from a trusted authority. Much like pharmaceutical prescriptions, the outcomes of these interventions should be intensively studied and optimized.

There is considerably less risk in experimenting with approaches to nutrition as opposed to medication management, and this allows for a more varied, contextual approach to each programs design. However, due to the relatively recent nature of "prescriptive" approaches to nutrition programs, the research is limited. Many studies address consumption patterns (in line with the 5-a-day guidelines),

self-efficacy, physical activity level, and knowledge pertaining to nutrition guidelines, but few studies have extensively examined objective health measures such as height, BMI, waist circumference, blood pressure, or A1C panels (specific to patients with diabetes).

Some studies have examined the use of prescriptions as a means to address nutritional access in primary care (Buyuktuncer et al. 2014; Kearney et al. 2005) but had little objective physical data. The effects were limited: The Buyuktuncer study (2014) was a continuation of a pilot study by Kearney et al. (2005) conducted through the Castlefield Health Centre in the UK. Researchers coupled a voucher for subsidized produce (4 vouchers each month and each voucher offered a discount of $1 for every $3 spent on produce; only one voucher per transaction) with nutrition education pertaining to the 5-a-day guidelines in the form of leaflets. Six hundred and twenty-one patients received a prescription and agreed to participate. There was a significant attrition rate, with only 54 patients completing the entire study. Overall, 2,484 vouchers were distributed and 1,188 were used. No statistically significant difference in fruit and vegetable intake was observed statistically, but 63% of the final group said the program increased their fruit and vegetable intake. The quality of produce available and "insufficient voucher value" were two oft-cited barriers for participants. The responses were assessed by phone interview, which limited the depth and complexity of understanding the barriers to voucher usage. In addition to price, pre-existing knowledge of the "5-a-day" guidelines may have accounted for the lack of statistical significance in pre- and post- intervention fruit and vegetable discussion.

Researchers in Ohio worked with physicians to provide $40 each month at a local farmer's market, though this program was targeted for pregnant women (Trapl et al. 2017). A goal of their study was to assess the feasibility of integrating a prescription produce program with their health care and farmers market systems. Seventy five patients were recruited, with 42 redeeming at least one of their monthly vouchers. Patients received program materials (a fruit and vegetable seasonality chart, recipes, cutting boards, shopping bags, peelers, etc.) at monthly visits with their provider. They also set monthly

nutrition goals and got their vouchers for that month. Researchers hosted a 3-hour training session with the referring providers before the intervention to go over the program information and delineate best practices for setting goals with patients. Providers also received monthly assistance from the research team with updated information and check-ins. Two key differences between our 2016 and 2017 interventions and this program were the frequency and depth of provider-researcher interaction and the availability of sites to redeem vouchers—this program offered vouchers that were redeemable at 22 different farmer's market locations. The mixed methods evaluation employed by the researchers included surveys and baseline characteristics for all 75 initial referrals, interviews with providers, and voucher redemption rates.

Another Midwest-based prescription produce program provides insight into the varied and complex arrangements that can arise when integrating health care and food systems. Researchers published a study titled, "Food Rx: A Community–University Partnership to Prescribe Healthy Eating on the South Side of Chicago," (Goddu et al. 2015) detailing their work of bringing together multiple stakeholders (health centers, corporate grocers, farmers markets, and university-affiliated researchers) for a health intervention to address relevant food access barriers while still meeting research standards. Because this intervention was in a densely-populated urban center, the research team made produce available at community Walgreen's stores, as well as farmers markets, to increase access. The Walgreens vouchers gave five dollars off on purchases of twenty dollars or more, and the farmers market vouchers were ten dollar coupons. Similar to other programs, researchers provided patients with recipes, nutrition pamphlets, and other related handouts. In this initial study, researchers tracked redemption rates and got feedback from program staff—for example, how difficult was it for Walgreens to incorporate the program and train staff to handle the vouchers? In the future they hope to include in-depth interviews with participants, assess and compare redemption rates across demographic

characteristics and program sites, and expand the number of Walgreens and Farmers Markets they operate in.

To date, perhaps the most comprehensive study on this type of intervention was conducted through the University of Miami. Stoutenberg et al. (2017) measured the feasibility of lifestyle intervention programs to large numbers of individuals at a single time in a community setting, similar to the format of many prescription produce programs. The attrition rate was comparable to the Buyuktuncer study, with 38% of participants leaving the study in the first 3 weeks. This study examined the efficacy of these programs in three main ways: (1) validated physical activity and nutrition questionnaires, (2) fitness assessments performed by researchers and MD/MPH students from the university, and (3) objective physical data measures. Overall, 76 participants completed the study, which consisted of a weekly meet-up at a local community fitness center. The fitness center offered its facilities prior to its operating hours each Saturday for a total of 16 weeks. Results showed "Significant changes observed among all participants included increased distances covered during the 6-Minute Walk Test, 30-Second Chair Stand Repetitions, daily FAV consumption, as well as decreased body weight and body mass index (BMI)," in addition to a significant change in other relevant psychosocial variables such as Nutrition Stages of Change and Cumulative Eating habits. These effects were more pronounced and varied for women who participated. Despite the high attrition rate, this study provides evidence for community-based nutrition interventions and reinforces the rationale for multi-modal interventions.

Much research exists on the link between adequate nutrition and prevention or maintenance of chronic disease. Being food secure leads to better nutrition, as well as lower risk and better management of diet-related chronic diseases. Asking questions about food security in clinical visits and providing nutrition education and supplemental assistance for accessing healthy foods are just a handful a of ways researchers and clinicians have tried to overcome barriers to consuming fresh produce. While

other attempts at “prescribing” a more nutritious diet have been made, patients still find increasing their fruit and vegetable intake to be challenging.

Using the template of our 2016 pilot year and a more situated understanding of “prescription produce” programs both in the research literature and in their practice, the aim is to make the MFVPP as effective as possible. Our study is comprehensive in data collection, gives credence to our specific program context, and also builds on the literature of prescription produce programs and barriers to food access. We will incorporate cooking demonstrations and a wide array of nutritional information with regular visits by medical professionals to our research sites. Although the length of our program (18 weeks) was longer than many in the mentioned studies, it is less intensive. This program evaluation has interviews with participants of the program, which I did not find anywhere else in the prescription produce program literature.

Methods:

What are the strengths and weaknesses of the new Missoula Fruit and Vegetable Prescription Program? What are the positives and negatives of offering a "prescription" for fruits and vegetables? How might the Missoula Fruit and Vegetable Prescription better meet its goals of helping program participants?

Setting

Providence Endocrinology Center health care providers and I recruited participants in the winter of 2017 for an 18-week Prescription Produce program tailored to the Garden City Harvest CSA growing season (June 6th, 2017 - October 5th, 2017) through phone calls and office visits. Providence Endocrinology Center staff provided program information to clinicians (primary care doctors, nutritionists, physician assistants, social workers) who referred their patients to the program. Information provided to the clinicians included program logistics and the referral criteria for patients (low-income or having a financial barrier to accessing fresh produce).

Clinicians referred their patients by providing them with the physical vouchers. These vouchers had an address for the farm stand as well as the days and times printed on them. Some clinicians included an information packet with farm stand location, times, and program description with the vouchers. Each patient received ten $1 vouchers at the time of referral, and they enrolled in the program by visiting one of two farm stand locations.

Farm stands operated Monday and Thursday evenings from 4:30-630PM at Orchard Gardens (a local community farm managed by Garden City Harvest) and the Providence Garden (a community garden space co-managed by GCH and the Providence Health Center), respectively.

In 2016, all participants and all sessions were held at the Orchard Gardens location. Between the Providence Center and the Missoula Veterans Association, roughly 40 participants visited the stand to enroll in the program that year. These participants joined on a rolling basis, and 40 was our final

number. We collected height, weight, and circumference for all participants and we assessed participant demographics and attitudes towards the program in pre- and post-season surveys that we administered on site. This rolling basis of participants joining the program complicated data collection and analysis, but the group decided to keep this format for 2017 because it allowed for more participants to join. The Prescription Produce team felt that offering an additional farm stand site in 2017 would enable more participants to visit. Placing this farm stand at the Providence Garden had the added benefit that providers from the Providence Medical Group could visit the farm stand easily, as their clinical offices are adjacent to the garden.

Participants continuously enrolled in the program, meaning that they could sign up at any point during the 18-week season. Clinicians continued to refer patients up to the final week of the program.

Participants

Clinicians primarily referred participants that were both low-income and being treated for chronic disease, but not all participants had an active chronic condition. The majority of referrals were through the Providence Medical Group Diabetes Care Management team, which consisted of Primary Care physicians, dieticians, and physician assistants. Other referring clinicians were local physicians affiliated with the Providence Medical Group.

There were no other significant, specific requirements to participate. We had a large age range, though a majority of our participants were elderly and on fixed-income. Clinicians were not targeting women for the intervention, yet 29 of the 40 Providence patients enrolled in 2017 were female.

Measures

On a participant's first visit, program staff (primarily myself) collected basic contact information (name, email, phone number, and referring provider) and assigned each visitor a Prescription Produce Number, or PP#. As time allowed on subsequent visits, I explained the program and research rationale—how we were exploring the question of if, and how, our program may result in measurable health improvements— and I asked them to sign a consent form.

After participants provided consent to participate in the program, I collected demographic and biometric data. As time allowed, I collected biometric data (height, weight, circumference, blood pressure, resting heart rate) on site using a portable scale, a tape measurer, and one of two battery-powered blood pressure cuffs—one regular and one bariatric. Biometric data was primarily collected by myself and Providence Health care providers who visited the Providence Garden farm stand on Thursday evenings. During the final month of the program, our plan was to collect the same biometric variables to compare pre- and post- program measures. In the final month of the program, our attendance rates dropped significantly. Many of the participants who had their pre-program biometric data collected did not attend any of the final 4 weeks, so we were unable to collect post-program measures.

In the months following the program, I interviewed 14 program participants. I split interviews into two categories, with two interview guides. The first interview guide was for participants who rarely visited the program, which I established as less than one-third of their available visits after enrolling, for a total of five interviews. The second was for participants who visited the program for more than one-third of their available visits. I interviewed nine participants in this category. For both interview guides, I chose participants randomly after separating them by attendance rates. Interviews with the rarely attending group were short, 5-10 minutes and semi-structured. I asked about their difficulties visiting the program, whether they would like to join the program again in 2018, as well as the question "What did it feel like to be prescribed fruits and vegetables?"

Interviews with frequent program attendees lasted 10-15 minutes and followed the same semi-structured format. In these interviews, I covered the same topics as the rarely attending group with added questions on program satisfaction and efficacy.

Analysis

I used SPSS software to assess participant demographic surveys, attendance data, and relevant biometric data. The change from pre- to posttest in BMI, blood pressure, etc. is omitted from this paper due to such a small data set ($n<5$). Pretest data are reported as baseline measures in Table 2 of the Results.

I analyzed follow-up interviews using open coding. I used initial coding, focused coding, axial coding, and selective coding sequentially to assess relevant themes in participant responses. Themes are presented and explored for each of the interview questions in the data analysis section.

Recommendations stem from my observations and experience managing program sites (~300 hours including the 2016 Prescription Produce program), prior research experience in Missoula food security projects and my understanding of other prescription produce programs.

Results:

We collected information on prevalence of chronic disease and pre-existing conditions in our participants (Table 1). Participants provided consent before they completed the surveys. The consent process took about 20 minutes for each participant. The flow of the farm stand was generally that most attendees on a given day would show up between 4:30pm and 5:00pm, meaning there was insufficient time to have everyone fill out a consent form properly. Participants were still able to participate in the program and receive the benefits of subsidized produce, but without the time to fill out the consent form it diminished our potential to recruit subjects to the study – which entailed taking a survey and collecting pre- and posttest biometric data. We found the group of participants who did take the survey had a high prevalence of diabetes (45%) and heart disease (20%). Thirty-five percent of participants reported having two or more chronic conditions.

Table 1. Participant Characteristics: Prevalence of Chronic Disease

Disease	(%) Percentage of Participants (n=20)
Diabetes	**45%**
Two Chronic Diseases $^{\varphi}$	**25%**
Heart Disease	**20%**
>Two Chronic Diseases $^{\delta}$	**5%**
No Pre-Existing Conditions	**5%**
Cancer	**0%**

$^{\varphi, \delta}$= combination the following chronic conditions – diabetes, cancer, heart disease, hypertension, sleep apnea, Chronic Obstructive Pulmonary Disease, anxiety, depression, thyroid condition, asthma, chronic pain, chronic fatigue, arthritis, fatty liver disease, Multiple Sclerosis endocrine disorder

*= only 20 of the 40 participants responded to this question

Seventy-three percent of our participants (n=29) were female (Table 2). Eighty percent of the participants who completed the demographic survey self-identified as Caucasian/white and 75% were low income— at or below $24,999 per year. A majority of our participants lived in small households; with 60% living alone and 15% living in a two-person household. We assessed relevant barriers to fruit

and vegetable consumption in our participants. Similar to our 2016 season, the most frequently cited barrier to eating enough fresh fruits and vegetables was cost. This was assessed in our demographic survey, where thirteen out of twenty survey participants (65%) cited cost as a barrier. Other responses included having difficulties with transportation and mobility, insufficient knowledge of how to prepare the foods, and lack of availability of produce where they shop.

Participant Characteristics

Baseline biometric data (height, weight, circumference, BMI, blood pressure, and resting heart rate) collected from participants is presented in Table 2.

Table 2. Baseline Participant Characteristics

Gender	73% Female (n=29) 27% Male (n=11)
Body Mass Index (kg/m2)	34.7±9.0 (n=14)
Waist Circumference (inches)	46.9in ± 7.3in
Blood Pressure (systolic/diastolic)	123±16/74±12

Figure 1. Income level for survey-taking participants in the program (by percentage).

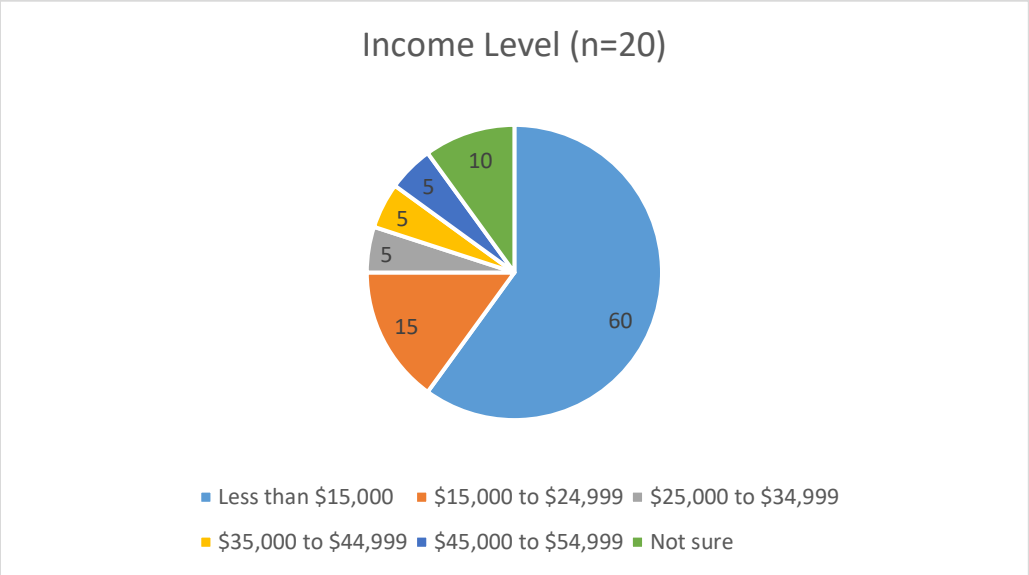


Figure 2. Survey-taking participant race and ethnicity (by percentage)

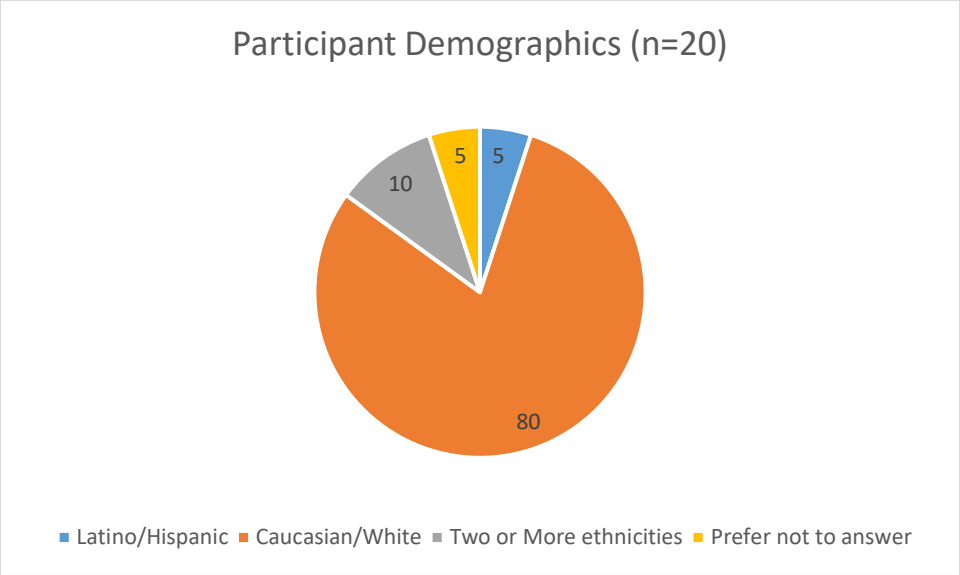
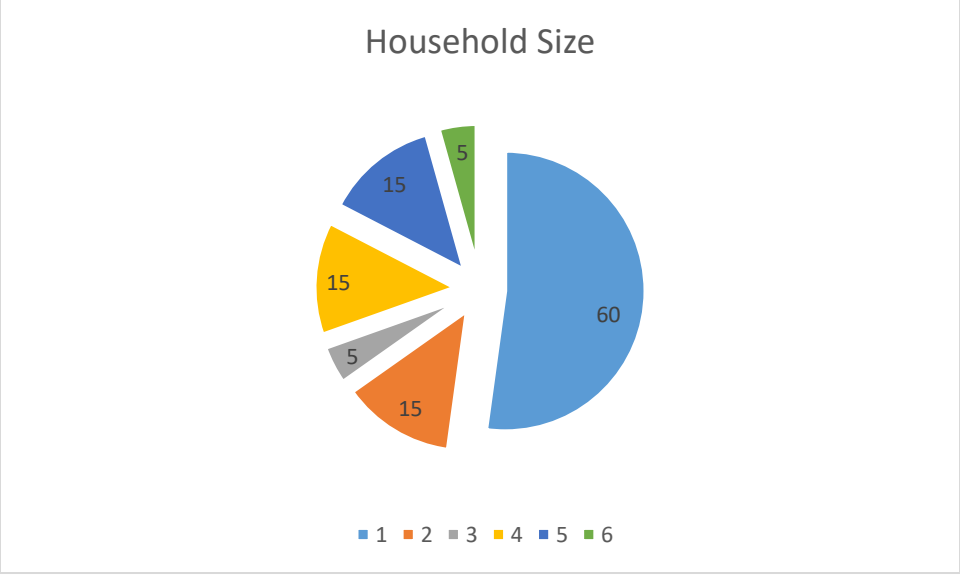


Figure 3. Household Size for Survey Taking Participants (by percentage)



Program Attendance/Retention

Participant start dates and average attendance rates are shown in Table 3. Using a continual enrollment process meant that the number of available sessions varied for participants. For example, because of the short nature of the program, if a participant enrolled towards the end of the season (late July) the number of sessions available were much fewer than for participants who enrolled in the program at the beginning of the season (early June). Thus, participant attendance rates are artificially inflated towards the end of the program. These results provide a general description of how enrollment and participation in the program progressed over the spring and summer months. The first column provides program dates, the second column provides the number of participants who enrolled on the given date, and the third column tallies the total number of participants enrolled by that time. The fourth column keeps a tally of how many sessions were remaining in the season. This means that a participant signing up in Week 2 on June 12th could attend 17 sessions, and a participant signing up in Week 8 on July 24th would only have 11 sessions available. The final column reflects the sessions that a participant could attend and the percentage of the time they actually did.

Table 3. Program Start Dates and Average Attendance Rates

Start Week (2017)	# of participants who enrolled on the given date (n=)	Cumulative participant total as of the given date (n=)	# of sessions available to participants enrolling on the given date	Average Participation rate (%) for participants enrolling on the given date
June 5th	4	4	18	29.2
June 12th	3	7	17	15.7
June 19th	4	11	16	39.6
June 26th	2	13	15	16.7
July 3rd	3	16	14	31.0
July 10th	2	18	13	23.1
July 17th	1	19	12	41.7
July 24th	2	21	11	22.7
July 31st	5	26	10	16
August 7th	0	26	9	0
August 14th	0	26	8	0
August 21st	4	30	7	39.3
August 28th	2	32	6	25
September 4th	1	33	5	60
September 11th	2	35	4	25
September 18th	2	37	3	83.3
September 25th	1	38	2	50
October 2nd	2	40	1	100

*mean, standard deviation

Interview Data

Themes, sub-themes and example responses are shown in Table 4, and described in more detail, below.

Table 4. Program Satisfaction and Suggestions for Improvement: Participant Interviews

Theme	**Subtheme**	**Sample Quote**
Addressing Relevant Barriers to Fruit and Vegetable Consumption	Cost alleviation	“Veggies and things like that are expensive and hard to get otherwise"… "Being on fixed income, we won't turn down fresh fruits and veggies"… "Cost. Its more cost-effective to buy frozen even when I want fresh."
	Access to fresh produce	"All the veggies in have made a BIG (participant emphasis) difference. I usually get sick in the winter, not this year."
	Quality of produce available	"It's amazing the difference … I'd much rather have them <produce> fresh from the ground"
Power of connecting clinical care to a population-based health intervention	Positive reflections on the idea of using a “prescription”	“Really great idea" .. “I loved it”.. "It's important because its going inside your body. If you're gonna be eating it might as well be healthy food."
	Feeling supported to make lifestyle changes	"Helps with eating what I need to." " I didn't know they could do that. I loved it."
	Improving patient rapport	"It made me feel like my Health Care Provider was concerned about my well-being in a great way."
Social Benefits	Benefits to Family	"It was a great time for my daughter and I"…
	Agency and Self-Efficacy	"I felt like I was contributing to my health on my own."
	Sense of Community	"Nice to be able to go and socialize."
Wanting to see the program grow	Increased program capacity in product	"I thought it was pretty great. Maybe more variety."
	Increased program capacity in delivery	"You need to advertise it more" ..
	Increased program capacity in content	“Pair nutritional knowledge and information with medications.”

Theme 1: Addressing relevant barriers to fruit and vegetable consumption.

Participants identified a number of barriers that can make ideal fruit and vegetable consumption difficult. The most prevalent barrier was cost—which this program tried to alleviate. Participants received up to $20 worth of vouchers for produce each month, and participants said they relied on this. One participant showed this when they said “For us, it’s the money. It’s reliable. I could eat salads more frequently," followed later with "Being on fixed income, we won't turn down fresh fruits and veggies.”

Access to fresh produce was a common theme. Nearly all respondents (i.e. 7 of 9 participants) said the program increased the amount of fruits and vegetables they consumed and improved the quality of the produce they consumed (i.e. 6 of 9 participants). Participants mentioned learning about new foods and ways to cook them, obtaining information on produce storage, and in general having more produce around—saying things like “Veggies and things like that are expensive and hard to get otherwise," or that this program affected them positively with “Fresher veggies and more of them.”

Theme 2: Power of connecting clinical care to an outpatient, lifestyle-based program

When I asked participants to describe what it felt like being prescribed fruits and vegetables, all but one respondent spoke positively about the experience. Three participants, “loved it”, another “felt like [their] Health Care provider was concerned about [their] well-being in a great way”, and another respondent said, “I felt it was appropriate, important, and surprising that it was an option.”

Participants also said that they felt more supported to eat fresh fruits and vegetables as a result. They said things like, “It's important because it’s going inside your body. If you're gonna be eating it might as well be healthy food." Another respondent said, “It helps with eating what I need to,” and another “my provider said it ‘increased our rapport’.”

Theme 3: Social Benefits

Participants often described positive aspects of the program. Many found that they were more willing to try new vegetables and recipes, and that this was also having a positive effect on their families. Participants mentioned spending time with family at the farm stand, getting their family to try new recipes, and in general being more comfortable with incorporating fresh fruits and vegetables into their diets. Participants frequently described interactions with program staff as a positive aspect of the program.

Theme 4: Wanting to see the program grow

All interviewees said that they would like to take part in the program next year. When asked "What would you like to see from this program in the future? How could we improve?" participant responses generally fell into subthemes such as increasing program capacity, whether that be in product, delivery, or nutrition-related content.

Four participants mentioned variety as something they would like to see increased. One participant mentioned having greens more regularly throughout the season and another thought it would be a good idea to have more specialty crops. For example, one respondent described getting a horseradish root from a farmer-friend and it made all the air in her house pungent! Another participant, one who visited the Providence Garden—mentioned wanting an increased quantity of vegetables at the stand.

Participant suggestions to improve the delivery of the prescription produce program included: wanting the program to be advertised more, wanting the stands to be open more often, wanting text reminders and more frequent communication, wanting better parking at remote farm stands, wanting farm stands near bus routes, and saying the farm stand timing was difficult with Missoula traffic.

One participant mentioned wanting more nutrition education with their medication, and two participants mentioned wanting more cooking classes and demonstrations. Another participant wanted the program to be more interactive.

Participants had a number of other comments and questions. Thinking the produce was at times expensively priced, wanting the program to be less regimented, and feeling unclear about the purpose of the study were all responses to this question. Participants also responded by saying that they enjoyed the quiet aspect of the program, they felt fortunate to be a part of it, and they wanted it to continue.

Discussion:

The interview data provides insight into how and why this program may be having an effect on participants. Cost alleviation, increased access to and quality of fresh produce for participants, experimenting with and learning about new foods and ways to prepare/preserve them, positive reflections on the programs incorporation with their health care, and enjoying their interactions at the stand were all mentioned as favorable aspects of the program that might have a positive health effect. Interview responses that show room for growth and change of the program are assessed in the recommendations section.

Cost alleviation and increased access to and quality of fresh produce are the most tangible and straightforward of our program's benefits. Preliminary research found that the main barriers to eating enough fruits and vegetables for low-income people are cost and access. A majority of our participants are low-income or on fixed income. It seems then, that we are hitting the mark when it comes to the type of impact we are having. This straightforward approach runs the risk of missing an important component of dietary change, however. The food culture that a person is embedded in can influence their food choices regardless of a doctor's prescription. Poverty is often associated with poor food choices, and while reducing the associated economic barriers to health eating is helpful it doesn't guarantee success. Many participants were exposed to new vegetables that they had never tried before, and returned to the stand excited to share their experiments and experiences with new recipes and ingredients. This introduction of a new way of eating can facilitate change and in many ways is a success.

The produce price, in addition to the subsidy, was set below market rates by Garden City Harvest and specifically priced in dollar amounts to make transactions at the stand efficient. Multiple interviewees mentioned getting organic and pesticide-free produce as a benefit, which may indicate that if cost was no issue they would purchase more of the same high-quality produce.

Learning about different fruits and vegetables, how to prepare and store them, and how they related to disease management were all mentioned by participants as benefits to the program. This is surprising given that this program did not have a large educational focus. Rather, it was through interactions with knowledgeable GCH staff and other program attendees that this information was shared. To give an example, we talked about different ways to preserve food with one of the participants. She had a fairly extensive knowledge of how to pickle/ferment vegetables, and a few weeks later she brought us spicy pickled cauliflower made with produce she got from the stand. We hosted two cooking demonstrations during the season (we hosted these at Orchard Gardens. We provided recipe cards for the meal we made, and I was assisted by a resident and community gardener at Orchard Gardens who received her culinary arts degree) and had recipe cards and produce information available on site. The most prominent information exchange it seemed was still the interactions with program staff.

Participants were largely in support of the "prescriptive" model for fruits and vegetables. To many, this type of intervention was important, appropriate, and gave them the tools to manage their own health. Whether by giving them the extra push to see that it was of value, or if simply the support (financially and in terms of accessibility) to do so was the main driver for utilizing the intervention should be studied further.

Interpreting participants' explicitly mentioned responses such as "having more energy" or "feeling healthier" was challenging. These statements, and others like them, are subjective, self-reported measures of health. While they point towards increased agency and belief in their ability to direct their own health outcomes through diet, they may have been influenced by participants' bias since I conducted the interviews and had interacted with those patients for the duration of the season. I made a concerted effort to remove my positivity bias of looking for participants to get more out of the program than they may actually have, but this still could have been a factor in patient responses.

Demographically, the high percentage of low-income participants (75% living on less than $25,000/yr) and high prevalence of chronic disease (45% of participants being treated for diabetes, 20% for heart disease, and over a third of participants having 2 or more chronic conditions) indicates that we are serving a vulnerable and underserved population. Compared to our 2016 season, we had nearly twice the amount of sign-ups, with 57 compared to 33. Similarly, the amount/value of produce subsidized by the research group more than quadrupled. This was in part because we increased the monthly voucher allotment from ten $1 vouchers to twenty.

There is little consensus on what level of produce subsidy is the most effective—currently prescription produce programs provide anywhere from $10 and month to as much as $40. Some employ a supplementary produce "coupon" that entails having the recipient purchase produce (for example, the Chicago Prescription produce team working with local Walgreens to offer $2 towards fresh produce with a purchase of $10 on fresh produce), and others, like our program, rely on direct subsidy. It remains unclear how these programs are substantially different from other nutritional assistance programs (SNAP, WIC, etc.), and differentiating the two should be a focus for researchers moving forward.

To illustrate, it's helpful to consider how expensive it would be for a single family of four to consume the recommended amount of fresh produce for an entire week. In this scenario, I will use a typical July week as an example. Keeping with the 5-a-day guidelines, a family of four would need to consume at least 20 servings of fresh fruits and vegetables each day, totaling 140 for the week. Taking into account average, and modest, produce availability and prices for July, it would cost nearly $30 for just one person to consume five servings of fruits and vegetables for the week. A person eating the recommended five-a-day diet might have a serving of blueberries for breakfast, a salad with a servings worth of lettuce and onion each for lunch, and additional servings of beans and peas with dinner. Blueberries cost $4/pint, at $2 per serving. Lettuce is $2/head, or about $1 per serving. Onions cost between $2 and $3 per pound and peas and beans each run between $3 and $4 per pound. The day I

described is likely not enough food to be sufficient, and even so entails between $5 and $6 dollars of produce. If later in the week they wanted raspberries ($5/pint), fresh cherries ($6/lb), tomatoes ($3/lb) or other specialty crops that number could increase. Five dollars every day is thirty five dollars each week. Multiply that figure by four and the family described would need to spend over $140 each week on produce alone—with a monthly total averaging between $560-600. While these types of calculations are inherently speculative, it goes to show that eating a sufficient amount of fresh fruits and vegetables is expensive.

According to the Bureau of Labor Statistics, the average annual household income before taxes in 2016 was just under $75,000 dollars. The average food expenditure was $7,000. If, for the sake of argument, we say that approximately 10% of a household's income will be spent on food, this leaves our patient population- with incomes primarily at or below $25,000, with less than $3,000 to spend on food. Our $20 monthly subsidy, lasting 4 months, barely scratches the surface of that disparity. Taking into account that heavily-processed, calorie-dense foods are often subsidized and hence more affordable, the taxing and expensive issue diet-related chronic disease management further exacerbates the income challenges. If we doubled our produce subsidy to $40 a month and operated year-round, those patients would still be on average left with less than $3,500 to spend on food per year. To fully address this gap would require over $300 each month, per household! For reference, the maximum benefit for a single-person household in the SNAP program in Montana is $192. In sum, these programs are a valuable supplement and can provide extraneous social and educational benefits, but they cannot address societal income inequality as it relates to nutrition. As pointed out earlier, the costs of these programs come back to us in health care savings. Economically, as well as ethically, we should pursue these types of reforms.

Another change from our 2016 season was the inclusion of the Providence Garden as a farm stand site. This additional site is still a Garden City Harvest community garden site but is co-facilitated

with the Providence Health Center, which owns the space. We started operating this stand to make use of this beautiful, and available space—as an aside, one of the initial goals of the Providence Garden was for occupational therapists to work with patients there. It is accessible for people with disabilities and has raised beds with a rich mix of stimulating plants, and other hospital staff frequently take lunch there. The motive behind the switch, though, was to allow health care providers from the Providence Health Center to more easily visit the stand and interact with patients in the program. The research team felt that this would increase patient rapport and build program understanding. Early start times at the stand, however, meant that visiting providers often missed the busy time at the stand (4:30-5:00PM) as they were finishing work. Another reason for the additional stand location was to make the program more accessible for participants. The Orchard Gardens location is on the West end of town and the Providence Garden is on the North.

At the farm stand, we often were not able collect all of the information we had set out to record. Participants were free to visit the stand from 4:30-6:30PM, but most visited between 4:30-5:00 and 6:00-6:30. I was generally the only approved person available on-hand to take objective measurements such as weight and waist circumference, and this caused a bottleneck because I simultaneously kept track of attendance data, handed out vouchers, and signed participants up for the program. There were also periodic instances of equipment malfunction or some other miscommunication – e.g., needing to replace the blood pressure cuff, leaving the scale at the Orchard Gardens site before a Monday at the Providence Garden. Every week of the intervention we had new sign-ups except for two weeks in early August, and because of the process of going over the consent form (roughly 4 pages) this took a lot of time.

Our data shows the how and the why of participants changing their diets, but the measurable health outcomes remain inconclusive. This can be distilled into a few main reasons; 1) the program lacked the capacity to collect that data effectively, 2) using continuing enrollment meant that we

reached the ~40 participants near the end of our season and 3) attributing shifts in population-based biometric variables to a short-term intervention is inherently challenging. Continual enrollment increased our numbers and ensured more patients access, but data collection and analysis was more challenging. Additionally, the effects of dietary changes on biometric measures take time. One does not eat kale and the next day weigh 20lb less. Consequently, rolling enrollment may not allow enough time for dietary change and increased produce consumption to show measurable results before the end of the season. Despite these difficulties, exploring the 'if, how, and why' this intervention can promote dietary change has provided a substantial amount of data that is still useful to the partners.

Limitations and Potential:

The 2017 MFVPP presented unique challenges; the overall number of enrollees nearly doubled and the group started operating at two different locations. Stakeholders submitted and were approved through St. Patrick Hospitals IRB approval process for a 3-year study. The tail-end of the growing program was especially challenging. Many participants were absent in the final weeks and I was unable to obtain the majority of the post-season biometric data. The initial research question of whether prescriptions for fresh produce change diets, and would those diets result in measurable changes in key biometric health measures, is inconclusive.

Despite this, the program was still in many ways a success. This was another season of learning and growth for the research team. For many participants, it was their second opportunity to have a doctor prescribe "produce" as an intervention and to get acquainted with our program. Qualitative findings show an overall positive response to the idea of prescription produce and give some insight into how the MFVPP could have a beneficial health impact, but relatively short interviews and a small sample size mean more research is necessary.

Researchers should continue to address the question of efficacy through qualitative and quantitative methods, with more rigorous methods for collecting quantitative data and in more depth qualitatively. Future research should explore the longitudinal benefits of the program—are participants who visit for more than one year more likely to experience benefits, and how or why? Researchers could also track the economic benefits of the MFVPP on the local food system if the program were to move to farmers markets and or grocery locations.

The ideal setup for a successful MFVPP entails increased inputs, a larger group of stakeholders, and a more-focused education and outreach component. As discussed, even an increase to $40 each month is still insufficient to cover all of a participants produce needs. A future program should offer as

much as $20 each week for each participant. In addition to having more money to spend on fresh produce, the “prescription” needs to be more easily redeemable. Adding sites such as Missoula’s farmers markets (there are three currently operating, since one of the two markets operates during a weekday), grocery stores, or even local farms interested in the work would help alleviate that issue. Participants ought to have more hours and greater convenience in utilizing their prescription. The largest barrier to incorporating new places to redeem prescriptions is having no clear structure for reimbursement and invoices between markets, stores, farmers, and the Providence Center. The Providence Center has already been contacted by other health clinics about the possibility of referring participants to the program, and as word gets out into the community and more health clinics want to use the model it may eventually be the case that the MFVPP become an independent organization who deals with multiple health clinics and markets. Building the educational component of the program would entail a higher degree of nutritional counseling and case management. Right now, the produce is subsidized, and offers recipes with the week’s produce. A more effective program would help participants make weekly diet plans, send out recipes before the week, offer cooking and other food-related demonstrations, and educate participants on systemic food issues in addition to nutrition.

Recommendations:

1- Recruit additional providers and provider networks

One of the best ways for the program to grow is for more providers to start referring their patients. Clinicians may have as long as 6 months to a year between visits with patients, so as the program continues there may be increased utilization by patients of already-referring providers. Even so, additional Providence-affiliated clinicians sending their patients to the program would increase enrollment through a larger patient base. Additional providers also add to the base of people who can advocate for this program, do outreach to the general public, and help with fundraising organizationally.

2- Establish a cohort model

I recommend the program begin using group enrollment sessions. Similar community health programs saw an increase in retention when participants enrolled at the same time (Fredriksen 2015, unpublished manuscript). Retention rate was one of our challenges as a program. Participants described difficulties with travel or timing of the stand, and although a group enrollment format would not address these directly they've shown to be effective. An example of a group enrollment structure would be to rent out a community space/center for a drop-in session once each month. For participants and referring physicians, the day and time would be constant to avoid confusion. At these meetings, participants could learn about the program and decide whether or not they would like to enroll. Enrolling at an informal meeting (collecting information, signing waivers, answering questions, etc.) would also free up time at the market stand for participants to interact with the farmers and health care providers. This process would also make the transition to other sites easier. A "cohort" would be the enrollees of that month's meeting. In the future, these meetings would be a great opportunity for interested physicians/health care providers to visit and find out more information about the program.

3- Increase program inputs

I recommend an increase in the total amount of subsidy from $20 each month to $40 each month, additional days and times to redeem the vouchers and utilize the program (including new sites such as farmers markets and grocery stores), and expansion of the length of the program to year-round. In the discussion, a rough calculation found that for a single person to consume the recommended five servings of fruits and vegetables would cost around $30 or more each week. Even doubling the amount of subsidy from $20 to $40 monthly covers less than a third of participants produce needs. While this program is not a social safety net it is important to be mindful of that gap. If participants feel that their voucher value is not worth the time and effort it takes to get to the stand during the limited hours, the expansion of days, times, and locations for participants to use the vouchers would remove the convenience barrier.

If the MFVPP stakeholders continue to wish to evaluate the program based on changes in biometric measures, the increased voucher value and program expansion become essential additions. Additional days, times, and sites would theoretically increase program attendance but these changes demand concurrent increases in necessary staff time. Working to establish the program with local grocers or farmers markets would also require time.

4- Hire a program coordinator to manage this expansion:

Hiring a program coordinator is in my opinion the best way to manage the operation and growth of the program. The extra time required to incorporate the above recommendations could easily fill a part-time role. In addition to staffing the farm stands and devoting sufficient time to program evaluation, the program coordinator could take on the following roles:

- Improve outreach to participants: developing a strategy for involving participants and clinicians including the creation of promotional materials, working with health care managers at Providence clinics, and calling past participants. Initiating outreach efforts for new and returning participants to the program year-round. Establishing a system for clearer and more frequent communication between participants and program staff.
- Establishing a clear organizational structure for the Partners and Participants of MFVPP
- Diversify funding sources: assisting with grant writing, exploring ways to fundraise such as community events or donation drives
- Connect with community resources: reaching out to local grocers, farmers market managers, university programs, and other health- or food-affiliated groups to explore avenues of collaboration

Improve Outreach to Participants:

The program needs a more efficient way to provide resources and information to participants week-to-week. This could take the form of a website or a newsletter as an information "hub" for participants in future seasons and texts for reminders and notifications. I sent personalized emails to participants with email addresses this season but having an email account specific to the program should be created. Some programs in other parts of the US are using text message reminders as a tool for preventive health with good success, and this is an opportunity to improve our communications and efficacy.

The program should integrate all enrollment materials, so they work across the season. The schedule that we originally handed out to participants had a date error regarding the August fundraising effort. Ideally, an enrollment packet would be a handout that we could give to providers/caretakers for

them to give to their patients that explains the structure and reasoning for the program, as well as what they are expected to contribute in terms of data collection and surveys. Participants' lack of clarity and understanding of the program was a barrier to running the market stand efficiently. If participants joined the program having a better idea of what to expect and a clearer sense of the programs purpose, I believe it would increase our retention rate through participant self-selection while simultaneously making the enrollment process easier. I also believe that an increased baseline understanding paired with a clearer and consistent communication on the part of the program would encourage participants to engage deeply with dietary change.The dissemination of this information to providers would ideally be handled by a program coordinator. If additional health clinics are interested in joining, it would also fall on the coordinator to work with health care managers at those sites to "educate the educator" as they pass along the packets to physicians and providers in their network.

Establish a Clear Organization Structure for the Partners and Participants of MFVPP:

This program is free for providers to refer patients, and doing the necessary outreach to health care teams has been relatively low-cost. Providers from outside the Providence Center team referring patients often were missing information. It was not unusual for a participant to show up with multiple months' worth of vouchers to start, showing up with vouchers already signed by the doctor, or to be confused about how much subsidy the program actually provided. Streamlining and standardizing the process of sharing our protocols and information with health care teams will be important moving forward.

Creating a set of standards and guidelines for making decisions would help the MFVPP stakeholders navigate the programs growth and development. There are a number of stakeholders currently involved and it is often difficult to reach consensus or clarity—having a process, which make take the form of regular meetings or more defined stakeholder roles, would address these challenges.

Ideally, these meetings would recur monthly. Deciding how to handle staffing, recruiting, evaluating, and any other questions or concerns of stakeholders and program staff could be addressed.

These recommendations are from my own experiences with the MFVPP, and not all of these will be feasible. Choosing which recommendations to build off of or incorporate would be an example of a challenge this group could tackle.

The MFVPP seems poised for growth, but it needs to do so in a calculated way. To achieve research outcomes like measurable changes in biometric variables across a population, the program needs to grow in such a way that logistically outstrips the capacity of Garden City Harvest. GCH helped to seed this program, but staffing and subsidizing farms stands and produce for a program more than twice as large is not feasible in the context of their other programs. If the program were extended on either end of the season this would also pose a challenge. The group could consider a guiding document or Memorandum of Understanding for stakeholders to reference.

Diversify Funding Sources:

Grant-funded programs continually need to expend effort just to stay in operation. This program is no different. Currently, this program relies on Garden City Harvest's subsidy and Providence Center's discretionary research funds. However, if the program is going to grow it needs to draw from a larger base of funding and think broadly about its impact.

I've put together a list of relevant organizations and foundations that award grants for programs seeking to improve nutritional and behavioral health outcomes. This document is in the appendix.

Programs similar to ours have been able to secure grant funding from both private foundations and government entities for a number of reasons; these have included medical education (Medicare offered funds to a program that added Emergency Room Diversion education to its services), food

security research, diabetes prevention research, connections between physical activity and nutrition research, and community-health intervention research, among others.

From the standpoint of the medical provider, there is no cost for referring patients to this program. As we expand the reach of this program, we could consider a "subscription" fee for doctors outside of the Endocrinology group to provide this service to their patients. We had a number of different providers refer patients, and although this could still be free for Providence providers, it could supplement administrative costs and pay researchers for their time moving forward.

Another conversation worth having is with the Health Insurance Agencies themselves. If patients "completed" this program- which included a threshold for a number of visits and cooking demonstrations or something similar- could they receive a discount on their premiums moving forward? Do Health Insurance Agencies provide research funding- and would we be eligible considering our capacity-building efforts these past 3 years?

Connect with Community Resources:

This program is an innovative way to integrate two merging systems- the food system and the health care system- and people are excited about it! There are a number of community and university organizations that would be interested in joining, expanding, building off of, and learning from our work.

I have already reached out to a number of University of Montana programs: Masters in Public Health, Ph.D. in Public Health, Masters of Physical Therapy, Doctor of Physical Therapy, Environmental Studies, and the Dean of the College of Health Sciences. The Public Health program has shared our work with their student listserv and the Physical Therapy program is interested in building this in as an internship for their students- a professor I met with has also offered us to visit her classroom with all of their current students to talk about our program and how the internship would look. Other University

programs we should consider coordinating with are the School of Social Work, Community Health, Health and Human Performance, and the Pharmacy program.

All of these programs require internship hours for their students in some form. By offering a supervised internship in the context of an on-going research project we would meet those requirements. Students that are especially motivated or interested in our work could pursue it as an independent study or a dissertation.

Community organizations could also serve as a way to build and staff our program. Organizations that come to mind as potential partners are the Missoula Food Bank, 1000 New Gardens, MUD, Home Resource, Women's Club, Enlyten Float Center, Community Food and Agriculture Coalition, Alternative Energy and Resources Organization, Missoula Farmer's Market, Clark Fork Farmers market, Community Medical Center, Eat Smart Missoula Coalition, Urban Indian Center, Missoula County Public Health, the Missoula Community Foundation, the Good Food Store, Orange Street Food Farm, and the Missoula Fresh Market.

This program can serve as a model to others in Western Montana looking to treat and prevent medical conditions using healthy food. Rural and pediatric populations are likely to gain from these types of programs in particular, as rural areas tend to be more food insecure and proper nutrition is crucial for child development. As a group, we should be open to sharing our successes and challenges and helping to "seed" the success of similar programs in the area.

From a policy standpoint, building a network of prescription produce programs provides the support needed to make change at broader, systemic levels. Pursuing goals such as getting health insurance companies to cover this kind of program or improved local food access and policy are more easily reached with wide support.

Conclusion:

Food insecurity is a growing concern for health care organizations. As continued research further elucidates connections between a lack of access to healthy, affordable produce and chronic health conditions, interventions like Missoula Prescription produce will become even more critical. Community and population-based initiatives that preemptively address the social determinants of health are cost-effective, forward-thinking, and as this study and others show, well-received by patients and providers alike. Empowering providers with the tools to address otherwise intangible barriers to good health expands the scope of their care. Broadly speaking, programs like these can help to address a cultural and systemic undervaluing of nutrition's role in health. We can make a basic understanding of diet into foundational component to health, akin to exercise or not smoking. Healthy, nutritious produce that is affordable and accessible to everyone can be a potent first line of defense, individually and organizationally, against chronic disease.

There are a number of ways to evaluate programs that address food security. For prescription produce programs specifically, it's important to be clear about what outcomes you are searching for most—and what is feasible and relevant to the specific program. Future questions for the Missoula team might explore the program from the lens of health care providers and care managers. Possible questions could include: how best to engage new organizational partners, how to grow this program sustainably, or how to recruit more providers. Additional research should evaluate the social and educational benefits of the program and attempt to measure how those benefits influence diet-related health outcomes. The efforts of the MFVPP so far have been a fine start, but if we are serious about addressing chronic disease in low income folks with nutritional programs, we need to dramatically increase our efforts.

Appendix:

Possible Foundations for Grant/Funding Submissions for the Missoula Fruit and Vegetable Prescription Program

Montana Community Development Block Grant

Browning Kimball Foundation

"The Browning Kimball Foundation is committed to improving the quality of life through support of youth and families, health with an emphasis on prevention, arts and humanities, and sustainable agriculture in Montana."

https://fmiokc.com/clients/browning-kimball/

Charles Engelhard Foundation

Charles Engelhard Foundation is a private foundation in New York, New York. In 1954, it received its exempt organization status from the IRS and now brings in $9.58 M in annual income. With $93.4 M in assets, the organization is one of the largest nonprofits in the United States.

(212) 935-2430 Call for Grant Dpmt.

Cadeau Foundation

Cadeau Foundation A Charitable Trust is a private foundation in Patagonia, Arizona. In 1990, it received its exempt organization status from the IRS and now brings in $735 k in annual income.

(520) 394-0023

Cotswold Foundation
http://www.nonprofitfacts.com/OH/The-Cotswold-Foundation-Trust-Of-Beth-B-Jones.html

Dennis Washington Foundation
https://www.dpwfoundation.org/

Elizabeth Wakeman Henderson Foundation
https://www.guidestar.org/profile/65-6234202

Fanwood Foundation

http://fanwoodcommunityfoundation.org/

Gallagher Western Montana Foundation

http://www.thegallagherfoundation.org/

High Stakes Foundation

https://highstakesfoundation.wordpress.com/

Levinson Foundation

http://levinsonfoundation.org/

Ilewellyn Foundation

http://llewellynfoundation.org/

(Mission: To fund initiatives that address the health, education and well-being of individuals, families and communities.

The Llewellyn Foundation accepts grant proposals by invitation only. If you would like to be considered, please fill out the **contact form** and if we feel that the organization is a fit for our mission and area of focus, we will be in touch to request more information.)

Longview Foundation

https://longviewfdn.org/ -- specializes in internationalizing education efforts

Missoula Community Foundation

http://missoulacommunityfoundation.org/

Missoula Redevelopment Agency

Montana Health Care Association

http://mthealthcare.org/

Montana Nonprofit Association

http://www.mtnonprofit.org/

Montana Primary Care Association

http://www.mtpca.org/

New Priorities Foundation

http://nonprofits.findthecompany.com/l/1534306/New-Priorities-Foundation

New Belgium Foundation

http://www.nbfamilyfoundation.org/

Robert Wood Johnson Foundation

https://www.rwjf.org/

Pleiades Foundation

https://www.guidestar.org/profile/20-6246872

Theodora Foundation

http://www.polamalufoundation.org/

Tides Foundation

https://www.tides.org/

Voice Foundation

http://voicefoundation.org/ out of Drexel School of Medicine

Wagon Mountain Foundation

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