Scan of Technology Solutions in the Produce Prescription Field:

A Snapshot of Available Software-based Solutions and Emerging Equity Considerations

NOVEMBER 2022

Prepared by DAISA Enterprises LLC | Commissioned by Wholesome Wave

Wholesome Wave is a national non-profit established on the belief that everyone, regardless of race, age, ethnicity, or income has a fundamental right to choose healthy food. Wholesome Wave's mission is to address disparities in diet-related disease and enhance nutrition equity by making fruits and vegetables more accessible and affordable to low-income community members through systems change.

Founded in 2007 by James Beard Award-winning Chef Michel Nischan and former USDA Undersecretary of Agriculture Gus Schumacher, Wholesome Wave successfully established the legal framework and advocated to fund the doubling of SNAP benefits when spent on healthy fruits and vegetables—a program that has reached millions of community members across the country and has been established as a permanent program in the 2018 Farm Bill, named the Gus Schumacher Nutrition Incentive Program. Today, Wholesome Wave is leveraging our 15 years of experience and relationships supporting successful fruit and vegetable access programs to advocate for their inclusion as a covered healthcare treatment through government-sponsored health plans. Visit us at **wholesomewave.org**.

DAISA Enterprises is a national consulting firm working at the intersection of food, culture, and health. We partner with social enterprises, nonprofits, policy makers, and investors to drive equitable food systems change and support the development of vibrant communities. DAISA provides innovative strategic and operational services including national field scan research, large-scale funding initiative design & management, and convening planning & facilitation. The DAISA team also facilitates the national Equitable Food Oriented Development (EFOD) Collaborative and serves as a Produce Prescription (PRx) Technical Assistance Partner for the GusNIP Nutrition Incentive Hub. Visit us at **DAISAenterprises.com**.

Wholesome Wave Editorial Team
Benjamin Perkins, Wholesome Wave Board of Directors FED Director
Natalia Feinstein, Executive Director
Brent Ling, Director of External Affairs

DAISA Enterprises Research Team & Authors
Gustavo Mamao, Entrepreneur-in-Residence & Senior Consultant
Daniel Ross, Partner & CEO
S. Maham Rizvi, Food Systems Associate
Maria Elena Rodriguez, Director of Research & Community Partnerships

Report layout and design by DAISA (Karina Bedoya-Ross and Monica Cadena) and Caroline Wineburg

The research included in this report was made possible by **Walmart**. The findings, conclusions, and recommendations presented in this report are those of Wholesome Wave alone, and do not necessarily reflect the opinions of Walmart.

TABLE OF CONTENTS

Acknowledgements 4
Executive Summary 5
Introduction 6
Field Context 7
Research Methodology 10
Research Findings: Program Complexity & Possibilities for Technology Interactions 11
PRx Technology Solution Mapping 17
Emerging Equity Considerations in PRx Technology 28
Conclusion and Recommendations for the Field 31
References 35
Appendix 1: List of PRx Tech Solutions Reviewed 37
Appendix 2: Report Lead Author Biographies 38

List of Figures and Tables

Figure 1: Flow of a Produce Prescription Program 8
Figure 2: Eleven Elements of the PRx Program 15
Figure 3: The Principles of the Fidelity, Equity, Dignity (FED) Framework 28
Figure 4: PRx Program Technology Maturity Spiral 32

Table 1: Potential Partners Involved in a Produce Prescription Program 13
Table 2: Summary of IT Solution Categories Mapped 17
Table 3: Fidelity, Equity, Dignity Criteria for Assessing PRx Tech 30

Image Source: FreshConnect

ACKNOWLEDGEMENTS

Wholesome Wave and DAISA Enterprises thanks the following entities for their participation in qualitative interviews or conversations that greatly informed this research:

- Technology Providers: Healthiby, FoodSmart, About Fresh, and Umoja

- PRx Program Operators: DC Greens, Reinvestment Partners, Vouchers 4 Veggies, Just Roots, Green Rural Redevelopment Organization (GRRO), and Adelante Mujeres

This report was also developed with contributions from Michel Nischan, Sandy Steigbigel, John McAndrew, Kelley Ferguson, and panel participants of the Fall 2021 Nutrition Incentive Hub Technology Solutions Webinar: About Fresh / Fresh Connect, Epic Technology Solutions LLC, Incomm, and Healthiby. More detailed analysis of the tech solutions was also developed by the Colombian social enterprise Coally, which supports young professionals to build experience.

Additionally, we'd like to thank the following individuals who reviewed and provided feedback on a draft of this report: Adam Shyevitch (About Fresh), Cissie Bonini (Vouchers 4 Veggies), Amanda Shreve and Ashley Wenger (Michigan Farmers Market Association), Julia Koprak (The Food Trust), Kaely Summers (Oregon Health & Science University), Whitney Smith (Fair Food Network), and Ted Mason (National Grocers Association Foundation, NGAF).

EXECUTIVE SUMMARY

This report has been commissioned to provide analysis and guidance on technology solutions for produce prescription (PRx) program operators, as well as funders and ally organizations. It features a list of commonly used technology tools leveraged by program operators, categorizes how they fit into these complex initiatives, and provides frameworks and recommendations.

As the PRx model is new and best practices are still being established, supporting technology is nascent. However, our analysis showed several promising platforms dedicated specifically to managing PRx programs are beginning to emerge. Interviews with PRx program operators surfaced a critical need for these technologies to serve as a tool to promote inclusion and justice, rather than being a barrier. The developing Fidelity, Equity, and Dignity (FED) framework was used to explore emerging equity considerations for PRx information technology (IT), which is included in this report.

As PRx programs have proliferated around the country in recent years and sought to sustain themselves and scale up, IT solutions have gained momentum. This research has identified that PRx Practitioners are seeking out technology solutions which help:

- Establish reliable electronic prescription redemption,
- Analyze data and provide more accurate and rapid information for healthcare partners,
- Enhance participant motivation, while often adding wrap-around support and education,
- Run more efficiently, reliably, and predictably overall.

This report provides a set of recommendations for the PRx field, including:

- Develop a curated online forum for practitioners to share current information on IT platforms for PRx and their experiences with those platforms,
- Identify and support IT platforms that align with equity needs of the field,
- Create an inclusive group of PRx program operators to interact with and inform the development of new technology solutions,
- Prioritize IT solutions that track program impacts centering the data and learning needs of program partners, not just redemption functionality.

Despite significant challenges, the pace of development of PRx programs and associated technology is allowing for great innovation and capacity expansion. With continual improvements in technology, there is strong promise to advance the use of this PRx model for impactful alignment between public health, food, and healthcare systems.

INTRODUCTION

DAISA Enterprises (DAISA) was engaged by Wholesome Wave in 2021 to research the state of technology solutions available to produce prescription (PRx) programs. As described in the 2021 joint Wholesome Wave / DAISA field scan report, PRx programs are growing throughout the United States, with significant growth observed within the last decade. PRx programs address both food security and health outcomes by equipping healthcare professionals with a tool to provide patients with a free or subsidized "prescription" redeemable for healthy fruits & vegetables at a retail venue, demonstrating a variety of positive health and well-being outcomes (Schlosser et al., 2019; Schwartz, 2018).

PRx programs are composed of multiple collaborators with complex interactions, transactions, and data flows, with high requirements for data security and report outputs. Technology can be a powerful tool for efficiency, but at present there is a lack of access to integrated technology solutions dedicated to PRx programs, often resulting in operators using multiple platforms to conduct different program functions.

There is currently a lack of comprehensive information about PRx technology solutions in the field, with no central place in existence where new programs can become quickly informed, nor are there any kind of credible peer-reviews readily accessible. Dozens of programs begin every year and as we approach well over 100 active programs across the country, each of these programs are navigating technology use without access to the necessary information to expedite their progress.

This research identified over 30 technology platforms being used by programs around the country, and mapped the primary functionalities of how those technologies have been applied to PRx. We also identified programs designed for workplace wellness and behavior change that are being adapted to leverage PRx success.

As technology has the potential to either unite or exclude, social justice and equity are important components to the development of IT solutions in the PRx field. This research was conducted in parallel with the ongoing development of the Fidelity, Equity, and Dignity (FED) Framework, created by Benjamin Perkins in collaboration with Wholesome Wave. The FED Framework provides the produce prescription field with a powerful tool for tangible program development and food and health systems transformation. A more in-depth analysis of the potential for FED development in PRx technology is provided towards the end of this report.

FIELD CONTEXT

Diet—Related Chronic Disease

The costs of diet-related chronic disease are driving healthcare expenses. Approximately 90% of the US $3.8 trillion in annual healthcare expenditures are for chronic and mental health diseases (CDC, 2022), with diet-related diseases directly attributed to 20% (Harvard, 2020). In 2017, the total estimated cost of diagnosed diabetes was $327 billion in medical costs and lost productivity (American Diabetes Association, 2018).

Diet is clearly a significant factor in healthcare expense and burden. An unhealthy diet is a leading risk factor for poor health, accounting for up to 45% of all deaths from chronic diseases such as heart disease, stroke, and type 2 diabetes. Of all adult deaths from coronary heart disease, 22.4% are associated with low fruit intake and 21.9% with low vegetable intake (Garfield et al., 2021).

These health trends and costs are worsening: the prevalence of type 2 and type 1 diabetes, for example, is projected to increase by 54% to more than 54.9 million Americans between 2015 and 2030; and total annual medical and societal costs related to diabetes will increase 53% to more than $622 billion by 2030 (Rowley et al., 2017).

According to the 2021 Rockefeller Foundation report True Cost of Food: Measuring What Matters to Transform the US Food System:

> While nutrition programs and benefits—both public and private—have often been viewed as expensive, looking at them through a true cost lens reveals that they are in fact wise investments for strengthening our country's economy.

Public and private healthcare systems are seeking answers to these rising costs, especially in the growing area of values-based healthcare contracting. Leaders in the healthcare industry are looking for innovative prevention and treatment interventions to improve patient diets, prevent or manage chronic disease, while also reducing costs.

Image Source: ADOBE

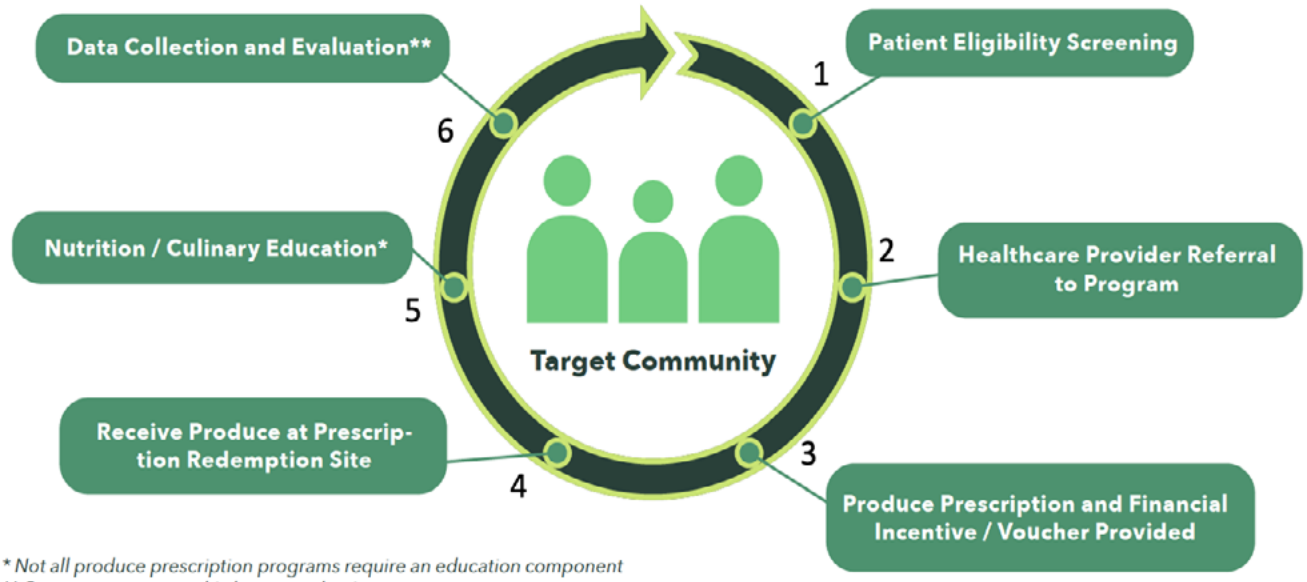
Produce Prescription Program Definition

PRx programs are a cornerstone of the growing field of "Food as Medicine" interventions, with a distinction being the focus on healthy fruits and vegetables, and the concept of the prescription being from a healthcare professional. The National Produce Prescription Collaborative provides the following definition:

> *A Produce Prescription (PRx) Program is 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. These prescriptions are fulfilled through food retail and enable patients to access healthy produce[1] with no added fats, sugars, or salt, at low or no cost to the patient. When appropriately dosed, PRx Programs are designed to improve healthcare outcomes, optimize medical spending, and increase patient engagement and satisfaction (NPPC, 2021).*

The below graphic, from the 2021 US Field Scan Report (Wholesome Wave), shows the typical functions and interactions of a PRx program.

Flow of Produce Prescription Program



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

This Field Scan Report identified over 100 PRx programs throughout the country in existence between 2010 and 2020, implemented through diverse approaches to program operation and function. There are several interpretations of the PRx model, with countless variables including diverse participant populations, how the prescription is provided and by whom, where the prescription can be redeemed, what food items can be included within prescription redemption, the level of dosage, the length of the program, and outcomes sought and measured.

[1] According to USDA WIC-eligible fruits and vegetables: https://www.fns.usda.gov/wic/wic-food-packages-regulatory-requirements-wic-eligible-foods#fruits%20and%20vegetables

Connecting Food and Health Systems

To implement a PRx program, two large and complex systems – food and healthcare – have to be interconnected.

The food system has intricate value chain connections, involving the production, processing, and the logistics of food on a global scale. Increasing produce consumption depends upon access to, affordability of, and the purchase intent of customers. Increasing produce consumption requires behavior change in the face of a food system built on the infrastructure, convenience, and billions spent on marketing of highly processed foods and beverages. In the US, 80% of the $14 billion total budget of food and beverage advertising companies promotes fast food, sugary drinks, candy, and unhealthy snacks (UConn, 2020).

The health system represented close to 18% of the US GDP in 2019 (Statista), with various contributors including physicians, hospitals, health insurance companies, regulators, and global economic trends. Much of this massive health system has been financially motivated to successfully treat disease, rather than prevent it. So, while the concepts of "food is medicine" and "you are what you eat" may be easily and widely understood, this intrinsic understanding alone has been insufficient motivation to change the practices of these massive systems. Healthcare leaders in policy and practice are seeking systemic reforms that are cost-effective, practical for clinic operations, and scalable to population impact. Early efforts in the development of PRx have shown promising results for outcomes and costs when compared to currently available treatments and have sparked the attention of healthcare leaders and food system industry across the country.

We hope that outlining these two complex systems can serve as important context for the discoveries and recommendations we make in the following pages.

RESEARCH METHODOLOGY

In order to explore these complex topics, DAISA conducted an in-depth review of existing field materials and had conversations with numerous program operators, technology developers, and field experts. We specifically gained input from over 20 program operators from around the country, several of whom had conducted their own extensive research on PRx IT options.

We categorize our methodology as action-oriented research, with some elements of participatory research, focused on getting critical and timely information available for utilization by the people on the front lines of change. DAISA is not a traditional research institution, we are entrepreneurs and community organizers. Instead of a focus on academic publication, we engage with a research methodology that can quickly provide key learnings for practitioners and allies.

For this engagement our methodology included:

- Analysis of data from a 2021 National Nutrition Incentive Network (NNIN) survey (3 tech questions, 32 program operator respondents)
- Review of existing data and materials from the 2020 DAISA/Wholesome Wave Produce Prescription Field Scan interviews
- Qualitative interviews with 4 technology solution providers and 6 PRx program operators
- Collaborative discussions with retail incentive technology experts
- Online research conducted on technology solutions

While we are confident that this methodology gave us a strong sense of the primary options available to program operators in real time, and that we uncovered the majority of the primary trends, we do not believe that our knowledge of the solutions available in the market is comprehensive, nor can we claim deep knowledge of each solution. New solutions are emerging constantly, new features are being developed for existing solutions, new adaptations and mergers are constant. It was not within the scope of the research to test each solution or secure references for the solutions. This is a snapshot of the commonly utilized PRx technology solutions and recurring trends at this time.

RESEARCH FINDINGS: PROGRAM COMPLEXITY & POSSIBILITIES FOR TECHNOLOGY INTERACTIONS

Throughout the last ten years, as PRx programs have proliferated around the country and sought to sustain and scale, IT solutions have gained momentum. This research has identified that PRx program operators look to technology solutions in order to:

- Establish reliable electronic prescription redemption,
- Analyze data and provide more accurate and rapid information for healthcare partners,
- Enhance participant motivation, while often adding wrap-around support and education,
- Run more efficiently, reliably, and predictably overall.

Our findings include:

1 First, there has been a wave of exciting development and activity in technology for PRx programs. There are beginning to be comprehensive solutions developed exclusively for PRx, as well as promising adaptations of existing technology that was originally developed for other uses. We have identified technology products being used by program operators for various aspects of program functionality, and in Appendix 1 we provide specific details on approximately 20 of them.

2 Second, still not one solution is yet comprehensive and fully functional for PRx program operators. All of the interactions in a PRx program have complexity and there is great diversity in program partners' operations and needs, so the level of investment and iteration required for a comprehensive solution is substantial.

3 Lastly, there is great recognition amongst practitioners, funders, and support organizations that the lack of dedicated and accessible technology for PRx programs is an essential obstacle to surpass as PRx programs scale for greater impact. There is a lack of shared information; there is no accessible place an aspiring or developing PRx program operator can go to find information about the technology solutions available for these programs. Many programs and support organizations have made an effort to track down technology solution leads or have hired consultants to customize existing products to create their own work-around solutions. However, there is still a lack of a dedicated forum where practitioners can see a more comprehensive list of existing products, and can share their innovations, experiences, and needs in a dedicated, curated space.

Program Complexity

PRx programs are an intuitive, elegant response to the growing national burden of diet-related chronic disease and food insecurity. However, there are in actuality a host of complex program interactions to manage, from identifying and enrolling participants, to issuing prescriptions, to redemption at retail venues, and finally tracking outcomes.

Originally, these programs were often piloted with very basic tools, and many of these original tools are still in use. Doctors or other healthcare personnel issue prescriptions using paper prescription pads or physical vouchers. In the case of programs partnering with farmers markets, these paper vouchers are then sometimes exchanged for wooden tokens by a partnering farmers market manager or organization. Participants use these wooden tokens for their purchases, with farmers returning the tokens back to the organization, often being reimbursed sometime later with a handwritten check.

Image Source: Mpu Dinani: A-Game Photography

Program participant health impact data has often been captured manually on paper and then entered into spreadsheets, with careful consideration taken to align participant and prescription codes. With the extensive labor needed to enter and clean this data to make it usable, analysis can be challenging and preparing program reports can take months. There can also be a large margin of error with this manual data entry process. Many programs are still using these basic practices due to the lack of access to improved technology tools, and with adaptations to different retail partners. All are still striving for the goals of robust analysis for ongoing program improvements and informing public health and medical science.

The below table takes the "Flow of a PRx Program" image from page 8 one step further to show the various potential partners engaged at each step of program execution. Any technology provider should take this complexity into consideration when designing solutions to ideally work across multiple program interactions. Importantly, not all PRx programs function in the same way, and this may prove challenging to developing full-spectrum technology solutions.

Flow of PRx Program:	Potential Partners Invlolved						
	Participant	PRx Program Lead	Healthcare Provider Team	Healthcare System (Admin / Insurance Plans)	Retail Redemption Venue	Evaluation Team	Others
1. Participant Eligibility Screening	🥕🥕	🥕🥕	🥕🥕	🥕🥕			
2. Participant is Reffered to Program	🥕🥕	🥕🥕	🥕🥕	🥕🥕		🥕	
3. PRx and Financial Incentive / Voucher provided	🥕🥕	🥕🥕	🥕🥕	🥕🥕			
4. Participant Redeems Prescription	🥕🥕	🥕🥕			🥕🥕		
5. Nutrition / Culinary Education (optional or 3rd party)	🥕🥕	🥕🥕					🥕🥕
6. Data Collection and Evaluation	🥕🥕	🥕🥕	🥕	🥕		🥕🥕	🥕

Source: DAISA analysis; Legend: 🥕🥕 Highly Involved; 🥕 Direct or Indirect Involved

Table 1: Potential Partners Involved in a PRx Program

As more communities and health systems have looked to the PRx model, these program operators have been creative and resourceful in developing tools and practices to make their programs function. Without a clear dedicated solution, they have done their own research to assess, assemble, and adapt what they could to fit their own needs. They have often cobbled together solutions by connecting spreadsheets, database programs, retail point-of-sale systems, and even manually operated bulk texting systems. Under intense pressure to manage their vital programs and deliver quality reports showing program outcomes, these programs have shown ingenuity and dedication.

With new programs emerging every week, there has been a wave of programs seeking technology tools to support efficiency and quality of the operations and data flow. In this context, IT platforms can deliver important characteristics:

- *Efficient* – reducing the time required for all the transactions and operations of the programs.
- *Interactive* – facilitating the communication of the many collaborators involved in the process.
- *Reliable* – making transactions and data more accurate and timely.
- *Measurable* – making data collection much more efficient and readily accessible for analysis.

Program practitioners who have produced analyzable and generalizable data and reports have had more success in maintaining and growing their programs. These examples have increased the demand for technology solutions that improve efficiency and quality of data flow and management.

Access to appropriate technology solutions will continue to be a key factor for the proliferation and sustainability of PRx programs. The labor intensity of program operations and data collection has made it much more difficult for these initiatives to transition from small pilots to mainstream care. However, PRx programs can still be favorably compared to the labor, expense, and societal costs of other interventions and existing US systems of addressing diet-related disease.

Exchanging paper scrip at the market
https://www.freshapproach.org/modernizing-food-access-with-the-power-of-p

PRx Functionalities — Possibilities for Technology Interactions

One way to look at PRx digitalization is to consider the entirety of complex program operations, from the moment participants are identified to be enrolled in a PRx program, to when programmatic data is analyzed and incorporated into reporting.

The below graphic represents a more detailed analysis of the original PRx program flow image from page 8, breaking it further into 11 specific program interactions. For each of these interactions, we include some of the traditional methods for accomplishing the task, and the related pain points or difficulties.

ELEVEN ELEMENTS OF THE PRX PROGRAM

WHERE TECH CAN HELP

1 RECRUITMENT/ PARTICIPANT IDENTIFICATION

From health partners
Correct parameters
Labor intensive

2 PARTICIPANT ENROLLMENT

From health partners
Patient approval
IRB authorization
EMR access
Labor intensive

3 BASELINE/SUBSEQUENT SURVEY(S)

Health team survey tools
Participation rates
Consistency
Tablets, Labor

4 NUTRITION EDUCATION / CONTENT

Integration with PPR program
In-person with clinic staff
Community partner
Language & culture
Expense

5 PROVISION OF INCENTIVE /REDEMPTION

Coded Vouchers, Paper "scrip", Loyalty card
Debit card, Correct coding by patient/ household, Limiting to correct products
Access to diverseretail venues
Limited tech situations

6 CAPTURING DATA FROM UTILIZATION/ INTERACTION WITH RETAILERS

Retail PoS systems
Farmer surveys
Loyalty card systems
Privacy vs robust data

7 MOTIVATION / SUPPORT / CONTENT TO PARTICIPANTS

Culturally/language appropriate
SMS, Recipes, Social media
Program staff time
Peer sessions at clinic
How to do effectively

8 CAPTURING PARTICIPANT BIOMETRIC / MEDICAL DATA

Manual inputs
Surveys
Integration with EMR
Clinical staff time
HIPAA regs
Programming

9 MONITORING PARTICIPATION

Clinical and program staff time
Spreadsheets
Dashboards

10 REPORTING / SHARING WITH RESEARCHERS / PARTNERS / PATIENTS

Reports from data software spreadsheets, timely access, too many systems, too dense

11 REPORTING TO FUNDERS / PARTNERS

Analysis input into research data software
Data scrubbing, Write reports
Slow, Expensive, Not inclusive

Created by DAISA Enterprises

Sometimes these functionalities and responsibilities are shared amongst several different partner organizations, and often the partners are not aware of the real resources needed to accomplish all the aspects of a fully integrated program. Breaking down these specific program interactions helped us better see the investment of labor and management throughout program operations. We could also see how PRx operators were integrating multiple technology solutions to execute these various program function needs.

Analyzing how technology can support these 11 programmatic elements is also an opportunity to explore how PRx IT solutions can either advance equity or perpetuate existing barriers. The integration of program technology should adapt to the realities of diverse potential program participants. Technological, generational, and language barriers exist in many communities, and the drive for greater program efficiency through technology should seek to address these barriers rather than excluding potential participants.

Interoperability with Electronic Medical Records

If PRx IT platforms can interact with the Electronic Medical Records (EMR or Electronic Health Records, EHR) of their partner health systems this can greatly allow efficiencies for participant enrollment, gathering baseline data, looking at biometric changes, tracking health care utilization and costs, and showing results for the participant population. It would reduce the burdens of multiple responsibilities of providing, gathering and entering basic participant data, either for clinical staff, participants themselves, evaluators, and program operator staff. There are various major obstacles, including:

1. There is not one system or company providing EMR systems for all healthcare systems in the US. Epic is the largest provider of EMR services with a 31% market share, and Cerner is close with 25% (Leventhal, 2021). All EMR systems provide access for developers to integrate (APIs) but application of this regulation is inconsistent, and there remains a large burden for programming and approvals across multiple systems.
2. Rigorous safety requirements for participant data are codified in the Health Insurance Portability and Accountability Act of 1996 (HIPAA). The burden for programming these security systems and getting approvals is high for development and continued maintenance.
3. There is still a lift for access and interoperability with each healthcare entity's system, each time a program seeks to integrate, requiring additional planning and set-up time and expenses.
4. Even with the proliferation of EMR systems in recent years many healthcare organizations choose to continue the use of traditional paper chart systems This creates a significant barrier to data integration with partners.

Interoperability is one area for future development and innovation for PRx solution providers. Some programs have found success with 3rd party referral platforms such as FindHelp, which integrate with the EMR to assist providers in connecting participants with needed services and programs such as PRx (Findhelp, 2022).

PRX TECHNOLOGY SOLUTION MAPPING

IT Solution Categorization

After an initial mapping of over 30 identified solutions, several key categories emerged. This grouping approach also reveals why some PRx operators made their choices. The following table represents this summary:

IT Solution Categories:	IT Solution	Program Users
1. **Dedicated PRx Managment solutions**	**Fresh Connect** (About Fresh) **Vouchers 4 Veggies** integrated solution	**About Fresh Connect** Other user partnershis in development **Vouchers 4 Veggies** *program localities*
2. **PRx solution based on RETAIL PARTNERSHIP (loyalty card-based)**	**Food Lion** *(North Carolina)* **Giant Foods** *(DC)*	**Reinvestment Partners** **DC Greens**
3. **Payment, redemption solutions**	**Fresh incentives** (Epic Technology Solutions LLC) **Healthy Savings (Soultran)** Others: **Snap2Save, Incomm, Speak, Tangelo, AppCard**	Michican PRx partners **Vouchers 4 Veggies** (uses Soultran, but only as one option for participants along with vouchers)
4. **Farm Direct / Farmers Market Management Solutions**	**FM Tracks** **Barn2door**	Approximately 50% programs have mentioned it (NNIN survey)
5. **Database/CRM/BI Solutions**	**SalesForce** customization **PowerBI,** Data dashboard	**Just Roots** (CSA model) **Chicago Botanic Garden**
6. **Behavior Change**	**Foodsmart, Healthiby**	*not Identified in PRx program*
7. **Home Delivery / Logistics**	**Umoja, US Hunger (Full Cart), and Fresh House**	*not Identified in PRx program*

Table 2: Summary of IT Solution Categories Mapped

1.Dedicated PRx Management Solutions

These solutions aim to cover all or most aspects of the PRx program as described in the PRx Elements graphic and have integrated functionality. The solutions described in this group also allow PRx operators to implement the redemption process, with connected data management systems providing effective participant outcome reports.

Company / Tech Solution	Description of Company / Tech Solution
AF About Fresh	**About Fresh** is a case of a community-based organization that developed its own full comprehensive solution, relying on its real PRx program management experience. Fresh Connect innovations have built on a type of prepaid technology that makes it possible for health plans and providers to cover the cost of food for participants at any retailer, restaurant, or online delivery platform. At the same time, Fresh Connect has some features and capabilities that facilitate data collection, card loading, and setting of spend parameters. By the time of the publication of this report, Fresh Connect's team had started some licensing experiments of their solution to other community-based organizations throughout the county.
VOUCHERS 4 VEGGIES EAT SF	**Vouchers 4 Veggies (V4V)** is another example of a PRx program that found its way to develop and integrate its own solution approach. V4V offers a reloadable produce debit card (currently based on Solutran technology) or vouchers or a combination of both. This is important for meeting the diverse needs of the participant population and retail landscapes served by the program. V4V also uses multiple solutions to manage participant data and track voucher utilization, including a customized Salesforce database and optical recognition software for voucher processing. They offer a comprehensive package to other community PRx programs, including produce cards and/or vouchers, back-end data management systems, enrollment and reporting, customer service, and technical assistance and consulting support. V4V does not brand their integrated IT solution but it is open to discuss with other programs on how to replicate its approach.

Advantages of this group of solutions include:

- Integrated systems, increasing chances to cover all PRx program and participant needs
- More ability to track participant data

Challenges include:

- Integrating all functions seamlessly
- Need to standardize, integrating with healthcare systems, addressing diversity of retailers
- Integration of follow-up/support tools (SMS texting, peer support functions, etc) is unclear

Fresh Connect

Founded to address food insecurity approximately 8 years ago, About Fresh began with a mobile market servicing the low-income communities of Boston, MA, and collaborating with health clinics. As the programming grew, the About Fresh team began to develop technology systems to improve their own efficiencies, to reduce the labor of paper vouchers, and better share the data their healthcare partners were interested in. This tech enabled the PRx management system now called Fresh Connect.

About Fresh staff member Josh Trautwein discusses the vision behind Fresh Connect's launch: "As a community-based food retailer, we know first-hand that purchasing power can act as a barrier to accessing food. We built Fresh Connect to empower people with the money, flexibility, and agency to access the foods they need to be at their best and to recruit the healthcare sector as a multi-billion dollar investor in food access equity."

At the time of this report, About Fresh runs 10 Fresh Connect programs in partnership with major health system partners and community-based organizations. The Fresh Connect card is accepted at over 440 locations in Massachusetts and surrounding states. These locations include a regional supermarket chain, independent grocery stores, farm stands, and farmers markets. The Fresh Connect program manages nearly all aspects of the PRx program, including participant enrollment and issuance of the Fresh Connect card, supporting participants to activate their cards and their customer experience, interfaces with retailer point of sale systems, and analyzing the data collected and sharing it with healthcare partners.

Fresh Connect is slowly expanding around the country as its team develops the program's technical functionalities, expands its retail network, and continues cultivating customers.

2. PRx solution based on RETAIL PARTNERSHIP (loyalty card-based)

We heard from some organizations that they started the digitalization of their programs based on partnerships developed with supermarket chains. This means they leveraged the current IT infrastructure of grocery stores, building upon on the prevalence of loyalty cards and the appetite of retailers to get customers utilizing them as much as possible. They receive reports on the utilization of the benefits through the data systems of the retailers, and pay the retailers for the prescription utilization. Cases we studied with strong regional retail partners were **DC Greens** with Giant Food (in the DC area), **Reinvestment Partners** with Food Lion (in North Carolina), and **Wholesome Wav**e has done PRx programs using Walmart loyalty cards across multiple geographies.

The loyalty card programs offer strong efficiencies in ease of implementation with retail partners and the ability to support large scale programs. It is not coincidental that the largest programs in the country are using these systems. However, the loyalty cards are not capturing health-focused data, and all these programs are using supplementary IT solutions to manage other aspects of their programs.

Advantages of this group of solutions include:
- Smooth adoption with retailers
- Participant familiarity
- Access to retailer data on purchases and baskets
- Ability to service large participant populations

Challenges include:
- Difficulty setting and maintaining eligible product parameters
- Cuts out small retailers (bodegas, ethnic markets) central to many low-income communities - some low-income communities (rural and urban) lack access to major retailers
- Does not cover many PRx program function needs
- Retail IT systems do not integrate easily with other tech solutions

3. Payment, Redemption Solutions

This category of solutions leverages existing financial payment networks, often with plastic cards, like re-loadable debit cards. The cards are familiar to retailers and participants, and allow an expression or materialization of the participant's affiliation with a certain organization. Some are utilizing the e-wallet principle, electronic transactions managed by smartphone apps.

One important finding related to this category – which represents a key component of most PRx programs and often drives program "digitalization"– is the crucial need of evolution of all types of solutions related to "restricted product cards." Technological solutions for restricted items (for instance, fruits and vegetables only, in the case of PRx programs) and universal acceptance at retail locations can catalyze nutrition programs and solve a major PRx program bottleneck, supporting their growth.

The next few solutions are good examples of this category:

Company / Tech Solution	Description of Company / Tech Solution
epic TECHNOLOGY SOLUTIONS	**Fresh Incentives** is a mobile app created by Epic Technology Solutions LLC - a software development company based in Flint, Michigan. For more than 7 years they have worked closely with food systems and farmers market programs in Michigan and the app provides a solution to processing both nutrition incentives and PRx. They have partnered with Michigan State University to run PRx program data analysis.
SOLUTRAN	**Solutran** is a large payments/transaction processing company that is owned by United Healthcare – a health insurance company. Solutran has developed products to serve health insurance companies in providing their subscribers with healthy foods benefit cards. They run a program / app called Healthy Savings, which participants of PRx programs can download on their phones and use to redeem produce in the network of retail stores where they are accepted. Partner with Vouchers for Veggies to deliver their solution to their own program.
snap2save	**Snap2Save** is a combination voucher/ cloud-based platform. Vouchers with unique numbers are issued by healthcare facilities and then redeemed at participating stores. Their solution, Health-EBucks-Rx (Food-Rx), fits both SNAP Doubling Incentive Programs and PRx solution needs.
incomm payments	**Incomm** is one of the leading gift card platforms in the United States and has recently built a platform to process health savings account (HSA) payment cards. HSA cards are a "restricted" product payment mechanism where card users may purchase only eligible items.
speak	**Speak Retail**, an original loyalty/gift card solution provider, has found other opportunities to apply its basic redemption technology in other areas, including health care applications.
tangelo	**Tangelo** is an e-wallet solution, created by a startup company, to allow the redemption of fresh and nutritious food. They offer this solution to be applied in the broad range of Food as Medicine application.
APP CARD	**AppCard** is a widely used customer loyalty platform that has recently developed both a PRx solution and a SNAP produce incentive solution. The system uses pre-printed vouchers with unique single use serial numbers as the transaction mechanism. Vouchers are issued at health facilities, then presented at the participating store for redemption. The AppCard platform manages the redemption at the Point of Sales.

As these solutions add more functionality for integration of further participant data such as survey tools, they could develop into more holistic dedicated options. Solutions from group #3 may then fit in group #1, once they expand their data management capabilities and target the PRx niche market.

Advantages of this group of solutions include:
- Participant familiarity with the concept of loyalty cards
- Easy access to purchase data
- They can work with diverse retailers

Challenges include:
- Card systems have to be integrated into the rest of program operations
- Data is limited to prescription utilization
- More limited retail network
- Some populations have resistance or lack of access to Smartphone solutions
- May require a minimum number of users

4. Farm Direct / Farmers Market management solutions

Some solutions designed to manage nutrition incentive programs at farmers markets have been adapted to accommodate PRx programs, especially those not relying on the redemption at retail or grocery stores. In one survey of program operators, 50% of the respondents mentioned FM Tracks as their "top of mind" PRx Solution.

We recognize that FM Tracks is designed to manage incentives at farmer's markets. We understand that other solutions exist to manage Community-Supported Agriculture (CSA) programs, but did not focus on any of these as we did not hear of any operators using them for PRx programs. Besides FM Tracks, the only other solution in this same category was Barn2door, a virtual Food Hub management system. We can see other farmer-driven market solutions being adapted to also handle nutrition incentives, but these will require significant investment and development to address the needs of healthcare data and reporting.

Advantages of this group of solutions include:
- Systems designed to support farmers or farmers market payments
- Familiarity among organizations running food / farmers market programs

Challenges include:
- Not designed for supermarket/other retail venues
- Not designed for healthcare integration & data
- Need to train farmers and farmers market managers

5. Database/CRM/BI Solutions

Data gathering and reporting is one of the most central functions and labor-intensive propositions of a PRx program. From originally relying primarily on the use of spreadsheets, many PRx programs are now beginning to use database solutions. Some of these are used as designed, while others are customized either by years of program operator iterations, or paid consultants doing designed adaptations.

Customer Relationship Management (CRM) based-solutions are part of a broader IT solution category. One of their key features is to manage larger databases of names (originally "customers"), which can be abstracted and adopted to beneficiaries of a certain program.

Just Roots in Greenfield, Massachusetts, hired a consultant to customize Salesforce (one of the largest and well-known CRMs) to address their needs in managing participant information from initial enrollment through the whole participant lifecycle.

This approach worked well for Just Roots, as it operates its PRx program based on a Community-Supported Agriculture (CSA) produce box model and did need retailer redemption interactions as a primary functionality. Vouchers 4 Veggies also hired a consultant for a custom adaptation of Salesforce for their voucher and data management.

The Chicago Botanic Garden in Illinois was able to use Microsoft PowerBI to develop a data management system with a dashboard allowing more real-time tracking of redemption rates at various sites, and related program management.

Advantages of this group of solutions include:

- Widely available and affordable
- Data can be readily accessed and utilized by evaluators of PRx programs

Challenges include:

- Requires extensive and expert customization, resulting in additional financial and time investments
- Lacks retail integrations
- Not necessarily designed for healthcare integration

Vouchers 4 Veggies

Vouchers 4 Veggies, known in San Francisco as EatSF, was founded in 2015 by Dr. Hilary Seligman of the University of California, San Francisco (UCSF), who observed that participants wanted to eat more fruits and vegetables according to their doctors' recommendations, but couldn't afford to.

With partnership and funding from the San Francisco Department of Public Health, Vouchers 4 Veggies was able to grow from one neighborhood in SF to city-wide programming, achieving strong results in increased consumption of fruits and vegetables and food security status, as reported by participants as well as other indicators. These results have been consistently replicated in multiple geographic locations and across diverse populations.

Through the years, the Vouchers 4 Veggies team has worked to improve systems and efficiencies, while remaining responsive to diverse participant communities. They added different redemption systems including card- based Solutran and back-end database programs, and worked to integrate them with effective interfaces. They rely on Salesforce CRM database systems to keep and track patient data.

Vouchers 4 Veggies is able to offer their integrated systems as a customizable package, or technical assistance contracting. At the time of the publication of this report, the Vouchers 4 Veggies program was being used in Los Angeles, California; Cumberland, Virginia; Boulder, Colorado; northern and central California, and Louisiana.

6. Behavior Change

We have been intrigued by a recent set of IT solutions designed around behavior change, specifically seeking to incentivize and encourage healthy diet and other healthy lifestyle habits. Some are incorporating "day by day gamification" – making common good habits score points, and bad habits taking off points. They can also provide customized diet plans, remote personnel or group support for diet coaching and to increase participant engagement.

Some have access to digital coupons provided by food retailers. More recently, those tools are integrating with the delivery of healthy food – which is the case of Foodsmart, backed by $100M+ venture capital investment (Crunchbase, 2021). Foodsmart has primarily conducted its own engagements with insurance companies and state health agencies, but is doing a broad prescription pilot with a leading academic partner now. They have a strong proposition for great scalability due to emphasis on digital functionality; at the beginning of 2022, Foodsmart reported the number of enrolled users at 1.4 million.

Another early stage solution is Healthiby, which covers the basic features of behavior change solutions. While they do not currently have proven integration with a redemption solution, they have recently announced an intention to add this function through a partnership with Incomm, a large payment redemption solution player. Healthiby is a new start-up, and to date has only been tested with community health pilots, not actual PRx programs.

While most of these behavior change IT solutions were designed for large government, healthcare, and corporate customers without collaboration with community organizations or healthcare systems, we see the potential of these solutions to be integrated with community-based programs. Many of these companies are for-profit and are actively seeking private capital investment requiring rapid growth and highly standardized approaches.

There are many concerns about applications for behavior change being diet programs in disguise. Many recommend specific diets, provide calorie tracking, and propose daily calorie limits. There is growing evidence that diet programs do not work (Shmerling, 2020), and can even have harmful health effects.

Image Source: Foodsmart

Advantages of this group of solutions include:

- Highly scalable due to emphasis on digital functionality
- Evidence base for behavior change

Challenges include:

- Not designed or fully tested for PRxs
- Not easy to partner for smaller community-based initiatives
- Often don't include smaller retailers
- Some weight-loss and diet strategies are being questioned by public health sector

7. Home Delivery / Logistics

We have also identified several newer technology solutions designed around home delivery of produce boxes with IT support systems. These are not easily considered IT platforms, however they are operational models that are distinct from PRx IT enablement.

While produce and meal prep home delivery solutions are now widely used and increasing in availability, the solutions we cite here are distinguished in that they are specifically addressing food security and health outcomes, they are seeking healthcare partnerships, and they also include functionalities of participant surveys and data tracking.

Examples of these include Umoja Supply Solution, FreshHouse, FarmBoxRx, and US Hunger's Full Cart program.

Advantages of this group of solutions include:

- Large scale approach
- Convenience and consistency for participants
- Can address home-bound participant needs
- Some IT solutions integrated in their programs

Challenges include:

- Lack of human interaction
- Limited choice in selection of produce by participants
- Lack of granularity and, in some cases, lack of community knowledge
- Do not offer a stand alone IT solution

8. Other IT / Tools Filling Functionality Gaps

Besides the 7 categories described above, we mapped other IT / communication solutions which have been incorporated to make some specific PRx Programs more efficient and impactful:

Function	IT or Communication Solutions	Key Uses / Highlights
Survey templates	**Survey Monkey, Google Survey, and Qualtrics.**	- Issue baseline and follow-up surveys, can be sent electronically and/or managed by clinic staff. - Qualtrics integrates for data analysis, very commonly used by evaluators
SMS / Automatic call machine solutions	**Ez texting, Trumpia** (to send text messages, emails), **and Dialmycall** (electronic voice calls)	- Texting and calling participants for redemption reminders, wellness appointment & refill reminders, prescription balance updates, recipes, motivational messages. - Significant improvements of communication and redemption with the usage of Dialmycall experienced by one program - "the voice drop has been 'transformational'"
Electronic Document Signing	**Docusign** and others	- Participant enrollment, partner MOUs fixed one PRx operator's critical participant enrollment process bottle-neck
Big public data sets / Target population Identification	**Socially Determind**	- Identifying potential participants in a given population, data analysis and reports - Currently Socially Determined is also a Program Evaluator.
Social Service Referrals	**UniteUs platform**	- UniteUs is providing the NC360 platform for the Medicaid 1115 Healthy Opportunities Pilots in North Carolina, allowing participants to be referred, enrolled, and tracked for several eligible services, including PRxs, and other healthy food options. It does not provide the redemption functionality.

EMERGING EQUITY CONSIDERATIONS IN PRX TECHNOLOGY

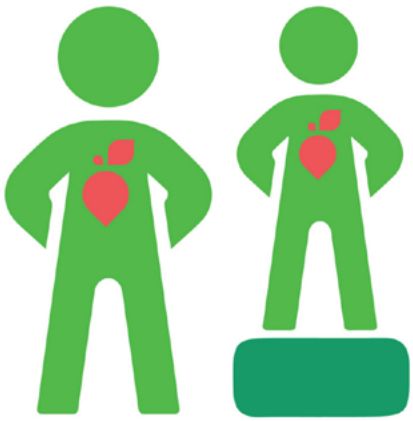
Technology can greatly aid in inclusion and equity when developed and used appropriately. It can allow programs to reach participants more consistently, improve communication and support, reach people where they are, and enable more visibility into shared goals and outcomes. However, when not developed and applied thoughtfully, technology can exacerbate disparities instead of reduce them. It can extract value of dollars and learning from Black, Indigenous, and People of Color (BIPOC) and low-income communities, transferring them to outside institutions and companies. It can exclude populations with less resources to adopt newer technologies. Many rural and even low-income urban communities lack consistent access to high-strength internet.

Like the other elements of a PRx program, the technology used should be evaluated for how well it supports equity. Health equity leader Benjamin Perkins has collaborated with Wholesome Wave to develop the Fidelity, Equity, Dignity (FED) framework as a tool for PRx and other food security initiatives to assess their incorporation of social justice principles.

The Principles of the Fidelity, Equity, Dignity (FED) Framework

Fidelity

The belief and commitment that meeting communities where they are, means building solutions that serve them.
Programs should serve communities and not the other way around.



Equity

We work tiressly to ensure that our efforts increase access to nutritional foods for our most vulnerable community members, and we should always interrogate our policies and practices to ensure that we are achieving that goal.

Dignity

Human beings have inherent worth regardless of their station in life, which is why we are all deserving of health and wellbeing. Nutritious food is the vehicle by which we affirm and celebrate human dignity.

Wholesome Wave FED Principle

The next table of criteria were developed in consultation with many program operators with extensive community roots, a National Advisory Group of PRx program operators from diverse communities, and national health equity leaders.

The table shows the high-level ways of exemplifying FED in technology and software development, and an "F," "E," or "D" is listed as an indicator of which FED principles that criteria falls under – Fidelity, Equity, or Dignity.

The criteria listed are an attempt at articulating broadly-applicable functions to any PRx IT solution – it is by no means comprehensive, and is meant to inspire adaptation to every program and community's unique circumstances. FED criteria will continue to be contributed to, and updated by a large community of practitioners. The FED framework was developed in parallel with this research, therefore IT solutions mapped in the previous section were not evaluated against these criteria, though we recommend this should take place in the future.

Central to social justice are considerations of ownership and decision-making power, and programs to address health-equity should focus "explicitly on building civic, cultural, economic, and political power by those most impacted" (Devich-Cyril et al., 2022). PRx programs are inherently interrelated with the long-term food environment, community health, economic, and social systems of their place. Some software-based solutions and their data-sharing models can undermine that and reduce the "ownership" and "decision-making power" one has over their own information and how it impacts larger systems. Solution-providers reviewing this report should prioritize transparency in their data-sharing models. Equally, when making decisions about which technology tools to invest in or use as a program, decision-makers should probe solution-providers about how their technology system will support, or potentially harm, the underlying assets and power of community members to affect their own health.

Fidelity, Equity, Dignity Criteria for Assessing PRx Tech	F	E	D
Integrate with BIPOC-owned & community-based retailers While not always possible in every community, ideally the dollars flowing through for prescriptions are spent at locally – and BIPOC – owned businesses and venues, building community food access, assets, community wealth and economic opportunity, and contributing to long-term systemic change.		E	
Build community/peer connections Health behavior change and systems change is not accomplished by individuals by themselves, peer support is recognized as an evidence – based practice (MHA, 2022). Programs that think of supporting healthy community interactions and networks of support rather than just individual participants are more consistent with social change and can be more effective.	F		D
Wrap-around support/motivation for patients Consistent proactive support and communication acknowledges that BIPOC participants face numerous obstacles to consistent program participation and access to healthy foods. Programs can help address disparities through frequent follow-up interactions.	F	E	D
Participants can own, and access, data and track their own progress towards goals Data should not just be extracted for the benefit of health systems and tech companies.			D
Ability to function in low-bandwidth/low-smart-phone environments, and with low-tech-appetite populations We should not base programs on assumptions that all potential participants have and use smartphones, 24% of very low-income people don't (Vogels, 2021).		E	
Customizable /metrics questionnaires based on community design, needs, and interests While standardization is helpful for scaling tech solutions, allowing communities to define their own health goals and metrics is important.	F		
Language Appropriate Program materials and IT should be accessible in all significant community languages.		E	
High attention to Patient Experience, easy, positive, fun Patients should feel welcome and ease in interactions with the technology. They should not feel intimidated, but lifted up.			D

Table 3: Fidelity, Equity, Dignity Criteria for Assessing PRx Tech

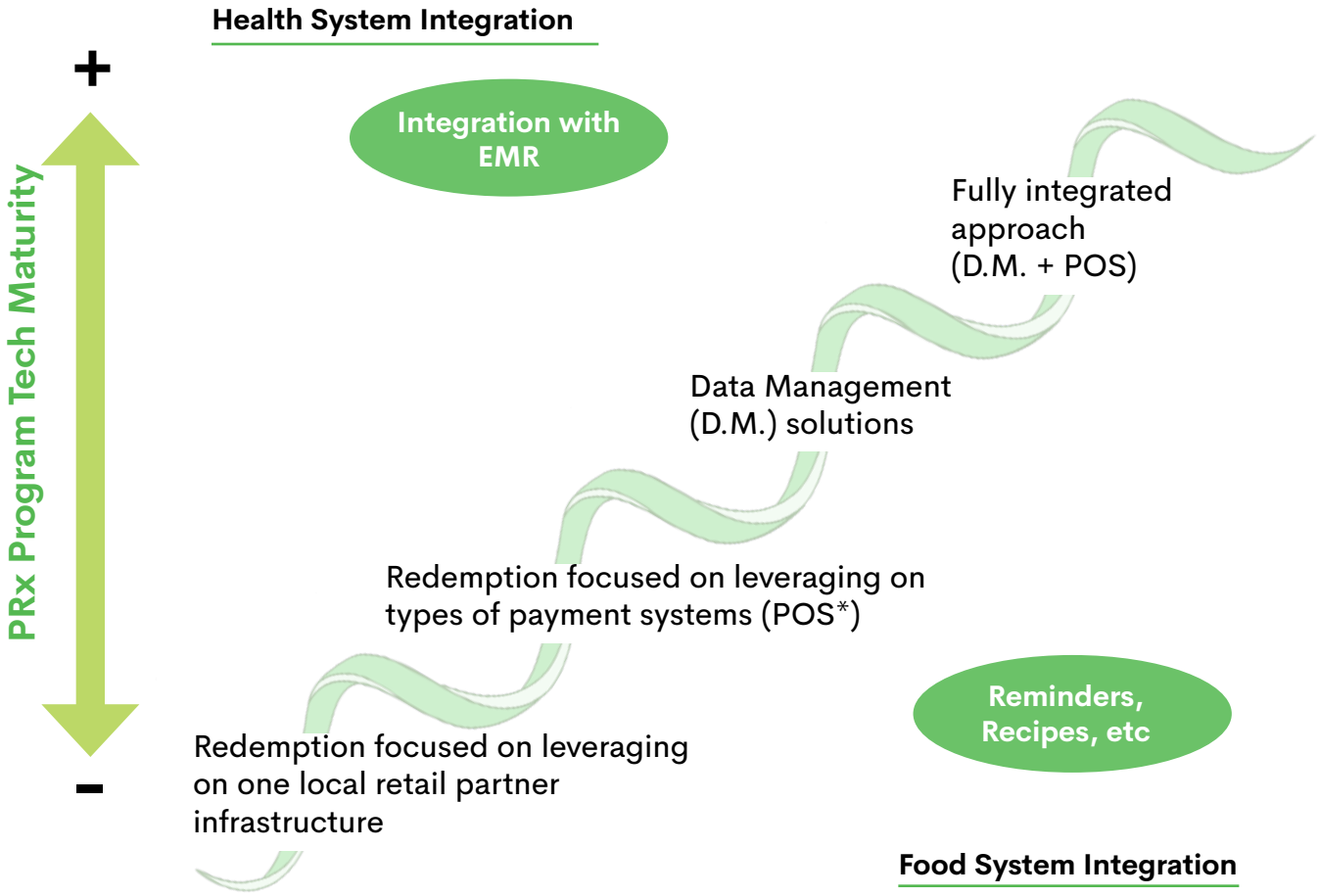
CONCLUSIONS AND RECOMMENDATIONS FOR THE FIELD

This report has presented technology solutions across a wide range of functionality and possibility. Of particular interest at this time are emerging behavior change solutions focused on larger healthcare or wellness markets and home delivery or large-scale food logistics solutions. The origins of these programs are not PRx specific, but they show intent in expanding to this market to meet the needs of PRx operators and healthcare partners. Backed by venture capital, pursuing high scalability, these approaches are growing rapidly in terms of number of solutions and the total number of people covered.

There are clearly a vast array of starting points for development and adaptation of PRx software. Many prominent solutions started with addressing the interactions of prescription redemption with retailers, and then have added other PRx-focused functionalities. While this redemption functionality is critical for efficiency and large adoption of programs, our research shows the importance of integrated systems.

After observing the patterns of evolution of prominent programs, we offer a visualization of a "PRx Tech Maturity Framework" that indicates the importance of spiraling up to technology integration across program operations. **The growing movement towards values-based healthcare is creating great opportunities for PRx programs to offer data-driven propositions for healthcare contracts.** If PRx program operators can anticipate these trends, put the right redemption systems in place for efficiencies, and highlight strong enrollment and survey features, data management, and reporting systems, they will be well-positioned to leverage health sector partnerships and funding.

PRx Program Technology Maturity Spiral



*POS = Point of Sale

By spiraling up program technology maturity, PRx programs can focus their resources on critical interactions with participants and their communities. Rather than spending time on overly laborious back-end functions, they can be high-touch where it most counts, resulting in increased fidelity, equity, and dignity (FED) with participants and program partners. Programs using more integrated approaches will also be most able to increase their sustainability as the overall field grows and new funding and learning opportunities arise.

Recommendations — Actions for the Field

As the costs and disparities of our current health system are dire and getting worse, PRx programs offer a way for health systems and communities to work together to improve health holistically. However, these programs are in danger of being limited to small-scale pilots unless they can reduce some of the burdens of manual labor on tasks that do not enhance the participant experience or program effectiveness.

We have the following recommendations for program operators, funders, and institutional allies:

1. **Develop and support a central online forum** where information on IT systems can be shared amongst practitioners, with some functionality for sharing user (participant and operator) experiences. This may include user reviews, comments, or expert testing. IT vendors should be encouraged, even incentivized, to share their solutions. A body respected by operators should be designated (and funded) to develop and curate this online forum.

2. While for-profit companies are certainly seeing the trillion dollar chronic disease problem as an opportunity, and building well-financed bold solutions designed for large-scale customers, **there is still a need for philanthropic funders and impact investors to support the innovations coming from mission-driven enterprises,** even nonprofit organization-driven solutions. The private market is not yet working to address health disparities. The venture capital-funded for-profit entrants are seeking to scale quickly, potentially bypassing equity considerations such as collaboration with community-based partners and incorporation of local cultural foods. Mission-driven solutions that are designed for real community collaborations and accountability, honoring the cultural elements of food, should be supported to have a fair chance at gaining traction. Any governmental or private funder should use strong equity criteria to assess their contracting or investments in PRx programs and their IT providers.

3. **Support an inclusive group of program operators** in having effective conversations with leading dedicated PRx platform vendors to support adoption, further development, and affordable access to one or more responsive solutions.

4. **Solutions need to focus on tracking impact,** as well as redemption functionality. In order to continue to scale, PRx programs need to have strong tracking and reporting functionality on a variety of program impacts. This should span beyond biometrics to also enabling learning on how programs affect food security, mental health, relationships between healthcare and community, and health disparities. Ideally, solutions have features that allow participants to track their own progress towards diet and health goals, and also some real-time visibility for program operators to track prescription utilization and outcomes, and allow for timely analysis and community reporting of aggregate results. Technology can even play a key role in supporting the standardization of evaluation across PRx programs to better understand the impact of these programs at a larger, national scale.

Integrating IT solutions into PRx programs should not completely eliminate person-to-person interactions that positively impact participant experience. Technology can be used in collaboration with high-touch program operation strategies to amplify results and sustain important community connections and relationship-building. For example, calling program participants to complete an evaluation survey may result in more meaningful responses and a higher response rate than an auto-generated survey. Simultaneously, increased program efficiency can be achieved by program representatives entering participant responses into a tool that automatically provides some level of data analysis and number-crunching. Maintaining the human connection between program staff and participants is a clear example of the Fidelity, Equity, and Dignity (FED) framework in action.

In conclusion, this is an exciting time for PRx programs, which are continuing to proliferate and innovate around the country. It is also a time where program efficiency is becoming even more important to allow the field to advance, and is an area where technology can play a key role. The first steps are providing for a clear sharing of options and information, allowing for better decision-making for new and growing programs, and investing to ensure accessible dedicated solutions for PRx program operators. Technology providers can also take a more proactive stance in developing solutions that center equity and accessibility, as opposed to being an afterthought. As technology can be a force both for inclusion, but also disparities, we encourage PRx program operators, funders, and allies to apply clear equity standards to their technology decisions.

REFERENCES

American Diabetes Association. (2018). Economic costs of diabetes in the U.S. in 2017. Diabetes Care, 41(5), 917–928. https://doi.org/10.2337/dci18-0007

CDC. (2022, June 6). Health and economic costs of chronic diseases. Centers for Disease Control and Prevention. Retrieved June 16, 2022, from https://www.cdc.gov/chronicdisease/about/costs/index.htm

Crunchbase. (2021, December). Foodsmart - funding, financials, valuation & investors. Retrieved May 2022, from https://www.crunchbase.com/organization/zipongo/company_financials

Devich-Cyril, M., Kan, L. M., Francisco Maulbeck, B., & Villarosa, L. (2022, June). Mismatched - Philanthropy's response to the call for racial justice. Philanthropic Initiative for Racial Equity. Retrieved July 1, 2022, from https://racialequity.org/mismatched/

Findhelp. (2022, February 24). Findhelp Provides Native Social Care Closed-Loop Referrals with Epic's Community Referral Network (CRN) [Press release]. https://www.businesswire.com/news/home/20220224005232/en/Findhelp-Provides-Native-Social-Care-Closed-Loop-Referrals-with-Epic%E2%80%99s-Community-Referral-Network-CRN

Garfield, K., Scott, E., Sukys, K., Downer, S., Landauer, R., Orr, J., Friedman, R., Dushko, M., Broad Leib, E., & Greenwald, R. (2021, March). Mainstreaming Produce Prescriptions: A Policy Strategy Report. Center For Health Law and Policy Innovation.

Harvard T. H. Chan School of Public Health. (2020, January 6). Poor diets linked to $50 billion in U.S. health care costs. News. Retrieved June 16, 2022, from https://www.hsph.harvard.edu/news/hsph-in-the-news/poor-diets-health-care-costs/

Leventhal, R. (2021, June 9). The Top EHR Vendors by Hospital Market Share: KLAS. Healthcare Innovation. Retrieved June 16, 2022, from https://www.hcinnovationgroup.com/finance-revenue-cycle/
health-it-market/news/21226099/the-top-ehr-vendors-by-hospital-market-share-klas

MHA. (2022) Peer support: Research and reports. Mental Health America. Retrieved June 23, 2022, from https://www.mhanational.org/peer-support-research-and-reports

NPPC: National Produce Prescription Collaborative (2021, March). Retrieved May 25, 2022, from https://nationalproduceprescription.org/

Rockefeller Foundation. (2021, July). True Cost of Food: Measuring What Matters to Transform the US Food System.

Rowley, W. R., Bezold, C., Arikan, Y., Byrne, E., & Krohe, S. (2017). Diabetes 2030: Insights from yesterday, today, and future trends. Population Health Management, 20(1), 6–12. https://doi.org/10.1089/pop.2015.0181

Schlosser, A. V., Joshi, K., Smith, S., Thornton, A., Bolen, S. D., & Trapl, E. S. (2019). "The coupons and stuff just made it possible": Economic constraints and patient experiences of a produce prescription program. Translational Behavioral Medicine, 9(5), 875–883. https://doi.org/10.1093/tbm/ibz086

Schwartz, H. (2018). Produce RX programs for diet-based Chronic Disease Prevention. AMA Journal of Ethics, 20(10). https://doi.org/10.1001/amajethics.2018.960

Shmerling, R. H. (2020, May 26). When dieting doesn't work. Harvard Health Publishing. Retrieved June 16, 2022, from https://www.health.harvard.edu/blog/when-dieting-doesnt-work-2020052519889

The Statistics Portal. Statista. (n.d.). Retrieved June 16, 2022, from https://www.statista.com/

UConn Rudd Center for Food Policy & Health. Food Marketing. (2020, April 20). Retrieved June 16, 2022, from https://uconnruddcenter.org/research/food-marketing/

Vogels, E. A. (2021, June 22). Digital divide persists even as Americans with lower incomes make gains in tech adoption. Pew Research Center. Retrieved June 16, 2022, from https://www.pewresearch.org/fact-tank/2021/06/22/digital-divide-persists-even-as-Americans-with-lower-incomes-make-gains-in-tech-adoption/

Wholesome Wave (2021, April). Produce Prescription Programs, US Field Scan Report: 2010-2020. https://bit.ly/3xGZHhF

APPENDIX 1 - LIST OF PRX TECHNOLOGY SOLUTIONS REVIEWED

Categories	Leading Feature	Company / Organization	Tech Solution / Platform name or brand	Year of the organization/ Company	Tech Solution Year of creation (1st release)	Organization type	Motto / Slogan	Organization contact / mail
1. Dedicated PRx Management solutions	• Self-developed Dedicated FVRx Management	About Fresh	Fresh Connect	2013	2018	Community-based Organization	"Food is our culture, happiness, and health"	erin@aboutfresh.org
	• Self-Integrated Dedicated FVRx Management	Vouchers 4 Veggies		2015	202x	Community-based Organization	"To create equitable local food systems where healthy food is affordable and accessible for all."	cissue.bonini@ucsf.edu
3. Payment, redemption solutions / Loyalty cards / Apps (e-wallet)	• Payment / Redemption solution for Food Insecurity Programs	Epic Technology Solutions	Fresh Incentives	2004	2018	Tech solution provider / Startup size	"Process Double Up Food Bucks, Fresh Prescription, and Hoophouses for Health transations, at participating locations."	erin@aboutfresh.org
	• Payment / Redemption solution	Solutran	Healthy Savings	1982	2013	IT Power house	"Leading in the fintech industry for nearly 40 years"	solutions@solutran.com
	• Payment / Redemption solution	Snap 2 Save	HealthEBucksRx (FoodRx), Loyalty platform app	2018	2018	Startup	"Save money, live healthy"	info@snap2save.com
	• Loyalty Cards	Incomm	InComm Healthcare Benefit Card	1992	2014-2016	Startup / IT Power house	"Everywhere payments happen, we're there."	jcutler@incomm.com
	• Payment / Redemption solution	Speak Retail	Speak Health	2015	2015	Startup	"Privide your members or employees with customer-centric solutions that encourage healthy behaviors."	Karla.rager@speakretail.com
	• E-wallet	Tangelo	Food benefits platform	2016-2017	2016-2017	Startup	"Improving acces to healthy food, one food benfit at a time."	hello@jointangelo.com
	• Pre-printed vouchers	AppCard		2011	2011	Startup	"The next generation of Customer Engagement"	sales@applecard.com
4. Farm / Farmer-Market management solutions	• Farm / Garmer-market managment solutions	FM Tracks	Farmers' Market (FM) Tracks | Tools | Factsheets | PRC | CDC	NA	NA	Born inthe field (*)	"An app and website to track healthy food purchases at farmers markets across the US."	ram249@case.edu (Roberto Martinez, MD, MPH)
	• Virtual Food Hub	Barn2Door		NA	NA	Startup	"Your Farm Online"	info@barn2door.com
5. Database / CRM / BI solutions	• Databbase / CRM	Salesforce-customized		1999	1999	IT Power House	"Built relationships with the clients that drive your business"	salesforce.com
	• Data / BI	PowerBi		1970-80	NA	IT Power House (Microsoft)	"An app and website to track healthy food purchases at farmers markets across the US."	powerbi.microsoft.com/
6. Behavior Change	• Behaviour change	FoodSmart		2010	2010	Startup	"The nation's largest registered dietitian adn foodcare network tha tmakes eating well, easy, affordable, and accessible for all."	inquiries@foodsmart.com
	• Behaviour change	Healthiby		NA	NA	Startup	"Create the life you want, by taking control of your helath. join a team that will journey with you."	mbsnodgrass@healthiby.com
7. Home Delivery / Logistics	• Produce Home delivery	Umoja	Food for Health(r) PP SYSTEMS	2021	2021	Startup	"Food for health, nutrition as an intervention"	mguillory@umojasupply.com
	• Produce Home delivery	Fresh House	Go fresh house program	2020	2020	NFPO	"Focus on your mission, we to the rest" (traduction from spanish)	info@gofreshhouse.com
	• Produce Home delivery	Farmbox Direct	FarmboxRx	2014	2019	Startup	"Delivering Food as Medicine Nationwide"	Hello@farmboxrx.com
	• Produce Home delivery	US Hunger	Full Cart Program	2010	2010	NFPO	"America virtual food bank"	rjacobs@ feedingchildreneverywhere.com
8. Others	• Surveys / Data	Qualtrics		2002	2002	Startup/IT Power house	"Your customers and employees are telling you how they feel. Now yo uhave the worlds most advanceed conversation analytics to listen to them smarter."	https://www.qualtrics.com/esla/contactenos
	• SDoH Data / Impact Measurement / Tracking Data	Socially Determined	SDoH Data	NA	NA	Startup / IT Power House	"Get full visibility into social risk andits impact on those you serve. Our unparalleled insights drive strategic, measurable programs to imporve healthcare and outcomes at scale"	info@socially determined.com
	• Social Service Referrals	UnitelsUs	Social platform, Healthcare platform	2013	2013	IT Power House	"We connect health and social care."	joshua.souane@uniteus.com

APPENDIX 2: REPORT LEAD AUTHOR BIOGRAPHIES

Gustavo Mamao (he/him) is a serial social impact entrepreneur – having founded and run Ecovec (mosquito-borne diseases monitoring systems) and Rizoflora (biological control products for agriculture). Gustavo has also acted as a leader consultant of an innovation management firm, working for both universities and large companies. He is the writer of the book *Inovação na Raiz / Innovation at the Roots* (2017) sharing the lessons learned from a 10-year venture started based on a Brazilian university technology. Gustavo holds a Science in Management degree from MIT Sloan. He is currently DAISA's Entrepreneur in Residence and Senior Consultant, and in charge of the DAISA Impact Investing practice.

Maria Elena Rodriguez (she/her/ella) is Director of Research & Community Partnerships with DAISA. Based in Puerto Rico, she has over fifteen years of community-engaged experience advocating for food justice, supporting small-scale food producers and artisans, and promoting local food culture. In her current role at DAISA, Maria Elena conducts field-building research, provides project management and strategic assistance to clients, and fosters collaboration and capacity-building among community-based food systems organizations. Maria Elena holds a Bachelor's degree in Environmental Studies from the University of Washington in Seattle and a Master's degree in Community Development from the University of California, Davis, where she created original research on the complex cultural and political dynamics of the Puerto Rican food system.

Daniel Ross (he/him) As Partner and CEO of DAISA Daniel specializes in supporting development of food & environmental enterprises and innovative programs in underserved communities. Works with entrepreneurs to strengthen business plans as well as the mission-driven investors and funders wanting to maximize their impact across health, community development and social equity. He has extensive experience working with diverse communities, able to bridge community perspectives to national level strategy and systems change. Daniel is recognized as a leading social entrepreneur with a lifetime fellowship from Ashoka – Innovators for the Public Good, MIT Sloan Fellow for Innovation and Global Leadership, MIT Legatum Fellow for Entrepreneurship and Development. MBA, Sloan School, Massachusetts Institute of Technology. BA, Political Science and Spanish, Oberlin College.

Maham Rizvi (she/they) is a Food Systems Associate with DAISA. They have more than 10 years experience in the food industry in the U.S. and abroad, spent cooking in restaurants, working on farms, with social enterprises and NGOs, and through grassroots organizing. In prior roles, Maham has worked as Program and Sponsorship Coordinator at the MIT Enterprise Forum and as a Program Director with Slow Food International in Italy. Maham has an education in radio journalism and a BA in Gastronomy, with a focus in agroecology and identity from the University of Gastronomic Sciences in Pollenzo, Italy.

Scan of Technology Solutions in the Produce Prescription Field:

A Snapshot of Available Software-based Solutions and Emerging Equity Considerations

Prepared by DAISA Enterprises LLC | Commissioned by Wholesome Wave

NOVEMBER 2022

DAISA ENTERPRISES

wholesome wave