

Toward Veggie Rx Integration:
Program Perceptions among Oregon's Coordinated Care Organizations

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Abstract

Regular consumption of fruits and vegetables is critical to maintaining health, yet accessing these foods can be challenging for low income consumers. Poor nutrition is the single leading cause of illness in the US, and food insecurity, defined as the lack of consistent access to the food needed to maintain an active and healthy life, further contributes to the development of diet-related chronic illness. These interrelated issues result in poor health outcomes, high health care utilization and costs, and burden health systems.

The concept of “food is medicine” acknowledges the importance of nutrition in achieving health; food is medicine focused nutrition interventions aim to treat and, in some cases, prevent disease. Produce prescription programs are one approach to food is medicine that improve food security and health outcomes by increasing access to and affordability of fresh fruits and vegetables for eligible consumers. Known as Veggie Rx in Oregon since 2014, these programs have grown in popularity in recent years; however, their use within health systems is still limited. Oregon’s Coordinated Care Organizations (CCOs) may support access to these programs for their members, although utilization is inconsistent. In addition, federal approval of Oregon’s 2022-2027 Section 1115 Medicaid Demonstration will require CCOs to provide some coverage of Veggie Rx for certain populations beginning in 2025. While produce prescriptions may reduce barriers to consuming fruits and vegetables, improving overall diet as well as physical and mental health, and reducing healthcare utilization and cost, little is known about how these programs are understood from the perspective of health systems.

This research aimed to address this gap in the literature by exploring the landscape of Veggie Rx in Oregon, and how Oregon's CCOs perceive, engage with, and finance these programs with regard to their integration with health systems, and their potential to improve nutrition security. A mixed methods case study was conducted with a subset of Veggie Rx programs and CCOs operating in Oregon in 2023. In addition to survey data from Veggie Rx participants and programs, interviews were conducted with Veggie Rx and CCO leaders, and key interested parties with knowledge of Veggie Rx. Data were analyzed to explore Veggie Rx operations, CCO perceptions of these programs, the existence of current partnerships, and the potential to implement new and strengthen current partnerships.

While Oregon's Veggie Rx programs shared similar goals and priorities, they varied widely in their approach to accomplishing this work. Variation in the delivery and operations of Veggie Rx programs was the result of operating within a geographically complex state where each region offers a different community context within which programs must adapt. Program characteristics, such as benefit format and delivery, program focus, and funding streams, were highly place-specific and necessarily responsive to the goals of each program and the participants whom they served.

CCOs were aware of Veggie Rx programs operating in Oregon broadly and within their service areas and seemed to view the programs favorably; however, they described limitations in their ability to utilize Veggie Rx as a tool for members. CCOs described a need to balance the priorities established at the state level with the unique

needs of the communities they serve as part of their strategic efforts to invest in social determinant of health initiatives. Variability across CCOs, service areas, community priorities, and availability of resources contributed to differences in the way that the organizations chose to support and partner with Veggie Rx programs. CCOs' funding of Veggie Rx was related to two key factors: direction from the organization's governance entities, and internal knowledge of and/or interest in the program. CCOs also described utilizing Veggie Rx in different ways, depending on local priorities and internal interest in the programs among staff. This resulted in varied approaches to collaboration and funding that were not readily categorized or classified as they reflected the inherent flexibility built into Oregon's CCO model.

Findings from this study indicate that participation in a Veggie Rx program may support Oregon's efforts to achieve the Triple Aim and increase member engagement with the healthcare system. Synthesis of the data collected throughout this study revealed opportunities to strengthen and expand the work of Veggie Rx programs through partnerships with CCOs. Four interrelated themes emerged: the importance of flexibility for both Veggie Rx programs and Oregon CCOs; assurance of an appropriate level of program fit between Veggie Rx and participants, as well as between Veggie Rx and CCOs; articulation of existing barriers to the success of Veggie Rx and the need to address those barriers; and considerations for health-related social needs coverage under Oregon's Medicaid 1115 waiver.

Dedication

For Celeste.

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Glossary of Commonly Used Terms

| | |
|--------|---|
| CAC | Community Advisory Council |
| CBI | Community Benefit Initiatives |
| CCO | Coordinated Care Organization |
| CHA | Community Health Assessment |
| CHIP | Community Health Improvement Plan |
| CSA | Community Supported Agriculture |
| FSA | Food Stamp Act |
| FSP | Food Stamp Program |
| FVs | Fruit and Vegetables |
| GusNIP | The Gus Schumacher Nutrition Incentive Program |
| HRF | Human Right to Food |
| HRS | Health-Related Services |
| HRSN | Health-Related Social Needs |
| IDI | In-depth Interview |
| NIFA | National Institute of Food and Agriculture |
| NI | Nutrition Incentives |
| NTAE | GusNIP Nutrition Incentive Program Training, Technical Assistance, Evaluation, and Information Center |
| OCFSN | Oregon Community Food Systems Network |
| OHA | Oregon Health Authority |
| PPR | Produce Prescription Program |
| RDT | Resource Dependence Theory |
| SDoH | Social Determinants of Health |
| SHARE | Supporting Health for All through Reinvestment |
| SHIP | State Health Improvement Plan |
| SNAP | The Supplemental Nutrition Assistance Program |
| US | United States |
| USDA | United States Department of Agriculture |

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Chapter One – Introduction

The consumption of food is a requisite for all physiological processes and is among the most basic of human needs (Maslow, 1943b, 1943a). Before a person can achieve their needs for safety, love, esteem, and self-actualization, they must first satisfy those needs that are most basic and necessary to survival, among them shelter, water, and food (Maslow, 1943a). The 1948 Universal Human Rights Declaration, which laid the foundation for the Rome Declaration on World Food Security in 1996, led to most developed countries adopting, among other things, the concept of food as an individual human right (Chilton & Rose, 2009; United Nations Office of the High Commissioner for Human Rights, 2010). The right to food is inextricably connected to the rights to health and to life (Universal Declaration of Human Rights, 1948). When and where food is inaccessible, inadequate, or unavailable to support the energy and dietary needs of the human body, major problems follow (United Nations Office of the High Commissioner for Human Rights, 2010). Failure to meet these conditions impacts not only a person's ability to live an active and healthy life, but also their ability successfully contribute to their community and to society more broadly (United Nations Office of the High Commissioner for Human Rights, 2010).

Food and Nutrition Security

Food security is defined as the state of having reliable access to the amount of food necessary to live an active and healthy life (Committee on World Food Security, 2017; Food and Agriculture Organization of the United Nations, 1996; National Research Council, 2006; USDA Economic Research Service, 2022). Not only must food be

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accessible, it must also be safe, nutritionally appropriate, and able to be acquired in a manner that is socially acceptable, without reliance on emergency food supplies or coping strategies, such as scavenging or theft (National Research Council, 2006). Within the US, food security is categorized into four statuses: high food security, where no issues of access occur; marginal food security, where a household may experience occasional difficulty accessing or anxiety about accessing food, without notable effect on food intake or quality; low food security, where food quality is affected but quantity remains mostly unchanged; and very low food security, where all aspects are affected (USDA Economic Research Service, 2022).

Where the US definition of food security primarily focuses on access, the definition endorsed by the United Nations considers food security as having four pillars, each representing a specific dimension of the problem: access, availability, utilization, and stability (Ashby et al., 2016; Committee on World Food Security, 2017). Food is strongly tied to social identity, therefore this definition can be expanded to include access to foods that are culturally appropriate and meet the dietary preferences of those who consume them (Alonso et al., 2017).

Food insecurity is a socioeconomic condition that occurs when the requisite conditions for food security are absent, limited, and/or inconsistently present (Anderson, 1990; National Research Council, 2006). It generally occurs as a result of inadequate resources to acquire and/or means to access food, rather than due to a shortage of available food (United Nations Office of the High Commissioner for Human Rights, 2010). The United States Department of Agriculture Economic Research Service

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(USDA ERS) has measured the household incidence of food insecurity since 1995 via US Census Bureau surveys (Coleman-Jensen, 2015). Internationally, existing tools used to measure food insecurity tend to focus only on access to food, rather than evaluating other dimensions such as the four pillars (Ashby et al., 2016).

Food insecurity is related to, though distinct from, hunger, which refers to the physical feeling of discomfort or pain caused by a lack of food, a potential side effect of food insecurity (National Research Council, 2006; Thorndike et al., 2022; USDA Economic Research Service, 2022). Hunger is an individual, physical experience that may be related to, or experienced separately from, food insecurity. Within families residing in the same household, despite all living with the same level of food insecurity, each individual may describe different experiences or perceptions of hunger; similarly, not all food insecure households experience hunger in the same way, or even at all (National Research Council, 2006). Food security may be considered a prerequisite to hunger and may offer a more upstream indicator that an individual is at risk for experiencing hunger.

While anyone can experience food insecurity, not all populations and demographic groups are equally affected, and disparities in the incidence of food insecurity are prevalent. Household composition, socioeconomic status, race and ethnicity, gender, education level, and employment status all influence the risk of food insecurity in a household (Coleman-Jensen et al., 2020, 2021; Edwards, 2020b).

Households with children, those that are single-parent or headed by women, have an income below 185% of the federal poverty level, and those that house racial or ethnic

minorities all have a greater risk of being food insecure than those that are of higher income and white (Coleman-Jensen et al., 2020, 2021; Edwards, 2020b). As with other social determinants of health, food insecurity is intersectional in nature; therefore, social, structural, and economic factors may be cumulative in their effect on an individual's risk of experiencing food insecurity (Lopez et al., 2016).

The prevalence of food insecurity in the US peaked during the Great Recession and since then has slowly declined. An estimated 10.5% of US households reported being food insecure at some point during 2020; while this number was unchanged from 2019, the inherent limitations associated with the tools used to measure food insecurity may have contributed to this low estimate (Coleman-Jensen et al., 2020, 2021). While food insecurity in the US did not apparently increase during the COVID-19 pandemic, there was both an increase in the availability of food assistance programs and in the number of people who sought food assistance resources throughout 2020 (Feeding America, 2021; Waxman et al., 2021). Public and private responses to economic hardship brought on by the COVID-19 pandemic may have prevented the overall US rate of food insecurity rate from rising in 2020, yet the effects of the pandemic on household food insecurity varied, and may persist into the future (Coleman-Jensen et al., 2021; Kim-Mozeleski et al., 2023; Waxman et al., 2021).

Food insecurity can result in malnutrition, a broadly defined condition that encompasses three related categories of diet-related risk factors and associated health outcomes: undernutrition, micronutrient-related malnutrition, and overnutrition (World Health Organization, 2021). Undernutrition refers to the consumption of less food than

is needed to maintain health, meaning both the number of calories and the nutritional content of foods consumed, while micronutrient-related malnutrition includes micronutrient excess and deficiencies stemming from inadequate dietary intake (World Health Organization, 2021). Overnutrition refers to diet-related conditions resulting from over-consumption of nutrients, including excess weight gain (World Health Organization, 2021).

Social policy as it relates to food has long treated the three categories of malnutrition as individual issues to be addressed separately, without acknowledgement that all forms of malnutrition are connected and some may occur together (Mozaffarian et al., 2021; Popkin et al., 2020). There has been a recent shift in the United States (US) toward understanding that both under- and over-nutrition are conditions of equal importance in how they impact health (Mozaffarian et al., 2021).

The term “nutrition security” represents an evolution of how governments, researchers, health providers, and others perceive issues of diet, food access, and health; it acknowledges all types of malnutrition as a single, multifaceted problem (Mozaffarian et al., 2021). Food security has long been the dominant paradigm for conceptualizing food-related disparities in the US; however, a growing cross-sector movement has resulted in nutrition security becoming increasingly recognized as a preferred term (Mozaffarian, 2023; Mozaffarian et al., 2021). However, a limitation of nutrition security is that there is not yet a clear approach to measuring its prevalence or severity among populations. Existing validated screening tools used to measure food insecurity lack emphasis on nutritional intake and require revision before a true

transition to nutrition security can be made (Ashby et al., 2016; Mozaffarian, 2023; Mozaffarian et al., 2021; Thorndike et al., 2022; USDA Economic Research Service, 2022). Therefore, despite a preference to use “nutrition security” throughout this introduction and dissertation more broadly, the term “food security” will primarily be used when discussing undernutrition. When referring to malnutrition more broadly as a result of food insecurity, “nutrition security” will be used wherever possible. As appropriate, both food and nutrition security or insecurity will be used when discussing the presence or absence of food access, availability, and adequacy.

Nutrition Security and Health

Individual diet exists on a social gradient where healthier foods, specifically fruits and vegetables (FVs), are typically less available to low-income consumers than they are to those with higher incomes; this is due in part to the high price of healthy foods, relative to the low price of energy-dense but nutrient-poor substitutes (Andreyeva et al., 2008; Darmon & Drewnowski, 2008). While FV intake is lower than recommended by the US dietary guidelines across all socioeconomic groups, income accounts for the largest disparity in adults meeting the recommended daily vegetable intake (Lee-Kwan, 2017; US Department of Health and Human Services, 2020). Approximately 12% of US adults consume the daily intake of fruit recommended by the US dietary guidelines, and only 10% meet the recommended daily intake for vegetables, while less than 7% of adults near or below the poverty level consume the recommended daily intake of vegetables, compared to over 11% in the highest socioeconomic group (Lee et al., 2022; Lee-Kwan, 2017).

Social determinants of health (SDoH) are socioeconomic, environmental, and structural factors that may impact the ability of an individual or population to acquire and maintain health (NEJM Catalyst, 2017). While not all SDoH are directly related to health, all SDoH have the potential to affect health (NEJM Catalyst, 2017). SDoH include socioeconomic status, the physical environment, social networks, employment status, educational attainment, access to healthcare, food, and the nutritional adequacy of the food available (Artiga & Hinton, 2018; NEJM Catalyst, 2017).

Malnutrition and food insecurity influence the development of diet-related chronic disease and contribute to high healthcare costs (Cook & Poblacion, 2016; Gregory & Coleman-Jensen, 2017; Gundersen & Ziliak, 2015; Jardim et al., 2019). Food insecure individuals are more likely than their food secure counterparts to report overall poor health, including physical, mental, and oral health (Carson & Boege, 2020; Gundersen & Ziliak, 2015; Tarasuk, 2004). Malnutrition is the single leading cause of illness in the US, accounting for over 600,000 annual deaths (National Center for Health Statistics, 2021). Common chronic conditions associated with food insecurity include persistent and heightened stress, depression, anxiety, iron deficiency anemia, and chronic metabolic and cardiovascular conditions such as hypertension, hyperlipidemia, and type 2 diabetes (Fanelli et al., 2020; Gregory & Coleman-Jensen, 2017; Gundersen & Ziliak, 2015; Laraia, 2013; Seligman et al., 2010). A lack of food security places a substantial burden on health systems which become responsible for treating poor health outcomes stemming from diet-related illness.

The economic implications of food insecurity are immense, with costs estimated at more than 160 billion dollars stemming from lost work productivity and the treatment of chronic disease (Berkowitz, Basu, et al., 2019; Cook & Poblacion, 2016; Garcia et al., 2018). Food insecurity is a strong predictor of future healthcare utilization and of high individual healthcare costs (Tarasuk et al., 2015; *The Impact of Poverty, Food Insecurity, and Poor Nutrition on Health and Well-Being*, 2017). Further, food insecurity can contribute to medication nonadherence and underuse which can exacerbate chronic health conditions (Herman et al., 2015). This is particularly relevant for those with chronic metabolic conditions and severe mental illness where limited food access and inadequacy can compound the effects of unstable blood sugar (Herman et al., 2015). Nationally, mean estimates of costs by state associated with diet-related illness (e.g., cardiovascular disease and type 2 diabetes) include over one billion dollars annually spent on health services, and \$773 million in related work and school absenteeism (Berkowitz, Basu, et al., 2019; Trogdon et al., 2015). Food insecurity and malnutrition place undue strains on health systems which require large amounts of resources to treat chronic diseases that may have been prevented with early interventions, such as at the onset of food insecurity and, when possible, in childhood.

The effects of food insecurity are particularly far-reaching for children. Compared to those living in food secure households, children who experience food insecurity have higher rates of asthma, are more likely to report depression and anxiety, have higher instances of tooth decay, and are more likely to be diagnosed with iron deficiency anemia (Gundersen & Ziliak, 2015). Exposure to food insecurity in utero

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increases the risk of obesity and developing metabolic disease later in life, and can result in birth defects related to poor micronutrient intake during development (Gallegos et al., 2021; Gluckman et al., 2008; Kimbro & Denney, 2015; Paquin et al., 2021). Young children exposed to food insecurity have a greater risk of adverse health outcomes than their food secure peers; while older children may struggle in school, are more likely to experience common illnesses, and are at a higher risk of engaging in risky behaviors during adolescence (Cook & Frank, 2008; Gallegos et al., 2021; Paquin et al., 2021).

Nutrition Security Policy

Given that food security and malnutrition have historically been considered separate issues, limited policy interventions have focused on addressing both food insecurity and dietary quality simultaneously (Downer et al., 2020; Mozaffarian et al., 2021). The Supplemental Nutrition Assistance Program (SNAP) is the preeminent policy in place to address food and, to some degree, nutrition insecurity at the federal level. SNAP is an entitlement program embedded within the Farm Bill and the largest federal food assistance program in the US, it is administered by the US Department of Agriculture Food and Nutrition Service (USDA FNS) and operated at the state level (Nestle, 2019; USDA Economic Research Service, 2019). Broadly available to those who meet income and other eligibility requirements, SNAP provides monthly financial benefits to offset the purchase of food (Center on Budget and Policy Priorities, 2019; Nestle, 2019). While SNAP benefits have been shown to reduce food insecurity, there is some debate about how effectively SNAP benefits can improve dietary quality, due to

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several factors such as the high cost of FVs, time required for food preparation, and lack of cooking and/or storage equipment (Andreyeva et al., 2015; Engel & Ruder, 2020; Gearing, Dixit-Joshi, et al., 2021; Gearing, Lewis, et al., 2021; Gleason et al., 2021; Gregory et al., 2013). While SNAP benefits do make a difference in food security and dietary quality for participating households, SNAP participants still consume fewer FVs compared to higher income households (Gleason et al., 2021).

SNAP includes a component intended to support FV access for low-income consumers; however, not all SNAP recipients receive these benefits (USDA National Institute of Food & Agriculture, n.d.). The Gus Schumacher Nutrition Incentive Program (GusNIP) was authorized in the 2018 Farm Bill and houses three competitive grant programs: 1) the Nutrition Incentive program, which encourages the purchase of FVs by providing financial incentives at the point of purchase, specifically for SNAP participants; 2) the Produce Prescription program, which promotes the purchase of fruits and vegetables through vouchers or “prescriptions” for FVs among low-income participants screening positive for food insecurity and with a diet-related chronic disease (e.g., type 2 diabetes); and 3) the GusNIP Nutrition Incentive Program Training, Technical Assistance, Evaluation, and Information Center (NTAE) which through reporting and evaluation and technical assistance, supports GusNIP grantees (USDA National Institute of Food & Agriculture, n.d.). This dissertation focuses on produce prescription programs; therefore, the Nutrition Incentive programs and NTAE will not be discussed further here.

Produce prescription programs, known as Veggie Rx in Oregon, improve nutrition security by offering “prescriptions” for FVs to low-income individuals or households in

order to increase purchase and intake of FVs, reduce food insecurity, and improve healthcare utilization and reduce costs (USDA National Institute of Food & Agriculture, n.d.). These programs increase affordability of and access to food by reducing or eliminating the cost of FVs and providing food directly to those at risk of, or who are experiencing, food insecurity, or those at risk of developing or already have a diet-related chronic illness (Cavanagh et al., 2017; Donohue et al., 2021; Feinberg et al., 2018; Heasley et al., 2021; Swartz, 2018; Taher, 2020).

Produce prescription program structure and operations vary based on location and organization, though typically follow one of several models, including membership in a farm share or community supported agriculture (CSA), or the provision of vouchers or other similar mechanism to use at the point of sale (e.g., participating farmers markets, grocery stores, clinics, corner stores, etc.) (Swartz, 2018; Taher, 2020). Despite their benefit to health systems, produce prescription programs are primarily financed through grants, including through GusNIP and other public and private funding sources, while health systems typically provide minimal and variable program financial support (Garfield et al., 2021; Swartz, 2018). Existing funding sources are often relatively short in duration, typically up to a few years, which complicates program sustainability and limits the number of participants able to access produce prescription programs (Garfield et al., 2021) (Center for Health Law & Policy Innovation, 2021). Program funding will be discussed in greater detail in Chapter Two.

Oregon Case Study

This research focused on Oregon as a case study. Despite being a national leader in the production of specialty crops (i.e., vegetables), Oregon is not immune to nutrition insecurity (USDA Economic Research Service, 2022). While overall rates of food security have been steadily declining in Oregon since the Great Recession, falling under 10% in 2019, the COVID-19 pandemic resulted in a large increase in the number of Oregon households that experienced food insecurity at some point during 2020, with estimates as high as 25% (Edwards, 2020b, 2020a). From 2020 to 2022 the statewide food insecurity rate was 11.2%, demonstrating an increase compared to the pre-COVID-19 rate (Edwards & McElhaney, 2023).

Prior to the COVID-19 pandemic, disparities in food insecurity existed for many demographic groups, including single parents (15.3% for mothers, 11.5% for fathers), those with less than a bachelor's degree (between 12% and 15.1% based on level of educational attainment), and racial and ethnic minorities (10.6% in Asian and Pacific Islander households, 18.2% in Black households, 21% in Hispanic households, and 24% in Native American households) (Edwards, 2020b). The pandemic exacerbated existing disparities while also exposing new ones; from 2020 to 2022 food insecurity in rural households increased from 10.5% to 18.9% while urban households remained constant at 9.7% (Edwards & McElhaney, 2023). Approximately half of all Oregonians at that time suffered from at least one chronic illness, and heart disease was the state's second leading cause of death, suggesting that (Oregon Health Authority, 2017; Oregon Health Authority Center for Health Statistics, 2022).

Oregon has long been a leader in health systems reform (McConnell et al., 2014), and offered a robust food system that could be leveraged in the pursuit of nutrition security. Veggie Rx programs have a well-established foothold across the state, and the Oregon Community Food Systems Network (OCFSN, which will be discussed in Chapter Two) offered an existing network of programs to engage in this study (Oregon Community Food Systems Network, 2021b; OSU Extension Service, 2021; Taher, 2020). Oregon delivers healthcare to its Medicaid recipients through the Coordinated Care Organization (CCO) model, a unique structure with an emphasis on addressing SDoH that lends itself to innovation and community partnerships. Oregon's climate and environmental resources have contributed to a longstanding tradition of agriculture, strong local food systems, and abundant yields to support statewide nutrition security. However, inequitable access across population groups remains an issue.

Conducting this study in Oregon also offered the benefit of convenience, as the researcher is a lifelong Oregonian and was pursuing their doctoral program in Portland, Oregon.

Health Systems

Despite the fact that the outcomes of nutrition insecurity affect the US healthcare system, the use of nutrition-focused interventions in delivery settings is limited. While the idea of "food as medicine" has gained traction in the healthcare sector, the majority of nutrition-focused interventions focus on a narrow range of medical conditions and specific patient characteristics where nutrition intervention has been deemed most appropriate (Downer et al., 2020; King et al., 2021). Increasingly,

there have been calls for healthcare systems to strengthen their use of nutrition-focused interventions in order to address food insecurity and malnutrition, which could improve healthcare spending and utilization (Barnidge et al., 2020; Berkowitz et al., 2018; Downer et al., 2020; King et al., 2021; Kris-Etherton et al., 2014; Y. Lee et al., 2019; Tappenden et al., 2013). One general approach to improving nutrition security and health outcomes is by providing access to low or no cost FVs for consumers vulnerable to diet-related illness, such as through the produce prescription program model (Downer et al., 2020; Tappenden et al., 2013; US Department of Health and Human Services, 2020).

The CCO model was created in 2012 with the goal of achieving the Triple Aim for Oregon's public healthcare system: reducing healthcare spending, improving patient and population health, and improving the quality of care (Berwick et al., 2008; McConnell, 2016; Oregon Health Authority Health Policy & Analytics Division, 2018). CCOs are community-based organizations that operate through the use of partnerships to provide integrated healthcare to Oregon's Medicaid recipients (Berenson et al., 2016; McConnell, 2016). CCOs operate locally and under the governance of community partnerships made up of key interested parties who share risk and responsibility in delivering care, achieving goals, and meeting benchmarks (McConnell, 2016; Oregon Health Authority, n.d.-d). CCOs operate on five-year contracts with the state in exchange for a single, fixed-growth budget to coordinate services for patients; they are also given flexibility to establish new care models in order to address health disparities in their service area (Oregon Health Authority, n.d.-d).

CCOs were created with the intention of addressing social determinants of health (SDoH) specific to the needs of their region; however, substantial flexibility in how social needs were approached resulted in uneven implementation of SDoH spending across CCOs (McConnell et al., 2014). For the second round of CCO contracts awarded in 2020, known as “CCO 2.0”, state leadership decided that CCOs should expand their use of community-based partnerships in order to focus on addressing SDoH (Kaye, 2021). This shift in focus came with several new requirements to ensure that CCOs prioritize spending on SDoH, including consideration of performance metrics specific to SDoH, and a requirement that a portion of revenue from the prior year be reinvested in SDoH and health equity projects (Center for Health Systems Effectiveness, 2021; Kaye, 2021; Oregon Health Authority Health Policy & Analytics Division, 2018).

Oregon identified poor nutrition as one of four modifiable risk factors for chronic disease to be prioritized by the Oregon Health Authority (OHA) as part of the state’s 2017-2025 strategic plan (Oregon Health Authority, 2017). This strategic plan specified that CCOs, state and local agencies, and other healthcare facilities should adopt policies that support access to nutritious foods for all Oregonians (Oregon Health Authority, 2017). The 2020-2024 State Health Improvement Plan (SHIP) identified increasing equitable access to healthy foods as goal for Healthier Together Oregon (Oregon Health Authority, 2020a). Collectively, the recent emphasis of the OHA on addressing poor nutrition via the health system, coupled with CCO 2.0’s focus on addressing the social needs of Oregon’s Medicaid recipients, offered a clear signal that a policy window may have been opening, offering an opportunity to strengthen the inclusion of policies

aimed at improving nutrition security, such as produce prescriptions, into the health service delivery system.

At the time of these research there were 16 CCOs operating across Oregon, each with a unique member population and set of community partners (Oregon Health Authority, n.d.-d, 2019). As CCOs increased strategic spending on SDoH and responded to Oregon's 2022 Medicaid Section 1115 Demonstration waiver (discussed in Chapter Two), there was an opportunity to expand community partnerships to include local food systems to implement policies that connect CCO enrollees to FVs through the health system. Given that CCO enrollment represented a large proportion of the state's population, aligning these systems had the potential to create an impact on population health and healthcare spending by preventing disease and improving health outcomes through nutrition.

Gaps in the Research

Improving nutrition security is a complex endeavor that necessitates innovative, cross-sectoral solutions (Mozaffarian, 2023; Mozaffarian et al., 2018). There is growing evidence that produce prescription programs contribute to positive outcomes for participants and health systems alike (Cavanagh et al., 2017; Center for Health Systems Effectiveness, 2021; Donohue et al., 2021; Feinberg et al., 2018; Heasley et al., 2021; Izumi et al., 2020; Swartz, 2018; Taher, 2020). However, most studies to date have focused on evaluating pilot programs for outcomes associated with health status and dietary quality (Swartz, 2018). Recent research concluded that financial coverage of produce prescription programs should be broadened via health systems (Swartz, 2018).

Given the variable ways that produce prescription programs are financed, research addressing funding mechanisms is still lacking.

While produce prescriptions may reduce barriers to consuming FVs, improving overall diet as well physical and mental health, and reducing healthcare utilization and cost, little is known about how these programs are understood from the perspective of health systems (Auvinen et al., 2022). Studies evaluating produce prescription programs have indicated that cross-sectoral collaboration is needed to successfully implement sustainable programs (Garfield et al., 2021). To that end, further research is needed to understand the perspectives of health systems to facilitate better collaboration among organizations. Additionally, there is a need for research into what metrics drive decision-making within health systems with regard to produce prescription programs and other interventions that target nutrition security (Garfield et al., 2021). This is particularly relevant in a state such as Oregon where improving food security and access to healthy food is a statewide priority, and where CCOs are in a position to invest substantial resources into programs that address SDoH (Oregon Health Authority, 2017, 2020a).

Research Question and Aims

This dissertation describes a study that sought to add to the growing body of knowledge about produce prescription programs, specifically regarding their integration with health systems and potential for improving nutrition security in Oregon. This research sought to understand how participation in Oregon's Veggie Rx programs affected participant outcomes, and how Oregon's CCOs perceived, participated in, and financed these programs. This dissertation addressed the research gaps described above

by answering the following question: How do Oregon's CCOs perceive and utilize produce prescription (Veggie Rx) programs with regard to addressing social determinants of health?

This question was answered by study of the following aims:

1. Describe Veggie Rx programs and how participation affects food security and health outcomes for program participants.
2. Analyze how Oregon's CCOs prioritize Veggie Rx programs among other programs that address social determinants of health, including assessing the effectiveness of and demand for Veggie Rx.
3. Compare and contrast elements of Veggie Rx programs with CCO perceptions and utilization of these programs.

Theoretical Frameworks

The researcher approached access to healthy food as a matter of human rights.

A human rights framework acknowledges that food is a human right and insists on government accountability in making meaningful progress to improve food security (Ayala & Meier, 2017; Carney, 2012; Chilton & Rose, 2009). A human rights approach allows produce prescription programs to be treated as necessary rather than novel interventions.

Donabedian's Quality of Care model offered a framework for conceptualizing how different elements of produce prescription (Veggie Rx) programs and health systems affect nutrition security and health outcomes for Oregon's CCO members (Donabedian, 1966, 1990). The Donabedian model articulates how structures, processes, and outcomes can be used to understand the quality of healthcare (Donabedian, 1966). While Donabedian's model has been applied often to questions of

healthcare quality, only more recently has it been applied as a framework for research

in the social sciences, including school-based health systems and absenteeism (Coates, 2021) and state-provided disability services (LoPorto, 2020). The Donabedian model enabled conceptualization of how Veggie Rx programs interact with CCOs. Structural measures included organizational features of CCOs and Veggie Rx programs (e.g., region, clinic and food outlet locations, variety of redemption sites, benefit amount and duration, participant characteristics, program demand). Process measures included organizational relationships, referral pathways, funding priorities and mechanisms, and patient engagement. Outcome measures included food security, changes in FV intake, and health outcomes associated with Veggie Rx participation. Whereas much of the existing research on produce prescription programs has emphasized outcome measures, this study focused on structure and process elements and how those influenced health and nutrition security outcomes.

Theories of organizational behavior provided a foundation for understanding how health systems make decisions around which SDoH-focused programs to prioritize. The Andersen Behavioral Model of Utilization approaches health policy as a means of influencing healthcare delivery and population health in order to improve patient satisfaction and services utilization (Aday & Andersen, 1974; Andersen, 1995). When applied in the context of CCOs and Veggie Rx, this framework allowed for the consideration that participation in Veggie Rx may affect participant diet-related health outcomes and healthcare utilization.

Resource dependence theory (RDT) aims to make sense of organizational behavior by considering the social context and external environment in which the

organization exists, and the effects that the environment has on the organization's behavior (Pfeffer, 1997; Pfeffer & Salancik, 2003; Weick, 1995). Applied specifically, RDT recognizes that CCOs may compete with one another for resources and are beholden to the demands of their environment, primarily the needs of their patient populations.

Institutional theory emphasizes that organizational decision-making is not predicated on meeting performance expectations or achieving efficiency, but rather that behavior is based on the desire of an organization to adhere to the beliefs, norms, and values of the institutions that operate in its environment (Birken et al., 2017; DiMaggio & Powell, 1983; Perrow, 2014). Institutional theory recognizes the importance of institutional direction in determining organizational behavior and thus lends itself to understanding how CCOs behave in response to pressures from the State of Oregon.

Conclusion

Food insecurity and malnutrition are complex problems with considerable negative implications for people and the health systems that serve them. Complicated problems necessitate innovative policy and programmatic solutions that reach across sectors. By bringing together food and health systems in this way, Veggie Rx programs present a path for Oregon's CCOs to improve nutrition security in their commitment to support Oregon's commitment to the Triple Aim: improving individual and population health while reducing healthcare costs and improving quality of care (Berwick et al., 2008).

The human right to food is the reasonable assertion that all people deserve available, accessible, and adequate food (Chilton & Rose, 2009; United Nations Office of

the High Commissioner for Human Rights, 2010). A healthy, productive population is integral to building strong economies and vibrant communities; however, before a population can flourish, its most basic needs must first be met. When a person lacks the resources and/or means of meeting those needs, it becomes necessary to implement solutions that reduce disparities in the interest of equity. Produce prescription programs offer one solution to ensure the right to food while promoting equity in access to healthy foods and working toward nutrition security for low-income people. This dissertation identified findings that support Oregon's Veggie Rx programs in their efforts to accomplish these goals.

In Chapter Two the relevant areas of literature that provided the foundation to answer the research question are reviewed and summarized, and Chapter Three describes the design and methods used in the study.

Chapter Two – Review of Related Literature

Overview

In the US, diet and health are often approached as unconnected issues, despite a clear relationship between the two. “There is no connection between food and health. People are fed by the food industry, which pays no attention to health, and are healed by the health industry, which pays no attention to food” (Berry, 2018, preface section 6). Individual diet and nutritional intake are closely associated with health and well-being.

This chapter presents a review of the relevant areas of literature that were foundational to answer the research question and associated aims introduced in Chapter One. The literature reviewed covers a breadth of topical areas, each with its own unique concepts and associated terms. A note on terminology is important to explain the use of these terms throughout this and subsequent chapters. The term “consumer” is derived from the food systems literature and is used throughout this chapter in reference to individuals when they are engaged in food system activities, specifically the consumption of food (Chase & Grubinger, 2014). This term identifies the individual’s role within the food system which is reflected in the idea of direct-to-consumer activities discussed later in this chapter. When summarizing literature pertaining to federal nutrition assistance and other similar programs, such as produce prescription programs and Veggie Rx, the term “participant” is used to denote the individual’s engagement with those programs. Finally, the term “patient” is used when referring to individuals in direct engagement with health systems and health services

delivery, such as when interacting with a healthcare provider, while “member” is used if referring to Medicaid beneficiaries who receive healthcare and/or coverage through a CCO in Oregon specifically.

One pillar of a healthy diet is the regular consumption of fresh produce, specifically FVs. However, this can be difficult to adhere to as well as costly. Demographic factors such as socioeconomic status influence not only access to food, but also the kind and quality of foods that an individual is able to consume. FVs are often more expensive than other shelf-stable foods, prone to spoilage and require access to refrigerated storage space and tools for preparation. Dietary behaviors, often constrained by income and access to resources, affect individual health outcomes and can lead to the development of chronic disease, which has downstream effects on communities and burdens health systems. Given financial and other resources required to acquire and prepare a diet rich in FVs, low-income consumers are particularly vulnerable to experiencing poor nutrition and associated adverse health outcomes.

Despite the clear relationship between food and health, health systems have been slow to connect with local food systems. Nutrition interventions that aim to increase access to and consumption of FVs through a food is medicine approach may present an opportunity to strengthen nutrition security and improve health outcomes for low-income patients. When coordinated with health systems and rooted in communities, these actions have the potential to reduce healthcare costs, improve community health, and benefit local economies.

This chapter begins with a discussion of the SDoH and the concept of health equity, including food-related SDoH and nutrition security, followed by a discussion of how nutrition security can be addressed through the health system and through Oregon’s CCOs specifically. This foundation is followed by a discussion of the human right to food, food systems and their connection to human health, and a brief history of US federal nutrition assistance policy. This chapter offers the collective background required to inform why a study that explores how health systems engage with produce prescription programs was warranted, concluding with a discussion of organizational, policy process, and other theories that were relevant to the framing of, and approach to, the dissertation study.

The Social Determinants of Health and Health Equity

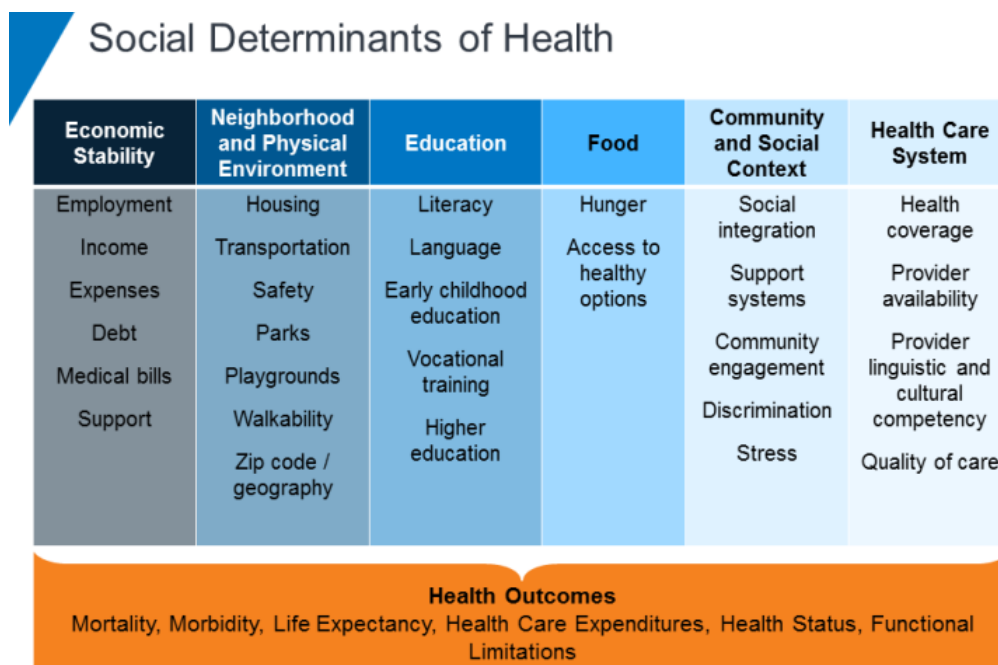
The concept of “health” is nuanced and may be affected by many different factors, although it is generally defined as a state of physical, mental and social well-being, rather than solely the absence of sickness or disease, where an individual is able to enjoy life as an effective member of society (McCartney et al., 2019; World Health Organization, 2005).

While individual health behaviors, biological predisposition, and the physical environment can all shape individual health, socioeconomic factors are also understood to have powerful effects on health status (Aday & Andersen, 1984; Braveman et al., 2011; Marmot et al., 2008; NEJM Catalyst, 2017; Whitehead, 1992; World Health Organization Commission on Social Determinants of Health, 2008). SDoH are

socioeconomic, structural, and environmental factors through which individual context can affect health (Marmot et al., 2008; NEJM Catalyst, 2017).

SDoH are defined by the World Health Organization (WHO) as, “the circumstances in which people are born, grow up, live, work and age, and the systems put in place to deal with illness” (World Health Organization, 2013, sec. “What are the social ‘determinants’ of health?”). This idea represents a wide range of factors which span from those directly related to healthcare, including proximity and access to health services, to those not immediately associated with health services, such as housing and transportation services, the physical and built environments, employment status, educational attainment, and nutrition security (see Figure 2.1) (Artiga & Hinton, 2018; Braveman & Gottlieb, 2014; Islam, 2019; NEJM Catalyst, 2017). Health disparities are artifacts of SDoH that exist between and within affected populations (Braveman, 2006; Whitehead, 1992). Importantly, SDoH are products of the broader environment and are beyond the control of those whom they affect, influenced by a broad range of forces related to economics, social policies, and politics (Alderwick & Gottlieb, 2019; Braveman et al., 2011; Braveman & Gottlieb, 2014; Islam, 2019; Marmot & Allen, 2014; World Health Organization, 2013). Examples of SDoH are illustrated in Figure 2.1.

Figure 2.1. Social Determinants of Health



(Artiga & Hinton, 2018)

Health disparities are the differences in health between groups, while health inequalities are “the systematic, avoidable and unfair differences in health outcomes that can be observed between populations, between social groups within the same population or as a gradient across a population ranked by social position” (McCartney et al., 2019, p. 22). Health disparities and inequalities are unnecessary, avoidable, unfair, and unjust differences in health among different population groups (Braveman, 2006; Whitehead, 1992). Health disparities and inequalities are more likely to be experienced by populations with certain socioeconomic characteristics (these may be specific to income level, educational background, health insurance status, geographical location, race and ethnicity, among others) who bear a greater burden of illness, have shorter life expectancies, face higher healthcare costs, and experience an overall poorer quality of

life as compared to those who are of a different socioeconomic background (Braveman, 2006; Braveman et al., 2011; Fitzpatrick et al., 2015; Whitehead, 1992).

Health equity is a state in which all people are able to achieve optimal health without hindrance or disadvantage (Whitehead, 1992). Discussions of SDoH should center health equity while recognizing the creation and perpetuation of health disparities and the effects of those disparities on health (Braveman, 2006; Whitehead, 1992). Centering health equity acknowledges health disparities (and SDoH more broadly) as products of the environment in which they occur, enabling them to be addressed through appropriate interventions. Health equity cannot be achieved unless the underlying causes of disparities related to the SDoH are addressed (Artiga & Hinton, 2018; Lucyk & McLaren, 2017; Marmot et al., 2008; Marmot & Allen, 2014; Williams et al., 2008; World Health Organization Commission on Social Determinants of Health, 2008).

Health-related social needs (HRSN) refers to the unmet socioeconomic needs that interfere with an individual's ability to achieve and maintain health (Alderwick & Gottlieb, 2019; Oregon Health Authority, n.d.-f). The effects of health disparities on health outcomes have implications for health systems, making the identification of individual HRSN a priority for health systems. While people may have multiple unmet HRSN, not all unmet needs are of equal importance to the individual; thus, clinical decision-making is guided by the priorities of the individual person when determining which HRSN should be addressed through interventions and/or referral (Alderwick & Gottlieb, 2019).

Food-Related Social Determinants of Health and Nutrition Security

As illustrated in Figure 2.1, SDoH may be categorized as environmental, educational, food-related, community and social, and healthcare (Artiga & Hinton, 2018). Food-related SDoH include food security, hunger, and access to healthy foods (Artiga & Hinton, 2018; Institute of Medicine, 2011; McIntyre, 2003; Pooler et al., 2019). Food-related SDoH can result in HRSN which can negatively influence health outcomes and contribute to high healthcare costs (Fitzpatrick et al., 2015; Institute of Medicine, 2011; Leonard et al., 2018; Palakshappa et al., 2023; Tarasuk, 2004; Tarasuk et al., 2015).

In some instances, people with food-related HRSN may be required to make difficult choices in regard to household spending priorities, choosing utilities over groceries, groceries over medication, medication over groceries, or other factors (Nord & Kantor, 2006; Weinfield et al., 2014). Food-related HRSN are frequently experienced with social needs related to other SDoH, including economic and housing instability (Institute of Medicine, 2011; Rose, 1999; Sharma et al., 2020; Tarasuk, 2004; Weinfield et al., 2014). Food-related HRSN may occur from low household income or a loss of employment, and may contribute to high healthcare costs related to the treatment of chronic and acute illness, and/or result in cost-related medication nonadherence, including rationing of prescription medications, delaying refilling a prescription due to cost, or necessitating that an individual make difficult decisions in which basic social needs to direct financial resources to (Banks et al., 2021; Herman et al., 2015; McIntyre, 2003; Patel et al., 2016; Weinfield et al., 2014).

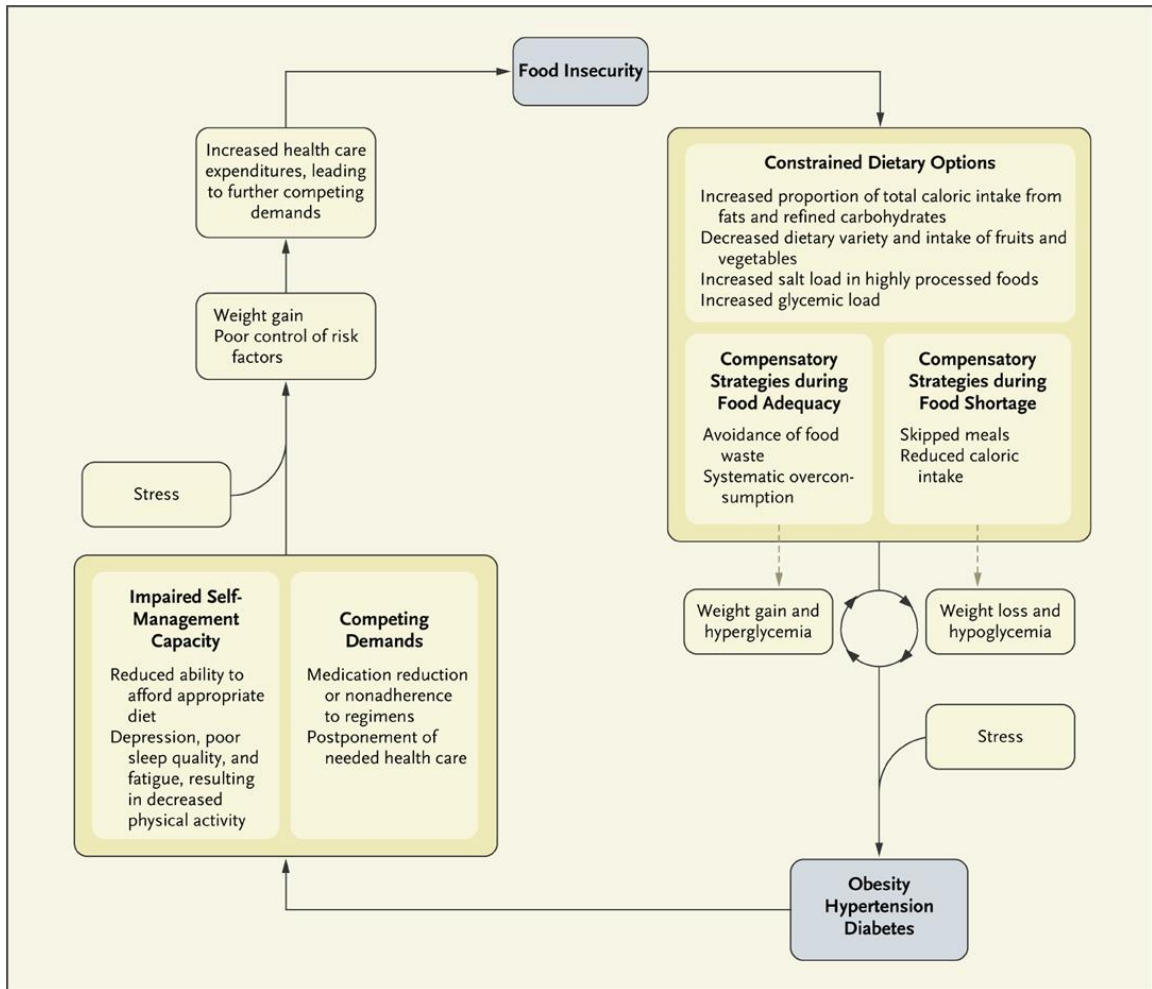
The stress of living with unmet food-related needs, coupled with difficult spending tradeoffs, can result in negative changes to dietary quality and unhealthy eating behaviors (Gregory et al., 2019; Seligman & Schillinger, 2010; Weinfield et al., 2014). Poor dietary quality, lack of access to food, and unhealthy eating behaviors can contribute to poor health outcomes, including unhealthy weight changes and the development of diet-related chronic disease (Gregory & Coleman-Jensen, 2017; Pan et al., 2012; Pooler et al., 2019; Seligman & Schillinger, 2010; Weinfield et al., 2014). These conditions can result in increased healthcare spending, creating a negative feedback cycle as shown in Figure 2.2 below (Pooler et al., 2019; Seligman & Schillinger, 2010; Weinfield et al., 2014).

Approximately 88% of US adults do not meet the recommended daily intake of fruit, and nearly 91% do not meet the recommended daily intake of vegetables (Lee-Kwan, 2017). FV intake is influenced by socioeconomic factors. While FV intake is low across all socioeconomic groups, a low income is the greatest barrier for adults to achieve the daily recommended intake of vegetables, and consumers with lower incomes generally eat significantly fewer vegetables than those with higher incomes (Hoy et al., 2017; Lee-Kwan, 2017). Food insecurity often contributes to limited consumption of FVs. According to an analysis by Lee-Kwan and colleagues (2017), over 11% of adults in the highest socioeconomic group consume the recommended daily intake of vegetables, as compared to only 7% of adults near or below the poverty level. While this figure is low for both groups, low-income consumers face greater challenges to increasing their intake of FVs with regard to cost to purchase and the time and

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resources to store, prepare, and cook sufficient quantities to meet daily recommendations (Andreyeva et al., 2008; Darmon & Drewnowski, 2008; Gearing, Dixit-Joshi, et al., 2021; Gearing, Lewis, et al., 2021; Krølner et al., 2011).

Figure 2.2. The Cycle of Food Insecurity and Chronic Disease



(Seligman & Schillinger, 2010)

Persistent food insecurity affects dietary quality and is associated with poor health and negative health outcomes (Duffy et al., 2009; Leonard et al., 2018; Leung et al., 2014; Mello et al., 2010; Portela-Parra & Leung, 2019; Rose, 1999). Food insecure individuals consume fewer FVs than those who are food secure (Litton & Beavers, 2021).

Diets that are high in sodium and low in grains, fruits, vegetables, nuts and seeds are particularly detrimental to health outcomes (Afshin et al., 2019). Poor nutrition is the single leading cause of chronic illness in the US, where diet-related health conditions account for more than 600,000 deaths annually (National Center for Health Statistics, 2021).

Discussion of food-related SDoH in the US has evolved over time, as the understanding of food and nutrition-related challenges has expanded. Relatedly, this evolution has resulted in changes in terminology; therefore, the terms “hunger,” “food security,” and “nutrition security” have all been used with regard to similar social issues affecting health. “Hunger” was first publicly identified as an important social issue in the 1960s; the terms “food security,” “food insecurity,” and “hunger” were first conceptually defined long after in the 1990s (Anderson, 1990; National Research Council, 2006). It was at this point that the national conversation began to shift away from focusing on the experience of hunger, and toward use of the term “food security,” which was defined as:

Access by all people at all times to enough food for an active, healthy life, and includes, at a minimum: (a) the ready availability of nutritionally adequate and safe foods and (b) an assured ability to acquire acceptable foods in socially acceptable ways (e.g., without resorting to emergency food supplies, scavenging, stealing, or other coping strategies). (Anderson, 1990, pp. 1575–1576)

Food insecurity exists when there is “limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways” (Anderson, 1990, p. 1576). Use of the term focuses on the absence or limited availability of sufficient calories to meet an

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individual's dietary needs, ignoring the nutritional content or quality of foods consumed (Mozaffarian, 2023; Mozaffarian et al., 2021; National Research Council, 2006; Thorndike et al., 2022). "Nutrition security" is an overarching term that represents both the state of food security and the regular consumption of healthy foods as a single, cohesive state of being, emphasizing the importance of an environment where individuals are able to choose foods that support their health and well-being (Ingram, 2020; Mozaffarian, 2023; Mozaffarian et al., 2018, 2021; US Department of Agriculture et al., 1996).

Nutrition security has been defined by the American Heart Association as: "an individual or household condition of having equitable and stable availability, access, affordability, and utilization of foods and beverages that promote well-being and prevent and treat disease" (Thorndike et al., 2022, p. e1077). A lack of nutrition security is associated with poor overall health, including physical, mental, and oral health (Carson & Boege, 2020; Gundersen & Ziliak, 2015; Tarasuk, 2004). It is also a strong predictor of both high healthcare utilization and costs (Jia et al., 2021; Seligman et al., 2014; Tarasuk et al., 2015; The Impact of Poverty, Food Insecurity, and Poor Nutrition on Health and Well-Being, 2017). Where nutrition security is lacking, a substantial burden is placed upon health systems which become responsible for treating diet-related poor health outcomes and require large amounts of resources to treat chronic disease that may have been prevented with early intervention (Cook & Poblacion, 2016; Gregory & Coleman-Jensen, 2017; Gundersen & Ziliak, 2015; Jardim et al., 2019; McBrien et al., 2013). Recent acknowledgment that malnutrition, food security, and dietary quality

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represent a multifaceted problem in need of coordinated and specialized intervention, has led nutrition security to become an important focus of US food policy (Mozaffarian, 2023; Mozaffarian et al., 2018; Thorndike et al., 2022).

Chronic illnesses related to diet are a major cause of poor health in the US (Fleischhacker et al., 2020). Chronic conditions associated with food insecurity and poor nutrition include physical conditions such as hypertension, hypercholesterolemia, hyperglycemia, Type 2 diabetes, iron deficiency anemia, and behavioral health conditions including chronic stress, anxiety, and depression (Fanelli et al., 2020; Gundersen & Ziliak, 2015; Patel et al., 2016; Seligman et al., 2010). In addition to many of these conditions, a lack of nutrition security in children is associated with a higher risk of asthma, tooth decay, and behavioral challenges, and an increased risk of obesity and development of chronic metabolic diseases later in life (Gluckman et al., 2008; Gundersen & Ziliak, 2015; Kimbro & Denney, 2015; Shankar et al., 2017). Adolescents who live with food insecurity may perform poorly in school, experience frequent common illnesses, and engage in risky behaviors (Cook & Frank, 2008; Paquin et al., 2021). In older adults, food insecurity has been associated with poorer cognitive function and medication underuse which can exacerbate existing medical conditions, resulting in higher healthcare costs compared to those who are food secure (Antonio et al., 2019; Berkowitz et al., 2013; Herman et al., 2015; Portela-Parra & Leung, 2019).

For example, type 2 diabetes accounted for \$237 billion in medical costs and another \$90 billion in reduced productivity in 2017 alone (American Diabetes Association, 2018; Berkowitz et al., 2013; McBrien et al., 2013). Type 2 diabetes places a

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large burden on US health systems; according to the American Diabetes Association (2018), one of every four dollars spent on healthcare in 2017 in the US was for treating patients with type 2 diabetes. According to the most recent national data available at the time of this dissertation, the median costs by state associated with diet-related illness (e.g., cardiovascular disease and type 2 diabetes) have been estimated at \$6,082 million in medical care, and \$773 million in related work and school absenteeism (Trogon et al., 2015). Costs associated with lost work productivity and the treatment of chronic disease resulting from food insecurity have been estimated at more than 160 billion dollars annually (Cook & Poblacion, 2016). Food insecurity can exacerbate chronic health conditions and contribute to medication underuse and nonadherence, both of which negatively affect existing health conditions (Herman et al., 2015; Seligman et al., 2010; Silverman et al., 2015). Collectively, the economic implications of food insecurity are immense.

The Human Right to Food

Food is among the most basic of human needs, and is a prerequisite for all physiological processes and, more plainly, survival (Maslow, 1943b, 1943a). Abraham Maslow's Theory of Human Motivation (1943) postulated that human motivation is driven by the pursuit of a hierarchy of needs, arranged in order of those most necessary for survival to those concerned with happiness and personal fulfillment. Physiological needs, which include obtaining water, food, and shelter, must be satisfied before a person can achieve their need for safety, love, esteem, or self-actualization (Maslow, 1943b). While the physiological need for food is undisputed, it is more complicated than

Maslow's framework originally established. Ellyn Satter's Hierarchy of Food Needs (2007) elaborated on this idea, noting that humans must first satisfy hunger by having enough food to eat, only after acquiring enough food can a person consider whether that food is acceptable to meet their preferences and nutritional needs. Building on this hierarchy, once food is acceptable then it may become reliable, good-tasting, novel, and eventually instrumental, at which point it can be chosen based on personal preference or with a specific diet-related goal (e.g., diets intended to support weight loss, or those that align with personal values and beliefs, such as veganism, ketogenic, or paleo diets) (Satter, 2007).

The human right to food (HRF) was first formally recognized as part of the United Nations (UN) Universal Human Rights Declaration in 1948 before being embedded within the 1966 International Covenant on Economic, Social, and Cultural Rights (CESCR) (International Covenant on Economic, Social and Cultural Rights, 1966; Universal Declaration of Human Rights, 1948; Messer & Cohen, 2007; United Nations Office of the High Commissioner for Human Rights, 2010). The HRF is directly connected to the human right to health and to life (Universal Declaration of Human Rights, 1948). The 1996 Rome Declaration on World Food Security led to most developed countries adopting, among other things, food as a human right, and agreeing to work to halve the incidence of global hunger by 2015 (Chilton & Rose, 2009; United Nations Office of the High Commissioner for Human Rights, 2010). A key piece of the HRF is its focus on access to food.

The HRF is defined as:

The right to have regular, permanent and free access, either directly or by means of financial purchases, to quantitatively and qualitatively adequate and sufficient food corresponding to the cultural traditions of the people to which the consumer belongs, and which ensures a physical and mental, individual and collective, fulfilling and dignified life free of fear. (United Nations Office of the High Commissioner for Human Rights, 2010, p. 2)

Despite widespread acceptance on a global scale, the US has never ratified the International Covenant on Economic, Social, and Cultural Rights and maintains no formal stance on the HRF (Messer & Cohen, 2007; US Mission to International Organizations in Geneva, 2015). Although many aspects of US policy and political ideals align with the HRF, it is typically viewed as a commitment in alignment with socialist ideology and out of step with the national attitude emphasizing self-reliance (Messer & Cohen, 2007). While the US does not formally endorse the HRF, the definition of food security used in the US does align with the priorities of the HRF, reflecting the importance of access and the primary factors that enable it (Chilton & Rose, 2009; Messer & Cohen, 2007; National Research Council, 2006).

Approaching food as a human right was indicated for several reasons. First, access requires food to be available, adequate, and affordable; therefore, treating food as a human right established that governments maintain a level of responsibility for ensuring that the right to food is a reality for every resident. This creates an opportunity to increase consumer involvement and encourage consumers to hold their governments accountable for safeguarding access and taking action when and where their right to food is unattainable (Ayala & Meier, 2017; Chilton & Rose, 2009). A rights-based

approach also situates access to food as a matter of nutrition security and begins to address disparities (Ayala & Meier, 2017; Chilton & Rose, 2009). Ultimately, a HRF approach is aligned with food sovereignty, another rights-based food movement which situates social justice as integral to creating sustainable food systems and achieving food equity (Ayala & Meier, 2017; Carney, 2012; Coté, 2016; La Via Campesina, 2021). Further, a rights-based approach to food may be used as a framework to support the development of multifaceted, long-term interventions that promote nutrition security and align with the food as medicine movement (Barnidge et al., 2020).

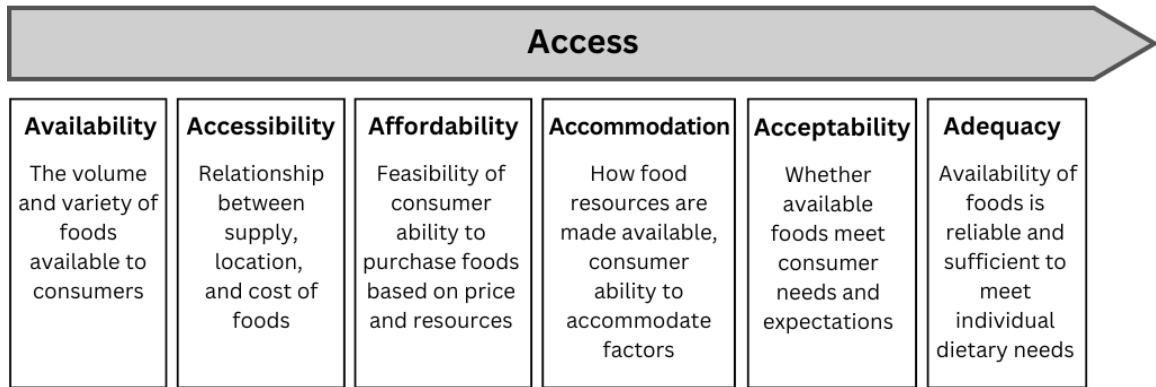
When and where food is unavailable, or inadequate, inaccessible to support the body's needs for energy and nutrients, substantial problems are likely to follow (United Nations Office of the High Commissioner for Human Rights, 2010). Without satisfying these conditions, the ability of a person to live an active, healthy life is hindered, as is their ability to successfully contribute to their community and to society more broadly (United Nations Office of the High Commissioner for Human Rights, 2010).

Access represents an intersectional idea that encompasses each of the factors that determine whether a person's right to food can be realized. Penchansky and Thomas (1981) developed a model of access to health services that includes five distinct components representing specific "areas of fit" between the individual and the system: availability, accessibility, accommodation, affordability, and acceptability. The HRF definition emphasizes three specific components of access to food: availability, accessibility, and adequacy (United Nations Office of the High Commissioner for Human Rights, 2010). Availability refers to the actual presence of food for consumption in the

environment, meaning that food can be produced and made available to consumers; accessibility encompasses both the economic and physical abilities to access available food; and adequacy implies that the available food is sufficient to meet each person's dietary needs, while also being considered culturally appropriate (United Nations Office of the High Commissioner for Human Rights, 2010). The model developed by Penschansky and Thomas includes most of the major components of access covered in the HRF, and can be adapted to describe access to food with the addition of adequacy, illustrating the level of fit between the consumer and the food system.

Taking both the HRF and the Penschansky and Thomas models of access together, availability is conceptualized as the volume and variety of available food resources; accessibility refers to the relationship between the supply of food resources and location and cost; accommodation refers to the ways in which food resources are made available to consumers and whether consumers can accommodate those factors; affordability occurs when consumers can feasibly purchase food resources; and acceptability encompasses whether the food resources available meet the needs and expectations of consumers (see Figure 2.3) (Ayala & Meier, 2017; Caspi et al., 2012; Penschansky & Thomas, 1981).

Figure 2.3. Conceptualization of Food Access



Adapted from the HRF (2010) and Penschansky and Thomas (1981)

Addressing Nutrition Security Through the Health System

In an effort to improve health outcomes and reduce costs, health systems are identifying and treating the SDoH (Banks et al., 2021; Cantor & Thorpe, 2018; Goff et al., 2021; Horwitz et al., 2020; Kreuter et al., 2021; Kushner & McConnell, 2019; NEJM Catalyst, 2017; Schickedanz et al., 2019). Many health systems screen for adverse SDoH (social risks) and unmet social needs, capturing this information in the electronic health record (EHR) in an effort to support clinical decision-making and connect patients with relevant interventions and outside resources (Adler & Stead, 2015; Cantor & Thorpe, 2018; Gottlieb et al., 2016). Some are investing in programs that aim to address the foundational SDoH contributing to HRSN, including collaboration with community partners (Artiga & Hinton, 2018; Kreuter et al., 2021).

Interventions intended to strengthen nutrition security have been shown to improve chronic health conditions and reduce healthcare costs (Berkowitz et al., 2014, 2015, 2018; Berkowitz, O’Neill, et al., 2019; Lee et al., 2019). While these interventions have gained traction over recent years, their use is still limited within health systems.

Most nutrition-focused interventions address a specific set of medical conditions for which nutritional intervention has been deemed medically indicated, rather than in order to improve nutrition security as a preventive approach to care (Downer et al., 2020; King et al., 2021). Medically-tailored meals and groceries, and produce prescriptions (discussed in greater detail later in this chapter), are some of the primary interventions that health systems have utilized to treat nutrition insecurity (Downer et al., 2020).

Horwitz and colleagues (2020) sought to calculate national health system spending on SDoH interventions by sector and found that the majority of SDoH spending between 2017 and 2019 was directed toward programs that address housing, employment, education, food security, social and community contexts, and transportation. While initiatives intended to address food security and nutrition were the fourth highest spending area, financial investment in these programs was notably lower than the top three, representing \$294.2 million dollars as compared to \$1.6 billion on housing, \$1.1 billion on employment, and \$476.4 million on education-focused interventions (Horwitz et al., 2020). The limited use of these interventions by health systems may be related to the length of time that such programs require before many desirable outcomes can be realized, specifically reductions in healthcare spending and the incidence of chronic disease stemming from nutrition security (Barnidge et al., 2020; Choi et al., 2017; Thorndike et al., 2022). Further research is needed to understand how health systems perceive these interventions and their utility in improving nutrition security.

Addressing SDoH presents a notable obstacle for health systems in terms of both complexity and cost (Kreuter et al., 2021). Given the substantial challenge that nutrition-related health conditions present to health systems, coordinated interventions are needed both within and outside of the clinic setting (Artiga & Hinton, 2018; Banks et al., 2021; Braveman et al., 2011; Francis & Mohta, 2016; King et al., 2021; Roncarolo & Potvin, 2016; Thorndike et al., 2022; Williams et al., 2008). Health system investment in nutrition security stands to contribute to critical improvement to health outcomes and spending; however, interventions of this nature require long-term sustainability to realize beneficial outcomes and savings.

Coordinated Care Organizations and SDoH

As discussed in Chapter One, the state of Oregon created CCOs in 2012 with the intention of reducing spending on healthcare services, improving health outcomes, and improving the quality of care delivered to the state's Medicaid patients in line with the Triple Aim (Berwick et al., 2008; McConnell, 2016; McConnell et al., 2014). CCOs are locally governed entities comprised of networks of health service providers working collaboratively to provide health services to their members (Oregon Health Authority, n.d.-c). CCOs rely on partnerships and decision-making is shared among health systems, providers, CCO members, and the broader community (Crumley & Houston, 2019). Each CCO has a community advisory council (CAC) made up of members and other key interested parties in the community; the CACs oversee regular community health assessments and community health improvement plans (CHIP), the results of which are intended to guide how each CCO serves their community (Crumley & Houston, 2019).

CCOs receive integrated global payments for each enrolled member with which they must provide a range of health services, including physical, oral, and behavioral healthcare. CCOs must meet various quality metrics dictated by the state and receive financial incentives based upon achieving performance benchmarks (Oregon Health Authority, 2021d). A separate category of services, known as health-related services (HRS), was created under state administrative law to offer an intentional funding mechanism for CCOs to address SDoH and HRSN, outside of services traditionally considered related to healthcare (Oregon Health Authority, 2021b, 2021a). CCOs are financially incentivized by the state to spend part of their global budgets on HRS in that they receive a portion of that spending back as a performance-based reward, provided that they maintain a minimum medical loss ratio (Oregon Health Authority, 2022a). HRS are services not covered under the state Medicaid plan that are meant to support the health and well-being of communities and improve the quality of care delivery to members (Oregon Health Authority, 2021d, 2021a).

While the initial CCO contracts in 2012 did not emphasize SDoH, the second round of contracts in 2017, known as “CCO 2.0,” directed CCOs to work with the communities they serve to identify the SDoH affecting those communities and direct dedicated funding to interventions designed to address those SDoH (Oregon Health Authority, 2021b; Oregon Health Authority Health Policy & Analytics Division, 2018). In CCO 2.0, HRS fall under two distinct categories: flexible services (FS), which cover cost-effective services for members that supplement their otherwise covered benefits; and community benefit initiatives (CBI), which may be used on services that benefit the

communities of CCO members more broadly (Oregon Health Authority, 2021c). CCOs can use HRS FS, often referred to as “flex funds,” for the purchase of goods and services otherwise not covered by the Oregon Health Plan (OHP), the state Medicaid program, provided that they meet a set of specific criteria for activities intended to improve the quality of healthcare (Oregon Health Authority, 2021b). The four criteria for activities that improve care quality are (Oregon Health Authority, 2021a):

1. The activity must be designed to improve individual health quality.
2. The activity must contribute to positive health outcomes in a way that can be measured and verified.
3. The activity must target individuals or specific member populations, or improve health for the general, non-member population for the same cost.
4. The activity must be evidence-based and adhere to best practices as deemed by any relevant institution.

Examples of HRS include care coordination, member education, food-related services, housing services and items needed for living, and transportation services (Oregon Health Authority, 2021a).

The goal of HRS funds is to address what OHA refers to as the “social determinants of health and equity” (SDoH-E¹) (Oregon Health Authority, 2021b). The definition of SDOH-E encompasses three separate components: SDoH; the structural and systemic factors that determine how SDoH are distributed across communities, known as the social determinants of equity; and HRSNs, the socioeconomic barriers that an individual may face to achieving health (Oregon Health Authority, 2021b). HRS funds are expected to be used to improve health outcomes, reduce disparities, and strengthen

¹ While OHA uses SDOH-E in discussion of HRS, SDOH is used throughout this dissertation
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the overall well-being of member communities (Oregon Health Authority, 2021c). CCOs are not expressly required to utilize HRS funds; however, as of 2020 HRS spending was a key factor in determining CCO performance-based rewards (PBR), meaning that CCOs are incentivized to utilize the HRS at their disposal (Oregon Health Authority, 2021c). Additionally, the 2018 Oregon Legislature stipulated that CCOs that exceed their financial requirements via profit were legislatively required to reinvest a portion of their profits into initiatives that address SDoH and were not otherwise related to healthcare (Oregon Health Authority, 2023c). The Supporting Health for All through Reinvestment (SHARE) initiative took effect in 2020; SHARE funds may not be spent on Medicaid-covered services or any services/benefits covered by Oregon's new 1115 Medicaid demonstration waiver (Oregon Health Authority, 2023c).

Under Section 1115 of the Social Security Act, the US Secretary of Health and Human Services has the authority to authorize state experimental, pilot, or demonstration projects with objectives that align with Medicaid program goals (Centers for Medicare & Medicaid Services, n.d.). Section 1115 Medicaid Demonstration waivers are typically authorized in five year increments; Oregon has received these waivers routinely since 1994 (Centers for Medicare & Medicaid Services, n.d.; Oregon Health Authority, n.d.-g). Oregon has a long history of using the Section 1115 waiver to support health systems innovation; the 1994 waiver allowed Oregon to create OHP as the state Medicaid plan, the 2012 waiver authorized Oregon's health system transformation efforts and the creation of the CCO model, and the 2017 waiver facilitated CCO 2.0 and the focus on SDoH (Oregon Health Authority, n.d.-g).

A new waiver was approved in October 2022 (through September 2027) which allows CCOs to take additional steps to address SDoH, partly by expanding coverage for HRSN for certain populations (Oregon Health Authority, n.d.-a). These populations include: young adults (19-26 years old) with special healthcare needs, youth and adults discharged from an institutional setting or released from a correctional facility, youth involved with the child welfare system, individuals transitioning from Medicaid to dual Medicaid/Medicare eligibility, individuals at risk of or experiencing homelessness, and individuals with a high risk clinical need residing in an area experiencing extreme weather (Oregon Health Authority, 2023b). HRSN coverage includes needs that arise during climate emergencies, post-transition housing and housing supports, and nutrition supports and education (Oregon Health Authority, n.d.-a, n.d.-a; US Department of Health & Human Services, 2022). Nutrition supports and services include: nutrition and cooking education, medically-tailored meal delivery for up to six months, meal or pantry stocking, and fruit and vegetable prescriptions (i.e. Veggie Rx) for up to six months (Oregon Health Authority Health Systems Division, 2023).

Food Systems

Agriculture is inextricable from public health (Neff et al., 2015). In his essay *The Pleasures of Eating*, Wendell Berry (1990) argues that consumers, whom he refers to as “eaters,” have become disconnected from the production, processing, and distribution of their food to the point where most have become passive participants in a system with major economic and health implications, both human and environmental.

I begin with the proposition that eating is an agricultural act. Eating ends the annual drama of the food economy that begins with planting and birth. Most eaters, however, are no longer aware that this is true. They think of food as an agricultural product, perhaps, but they do not think of themselves as participants in agriculture. (Berry, 1990, p. 145)

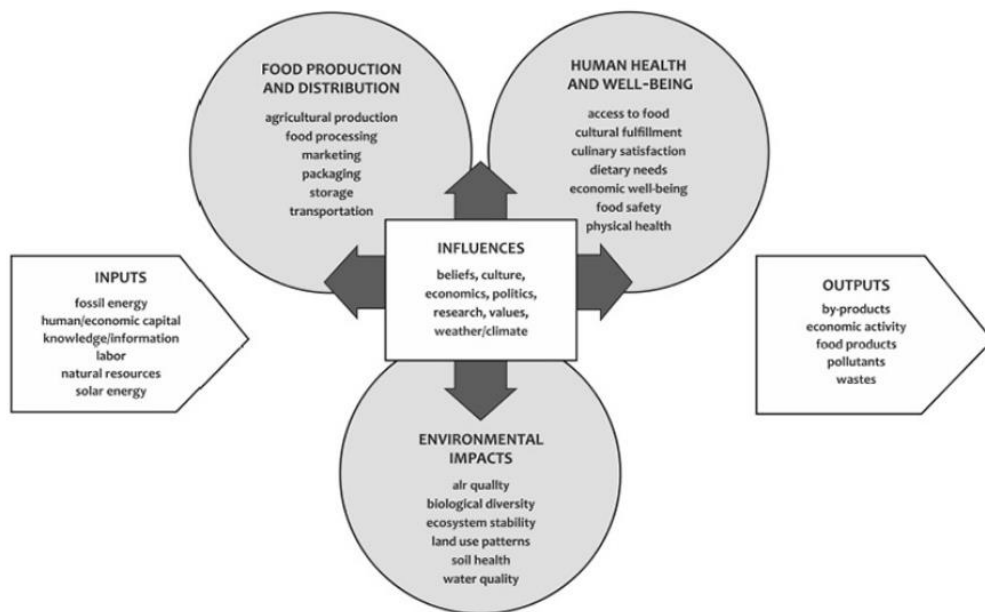
In order to fully understand the role of nutrition and food security in health and health systems, it is imperative to understand food systems. A food systems approach to nutrition security takes into consideration the complex relationships and feedback loops that exist within and across sectors (Chase & Grubinger, 2014; Neff et al., 2015; Story et al., 2009). Not only does a systems approach reduce the emphasis on individual behavior and instead prioritize factors such as SDoH, it also creates the opportunity for new approaches to problem-solving by establishing nutrition security as a health systems problem, embracing the complexity of the problem (Neff et al., 2015; Story et al., 2009).

Food systems are networks in which individuals, resources, and organizations come together to nourish a population through food and economic opportunity; food systems include all of the ways that food is produced, processed, and made available for human consumption (American Public Health Association, 2007; Chase & Grubinger, 2014; Grubinger et al., 2010; International Food Policy Research Institute, n.d.; Neff et al., 2015; Sobal et al., 1998). While the focus of food systems is primarily on the production of food, a more complex description includes environmental impacts, human health and well-being, and the social, cultural, political, and environmental influences on food system activities (see Figure 2.4) (Chase & Grubinger, 2014; Grubinger et al., 2010; Sobal et al., 1998). Therefore, food system interested parties include, but are not

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limited to: agricultural and livestock producers of all sizes; food processing, marketing, packaging, and storage companies; transportation services; food retail outlets, including grocery stores, farmers markets, and restaurants; charitable food providers such as food banks and pantries; consumers; health systems; communities; and advocacy organizations.

Figure 2.4. Diagram of a Food System



(Chase & Grubinger, 2014)

Food systems can be classified on a spectrum of size, existing at various scales ranging from vast and global to small and local (Bower et al., 2010). The term “local” in relation to food has not been fully defined and interpretation can vary widely (Johnson, 2016; Martinez et al., 2010). Local is often classified as a measure of the distance that a food had to travel from where it was produced to where it was consumed, with ranges varying from a few miles to several hundred miles, although the average consumer generally assumes the distance is 100 miles (Johnson, 2016; Martinez et al., 2010). The Kihn-Stang Chapter Two

state of Oregon defines local foods as those grown or produced in-state, and includes a number of adjacent counties located in California, Idaho, Nevada, and Washington (Oregon Farm Direct Nutrition Program, 2006). Local food system boundaries are also undefined, although often perceived as emphasizing direct-to-consumer sales channels, emphasizing the sale of locally produced foods through outlets such as farmers markets, community-supported agriculture (CSA), and other programs (Johnson, 2016; Martinez et al., 2010; Mertens, 2014).

Local food systems highlight the role of small-scale producers, including small and diverse farms where direct-to-consumer sales constitute a large share of total business as compared to farms of a larger size (Johnson, 2016; Low & Vogel, 2011; Martinez et al., 2010; Rahe et al., 2017). Additionally, local food systems produce more fresh produce as compared to traditional, larger-scale farms (Low & Vogel, 2011). Local food systems have grown in popularity in recent years, due in part to the consumer perception that they offer a close connection to foods and producers, as well as the perception of a reduced environmental impact due to agricultural and transportation practices (Johnson, 2016; Mertens, 2014).

Local food systems are important to the economic health of a community. While research in this area is limited, the sales and purchases within a local food system offer direct and indirect economic benefits to communities through the creation of employment opportunities, and money spent on purchases within local food systems is more likely to remain within the local economy (Freedman et al., 2014; Rahe et al., 2017; Rossi et al., 2017). Local foods tend to be priced higher than non-local

alternatives, selling through direct-to-consumer channels can result in increased profitability for small farms (Feenstra, 1997; Rossi et al., 2017; Stephenson & Lev, 2004). Information-sharing among farms can result in increased productivity and the development of relationships among producers (Boys & Hughes, 2013; Brasier et al., 2007). Local food systems can increase social capital for their communities, expanding social networks and strengthening relationships between producers and consumers, while contributing to the growth of agricultural tourism which drives further food sales (Andreatta et al., 2008; Boys & Hughes, 2013; Macias, 2008; Mertens, 2014; Paul et al., 2019).

Food Systems and Health

Eaters, that is, must understand that eating takes place inescapably in the world, that it is inescapably an agricultural act, and that how we eat determines, to a considerable extent, the way the world is used. This is a simple way of describing a relationship that is inexpressibly complex. To eat responsibly is to understand and enact, so far as one can, this complex relationship. (Berry, 1990, p. 149)

Consumer behavior within a food system is driven by a number of social, economic, and environmental factors. While individual and household preferences are important, the food environment also plays a role, as does the consumer's ability to access food and what foods are available to them (HLPE, 2017). Both the physical and financial availability of foods affect consumption patterns, while patterns of consumption influence individual health and the development of disease; food production activities are also an influential factor in environmental quality which affects health at individual, community, and population levels (Afshin et al., 2019; Fleischhacker et al., 2020; Forouzanfan et al., 2016). While a detailed discussion of the environmental

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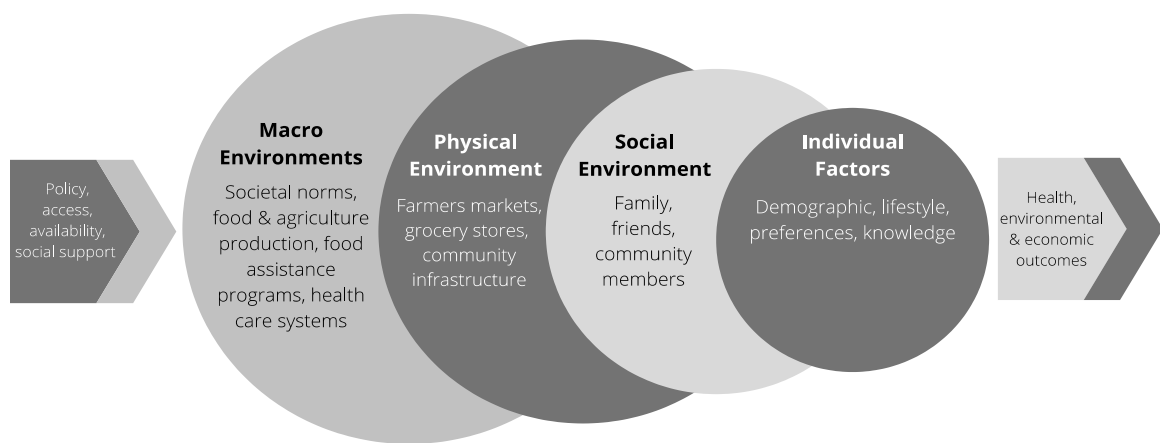
outcomes associated with food systems is beyond the scope of this dissertation, briefly, agricultural practices and activities influence food safety, air, and water quality; they also create environmental and occupational hazards which can jeopardize worker health and perpetuate income inequality (Neff et al., 2009, 2015; Shannon et al., 2015).

Food systems play a role in shifting consumer dietary patterns which can influence the development of diet-related diseases (HLPE, 2017; Shannon et al., 2015). Changes in the production of commodity crops have resulted in an increase in consumer intake of unhealthy foods, including sugars and processed foods; this is particularly relevant for over-nutrition and has resulted in increased rates of cardiovascular disease and other metabolic conditions (Shannon et al., 2015). Similarly, unhealthy food products may be more affordable than healthier alternatives; therefore, consumers with limited incomes may tend toward an unhealthy diet out of financial necessity (Rao et al., 2013). Where larger-scale food systems can make accessing healthy foods challenging, local food systems can offer a more direct line to healthy foods. Still, pricing remains an issue. Darmon and Drewnowski (2008) established the presence of a “social gradient” with regard to diet quality, where healthier foods were less available to low-income consumers than to those with higher incomes, due both to the higher price of healthy food options and to the features of the respective food environments (Andreyeva et al., 2008; Darmon & Drewnowski, 2008).

The Levels of Human Health and Food Systems framework conceptualizes how food system activities are related to human health and the development of disease, specifically considering which aspects of the macro, physical, social, and individual

environments can be acted upon in order to improve individual and population health (see Figure 2.5) (Chase & Grubinger, 2014). The food environment impacts individual and community health through many factors, including the types of food outlets available, the built environment in which those outlets reside, and the quality of foods purveyed at those outlets (HLPE, 2017).

Figure 2.5. Levels of Human Health and Food Systems



Adapted from Chase & Grubinger (2014)

Local food environments are heterogeneous and vary widely among neighborhoods, even within the same community (Moore & Diez Roux, 2006). For example, Walker and colleagues (2020) identified certain aspects of the food environment, including the ratio of fast food outlets to other restaurants, that were associated with a higher prevalence of obesity (Walker et al., 2020). Food environments are also a matter of equity, as low-income, predominantly non-White neighborhoods tend to have fewer healthy food options as compared to wealthier, predominantly White neighborhoods (Moore & Diez Roux, 2006). These access-related failures within

the food system exacerbate disparities and have both health and economic repercussions (Neff et al., 2009). If the food environment offers insufficient access to healthy food alternatives and/or minimal social and economic support to aid low-income residents in accessing them, nutrition insecurity is a likely consequence.

The production and consumption of food are intrinsically linked to human health and well-being. Not only can dietary habits influence health and the development of disease, but patterns of food production and consumption are also an influential factor in environmental quality which further affects health and quality of life. This interconnected nature of human health and food system activities underscores the importance of considering their relationships more closely in order to improve health outcomes through policy interventions.

As noted by Wendell Berry (2018), food and health are often treated as independent systems in the US. This separation can be seen at the policy level where policies affecting nutrition security and health system activities are routinely siloed from one another. However, food system policies can be a tool to improve public and population health (Jackson et al., 2009; Muller et al., 2009; Shannon et al., 2015).

US Food System Policy

Public policies cover a wide range of topics that pertain to human health and the social environment, the physical environment, public health, and health systems. While food system policies are not always included in discussions of other public policies, the policies that govern food system activities have implications across many settings. For example, social policies may affect employment and housing, which in turn can affect

access to, and quality of, available food. Policies governing food system activities may influence the variety and quality of foods available which can translate into health outcomes. Food production practices directly affect the environment, while food safety practices are an immediate concern of public health entities.

Food system policies comprise a broad category within public policy, and typically address agriculture and food production and safety, food distribution and access, and nutrition security. The majority of US food system policies come from federal, state, and local governments, with the federal government playing a notable role in directing food system policy across all sectors (Shannon et al., 2015). Given that access to food and nutritional intake are both of great importance to public health and to supporting a healthy, productive society, governments (federal, state, and local) have an interest in ensuring that populations are adequately fed. As a result, food and nutrition assistance policies (henceforth referred to as nutrition assistance) and programs are prevalent within public policy.

In the US, the preeminent source of food system policy is the Farm Bill (115th Congress, 2018), a massive piece of federal legislation with major implications across all sectors involved in food system activities. The Farm Bill is an omnibus law that is reauthorized every five years (Johnson & Monke, 2019). In addition to supporting agriculture and food production, a third major purpose of the Farm Bill is the financing of nutrition assistance initiatives. Embedded within the Farm Bill is the Supplemental Nutrition Assistance Program (SNAP), the single largest nutrition assistance policy in the

US (Nestle, 2019; Oliveira et al., 2018). In 2021, SNAP programs provided nutrition assistance to 41.5 million participants monthly (Jones et al., 2022).

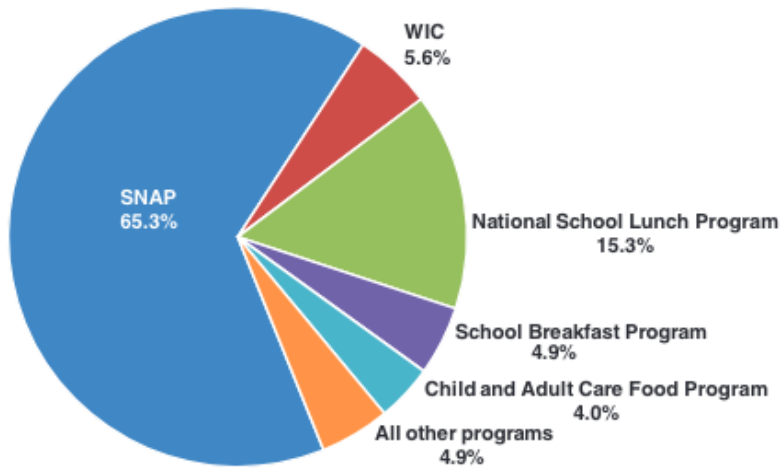
The Supplemental Nutrition Assistance Program (SNAP)

The US Department of Agriculture (USDA) is responsible for the administration of 15 domestic federal nutrition assistance programs, collectively accounting for approximately 60% of the agency's annual budget (Jones et al., 2022; Tiehen, 2020). In 2019 the USDA spent \$92.4 billion on domestic nutrition assistance programs, an amount that has increased markedly in response to the Coronavirus pandemic (COVID-19), reaching \$182.5 billion in 2021 (Jones et al., 2022; Tiehen, 2020). The implications of COVID-19 for SNAP and food assistance more broadly will be discussed later in this chapter.

SNAP makes up the majority of the USDA's annual expenditures on domestic nutrition assistance programs, accounting for over 65% of spending in 2019, and over 60% in 2021 (Jones et al., 2022; Tiehen, 2020). The USDA's five largest nutrition assistance programs (SNAP; the National School Lunch Program; the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC); the School Breakfast Program, and the Child and Adult Care Food Program) comprise 95% of the agency's annual nutrition assistance budget (see Figure 2.6) (Tiehen, 2020).

Figure 2.6. USDA Nutrition Assistance Expenditures by Program for 2019

USDA food and nutrition assistance expenditures by program, FY 2019
SNAP accounted for nearly two-thirds of food and nutrition assistance spending



(Tiehen, 2020)

SNAP is a federally authorized entitlement program that is administered by the USDA Food and Nutrition Service (FNS) and managed at the state level. SNAP is intended to provide supplemental financial assistance for the purchase of food to households that meet specific eligibility requirements; this is accomplished by increasing household purchasing power and enabling participants to improve their diet, nutrition, and overall health (Caswell et al., 2013; Nestle, 2019; Oliveira et al., 2018). Adults collectively make up the largest demographic group of SNAP participants, followed by children and the elderly (Oliveira et al., 2018).

To qualify for SNAP benefits, households must meet strict income limitations and other eligibility criteria; in exchange, they receive a monthly electronic benefit transfer (EBT) based on household size which can be used to supplement the purchase of approved foods from specific retailers, including grocery stores and farmers markets.

SNAP benefits are determined on a per-household basis, where a household is considered a group of individuals who live together and prepare meals together, an individual living alone, or an individual who lives with others but does not prepare meals with others (Oliveira et al., 2018). The purpose of determining program eligibility and benefits on a per-household basis is to ensure that smaller households receive larger benefits on a per-person basis than larger households (Oliveira et al., 2018; US Senate, Committee on Agriculture, Nutrition, and Forestry, 1985).

The federal government pays for SNAP benefits and federal administrative costs while sharing half of state-specific administrative costs (Oliveira et al., 2018). States are responsible for local program administration, coordinating with applicants and participants, determining eligibility and benefit level, issuing benefits, providing nutrition education and employment and training programs, and choosing policy options (Oliveira et al., 2018). States have the authority to simplify local program administration, and to take steps to expand access, often choosing to align eligibility criteria with other safety net programs in order to make it easier for those who need assistance to enroll in multiple programs simultaneously, such as Temporary Assistance for Needy Families (TANF) (Oliveira et al., 2018). States also have control over implementing policies to simplify enrollment processes and to make it easier for participants to remain enrolled, including extending certification periods and reducing reporting frequency for changes in employment and income (Oliveira et al., 2018).

In addition to improving food security, SNAP has implications for the US economy more broadly (Gundersen et al., 2019; Oliveira et al., 2018). SNAP benefits

account for a larger share of food expenditures for low-income households than non-SNAP dollars (Wilde, 2013). Increases in SNAP expenditures have been projected to have a greater return on national GDP per dollar spent, with positive effects on annual employment and overall demand across US food systems (Hanson, 2010; Oliveira et al., 2018; Tiehen, 2020; Wilde, 2013).

Nutrition incentives (such as SNAP benefits) that provide financial incentives for the purchase of healthy foods have been shown to offer some improvement in participant dietary quality and nutritional status (Carlson & Keith-Jennings, 2018; Verghese et al., 2019). However, SNAP has been criticized for not doing enough to support healthy dietary patterns among participants (Carlson et al., 2021; Engel & Ruder, 2020; Franckle et al., 2017; Gearing, Dixit-Joshi, et al., 2021; Gearing, Lewis, et al., 2021; Verghese et al., 2019; Zhang et al., 2018).

Healthcare Utilization and Nutrition Assistance

While SNAP alone is not a perfect solution to achieve nutrition security, it does have the potential to positively affect program participants. A retrospective cohort study found that low-income adults who participated in SNAP had lower estimated annual healthcare expenditures from 2012 to 2013 than other low-income adults who did not participate in the program (Berkowitz et al., 2017). This study also found that the annual savings in healthcare expenditures outweighed the individual average annual SNAP benefit (Berkowitz et al., 2017). The authors concluded that SNAP participation could have the potential to reduce state spending on Medicaid programs, given that SNAP is an entitlement program paid for by the federal government, while Medicaid

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budgets are shared with the states (Berkowitz et al., 2017). Other studies have found that older adults with dual Medicaid and Medicare eligibility who participate in SNAP have lower healthcare costs and experience fewer hospital admissions than those who did not participate in SNAP (Berkowitz et al., 2017; Samuel et al., 2018). SNAP participation for older adults with diabetes was found to reduce cost-related medication nonadherence, a finding with potential implications for healthcare expenditures and outcomes (Pooler & Srinivasan, 2019).

Brief History of US Nutrition Assistance

A brief history of US nutrition assistance at the federal level is included here to provide background on the evolution of food and nutrition assistance policy, and context for understanding the current landscape. US food assistance originated as a means of distributing surplus commodity crops to those in need during the Great Depression (Caswell et al., 2013; Nestle, 2019; USDA Food and Nutrition Service, 2018). Prior to the 1930s, the federal government had no role in providing nutrition assistance; it was the responsibility of states and local communities to identify and respond to hunger (Oliveira, 2010; Poppendieck, 2014). The Great Depression resulted in extensive unemployment across the US, plunging much of the US population into poverty. At the same time, farmers were producing surplus foods that were unaffordable for many consumers, contributing to economic hardship and extensive waste across the agricultural industry. The politically untenable situation culminated in the creation of the original Food Stamp Program (FSP) in 1939. The FSP was originally designed with two sets of color-coded coupons. One was sold at face value of \$1 to be used for the

purchase of household items; each coupon purchased came with an additional coupon valued at \$0.50 to be redeemed for surplus commodity crops (Caswell et al., 2013; Daponte & Bade, 2006; USDA Food and Nutrition Service, 2018). The FSP enabled the government to compensate struggling farmers while also supporting food retailers (Caswell et al., 2013; Daponte & Bade, 2006; Nestle, 2019; USDA Food and Nutrition Service, 2018).

The original FSP was popular; however, reductions in the availability of surplus foods and unemployment levels resulting from World War II led to the termination of the program in 1943 (Caswell et al., 2013). Additional food stamp programs were piloted in the early 1960s, ultimately resulting in the Food Stamp Act (FSA) of 1964, which created the foundation for SNAP as it exists today (88th Congress, 1964; Caswell et al., 2013; Nestle, 2019; USDA Food and Nutrition Service, 2018). The purpose of the FSA was to:

...promote the general welfare, that the Nation's abundance of food should be utilized cooperatively by the States, the Federal Government, and local governmental units to the maximum extent practicable to safeguard the health and well-being of the Nation's population and raise levels of nutrition among low-income households. (88th Congress, 1964, Declaration of Policy)

The FSA operated as a coupon-based system administered at the county level, program eligibility was determined by participating states, and participants were required to purchase the coupons for use with their regular food purchases (Caswell et al., 2013). The FSA eliminated the surplus commodity food requirement from consumer purchases and shifted transactions to qualified grocery stores, ultimately reducing the direct benefit to farmers but strengthening business for grocery stores (Nestle, 2019).

Throughout the 1970s the FSP was amended, beginning with the adoption of national standards for program eligibility in 1971, followed by a nationwide program expansion in 1974, and culminating with the elimination of the coupon purchase requirement in 1977 (Caswell et al., 2013; USDA Food and Nutrition Service, 2018). The FSA was added to the Farm Bill as a new title program in 1977 with the intention of improving nutrition in low-income households (Caswell et al., 2013). The cost associated with SNAP, as well as its status as an entitlement program, caused the program to receive substantial scrutiny from policymakers (Oliveira et al., 2018; Wilde, 2013). The changes implemented in the 1970s increased program participation dramatically, and by the 1980s there was concern among Congress and the Executive branch of the federal government that the program had grown too large and costly, resulting in the adoption of policies designed to limit participation, including shifting the income requirement to be based on gross earnings and a reduction in cost-of-living adjustments to benefit amounts (Caswell et al., 2013; USDA Food and Nutrition Service, 2018).

The political climate of the 1990s emphasized welfare reform and furthered efforts to reduce rates of participation in the FSP. The Personal Responsibility and Work Opportunity Reconciliation Act of 1996 sought to reduce program size by limiting eligibility to reduce the number of participating households. Eligibility criteria were restricted to exclude many legal non-citizens and limit eligibility for able-bodied adults without dependents (ABAWD); the EBT system was formally adopted to reduce the possibility of fraud (104th Congress, 1996; Caswell et al., 2013; Nestle, 2019; USDA Food and Nutrition Service, 2018). In 2008 the program was renamed SNAP to emphasize its

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focus on improving nutrition and to reduce stigma associated with participation (110th Congress, 2008; Nestle, 2019; USDA Food and Nutrition Service, 2018).

Under the Obama Administration (2008-2016), USDA spending on nutrition assistance programs increased in response to the Great Recession and the American Recovery and Reinvestment Act of 2009 (111th Congress, 2009; Oliveira, 2010). The Agricultural Act of 2014 brought further changes to SNAP. In addition to the piloting of mobile and online SNAP benefit redemption, the use of financial incentives to encourage the purchase of fruits and vegetables at grocery retailers and farmers markets was established through the authorization of the Food Insecurity and Nutrition Incentive Grant program (FINI), and later renamed the Gus Schumacher Nutrition Incentive Program (GusNIP) (113th Congress, 2014; USDA Food and Nutrition Service, 2018). GusNIP is introduced here and discussed in greater detail in a subsequent section.

The purpose of GusNIP is to provide grants in support of projects that expand access to fresh produce for low-income consumers through use of financial incentives designed to increase the purchase of fruits and vegetables at the point of purchase. The Agricultural Improvement Act of 2018 permanently reauthorized GusNIP for \$250 million over five years, substantially expanding program funding (115th Congress, 2018; USDA Economic Research Service, 2019). In addition to the Nutrition Incentive (NI) Program, the 2018 Farm Bill added a Produce Prescription Program (PPR), developed to fund pilot projects addressing adverse health outcomes through the prescription of

fresh produce (Gretchen Swanson Center for Nutrition, 2021; USDA Economic Research Service, 2019; USDA National Institute of Food & Agriculture, n.d.).

Prior to 2020 and the arrival of the COVID-19 pandemic, political and policy discussions about SNAP were dominated by concerns over program cost and a need to reduce reliance on the social safety net (Nestle, 2019; Perdue, 2019). The Trump Administration (2016-2020) sought to “restore the original intent of SNAP” (Perdue, 2019), emphasizing personal responsibility in an attempt to reduce reliance on governmental programs. Between 2018 and 2019 the USDA considered SNAP reforms which would have revisited the use of surplus commodity foods, restricted program eligibility for immigrants and ABAWD, eliminated state waivers for benefit time limits, and eliminated automatic enrollment for households that qualify for certain state and federal benefit programs (Nestle, 2019; USDA Press, 2019). The USDA cited low unemployment rates and the need to promote self-reliance through work in support of the proposed changes (Perdue, 2019; USDA Press, 2019). In 2019 SNAP enrollment and participation, as well as total USDA expenditures on food assistance, declined to historically low levels (Nestle, 2019; Tiehen, 2020).

SNAP and COVID-19

The COVID-19 pandemic that was acknowledged in March of 2020 led to an unprecedented rise in the US unemployment rate, plunging many households into financial distress. Between March and April of 2020, the monthly unemployment rate jumped from 4.4 to 14.7%, eventually dropping just above 11% by June of that year (Tiehen, 2020). Demand for public and private nutrition assistance increased sharply

during this time, causing the USDA to implement policy changes intended to expand existing programs, while simultaneously creating additional temporary programs which continued through 2021 (Jones et al., 2022; Tiehen, 2020). These changes resulted in USDA nutrition assistance spending reaching an all-time high, surpassing spending in 2020 by 43% (\$127.5 billion, adjusted for inflation) (Jones et al., 2022). In addition to the spike in demand for public nutrition assistance programs, demand for charitable food assistance programs also increased dramatically during the initial years of COVID-19 (Feeding America, 2011; Hodges et al., 2021; Jones, 2021; Waxman et al., 2021).

Gus Schumacher Nutrition Incentive Program (GusNIP)

GusNIP is a competitive federal grant program administered by the USDA National Institute of Food and Agriculture (NIFA). The program includes three distinct programs: NI, PPR, and Training, Technical Assistance, Evaluation, and Information Center (NTAE) which was awarded to one entity, the Gretchen Swanson Center for Nutrition (Gretchen Swanson Center for Nutrition, 2021; USDA National Institute of Food & Agriculture, n.d.). The purpose of GusNIP is to improve nutrition security and the health of low-income consumers by increasing access to and consumption of FVs, while supporting community economic growth and establishing best practices (USDA National Institute of Food & Agriculture, n.d.). The NTAE provides training and support opportunities, technical assistance, and evaluation to GusNIP and the NI and PPR projects (Gretchen Swanson Center for Nutrition, 2021; USDA National Institute of Food & Agriculture, n.d.).

Nutrition Incentive Program: Projects awarded under the NI program are designed to increase consumption of healthy foods (specifically FVs) among SNAP participants by increasing their purchasing power at the point of purchase, providing targeted financial incentives that make fresh produce more affordable, and also benefitting local communities through the additional expenditures (Gretchen Swanson Center for Nutrition, 2021). NI projects operate at grocery stores, farmers markets, and/or other food retail outlets, and require matching funds for the purchase of FVs. SNAP participants who utilize nutrition incentives offered through NI projects have been shown to consume more FVs over time, even consuming more FVs than non-SNAP participants (Gretchen Swanson Center for Nutrition, 2021). In 2020 there were 30 GusNIP NI projects funded across the US, representing over 1650 participating “firms” (Gretchen Swanson Center for Nutrition, 2021). “Firms” represent sites participating in NI (or PPR) projects, including farm direct (farmers markets, farm stands, mobile markets, and community supported agriculture), and traditional food retail outlets (grocery stores, supermarkets, convenience stores, and wholesalers) (Gretchen Swanson Center for Nutrition, 2021).

Nutrition Incentive Program Example: Double Up Food Bucks: The national farmers market matching program, Double Up Food Bucks (DUFB), was founded as a pilot program in Detroit, Michigan in 2009 (Fair Food Network, 2014). The goals of the DUFB program are three-fold: to increase the consumption of healthy, locally grown fruits and vegetables; to increase income and sales for local farmers; and to keep the money invested in both SNAP and DUFB within the local economy (Fair Food Network, 2014).

Farmers market nutrition incentive programs like DUFB have been shown to improve nutrition security and consumption of fresh produce (Parks et al., 2021; Verghese et al., 2019). Oregon adopted DUFB in the summer of 2016 where it is operated as a GusNIP NI project by Farmers Market Fund, a 501(c)3 nonprofit (Double Up Food Bucks Oregon, 2020; Fair Food Network, 2014; Furia, 2016). DUFB in Oregon is notable as benefits are available to SNAP households at participating locations regardless of whether those households receive additional benefits from other nutrition assistance programs.

Produce Prescription Program: GusNIP projects awarded under the PPR are intended to advance the provision of fresh produce in the form of FV prescriptions; these projects aim to simultaneously improve nutrition security and health outcomes, lowering healthcare costs and frequency of healthcare usage for participants (Choi et al., 2017; USDA National Institute of Food & Agriculture, n.d.). PPRs enable health systems to prescribe fresh produce to patients at risk for, or with a diagnosis of, a diet-related health condition, a low household income, and/or who are experiencing nutrition insecurity (Gretchen Swanson Center for Nutrition, 2021; Swartz, 2018). These projects offer a means of bringing together interested parties across food and health systems to build shared understanding in support of improving household food insecurity through the prescription of fresh produce (USDA National Institute of Food & Agriculture, 2022b).

Produce prescriptions are typically prescribed by a healthcare provider, most frequently a physician or nurse practitioner; however, other clinical or non-clinical staff may also prescribe benefits, including but not limited to nurses, dietitians, community

health workers, social workers, and pharmacists (Newman et al., 2022). Prescription benefits may be administered in different ways, including paper vouchers (most common), preset boxes, or electronic benefits via debit card (Newman et al., 2022; Swartz, 2018). Benefits may be redeemed for the purchase of fresh produce at a participating location, including clinics, farmers markets, grocery stores, mobile food markets, or farms directly via a farm stand or community supported agriculture (CSA) (Newman et al., 2022; Swartz, 2018). Receiving SNAP benefits is not necessarily a requirement for participation in a PPR and eligibility criteria are broader than NI programs which typically require SNAP participation; eligibility criteria for PPR include living in a low-income household, being food insecure or at risk of becoming food insecure, or having a diagnosis of or being at risk of developing a diet-related health condition (USDA National Institute of Food & Agriculture, 2022b).

While PPR and NI programs appear similar in purpose, projects under these programs operate differently from one another and have different objectives. Two prominent differences between NI and PPR projects are the scope and number of people reached by each type of program (Budd Nugent et al., 2021; Gretchen Swanson Center for Nutrition, 2021). The intensity of program benefits, in terms of dollar value of the incentive, also differ between programs, as does the level of nutrition education provided, and the amount of additional services provided to program participants (Gretchen Swanson Center for Nutrition, 2021). According to an NTAE evaluation (2021), NI projects provide a lower intensity benefit to a greater number of people. Produce Prescription projects, by comparison, reach fewer participants than do NI projects;

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however, they offer a higher intensity benefit to participants than do NI projects alone, meaning that the dollar benefit amount per participant is greater for PPRs but those programs support fewer participants than NI programs (Gretchen Swanson Center for Nutrition, 2021). In 2020 there were 19 GusNIP PPR projects funded across the US, representing over 300 participating firms (i.e., locations administering PPR projects, including farm direct, traditional retail outlets, and health clinics) (Gretchen Swanson Center for Nutrition, 2021; USDA Press, 2022). Not all PPRs funding through GusNIP.

Participation in a PPR, referred to as “Veggie Rx” in Oregon, has been shown to increase affordability of, access to, and consumption of FVs (Cavanagh et al., 2017; Donohue et al., 2021; Feinberg et al., 2018; Gretchen Swanson Center for Nutrition, 2021; Heasley et al., 2021; Taher, 2020). Research suggests that participation improves household nutrition security in two ways: providing direct nutrition assistance, and freeing up income for use on other expenditures (Brzozowski et al., 2019; Cook et al., 2021; Heasley et al., 2021; Izumi et al., 2020; Jones et al., 2020; Royal et al., 2016; Taher, 2020). Participation also shows promise in improving health outcomes associated with metabolic disease, reducing hemoglobin A1C (HbA1C) and body mass index (BMI)², and improving participants’ overall health status; however, the strength of this evidence is limited (Bhat et al., 2021; Bryce et al., 2017; Brzozowski et al., 2019; Budd Nugent et al., 2021; Cavanagh et al., 2017; Cook et al., 2021; Feinberg et al., 2018; Izumi et al., 2020; Jones et al., 2020; Royal et al., 2016; Taher, 2020).

² HbA1C and BMI are indicators of clinical significance in measuring metabolic health, they are also used in the evaluation of programs designed to improve food and nutrition security.

Further, evaluations of PPRs indicate that the prescription benefits redeemed at farmers markets increase revenue and community engagement for farmers, offering an added income stream beyond that generated by routine farmers market customers (Ball et al., 2019; Freedman et al., 2014; Swartz, 2018). The seasonality of PPRs can be challenging for farmers in that the revenue generated by prescription benefits may be unreliable across seasons, due to fluctuating attendance, limited program length, and/or inconsistent program renewal in subsequent years (Buttenheim et al., 2012; Swartz, 2018). This variability in program resources can also present challenges for health systems in measuring outcomes and for programs themselves regarding enrollment.

A limitation of PPR projects is sustainability, particularly related to limitations of funding size and duration. While these types of programs may receive funding through GusNIP PPR grants, PPR grant duration is limited to a maximum of three years and these projects are considered “pilots” (USDA National Institute of Food & Agriculture, 2022b). Federal programs such as GusNIP are highly competitive and applications require extensive planning and preparation. This can be a challenge for small programs that may not have the staff support needed to manage complex grant applications, or the knowledge and capacity required to conduct robust evaluations to demonstrate evidence of program success (Budd Nugent et al., 2021; Oregon Community Food Systems Network, 2021b). Many programs offering produce prescriptions do not receive USDA funding, despite operating in alignment with grant eligibility requirements (Swartz, 2018). Applying for funding is also complicated by the myriad of models that a produce prescription program may choose, which may lead to evaluation challenges

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should several existing programs look to partner in the interest of applying for a larger source of funding (Budd Nugent et al., 2021; Newman et al., 2022). Other funding sources available to produce prescription programs may be short term and/or limit participant eligibility criteria (Garfield et al., 2021). Even programs operating within the same region may utilize different combinations of funding sources and be unaware of all options available (Oregon Community Food Systems Network, 2022b). Limited and uncertain funding streams can result in programs limiting the number of participants annually and/or adopting rules that limit participants' ability to apply for subsequent years. It is also important to note that, while PPR and Veggie Rx programs aim to offer program benefits to all who qualify, culturally appropriate produce may not be available to program participants, meaning that the benefit itself may not be truly helpful to all who receive it.

Private and Charitable Nutrition Assistance

Federal and state policies are a critical component of food and nutrition assistance; however, they are insufficient to meet the needs of every US household that could benefit from nutrition assistance. Food banks were created late in the 1960s in an effort to address unmet needs for families not eligible for federal programs (Campbell et al., 2015). Changes to US nutrition assistance, including the removal of the Food Stamp purchase requirement in 1979 and other reforms of the 1980s, contributed to unmet household need and demand for private nutrition assistance, culminating in a rise in food banks and other nonprofit organizations working to fill the gaps (Berner & O'Brien, 2004; Daponte & Bade, 2006). At the same time, the federal government began

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donating surplus and commodity foods for private organizations to distribute, creating an unofficial tax-saving approach to support nutrition assistance (Daponte & Bade, 2006). A national network of organizations, sometimes referred to as the charitable food assistance network or the charitable food system, developed in response to these conditions.

The charitable food system is a loose network of organizations and agencies that work together to distribute food to those whose needs are not fully met by other nutrition assistance resources, who do not qualify for state food assistance, or for whom the stigma of formal program participation may be a barrier to entry. While governmental resources are utilized and federal funding accounts for a quarter of charitable food distribution, the network relies heavily on private resources and beneficial organizational relationships in order to offer nutrition assistance, with approximately two thirds of the total food distributed provided via donation (Daponte & Bade, 2006; Thorndike et al., 2022). Food banks provide the backbone of the US charitable food system which is coordinated at the national level by Feeding America, the largest hunger relief organization in the US, which works with other community-based partner agencies to (Campbell et al., 2015; Feeding America, 2011; Thorndike et al., 2022). This system is comprised of affiliated member food banks in all 50 states, as well as thousands of partner agencies, including community soup kitchens, food pantries, and other organizations with similar missions (Campbell et al., 2015; Feeding America, 2011).

While the charitable food system has historically measured its success based on the amount of food distributed, food quality has become more of a focus in recent years (Thorndike et al., 2022). This shift has occurred in response to an increase in the use of the charitable food system and associated concerns over dietary quality, as well as client requests for healthier food items (Campbell et al., 2015; Thorndike et al., 2022). Feeding America now provides nutritional guidance to support member foodbanks in their efforts to improve client dietary quality, and the Healthy Eating Research program of the Robert Wood Johnson Foundation recently created a color-coded ranking system to support charitable food system organizations in providing nutrition guidance to clients (Campbell et al., 2015; Schwartz et al., 2020; Thorndike et al., 2022).

The Oregon Community Food Systems Network and Veggie Rx

The Oregon Community Food Systems Network (OCFSN) is a collective of nonprofit organizations and “public health allies” who are “dedicated to strengthening local and regional food systems to deliver better economic, social, health, and environmental outcomes across Oregon” (Oregon Community Food Systems Network, 2021b, p. 4). Oregon’s PPRs collaborate through OCFSN and have operated under the title of “Veggie Rx” since 2014, approaching produce prescriptions as interventions and/or prevention services and following the same eligibility criteria as those outlined in the GusNIP PPR grant guidelines (Oregon Community Food Systems Network, 2021b; USDA National Institute of Food & Agriculture, 2022a). The Veggie Rx working group, a subcommittee within OCFSN, works to advance partnerships with health systems in support of advancing Veggie Rx across Oregon, with a goal of integrating Veggie Rx into

the Oregon healthcare system in order to address both food insecurity and diet-related chronic diseases (Oregon Community Food Systems Network, 2021b).

Most of the Oregon Veggie Rx programs provide participants with vouchers for redemption at participating grocery stores and farmers markets, although some programs have begun piloting electronic debit cards via Fresh Connect which will enable benefits to be redeemed at a larger number of retailers (Oregon Community Food Systems Network, 2021b, 2022a; Taher, 2020). Veggie Rx participants typically receive at least \$6 per household member per week, with a total benefit that varies by program (Taher, 2020). Program duration often mirrors the farmers market season, May through September, depending on location, with most programs operating between three and 12 months (Oregon Community Food Systems Network, 2021b).

According to the most recent data available, in 2020 there were 11 Veggie Rx programs operating across Oregon, serving more than 1300 individuals, with approximately 3000 household members benefitting (Oregon Community Food Systems Network, 2021b). In 2020 approximately \$320 was spent per Veggie Rx participant, with approximately \$500,000 going directly into local economies (Oregon Community Food Systems Network, 2021b). Oregon's Veggie Rx programs are different from other nutrition assistance programs available in that Veggie Rx participants do not need to be enrolled in SNAP to be eligible for program benefits (Oregon Community Food Systems Network, 2021b). While Veggie Rx programs operate as PPRs, they do not necessarily receive funding as GusNIP PPR programs.

Most Veggie Rx programs in Oregon receive at least some of their funding from their local CCO; however, the level of integration and funding provided varies across programs (Oregon Community Food Systems Network, 2021b, 2022b). While some Veggie Rx programs are well aligned with their local CCO, including having a clear path to receive flex fund dollars, the level of involvement and cooperation varies by CCO, leaving some Veggie Rx programs with an untapped funding source and a missed opportunity to better align with the local health system and expand program reach. Broadly, Veggie Rx leaders have identified CCO HRS as a local source of funding that they would like to further develop (Oregon Community Food Systems Network, 2021b).

Relevant Theories and Frameworks

This dissertation focused on how CCOs perceive and engage with Veggie Rx programs, including how funding decisions are made. A grounding in organizational theory was helpful in this work to support an understanding of how CCOs approach decision-making when working with community partners. Theories and frameworks introduced in this section are categorized in two ways: by type (e.g. organizational theory or policy process) and by application. Application occurred in two ways, foundationally and analytically. Foundational frameworks provided framing for the dissertation study; in addition to contributing to the framing of this dissertation, analytical frameworks were used to guide analyses, interpretation and discussion.

Organizational Theories

Organizational theories relevant to the study are discussed below.

Resource Dependence Theory: Introduced by Pfeffer and Salancik (1978), resource dependence theory (RDT) seeks to explain organizational behavior by focusing on how the social context present in the organization's external environment affects organizational behavior (Katz & Kahn, 1966; Pfeffer & Salancik, 1978; Weick, 1995). Rather than emphasizing internal dynamics or leadership directives as an explanation of organizational decision-making, RDT focuses on the importance of the social context as an influential force on organizational behavior (Pfeffer & Salancik, 2003). RDT asserts that organizations acquire and maintain resources through relationship building; their networks are built on organizational relationships, therefore decision-making is also heavily influenced by external relationships (Birken et al., 2017; Pfeffer & Salancik, 2003).

RDT suggests that an organization will seek to minimize resource interdependence with other organizations; this could be done by using contractual agreements between CCOs and community partners. The application of RDT may help illuminate CCO behavior as it explains that, while CCOs may compete on the basis of performance in pursuit of state funding, they are ultimately beholden to the priorities of their patient populations. RDT provided a theoretical framing to the research question.

Institutional Theory: While RDT focuses on the external environment by considering the social context in which an organization exists, it does not acknowledge the influence of institutions on organizational behavior, including state agencies such as the Oregon Health Authority (OHA) and the Oregon Health Policy Board (OHPB). Institutional theory emphasizes that organizational decision-making is predicated on an organization's

desire to align itself with the beliefs, norms, and values of the major institutions that operate within the external environment (Birken et al., 2017; DiMaggio & Powell, 1983). IT expands the external environment outlined in RDT, recognizing the importance of institutional influence, and illustrating how institutions affect organizational change (Perrow, 2014).

The influence of major institutions can prompt organizational change in response to three institutional isomorphic pressures: mimetic, coercive, and normative. Mimetic change occurs in response to uncertainty, coercive change in response to external pressures to comply with the rules and regulations imposed upon the organization, and normative change as an organization seeks to align itself with the norms and expectations of the major institutions present in its environment (Birken et al., 2017; DiMaggio & Powell, 1983). DiMaggio and Powell (1983) describe isomorphic pressures as causing organizations that are already similar, to become more alike over time ultimately reducing diversity throughout the field. This can be problematic as not all organizations benefit equally, and change is only beneficial so long as it improves organizational function or accomplishes another purpose, while change for the sake of change can be counterproductive to organizational goals (DiMaggio & Powell, 1983).

DiMaggio and Powell (1983) hypothesized that isomorphic change could be predicted by certain factors, including: the level of interdependence among organizations, resource centralization, relationship instability, ambiguity of organizational goals, level of workforce specialization required by the organization, leadership involvement with professional organizations, the extent to which

organizations within a specific field rely on a single support resource, the extent to which organizations within the field interact with the state, the number of alternate structural models present within the field, uncertainty of technology, the degree of professionalism and structure within a field (DiMaggio & Powell, 1983). Applied to CCOs, many predictors of change are likely to be present, given that CCOs share a general purpose, operate under the same state-level leadership, and compete for many of the same resources available across the state. Collectively, institutional theory suggests that as CCOs change over time they may become increasingly similar. Institutional theory provided a theoretical framing to the research question and study design.

Donabedian's Model of Quality: Donabedian's original model for evaluating the quality of medical care offers a framework for evaluating the quality of health services that considers how structures, processes, and outcomes collectively contribute to quality (Donabedian, 1966, 1990). Donabedian noted that the definition of "quality", while flexible, typically reflects the goals and values of the system and environment in which that system operates (Donabedian, 1966). Donabedian later established seven pillars that can be used in the evaluation of quality (Donabedian, 1990):

- efficacy, the ability of healthcare to improve health and well-being;
- effectiveness, health improvements expected under normal practice;
- efficiency, achieving the best possible outcomes for the lowest cost;
- optimality, the value of care relative to its cost;
- acceptability, including accessibility of care, the relationship between provider and patient, and amenities available to those receiving care;
- legitimacy, whether care is acceptable to the community and provided in a responsible manner; and
- equity, whether that care is provided in a fair and just manner.

Donabedian's seven pillars of quality articulated in 1990 foreshadowed the Institute of Medicine's (IOM) six aims for improvement (2001), which offered a set of characteristics for measuring performance. The IOM's six aims illustrated the staying power of Donabedian's pillars of quality, reflecting many of the same principles. They are (Institute of Medicine Committee on Quality of Health Care in America, 2001):

- Care is safe and delivered without unintended injury.
- Care is effective and based on substantive evidence.
- Care is patient-centered and responsive to the needs of the individual.
- Care is delivered in a timely manner.
- Care is efficient and does not waste resources.
- Care is equitable and quality does not change in response to individual characteristics.

While outcome measures alone may be useful in evaluating care or service quality, they are limited by their level of relevance in relation to the goals of the care or service that is provided (Donabedian, 1966); this is why Donabedian also articulated structural and process measures intended to move beyond the traditional features of organizations that acknowledge the environmental factors at play. Additionally, outcomes may not be immediately apparent and do not necessarily rule out the involvement of other factors (Donabedian, 1966). This is particularly relevant to nutrition-related interventions where the goal of treatment is prevention or reversal of disease; therefore, health system outcomes of interest may not be seen for a long time, if at all. Process measures represent the process of how care is delivered, including whether that care was successful, appropriate, necessary, useful, etc., and offer a means of quality evaluation that may be more relevant in some contexts than outcome

measures (Donabedian, 1966). Measures of structures focus on the settings and mechanisms of care delivery; the idea behind their inclusion was that appropriate structures contribute to quality attainment (Donabedian, 1966). Structural measures also include how that care is delivered from the systems perspective, including aspects such as workforce and training, and policies guiding delivery. When applied in the context of CCOs and Veggie Rx, Donabedian's framework brings together outcomes at the individual and health systems levels, along with the structures and processes of how those programs are administered, financed, and delivered, including integration between CCOs and Veggie Rx programs. The Donabedian framework was applied as both a foundational basis for the study design and a key analytical framework.

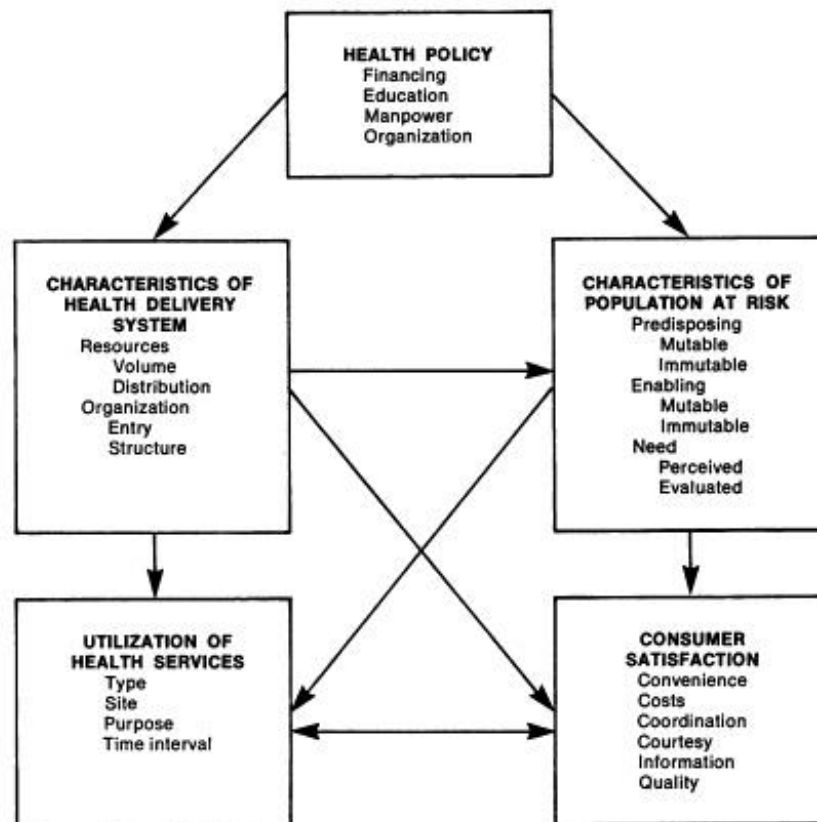
The Behavioral Model of Health Services Use

The Behavioral Model of Health Services, developed originally by Aday and Andersen (1974) and revised by Andersen (1995), illustrates the myriad of factors that influence individual health and determinants of individual utilization of health services (see Figure 2.7 for the original model, Figure 2.8 for the later model) (Aday & Andersen, 1974; Andersen, 1995). Aday and Andersen's initial model (1974) focused more broadly on the influence of policy on the health system, whereas Andersen's 1995 revision shifted emphasis to the individual, looking at the combination of factors that most influence utilization of health services.

According to Andersen, predisposing characteristics include individual demographic factors, social structure, and health beliefs, while enabling resources include the individual's immediate social circle and broader social network (Andersen, Kihn-Stang Chapter Two

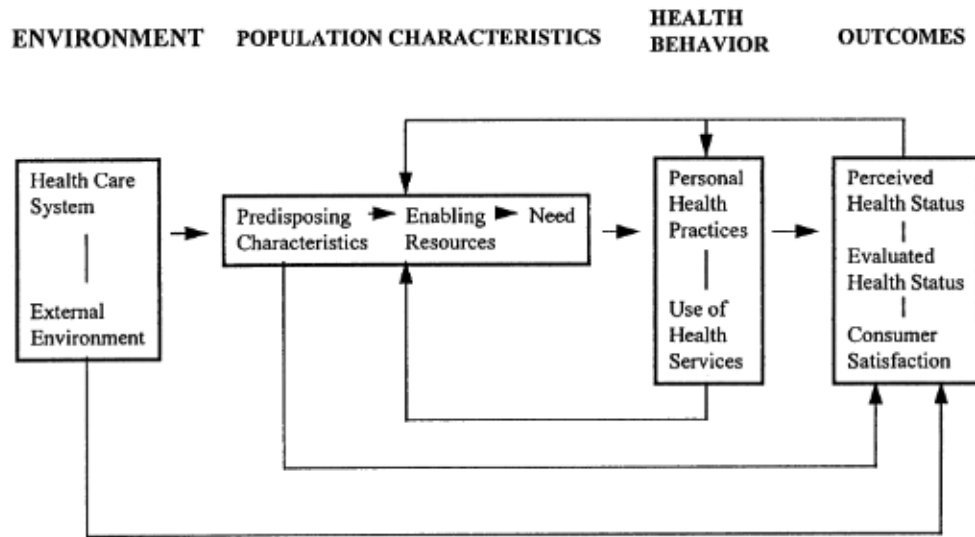
1995). Predisposing characteristics indicate an individual's health and their future need for health services, and their ability to attend to health-related matters and likelihood of doing so, in addition to the beliefs, attitudes, and values that may drive them to seek or not seek health services (Andersen, 1995). Enabling factors look at the environment and health system, including the availability of services and the individual's means of using those services (transportation, insurance, knowledge, etc.) (Andersen, 1995).

Figure 2.7. The Aday and Andersen Model of Access to Medical Care



(Aday & Andersen, 1974)

Figure 2.8. Andersen Behavioral Model of Health Services Use



(Andersen, 1995)

While Aday and Andersen’s 1974 framework is not dissimilar from Andersen’s 1995 Behavioral Model, the framework includes an explicit focus on access and health policy as distinct factors that exist separately from the health system (Aday & Andersen, 1974). Noting that access is highly complex and typically treated as a political issue, Aday and Andersen use health policy as a starting point to establish that health policies affect how populations access care (Aday & Andersen, 1974; Andersen et al., 1983). The authors draw upon Donabedian’s Quality of Care model in that they emphasize both process and outcome measures in the evaluation of access, where utilization is the primary outcome measure indicative of access to services (Aday & Andersen, 1974; Andersen et al., 1983). More simply, the framework conceptualizes how health policy effects access through its effects on populations and health systems. The Andersen

Behavioral model was applied as both a foundational basis for the study design and a key analytical framework.

Critical Race Theory

Critical race theory (CRT) originated in the 1970s, growing out of a legal movement to further civil rights (Bell, 1995; Delgado & Stefancic, 2001; Ford & Airhihenbuwa, 2010). CRT acknowledges that racism has been normalized within every aspect of society and is therefore inherently present (Bell, 1995; Ford & Airhihenbuwa, 2010). CRT asserts that race itself is a social construction, rather than a feature of biology, and that White people are disincentivized to address racism within society (Bell, 1995; Ford & Airhihenbuwa, 2010). CRT itself is a direct rebuttal to incrementalism in policymaking (Bell, 1995; Delgado & Stefancic, 2001).

The social construction of race is important, as application of the principles of CRT acknowledges that race itself is not a predisposing factor that affects an individual's access to health services inasmuch as it is an indicator of the potential to experience discrimination and racism (Delgado & Stefancic, 2001; Ford & Airhihenbuwa, 2010). In this context, it is not racial or ethnic identity that affects nutrition security; however, racism and discrimination attributed to identity may be factors that impede access to and the quality of food resources available to an individual. The application of CRT aims to center populations that have been and continue to be marginalized in conversations of nutrition security and food access.

While a thorough account of state history is beyond the scope of this dissertation, Oregon has a long history of racism, racial discrimination, and exclusion

that is briefly introduced here. Oregon was founded as a “free state,” and the decision to prohibit slavery was made on economic grounds stemming from white supremacy and a desire to exclude all Black people from residing within state borders (Coleman, 2014; Thoennes & Landau, 2019). An exclusion clause was embedded within the state constitution in 1857; however prior race-based exclusion laws (1844 and 1849) predated Oregon’s statehood (Coleman, 2014). Under the Donation Land Act of 1850, those who were Black, Chinese, Pacific Islanders, and most Native Americans were expressly prevented from owning property in the Oregon Territory (Coleman, 2014).

During World War II, Japanese Americans residing in most of Oregon (and West Coast states more broadly) were ordered into internment camps and effectively stripped of their property rights (Collisson, 2022). When the exclusionary policy ended in 1945, the Oregon public, current, and former state politicians remained deeply opposed to the return of those who had been wrongly imprisoned (Collisson, 2022).

During the Termination Era of the 1950s, Oregon was home to more than half of the 109 Native American tribes terminated by the federal government; the status of 60 Oregon tribes was terminated, resulting in massive property loss and forced relocation (Lewis et al., 2015). Restrictive covenants in Oregon property deeds continued to exclude those who were not White from purchasing property in specific neighborhoods throughout much of the 20th century (Smith, 2018). Collectively, these exclusionary policies have contributed to an environment hostile toward racial and ethnic minorities, resulting in a state that remains predominately White today. Further, these historical and modern injustices have resulted in fewer resources, particularly economic and

political, available to support these populations in achieving their full potential with regard to health and economic opportunity.

The purpose of incorporating CRT into the theoretical basis for this dissertation is to openly acknowledge that racism and discrimination affect how Native American, Black, Hispanic, Latino, and other racial and ethnic minorities in Oregon can access healthy foods. Specifically, approaching this dissertation through a CRT lens ensures that the experiences of racial and ethnic minorities are appropriately considered when discussing how Oregon's CCOs can support nutrition security through the health system. CRT has been included as a foundational framework with implications for future research addressed in Chapter Seven.

Policy Process Theories

The policy process is defined as “the interactions that occur over time between public policies and surrounding actors, events, contexts, and outcomes” (Weible, 2018, p. 2). It is the highly complex cycle surrounding the creation, implementation, and modification of public policies. Public policies are “the deliberate decisions – actions and nonactions – of a government or an equivalent authority toward specific objectives” (Weible, 2018, p. 2); they may cover a wide array of topics. The complexity of the policy process results from a number of factors, including the varied contexts in which public policies exist, the type of governing body responsible for the policy, how different policies overlap with each another, the numerous interactions among diverse actors involved in the policy process, and the unpredictability of events affected by and affecting the policies (Weible, 2018).

The complexity of the US food system and the policies that govern its activities result in an environment where policies may overlap and ultimately work against one another. As illustrated by Muller and colleagues (2009), federal economic policies that encourage the production of processed foods are in direct opposition to local policies designed to incentivize the sale of fresh produce in convenience stores (Muller et al., 2009). A driver of these oppositional policies is the nature of food system problems. In setting a policy agenda and formulating effective policy solutions, food systems present a “wicked problem” (Hamm, 2009).

Wicked problems are those that are difficult to define, first articulated by Rittel and Webber (1973); they are comprised of many related issues which are difficult to separate from one another and challenging to address through a single policy solution. To that end, wicked problems lack a single, straightforward solution and are instead only resolvable on a temporary basis (Rittel & Webber, 1973). Wicked problems are inherently social problems; they do not offer a reliable, uniform path forward for policymakers, and any policy resolutions are difficult to evaluate for effectiveness, especially in the short term (Rittel & Webber, 1973). Further, in order to account for their multiple causes, wicked problems necessitate cross-sectoral collaboration (Bacchi, 2016). Food system problems are wicked in that they coincide with socioeconomic issues which makes them difficult to address cohesively (Muller et al., 2009). Food system problems affect many different population groups simultaneously yet with different consequences, hence the best ways to identify solutions will vary depending on whom they are intended to benefit and which community partners are involved in

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identifying the resolution (Hamm, 2009). The concept of wicked problems provided a foundational basis to guide the study design and informed the framing of the policy recommendations presented in Chapter Seven.

While it is difficult to disentangle the interactions among agriculture, health, and economic policies, policy process frameworks offer one means of understanding how policies that affect nutrition security come into existence and change over time. Several theories are relevant to this research, and are discussed below: incrementalism, the garbage can model, and the multiple streams framework. These policy process theories provided foundational framing for the research question and study design, they are not revisited in the final discussion of findings.

Incrementalism: Lindblom (1959) first introduced this concept as “Muddling Through”; incrementalism is a policy concept that refers to both a political pattern and a form of policy analysis (Lindblom, 1959, 1979). As a political pattern, incrementalism is the idea that political change can be achieved over a sustained period of time through the adoption of many minor changes to existing policy (Lindblom, 1979). Lindblom argued that incrementalism was the most practical approach to policymaking in the US, in addition to being the most common (Lindblom, 1979). In policy analysis, incrementalism (Lindblom, 1979) refers to three kinds of analyses used to make decisions with regard to policy decisions:

1. simple incremental analysis, which considers alternative policies only incrementally different from the status quo;
2. disjointed incrementalism, which takes a trial-and-error approach, focusing on previously identified policy solutions but does not thoroughly

- consider all potential outcomes associated with those policy alternatives;
and
- 3. strategic analysis, which aims to solve complex policy problems by means of simplification.

Incrementalism is closely tied to the idea of bounded rationality, which assumes that policymakers can only focus on a limited number of policy issues at any given time. Incrementalism acknowledges that fully rational decision-making is not typically possible, as the amount of time, resources, and understanding required for policymakers to consider all possible solutions are limited. Therefore, incremental change is often the most reasonable approach to policy change, allowing policymakers to make small changes over an extended period of time which collectively add up to larger policy changes.

Multiple Streams Framework and The Garbage Can Model: Cohen, March, and Olsen, in *A Garbage Can Model of Organizational Choice*, describe organizations as “organized anarchies” that are “characterized by problematic preferences, unclear technology, and fluid participation” (Cohen et al., 1972, p. 1). They describe organizations as “collections of choices looking for problems, issues and feelings looking for decision situations in which they might be aired, solutions looking for issues to which they might be an answer, and decision-makers looking for work” (Cohen et al., 1972, p. 1). According to Cohen et al., these organizations rely on a trial and error approach to decision-making that is more reactive than it is proactive, and the time, energy, and resources that they are able to dedicate to any given issue will vary over time (Cohen et al., 1972). The descriptor of an organized anarchy may be given to many types organizations; however

it is particularly apt for describing complex bureaucracies such as the federal government, state governments and related agencies, and Oregon's CCOs (Herweg et al., 2018).

The Multiple Streams Framework (MSF), introduced by Kingdon in 1984, builds upon the Garbage Can Model, emphasizing the same major assumptions (Herweg et al., 2018; Hoefler, 2022; Kingdon, 2003). The basic assumptions of the MSF are (Herweg et al., 2018; Kingdon, 2003):

1. Problems are complex and ambiguous, therefore many potential policy solutions may exist for any given problem and those policies may have unintended outcomes that must be considered.
2. Decision-making ability is limited by time constraints and therefore problems must compete for attention from policymakers.
3. Policy preferences are ambiguous, they may change over time and may not be known in advance of decision-making.
4. Technology and processes are unclear to decision-makers which limits their ability to identify solutions.
5. The participation of decision-making bodies is fluid and the actors involved may change over time, making it challenging to dedicate attention to any specific issue for an extended period of time.
6. There are three distinct "streams" – problem, policy, and political – which operate independently from one another; the streams represent political problems, policy solutions, and politics more broadly.

In order for policy innovation to occur, a problem must first be added to a policy agenda at a point when both the motivation and resources are available to address the problem, and at the same time that a feasible solution becomes available (Figueroa et al., 2018; Herweg et al., 2018; Kingdon, 2003). The brief period of time when the three streams come together is known as a "policy window" (Herweg et al., 2018; Kingdon, 2003). According to the assumptions of MSF, only where a policy window occurs can an issue receive sufficient attention from policymakers so that a solution may be identified

and agreed upon (Cairney & Jones, 2016). MSF has been widely applied in order to examine the policy process from the systems level, and is particularly appropriate for case studies, in part due to its flexibility which allows for application when evaluating many kinds of policy problems (Cairney & Jones, 2016; Hoefer, 2022; Jones et al., 2016). MSF served as a foundational theory to the conceptualization of the dissertation and is therefore not revisited in later chapters.

Conclusion

Access to food is a basic human right, and the consumption of healthy, nutritious food is widely understood to be a prerequisite for a healthy, productive life. Nutrition security is an important social determinant of health that has major downstream implications for population health, healthcare utilization, and economic activity. In light of these implications and in response to the complex problem that ensuring nutrition security presents, health systems have assumed an increasing role in supporting and providing solutions as a component of routine care. However, questions remain regarding how health systems should allocate funding for these projects and how programs designed to improve nutrition security affect health systems.

This chapter offered an overview of the background literature that supports why a dissertation focused on nutrition security is relevant to the study of health systems and policy. The literature presented here clearly establishes indisputable connections among food access, dietary quality, and health. Chapter Three presents the research design, and methods for data collection and analysis used in this dissertation.

Chapter Three – Design and Methods

This chapter provides an overview of the research design, methodological approach, and the analytical approach for the dissertation study. This chapter builds upon the literature reviewed in Chapter Two, and presents a description of and justification for the research design; a description of the conceptual foundations and frameworks used to inform the study design and activities; the working definitions, key concepts, and proposed variables which guided the research; protocols used to identify the research participants and eligibility criteria for inclusion; and data sources, data collection and analytical approaches used in the dissertation study. Protocols and instruments used to guide data collection activities described in this chapter are included in Appendix A.

Introduction

The connections among food access, dietary quality, and health have been well established in the literature, as discussed in Chapter Two. Produce prescription programs are the focus of a rapidly growing area of research where existing studies have primarily focused on program assessment, emphasizing participant outcomes (Abel et al., 2022; Afshin et al., 2019; Aiyer et al., 2019; Cavanagh et al., 2017) and the perspectives of healthcare providers (Feinberg et al., 2018; Stotz et al., 2022). More recent additions to the literature show a growing interest in understanding how to best integrate PPRs into health systems (Downer et al., 2020; Garfield et al., 2021; Hager & Mozaffarian, 2020; Harmsen, 2020), but only recently has this interest turned toward

understanding the perspectives of health system payors in funding these programs (Auvinen et al., 2022). Despite this recent addition to the literature, studies centering broader organizational perspectives are lacking, and there remains a need for place-specific studies which consider Oregon's unique approach to the delivery and financing of Medicaid-eligible programs, and what role Veggie Rx programs may play in the future of health services delivery. This dissertation sought to address this gap in the literature, and to add to existing knowledge about produce prescription programs, their integration with health systems, and their potential for improving nutrition security.

This research sought to explore how participation in Oregon's Veggie Rx programs affected participant outcomes, and how Oregon's CCOs perceived, engaged with, and financed these programs. Veggie Rx program leaders also have an interest in increasing capacity and sustainability of their programs, which could be strengthened through CCO partnerships. Members of the OCFSN Veggie Rx Working Group have described varying degrees of partnerships with CCOs and have identified a lack of knowledge regarding how to best adapt program structures and processes to maximize the number of consumers able to access and benefit from their programs. With federal approval of Oregon's 2022-2027 Medicaid 1115 Demonstration waiver, it will be possible to use Medicaid funds to cover nutrition supports through the OHP, including up to six months of Veggie Rx program participation, as part of the state strategy to address SDoH using an upstream approach (Oregon Health Authority, n.d.-a, 2022; US Department of Health & Human Services, 2022). As CCOs increase strategic spending on

SDoH and direct specific attention toward funding evidence-based nutrition assistance programs in response to the 2022-2027 Medicaid waiver, and given Oregon's ongoing prioritization of addressing SDoH through the health system in CCO 2.0, there is an opportunity to conduct timely research that may inform future Veggie Rx program direction and state Medicaid spending strategy.

Research Question and Aims

Research Question

This study sought to answer the question: How do Oregon's CCOs perceive and utilize produce prescription (Veggie Rx) programs with regard to addressing social determinants of health?

Research Aims

The research question was answered by study of three specific aims. These aims were designed to capture and utilize data that attend to the perspectives of both Veggie Rx programs and Oregon's CCOs.

Aim 1 – Veggie Rx: Describe Veggie Rx programs and how participation affects food security and health outcomes for program participants. While the primary focus of the research question is on CCOs, the dual purpose of Aim 1 was also to provide context and guidance in CCO case selection. Aim 1 combined quantitative analysis of secondary

survey data from Veggie Rx participants and in-depth qualitative interviews with Veggie Rx program leadership.

Aim 2 – Coordinated Care Organizations: Analyze how Oregon’s CCOs prioritize Veggie Rx programs among other programs that address social determinants of health, including assessing the effectiveness of and demand for Veggie Rx. Informed by findings from Aim 1, Aim 2 utilized in-depth qualitative interviews with CCO leadership responsible for addressing SDoH, content analysis of written policies, and review of publicly available spending and performance reports.

Aim 3 – Integration of Findings: Compare and contrast elements of Veggie Rx programs with CCO perceptions and utilization of these programs. Aim 3 drew upon cross-case findings from Aims 1 and 2 in order to integrate findings and draw conclusions for Veggie Rx programs and CCOs, with particular attention to recommendations for strategies and policies to strengthen the alignment of CCOs with local food systems. A key focus of Aim 3 was consideration of the implications for strengthened future alignment of CCOs and local food systems, with attention to implications for systems and policy.

Operationalization of Domains and Concepts

Table 3.1 operationalizes the six major domains that were derived from the literature and were deemed important to developing the research study based on the research question and aims. While nutrition security is considered a SDoH, it was treated as a separate domain, given its importance to this study and emphasis within

this dissertation. Each study domain includes two or more related concepts which are defined subsequently (Table 3.2). Operational definitions for each domain reflect literature reviewed in Chapter Two, with selected supporting citations noted.

Table 3.1. Study Domains and Operational Definitions

| Domain | Operational Definition | Source |
|---|---|---|
| Veggie Rx - Prescription Produce Programs | <p>Programs that are intended to improve individual and household nutrition security and health outcomes by providing access to low or no cost healthy foods (e.g., fresh fruits and vegetables) for consumers who are vulnerable to diet-related illness. In these programs, healthy foods are prescribed in a healthcare setting, and “prescriptions” are redeemable at a participating retail outlet within the local food system (e.g. grocery store, farmers market, farm stand, or other distribution site). Over time, these programs aim to improve nutrition security and health outcomes, increase FV intake, lower healthcare costs, and reduce the frequency of healthcare usage.</p> <p>Veggie Rx refers to all programs with this goal operating in Oregon, regardless of their specific approach to the allocation of benefits. Veggie Rx programs partner with community-based organizations responsible for the delivery of health services and support health-related social needs by improving food security and diet.</p> | National Produce Prescription Collaborative (2021); Oregon Community Food Systems Network (n.d.); Downer et al. (2020); Tappenden et al. (2013) |
| Coordinated Care Organizations (CCOs) | Networks of healthcare providers working together within local communities to serve the needs of Oregon Health Plan (Medicaid) members. CCOs emphasize the prevention and management of chronic disease and seek to improve the cost, quality, and experience of care delivery. CCO 2.0 includes a focus on social determinants of health as one of four priorities outlined by former Oregon Governor Brown. | Oregon Health Authority (n.d.-b, n.d.-a) |
| Social Determinants of Health and Equity | The complex factors and conditions of daily life that affect an individual’s health outcomes, including nutrition security, the physical and social environment, economic stability, access to/quality of healthcare and education, and the distribution of these factors and conditions across populations. SDoH and equity also include health-related social needs, meaning the social and economic barriers that prevent an individual/population from achieving health. | Anderson (1990); Braveman et al. (2011); Braveman & Gottlieb (2014); Marmot et al. (2008); NEJM Catalyst (2017) |

Table 3.1. Study Domains and Operational Definitions (continued)

| Domain | Operational Definition | Source |
|--------------------|--|---|
| Local Food Systems | The networks of individuals, resources, and organizations that work together to nourish Oregon residents through the provision of food and economic opportunity. Local food systems include all actors and interconnected value-adding activities related to food production, processing, distribution, consumption, and disposal; emphasis is on direct producer-to-consumer relationships within Oregon, or in an adjacent county in California, Idaho, Nevada, and Washington. | Chase & Grubinger (2014); Bower et al. (2010); Oregon Farm Direct Nutrition Program (2006); Von Braun et al. (2021) |
| Nutrition Security | Nutrition security refers to all people having consistent, equitable access to healthy, safe, and affordable food that promote optimal health and well-beings; it can be explored within the context of social determinants of health and equity. Nutrition security is a conceptual idea that combines quality of dietary intake (e.g. adequate consumption of healthy foods) and individual/household food security. While food security and dietary intake are distinct ideas, for the purpose of this dissertation, they will be explored together with appropriate distinction made during discussion and analysis. | Anderson (1990); Mozaffarian et al. (2021); Thorndike et al. (2022); US Department of Agriculture (2023) |
| Outcomes | Measures and indicators of the health (physical, mental, and social well-being) and satisfaction of an individual or population. Outcomes may also include CCO performance metrics and CCO spending on SDoH through community benefit initiatives, health-related services, and flexible service funds. Health indicators associated with nutrition security include but are not limited to: BMI, cholesterol, blood pressure, HbA1C, chronic metabolic disease, depression, anxiety, self-described overall health and well-being. | Anderson (1990); Donabedian (1966); Gundersen & Ziliak (2015); Oregon Health Authority (n.d.-b) |

Table 3.2 further defines the study domains by articulating specific concepts that were addressed through data collection and includes definitions and relevant sources for those concepts. The domains and concepts identified here were foundational to the conceptualization of the study design and development of the interview protocols; however, findings from each study aim have been organized by themes that emerged during analysis, rather than by concepts defined here.

Table 3.2. Study Domains and Concepts of Interest

| Domain | Concept | Definition (Source) |
|---|---------------------------|--|
| Veggie Rx - Prescription Produce Programs | Operations | Structural program characteristics, including size, benefit amount, duration, delivery method, etc. (Donabedian, 1966). |
| | Infrastructure | Integration of Veggie Rx with health systems (providers, clinics, CCOs) and accessibility of benefit redemption options for participants (Garfield et al., 2021). |
| | Sustainability | The ability of a program to secure funding needed to maintain operations, expand the number of participants and/or benefit value offered, and need to limit repeat participants due to limits on program enrollment (Garfield et al., 2021). |
| Coordinated Care Organizations (CCOs) | Operations | Operational characteristics of CCOs, including structural elements such as service area(s), governance, partners, community needs and priorities; and operational elements such as internal priorities, relationships with community partners, etc. (Oregon Health Authority, n.d.-c, n.d.-b). |
| | Policy Environment | A feature of the external environment and/or health system that guides Veggie Rx program and/or CCO behavior, structure, or processes (Andersen, 1995; Donabedian, 1966). |
| | Receptivity to Veggie Rx | A CCO’s awareness of local Veggie Rx programs, knowledge about program purpose and operation, history of and willingness to invest in them as a health-related service for their members; health systems responsiveness (Mirzoev & Kane 2017). |
| Social Determinants of Health and Equity | Demographics | Demographic factors known to interact with social determinants of health, including: age, gender identity, race/ethnicity, income, etc. (Anderson, 1990; De Marco & Thornburn, 2008; Marmot et al., 2008; NEJM Catalyst, 2017). |
| | Barriers and facilitators | Factors that affect population disparities in social determinants of health; including: community resources, transportation, healthcare services, geographic characteristics, etc. (Braveman, 2006; Braveman et al., 2011; Braveman & Gottlieb, 2014). |

Table 3.2. Study Domains and Concepts of Interest (continued)

| Domain | Concept | Definition (Source) |
|--------------------|--------------------------------|--|
| Local Food Systems | Structure | General characteristics of local food systems, including location, geography, composition, climate, size, and resources (Low et al., 2015; Martinez et al., 2010). |
| | Relationships | The connections between actors and activities both within and outside of the local food system; including the between consumers and producers, and those between food system activities and health systems, economic and governance systems (Bower et al., 2010; Von Braun et al., 2021). |
| Nutrition Security | Food security | The state of having adequate access to the amount of food required to live an active, healthy life (National Research Council, 2006). |
| | Dietary intake | Composition of individual/household dietary intake, including adequate consumption of healthy foods, specifically fruits and vegetables (Anderson, 1990; Miller et al., 2020). |
| Outcomes | Physical health | Outcomes associated with physical health, including but not limited to self-described physical health, relevant biomarkers, and disease diagnosis (Anderson, 1990; Donabedian, 1966; Gundersen & Ziliak, 2015). |
| | Behavioral health | Outcomes associated with behavioral health, including but not limited to self-described mental health and diagnosis with a behavioral health condition (Gundersen & Ziliak, 2015; Paquin et al., 2021). |
| | Well-being | An individual’s positive outlook on life, including personal satisfaction, emotion, engagement, and a sense of meaning (Diener & Seligman, 2004; Gundersen & Ziliak, 2015). |
| | Satisfaction | An outcome of interest for participation in Veggie Rx; consumer/participant satisfaction includes impressions of convenience, availability, affordability, quality, and overall satisfaction with the program (Andersen, 1995; Donabedian, 1966). |
| | CCO investment and performance | Financial investment in health-related services, flexible services, and community benefit initiatives with the intention of improving SDoH for CCO members, specifically nutrition security; CCO performance in meeting state-identified metrics related to SDoH (Donabedian, 1966; Oregon Health Authority, 2021b). |

Study Design

A multiple-case study design was used to investigate how CCOs in Oregon made decisions regarding how to prioritize Veggie Rx programs as part of their mandate to address SDoH for their member populations. Case study research is indicated when the primary research question asks *how* or *why*, and is useful when the researcher seeks to create a detailed description of a modern and complex social phenomenon which the researcher has no ability to control (Yin, 2014). A case study design is also useful when compiling data from multiple sources to investigate a phenomenon within its real-world context (Yin, 2014). Based on current social interest in nutrition security at federal and state levels of government, and the increasing popularity of interventions designed to address SDoH through health systems, this study met these criteria.

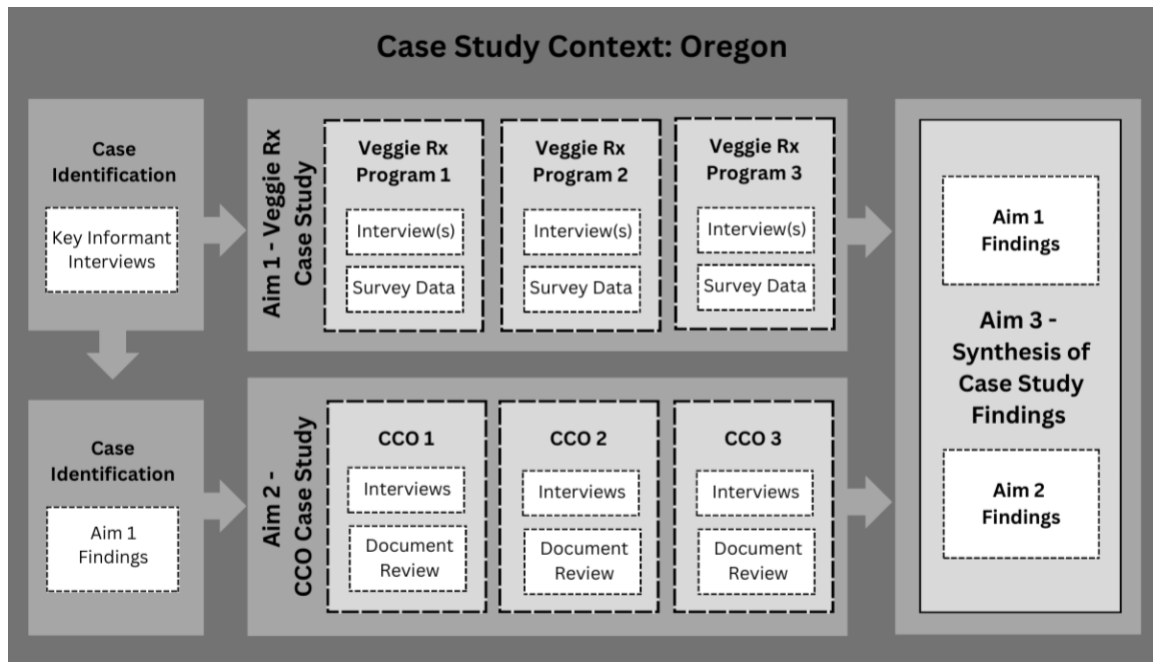
Given limited existing research in this area, this study followed an exploratory, multiple-case study design, using a mixed methods analytic approach. An exploratory case study was warranted due to the absence of prior research in this specific topic. At the time of this writing, there was a lack of research investigating how prescription produce programs were perceived at the organizational level within health systems. Additionally, in Oregon there was a lack of empirical evidence demonstrating how CCOs made decisions regarding SDoH spending. Each aim of the study contributed to the overarching case study design by focusing on a different primary unit of analysis. Aims 1 and 2 both followed an embedded, multiple-case study design. In Aim 1, research activities focused on Veggie Rx programs as the primary unit of analysis, with a nested,

mixed-methods approach analyzing survey data within the case study. Aim 2 focused on CCOs as the primary unit of analysis.

Aims 1 and 2 were each conducted through separate, sequential multiple-case studies. Findings from Aim 1 informed case selection for Aim 2. Both Aim 1 and Aim 2 were studied within the same external context, the state of Oregon. Five cases were included in Aim 1, and seven included in Aim 2. In Aim 3, cross-case findings from Aims 1 and 2 were compiled, integrated, and synthesized in order to describe shared themes relevant to both Veggie Rx programs and Oregon's CCOs, with a discussion of policy and practice implications for furthering alignment. Figure 3.1, adapted from Yin (2014), illustrates the study design.

Appendix A includes all documents guiding participant recruitment and data collection tools for all semi-structured interviews.

Figure 3.1. Study Design and Units of Analysis by Aim



(Yin, 2014)

The researcher engaged in primary data collection to support the majority of the analytic activities, using in-depth, semi-structured qualitative interviews, supplemented by review of publicly available documents and reports and secondary survey data. In-depth qualitative interviews (IDIs) are a useful method of data collection when seeking to develop a detailed and nuanced understanding of the motivation for the behaviors and attitudes that affect the outcome of interest to the study; therefore, they were appropriate for data collection for the dissertation (Roller & Lavrakas, 2015).

The research design and methods specific to each individual aim are briefly introduced here and discussed in greater detail in subsequent chapters; design and methods for Aim 1 are detailed in Chapter Four, Aim 2 in Chapter Five, and Aim 3 in Chapter Six. In Aim 1, IDIs were conducted with a selection of Veggie Rx program leaders

to provide the program perspective. Limited secondary analysis of existing Veggie Rx program participant pre/post survey data, using data from a survey developed by the OCFSN, was completed to offer the perspective of program participants. In Aim 2, IDIs were conducted with CCO leaders with knowledge of the organization's programs designed to address SDoH. Aim 2 originally sought to also employ content analysis of state reports on CCO spending and performance, as well as written CCO policy documents; limited availability of these documents resulted in this component of the dissertation being a minimal portion of the data analyzed for the aim.

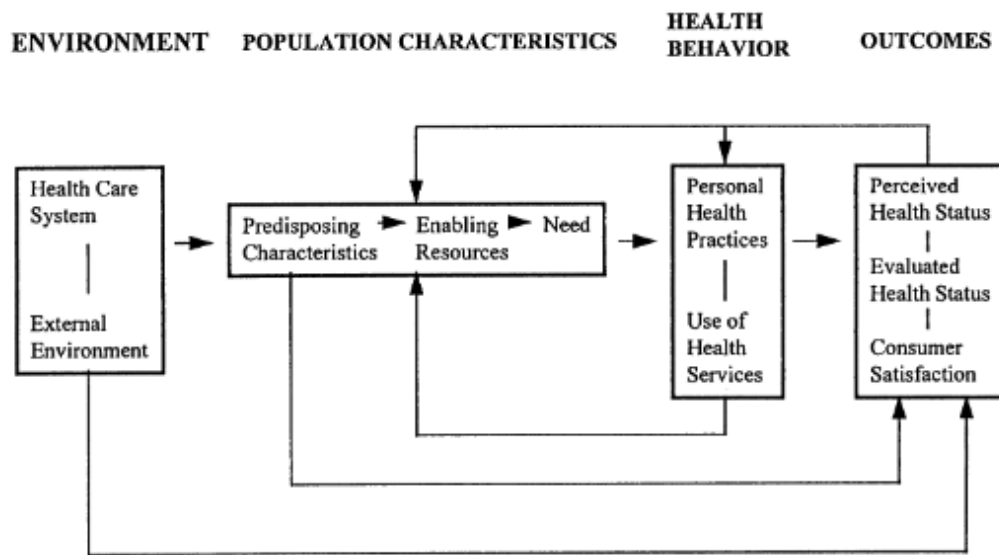
Theoretical Frameworks

The dissertation study was guided by two primary theoretical frameworks, introduced in Chapter Two: Donabedian's model for evaluating the quality of healthcare (Donabedian, 1966) and Andersen's Behavioral Model for Health Services (Andersen, 1995). The application of these frameworks is described here and in the context of each study aim.

Andersen Behavioral Model of Health Services: As reviewed in Chapter Two, the Behavioral Model of Health Services was developed by Aday and Andersen in 1974 and later revised by Andersen in 1995 (Aday & Andersen, 1974; Andersen, 1995). The Andersen model (see Figure 3.2) illustrates the factors that influence individual health outcomes and the determinants of health services utilization. The 1995 revision emphasizes factors that influence individual health services utilization, including an individual's predisposing characteristics, enabling resources and need (Andersen, 1995).

Predisposing characteristics and enabling resources affect individual health and an individual's future need for health services, as well as individual ability and likelihood of attending to health-related matters through the health system. Predisposing characteristics and enabling resources also interact with individual attitudes, health beliefs, and values that may drive an individual to seek or not seek health services. Enabling factors consider the environment and health system, including availability and means of utilizing health services (transportation, insurance status, personal knowledge, etc.) (Andersen, 1995).

Figure 3.2. Andersen Behavioral Model of Health Services Use



(Andersen, 1995)

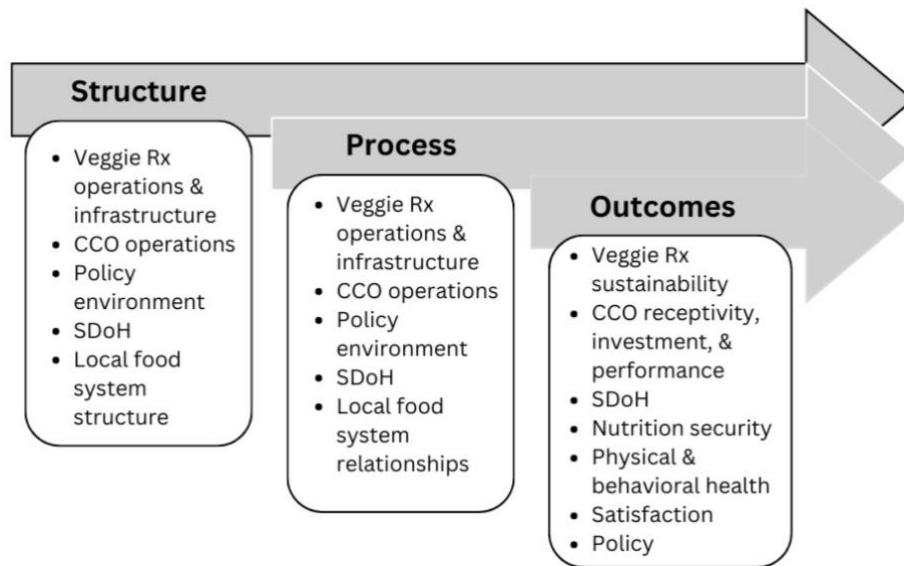
Aim 1 of the study drew upon the Andersen model to inform the analytic approach and categorization of the data and findings.

Donabedian Model for Evaluating the Quality of Healthcare: Aim 2 drew upon

Donabedian's 1966 Model for Evaluating the Quality of Healthcare. Donabedian's model
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was developed based on the terminology of the time which was specific to medical care. In the years since its introduction there has been a shift in emphasis from the concept and use of “medical” care toward “health” care as a broader framing inclusive of services beyond those strictly medical in nature. The phrase “health services” will be used throughout this discussion to emphasize the broader scope of this dissertation with regard to evaluating the quality of health-related services. This interpretation of the Donabedian model is grounded in what was originally written and has been updated for relevance to this topic. The Donabedian model offers a framework for considering the unique structures and processes involved in the delivery of Veggie Rx programs for CCOs, and the resulting outcomes, that collectively contribute to the experience of quality in health services (see Figure 3.3) (Donabedian, 1966, 1990).

Figure 3.3. Adaptation of the Donabedian Model



Adapted from Donabedian (1966)

When applied in the context of CCOs and Veggie Rx programs, Donabedian’s framework addresses outcomes at the individual and health systems levels, as well as the structures and processes of how those programs are administered, financed, and delivered, including integration between CCOs and Veggie Rx programs.

Overview of Analytic Activities

Analytic activities incorporated applied thematic analysis of IDIs and open-ended survey responses; quantitative analysis, including descriptive and minimal inferential statistics, of survey data; and limited review of publicly available state reports and CCO policy documents. Table 3.3 presents a summary of data sources and analytic approaches by study aim. Data collection methods and analytic activities are discussed in greater detail in subsequent chapters.

Table 3.3. Summary of Data, Analytic Approaches, and Unit of Analysis by Aim

| Aim | Data Source | Data Type | Analytic Approach | Primary Unit of Analysis |
|-----|--|---|--|--------------------------|
| 1 | OCFSN Annual Survey | Pre/post survey (secondary) | Descriptive and inferential statistics, applied thematic analysis of written comments (Guest et al., 2012) | Veggie Rx Consumer |
| | In-depth, semi-structured interviews with Veggie Rx program leadership | Interview transcripts | Applied thematic analysis (Guest et al., 2012) | Veggie Rx Program |
| 2 | In-depth, semi-structured interviews with CCO SDoH leadership | Interview transcripts | Applied thematic analysis (Guest et al., 2012) | CCO |
| | CCO policies documents, performance and spending reports | Organizational policies and state reports | Primary qualitative content analysis (Roller & Lavrakas, 2015) | |
| 3 | Aim 1 Findings | -- | Secondary qualitative content analysis of case study findings from Aims 1 and 2 | Oregon |
| | Aim 2 Findings | -- | | |
| | In-depth, semi-structured interviews with key informants | Interview transcripts | Applied thematic analysis (Guest et al., 2012) | |

Case Study Propositions

This study was exploratory in nature; therefore, limited propositions were made about potential findings (Yin, 2014). Rather, the purpose of this research was to contribute to a growing foundation of information to support future research, program development, and policy changes. Nonetheless, some key propositions did guide the development of the study aims and overall research design. One proposition of this study was that participation in a Veggie Rx program contributes to positive individual outcomes in food access, lifestyle behaviors, and health. This proposition is well

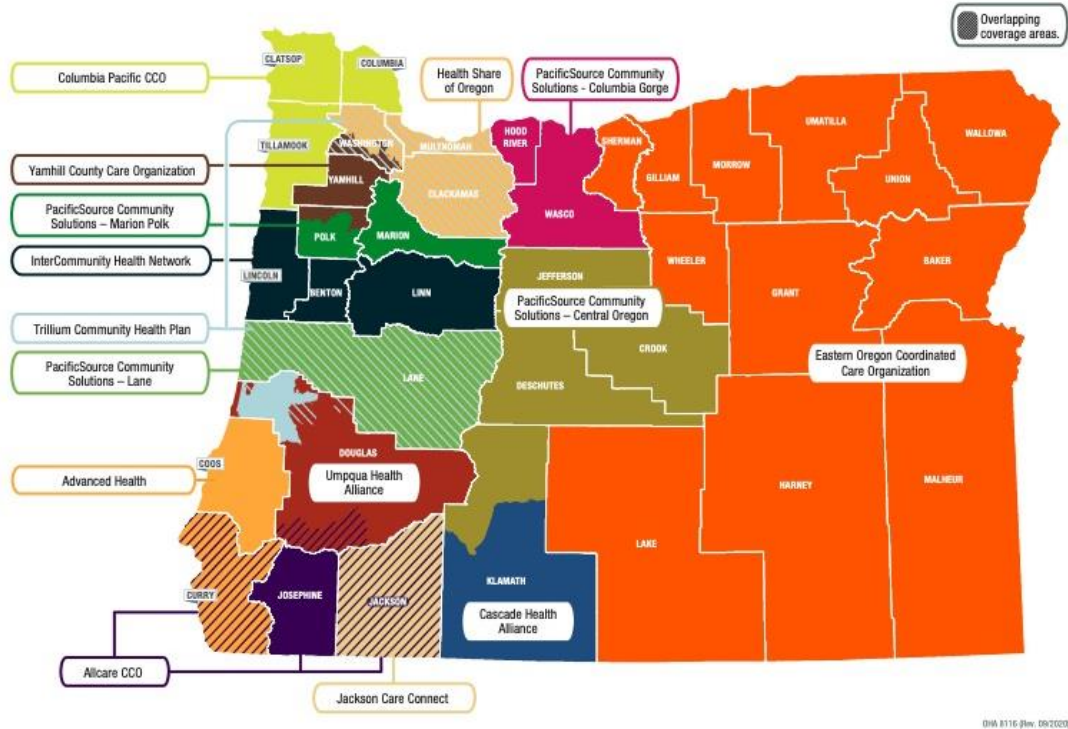
supported by the literature (Bryce et al., 2017; Brzozowski et al., 2019; Cavanagh et al., 2017; Cook et al., 2021; Gretchen Swanson Center for Nutrition, 2021; Heasley et al., 2021; Izumi et al., 2018, 2020; Little et al., 2022; Taher, 2020; Trapl et al., 2018). Second, this study assumed that there was variability in how CCOs perceived and engaged with Veggie Rx programs as part of their strategic approach to addressing SDoH. A final proposition was that aligning Veggie Rx programs and CCOs will have implications for healthy food access for Oregon's Medicaid recipients, and that changes in healthy food access for the state Medicaid population will contribute to positive health outcomes and, ultimately, reductions in the cost of care over time.

Study Population

The research began and concluded with semi-structured IDIs with key informants in the interest of gathering background contextual information, guiding case selection for Aims 1 and 2, finalizing interview guides for Aims 1 and 2, and providing context for the Aim 3 synthesis. Figure 3.4 presents a list of current CCOs and their respective service areas (Oregon Health Authority, 2020b).

Figure 3.4. OHA CCO 2.0 Service Areas

Coordinated Care Organization 2.0 Service Areas



OHA 8116 (Rev. 09/2020)

(Oregon Health Authority, 2020b)

Fifteen organizations were initially awarded contracts as CCOs by the State of Oregon in 2019 as part of CCO 2.0, with the addition of a sixteenth contract in 2020 (Oregon Health Authority, 2019; Trillium Community Health Plan, 2020). Table 3.4 expands upon Figure 3.4, showing current CCOs, Oregon counties included in their service areas, and known Veggie Rx programs operating within those counties. According to the most recently available data, there were 11 Veggie Rx programs operating across Oregon in 2020; this number is likely outdated due to strain from the COVID-19 pandemic and changes in program funding which have led to at least one

program pausing services for the 2021-2022 season (High Desert Farm & Food Alliance, n.d.; Oregon Community Food Systems Network, 2021b).

Table 3.4. CCOs, CCO Service Areas, and Veggie Rx Programs as of 2023

| CCO | Service Area by County | Known Veggie Rx Program(s) in Service Area |
|--|--|---|
| Advanced Health | Coos, Curry | -- |
| AllCare CCO | Curry, Josephine, Jackson, Douglas* | Thrive Umpqua Veggie Rx Program (Douglas county) |
| Cascade Health Alliance | Klamath* | -- |
| Columbia Pacific CCO | Clatsop, Columbia, Tillamook | -- |
| Eastern Oregon CCO | Baker, Gilliam, Grant, Harney, Lake, Malheur, Morrow, Sherman, Umatilla, Union, Wallowa, Wheeler | Greater Oregon Behavioral Health Inc. (GOBHI)/Eastern Oregon Healthy Living Alliance Frontier Veggie Rx Program and Expansion (Gilliam, Harney, Lake, Malheur, Sherman, Wheeler counties) |
| Health Share of Oregon | Clackamas, Multnomah, Washington | Adelante Mujeres Produce Rx Program (Washington county), Friends of Zenger Farm CSA Partnerships for Health Program (Multnomah county) |
| InterCommunity Health Network CCO | Benton, Lincoln, Linn | Community Health Centers of Benton and Linn Counties Veggie Rx Program |
| Jackson Care Connect | Jackson | -- |
| Pacific Source Community Solutions Central Oregon Region | Deschutes, Crook, Jefferson, Klamath* | High Desert Food & Farm Alliance Veggie Rx Program (Deschutes and Crook counties) |
| Pacific Source Community Solutions Columbia Gorge Region | Hood River, Wasco | Gorge Grown Food Network Veggie Rx Program |
| Pacific Source Community Solutions Lane | Lane | Food for Lane County Trillium Veggie Rx Program |
| Pacific Source Community Solutions Marion/Polk | Marion, Polk | Marion Polk Food Share Farm Share Rx Program |

Table 3.4. CCOs, CCO Service Areas, and Veggie Rx Programs as of 2023 (continued)

| CCO | Service Area by County | Known Veggie Rx Program(s) in Service Area |
|--|----------------------------------|--|
| Trillium Community Health Plan Southwest | Lane, Linn*, Douglas* | Thrive Umpqua Veggie Rx Program, Food for Lane County Trillium Veggie Rx Program |
| Trillium Community Health Plan Tri-County (Expansion occurred in 2020) | Clackamas, Multnomah, Washington | Adelante Mujeres Produce Rx Program (Washington county), Friends of Zenger Farm CSA Partnerships for Health Program (Multnomah county) |
| Umpqua Health Alliance | Douglas* | Thrive Umpqua Veggie Rx Program |
| Yamhill Community Care | Yamhill, Washington*, Polk* | Adelante Mujeres Produce Rx Program (Washington county) |

*Indicates that only part of the county is served by the CCO
(Oregon Health Authority, n.d.-c; OSU Extension Service, 2021)

Case selection for Aim 1 was limited by the number of Veggie Rx programs in operation that met inclusion criteria, while selection for Aim 2 was restricted to those CCOs and affiliated organizations with a Veggie Rx program operating within the CCO service area (see Table 3.4). CCOs may not serve the entire geographic area of the counties listed, while Veggie Rx programs may serve only a specific city or region within the county in which they are located.

The initial case selection period targeted two to four key informants to interview to inform case selection for Aims 1 and 2; however only a single key informant interview was conducted with the current OCFSN Veggie Rx working group coordinator. This informant was a former Veggie Rx program with current and historical knowledge of Veggie Rx in Oregon, including development of and participation in the evaluation survey described as part of Aim 1 analysis. Only one interview was needed in advance of

Aim 1 and 2 activities as that informant was able to address all outstanding questions. The initial interview was transcribed and analyzed as a key informant interview and included in analysis for the Aim 3 synthesis.

Snowball sampling was used to determine additional participants to recruit for further key informant interviews to inform the Aim 3 synthesis. The researcher identified potential interviewees by engaging in informal conversations with contacts from her professional network who had working knowledge of CCOs. The purpose of the key informant IDs was to provide background information about Veggie Rx in Oregon and the current landscape of Veggie Rx and CCO collaboration. The interview guide used for all key informant interviews is included in Appendix A.5.

The next sections briefly introduce the specific design and methods for each study aim and include additional details about the application of the theoretical frameworks. More detailed information is included in subsequent chapters.

Specific Design and Methods by Aim

A brief description of the design and methods for each aim is presented here. Since Chapters Four, Five and Six are written as freestanding manuscripts to be submitted for publication, more detail about each aim's design and methods is presented in those chapters.

Aim 1 Design and Methods

Aim 1: Describe Veggie Rx programs and how participation affects food security and health outcomes for program participants. The Aim 1 multiple-case study employed

a nested, mixed methods arrangement with a focus on Veggie Rx programs as the primary unit of analysis. The nested arrangement emphasized semi-structured, IDIs with Veggie Rx leadership (e.g., program directors, administrators, program managers) as the qualitative component, and secondary analysis of OCFSN member survey data, a pre/post evaluation survey of outcomes and satisfaction that individual Veggie Rx programs could choose to administer to participants, as the quantitative component.

The Andersen model informed the design and analytic approach for Aim 1. Part of the rationale for use of the model was the inclusion of consumer satisfaction as a model element. Table 3.5 shows the operationalization of the Andersen constructs, study concepts, and the method for data collection. The Andersen model was used as a framework to organize data collection and to explore findings from the Aim 1 analyses; however, study results presented in Chapter Four are organized by themes that emerged during analysis, rather than according to the Andersen model.

Table 3.5. Aim 1: Andersen Constructs, Study Concepts, and Methods

| Andersen Constructs | Study Element | Method | |
|----------------------------|------------------------------------|--|------------------|
| Environment | Healthcare System | CCOs operating within Veggie Rx program area | IDIs |
| | | CCO investment in Veggie Rx | IDIs |
| | | Availability of health services in program area | IDIs |
| | | Veggie Rx program characteristics - Size, benefit amount and delivery method, redemption location(s), area served | IDIs |
| | External Environment | State policies pertaining to CCOs and SDoH | (Aim 2) |
| | | State policies pertaining to nutrition/access | (Aim 2) |
| | | Geographic location | IDIs |
| | CCO service areas | (Aim 2) | |
| | CCO policies pertaining to SDoH | (Aim 2) | |
| | Transportation availability | IDIs | |
| Population Characteristics | Predisposing Characteristics | Gender | Survey |
| | | Age | Survey |
| | | Race/ethnicity | Survey |
| | | Household size and composition | Survey |
| | | Fruit/vegetable intake | Survey |
| | Barriers to fruit/vegetable intake | Survey | |
| | Need | Food insecurity | Survey |
| | Household income | Survey | |
| | Financial stress | Survey | |
| Health Behavior | Personal Health Practices | Fruit and vegetable intake | Survey |
| Outcomes | Perceived Health Status | Health indicators - Physical health - Behavioral health | Survey |
| | Evaluated Health Status | Health indicators - Number of prescriptions for chronic conditions - Presence of chronic conditions - High blood pressure - Diabetes/Prediabetes - Cardiovascular disease - Obesity - High cholesterol - BMI | Survey |
| | Consumer Satisfaction | Impacts of Veggie Rx Impressions of Veggie Rx | Survey Survey |

Case Selection and Recruitment: Given the limited number of known Veggie Rx programs operating across Oregon at the time of this study, the target number of cases for the Aim 1 multiple-case study was three in order to cover diverse geographic areas of the state while also attending to limitations of available survey data and reasonable time constraints for the dissertation research (discussed subsequently). The researcher was able to include five Veggie Rx cases in the Aim 1 multiple-case study. Case selection was originally intended to be limited by the number of Veggie Rx programs that opted to administer the evaluation survey; however, only five Veggie Rx programs administered the 2021 survey and therefore the researcher chose to recruit other Veggie Rx programs as cases that met the other inclusion criteria.

The OCFSN Veggie Rx working group conducted member outreach in early 2023 to survey current Veggie Rx programs operating across the state and to document specific details about their operations; this background “Veggie Rx Census” was led by an OHSU-PSU master of public health student as part of their practice experience and was completed in the spring of 2023. The researcher was given access to these survey data, and findings from the completed census project informed initial case selection and provided background information on program operations. Case selection inclusion criteria are described in Table 3.6.

Table 3.6. Units of Analysis and Inclusion Criteria for Aims 1 and 2

| Aim | Units of Analysis | Number | Inclusion Criteria |
|------------|-------------------------------------|--|---|
| 1 | Veggie Rx Programs | 3-5 targeted; 5 actual | Program: Operates within the state of Oregon and meets the definition of a produce prescription program introduced by the NPPC and described above. Identifies as a member of the OCFSN. Participated in the 2021 or 2023 OCFSN evaluation survey <u>or</u> conducted their own evaluation and are willing to share data with the researcher; this criterion was removed to allow for the inclusion of additional cases. |
| 1 | Veggie Rx Program Leadership | 1-2 per organization targeted; 1 per organization actual | Staff member serves as the primary representative for the Veggie Rx program, given that many organizations that operate a Veggie Rx program may have few staff members, there may only be one primary leader per organization. No minimum time with the organization is specified for the same reason. |
| 2 | CCOs (and affiliated organizations) | 3-5 targeted; 7 actual | Organization has an active contract as part of CCO 2.0, including independent delivery system partners. Service area overlaps with at least one Veggie Rx program. |
| 2 | CCO SDoH Leadership | 2-3 per organization targeted; 1-2 actual | Staff member has been employed by CCO for at least one year. Staff is knowledgeable about organizational approach to SDoH and/or flex fund spending. |

Secondary Survey Data: Members of the OCFSN have been collecting participant evaluation data via online and phone pre/post surveys since 2019. The researcher has engaged with the OCFSN since fall of 2021 and began providing support to the Veggie Rx working group in its program evaluation efforts in late summer of 2022, which facilitated access to these survey data.

Five Veggie Rx programs participated in the OCFSN 2021 evaluation survey (Oregon Community Food Systems Network, 2021a). Pre/post survey data included a combination of closed- and open-ended questions that addressed topics of household

food security, fruit and vegetable intake, participant health, lifestyle and program satisfaction. While all programs that reported 2021 OCFSN evaluation data used the same survey instrument, individual programs may have chosen to omit some questions from the pre and post surveys, meaning that data availability may have varied by program. For example, one program did not collect clinical information for their program participants, meaning that clinical health indicators were unavailable for this program. Additionally, some programs may have added additional questions to the survey instrument as needed to meet the needs of their internal evaluation efforts. These limitations in the dataset were considered during analysis. Due to the COVID-19 disruption, a survey was not administered in 2022. An evaluation was conducted in the 2023 season; however, fewer programs participated compared to 2021 and the survey period overlapped with data collection for this study, so the 2021 data were used in order to provide the most complete data for analysis. It was recognized during analysis that some findings from the survey data were affected by the COVID-19 pandemic.

Questions from the 2021 survey tool are displayed in Table 3.7 with a listing of the key concepts operationalized in Table 3.2. Not all questions were asked by each Veggie Rx program; similarly, some questions were optional for participants from some programs who completed the survey. The extent of analyses of OCFSN survey data was driven by the quality of data available to the researcher resulting in some anticipated analytic activities being excluded. While the survey questions were mapped onto the study concepts in Table 3.7 to the best ability of the researcher, the OCFSN survey tool

had not been validated and some of the variables included served as proxies where more valid measures were absent. Details and rationale for the variables included in analyses of the survey data are discussed in Chapter Four.

Table 3.7. Aim 1: Survey Variables, Study Concepts, and Constructs

| Concept | Survey Question/Variable(s) | Andersen Construct |
|-------------------|--|---|
| Local Food System | Have you ever shopped at a local Farmers Market? (pre survey only) | External environment Health behavior |
| Health Outcomes | Self-described health <ul style="list-style-type: none"> - Would you say that in general your health is poor, fair, good, very good, or excellent? - Thinking about your PHYSICAL HEALTH, which includes physical illness and injury, for how many days during the past 30 days was your physical health NOT good? - Thinking about your MENTAL HEALTH, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health NOT good? - During the past 30 days, for about how many days did poor physical OR mental health keep you from doing your usual activities, such as self-care, work, or recreation? | Perceived health status |
| | Clinical indicators <ul style="list-style-type: none"> - High blood pressure - Diabetes - Obesity - Heart Disease - High Cholesterol - Other - BMI | Evaluated health status |
| | How many different prescription medications are you currently taking for a chronic illness? | Evaluated health status |

Table 3.7. Aim 1: Survey Variables, Study Concepts, and Constructs (continued)

| Concept | Survey Question/Variable(s) | Andersen Construct |
|--|--|--|
| Social Determinants of Health | Demographic information <ul style="list-style-type: none"> - Gender identity - Age - Household size and composition - Racial and ethnic background - Annual gross household income | Predisposing characteristics |
| | Insurance status (OHP, Medicare, private, uninsured) | Enabling characteristics |
| | In the last 30 days, how stressed have you been about paying your bills (rent, utilities, insurance, etc.)? | Need |
| | How often do you see or talk to people that you care about and feel close to? (For example: talking to friends on the phone, visiting friends or family, going to church or club meetings) | Enabling characteristics |
| | Within the past 30 days, did you worry your food would run out before you got money to buy more? | Need |
| | Within the past 30 days, did the food you bought just not last and you didn't have enough money to get more? | Need |
| | Do you or anyone in your household receive any additional nutritional support? (SNAP, WIC, Farm Direct Program, food pantry) | Enabling characteristics |
| | Have any of the following reasons kept you from eating as many fruits and vegetables (F&V) as you want? <ul style="list-style-type: none"> - Cost - Availability - Transportation - Cooking skills | External environment Enabling characteristics |
| | How many cups of fruits and vegetables do you usually eat each day? Do not include French fries, fried potatoes, potato chips or juice. | Personal health practices |
| | Veggie Rx - Prescription Produce Programs | What aspects of the program were most helpful to you? (post survey only) |
| What aspects of the program could be changed or improved in the future? (post survey only) | | Consumer satisfaction |
| Please share any ways in which the Veggie Rx program has impacted your health or wellbeing. (post survey only) | | Consumer satisfaction |

No other Veggie Rx programs provided program evaluation data to the researcher. The availability of evaluation data not included in the OCFSN survey was explored during Aim 1 interviews with Veggie Rx leadership.

Semi-Structured Interviews: In addition to secondary analysis of OCFSN survey data, the researcher conducted semi-structured IDIs with Veggie Rx program leadership.

Interview recruitment and analysis for Aim 1 is discussed in Chapter Four. The guide for the IDIs with Veggie Rx leaders was informed by the key concepts for the study and review of relevant literature conducted in Chapter Two and is available in Appendix A (see Appendix A.6). Table 3.8 maps study domains and concepts onto Andersen constructs and interview questions.

Table 3.8. Aim 1: Study Concepts, Constructs, and Interview Questions

| Domain | Concept | Andersen Construct | Interview Question |
|---|---------------------------|---|--------------------|
| Veggie Rx - Prescription Produce Programs | Operations | Healthcare system | 1, 2 |
| | Infrastructure | Healthcare system | 2, 3, 6 |
| | Sustainability | External environment, healthcare system | 7, 9 |
| Local Food Systems | Structure | External environment | 5 |
| | Relationships | External environment | 5 |
| Outcomes | Physical health | Health status | 4 |
| | Satisfaction | Consumer satisfaction | 4 |
| | CCO investment | Healthcare system | 7, 8, 9 |
| Social Determinants of Health | Demographics | Predisposing characteristics | 2 |
| | Barriers and facilitators | Enabling characteristics | 4 |
| Nutrition Security | Food security | Need | NA |
| | Dietary intake | Need, health behaviors | NA |
| Coordinated Care Organizations | Operations | Healthcare system | 8 |
| | Policy | Healthcare system, external environment | 8, 9 |
| | Receptivity to Veggie Rx | Healthcare system | 8 |

Analysis: Analysis of data for Aim 1 followed a mixed methods approach that emphasized descriptive and inferential statistical analyses of quantitative data and applied thematic analysis of qualitative data. The specific analytic approaches are discussed in Chapter Four. Findings were integrated using a concurrent analytic approach, where quantitative and qualitative data were analyzed separately and integrated during the discussion of findings (Guest et al., 2012).

Aim 2 Design and Methods

Aim 2: Analyze how Oregon's CCOs prioritize Veggie Rx programs among other programs that address social determinants of health, including the effectiveness of and demand for Veggie Rx. As discussed in Chapter Two, while the State of Oregon places certain requirements on CCO organizational activities and goals, there is considerable structural and operational variation among these organizations. In addition to geographic service areas, CCOs differ in governance structure, operationalization of state policies, funding, member characteristics, and organizational priorities depending on their geographic location and the needs of their communities. Similarly, CCOs may choose how they spend HRS and flexible service funding (often referred to as "flex funds" by Veggie Rx programs and some CCOs) in their approaches to addressing SDoH; the way they choose to do so varies across organizations and does not follow a single, prescribed approach.

CCOs are driven by incentives tied to state-approved performance metrics; this may determine which areas they prioritize for improvements. Anecdotal conversations

during OCFSN Veggie Rx Working Group meetings suggested that not all CCOs approach SDoH spending in the same way, particularly with regard to spending on Veggie Rx programs. Some Veggie Rx leaders described routine collaboration with and support from the CCO(s) in their service area(s), while others described a lack of involvement and/or related investment of flexible funding to support program referrals for members. The purpose of the Aim 2 multiple case study was to gather and analyze CCO perspectives in order to explore the different ways that CCOs engaged with Veggie Rx programs. The goal of the Aim 2 analysis was to establish how Veggie Rx programs described these differing patterns of involvement from their local CCO(s), and to derive recommendations to strengthen Veggie Rx sustainability and increase access for CCO members. The Aim 2 case study focused on CCOs as the primary unit of analysis, utilizing semi-structured interviews with CCO leaders. Document review of existing CCO and external policy documents and state-issued reports on CCO performance and spending was also planned; this component was less explored due to limitations of documents available to the researcher. Table 3.3 presented the originally intended data sources; additional details on case selection, methodology, and analysis are briefly described and covered in greater detail in Chapter Five.

As discussed earlier in this chapter, the Donabedian Model for Evaluating the Quality of Healthcare informed the research design for Aim 2 and was used as a framework for analyzing data and interpreting findings. Structure, process, and outcome measures of interest to Aim 2 of this study are highlighted in Table 3.9.

Table 3.9. Aim 2: Constructs, Study Concepts, and Method

| Donabedian Construct | Study Concept | Data Collection Method |
|----------------------|----------------------------------|------------------------|
| Structure | CCO operations | Document review, IDIs |
| | CCO policy environment | Document review, IDIs |
| | Member demographics | Document review, IDIs |
| | SDoH barriers and facilitators | Document review, IDIs |
| Process | CCO operations | IDIs |
| | CCO receptivity to Veggie Rx | IDIs |
| | Local food systems relationships | IDIs |
| Outcomes | Nutrition security | Document review, IDIs |
| | Community health outcomes | Document review, IDIs |
| | CCO investment and performance | Document review, IDIs |

Case Selection and Recruitment: The goal for the Aim 2 case study was to include a minimum of three cases, each comprised of an organization currently contracted to serve as an Oregon CCO. In order to ensure overlap between Veggie Rx programs and corresponding CCO service areas (refer to Table 3.4), case selection for Aim 2 was informed by the initial case selection phase and findings from Aim 1. While the target number of cases was three, seven cases were ultimately included. Inclusion criteria for Aim 2 are described in Table 3.6 and include: the organization was awarded a contract with the state of Oregon to operate as a CCO as part of the CCO 2.0 period; and the CCO service area included at least one Veggie Rx program.

The researcher utilized findings from the initial case selection phase, web searches, Aim 1 interviews, and professional contacts to identify CCO leaders with knowledge of SDoH strategy and utilization of flexible service funding to contact and invite to participate in a semi-structured interview. Invitations were made via email (see Appendix A for email template) with follow-up inquiries via telephone where necessary

and feasible. The goal was to conduct two to three interviews per CCO; this target was adjusted due to challenges with data collection described in Chapter Five.

CCO Qualitative Interviews: The researcher conducted semi-structured IDIs with members of leadership from each CCO. The semi-structured interview guide, informed by the study domains and concepts of interest listed in Table 3.10, is available in Appendix A. CCO interviews were conducted virtually to account for scheduling constraints.

Table 3.10. Aim 2: Study Concepts, Constructs, and Interview Questions

| Domain | Concept | Donabedian Construct | Interview Question |
|---|--------------------------------|----------------------|--------------------|
| Veggie Rx - Prescription Produce Programs | Operations | Structure, process | 5 |
| | Infrastructure | Structure | 5 |
| | Sustainability | Outcome | 5 |
| Local Food Systems | Relationships | Structure | 5 |
| Outcomes | Community health | Outcome | 2, 3 |
| | CCO investment and performance | Outcome | 2, 4, 5, 6 |
| Social Determinants of Health and Equity | Demographics | Structure | 2 |
| | Barriers and facilitators | Structure, process | 4 |
| Nutrition Security | Food security | Outcome | 5 |
| | Dietary intake | Outcome | 5 |
| Coordinated Care Organizations (CCOs) | Operations | Structure, process | 2 |
| | Policy environment | Structure | 6 |
| | Receptivity to Veggie Rx | Process, outcome | 5 |

Document Review: Aim 2 was intended to include collection of several types of documents to support analytic activities. The researcher identified publicly available policy documents pertaining to CCO SDoH spending, including state and organizational policies, and Medicaid 1115 waiver policies. Internal policy documents specific to Veggie Rx and similar programs were unavailable. In order to provide insight into CCO

performance and spending on SDoH, the researcher conducted a search of the State of Oregon website for publicly available reports disclosing CCO performance on SDoH metrics and spending. The researcher also conducted a web-based search of Veggie Rx programs on organizational websites of participating CCOs.

Analysis: Analysis of data for Aim 2 followed a qualitative approach that emphasized applied thematic analysis of qualitative interview data. Primary qualitative content analysis using a deductive-inductive approach was planned but ultimately limited (this is discussed further in Chapter Five). Aim 2 also employed a concurrent analytic approach to integrate findings from the content analysis and interview coding. Datasets were analyzed separately and integrated during the discussion of findings for the Aim 2 multiple-case study, and each component provided context to the discussion which was informed by cross-case synthesis (Guest et al., 2012).

Aim 3 Design and Methods

Aim 3: Compare and contrast Veggie Rx programs with CCOs approaches to Veggie Rx and consider implications for alignment of CCO and local food systems. Aim 3 synthesized findings from the Aim 1 and 2 multiple case studies in order to identify lessons and generate recommendations to strengthen and expand integration between CCOs and Veggie Rx programs. Five additional key informant IDIs were conducted as part of Aim 3 to offer context and confirm findings included in the synthesis.

Analysis for Aim 3 drew upon both theoretical frameworks, the Andersen model and the Donabedian model, and sought to draw parallels between different

components of each. Table 3.11 shows the linkages between elements of the Andersen model and elements of the Donabedian framework; this is discussed further in Chapter Six.

Table 3.11. Constructs of the Andersen Model and Donabedian Frameworks

| Andersen Construct (Aim 1) | Donabedian Construct (Aim 2) |
|--|---|
| Environment Healthcare System External Environment | Structure, Process Structure |
| Population Characteristics Predisposing Characteristics Enabling Characteristics Need | Structure Structure, Process Process, Outcome |
| Health Behavior Personal Health Practices Use of Health Services | Process, Outcome Process, Outcome |
| Outcomes Perceived Health Status Evaluated Health Status Consumer Satisfaction | Outcome Outcome Outcome |

Protection of Human Participants

Although this study utilized data generated by human participants, the majority of data collection involved individuals speaking as representatives of an organization and posed minimal risk of harm to participants. Interview transcripts were deidentified and identifiable information was kept separately from interview transcripts in a secure file that only the researcher was able to access. OCFSN survey data were deidentified before the researcher was given access to the dataset.

An application was submitted to the PSU IRB in May 2023. This study received approval from the Portland State University Human Research Protection Program

(HRPP) Institutional Review Board and was determined to be exempt from human participants review (HRRP #238138-18).

Conclusion

The study design and activities presented in this chapter were designed to answer the question: “How do Oregon’s CCOs perceive and utilize prescription produce (Veggie Rx) programs with regard to addressing social determinants of health?” Research activities were informed by two primary theoretical frameworks, the Andersen Behavioral Model for Health Services and the Donabedian Model for Evaluating the Quality of Medical Care, and the research followed a multiple-case study design where Oregon provided the external context in which to explore Veggie Rx and CCO perspectives of those programs. This research was intended to make a timely contribution to a continuously evolving field; findings by aim are discussed in Chapters Four, Five and Six, and implications of the study findings are discussed in Chapter Seven.

Chapter Four – Veggie Rx: A Case Study of Produce Prescriptions in Oregon

Introduction

Produce prescription programs, known as Veggie Rx in Oregon, aim to improve nutrition security by increasing access to and affordability of fresh fruits and vegetables (FVs). These programs target individuals/households that screen positive for food insecurity, are low-income and/or at risk of or diagnosed with a diet-related health condition. The goals of these programs are typically to increase purchasing and intake of FVs, reduce food insecurity, and decrease healthcare utilization while reducing costs (Cavanagh et al., 2017; Donohue et al., 2021; Feinberg et al., 2018; Heasley et al., 2021; Newman et al., 2022; Rodriguez et al., 2021; Swartz, 2018; USDA National Institute of Food & Agriculture, n.d.). First established in Oregon in 2014, there were at least 11 Veggie Rx programs operating across the state in 2020, directly serving more than 1300 individuals, with benefits extending to support approximately 3000 household members (Oregon Community Food Systems Network, 2021b; Taher, 2020).

Background

There is a growing body of evidence that supports that participation in produce prescription programs can result in positive outcomes for both program participant health and food security and for health systems (Cavanagh et al., 2017; Center for Health Systems Effectiveness, 2021; Donohue et al., 2021; Feinberg et al., 2018; Heasley et al., 2021; Izumi et al., 2020; Rodriguez et al., 2021; Swartz, 2018; Taher, 2020; Veldheer et al., 2020). These programs may benefit health systems by reducing healthcare utilization and long-term spending on diet-related chronic health conditions

(Bhat et al., 2021; Lee et al., 2019; Wang et al., 2023). Despite the increasing consensus that participation in these programs may increase consumption of FVs and improve health, there is less agreement on best practices for how these programs should operate and be funded.

Produce prescription programs differ in target populations and enrollment criteria, length of intervention, delivery model, and funding source, among other factors (Cafer et al., 2023; Garfield et al., 2021; Newman et al., 2022; Rodriguez et al., 2021).

The mode of delivery for program benefits typically follows one of two primary models: either as a membership in a farm share or community supported agriculture (CSA); or through the use of paper or digital vouchers intended to cover the cost of produce purchased from a retail outlet, such as a farmers market or grocery store (Newman et al., 2022; Rodriguez et al., 2021; Swartz, 2018). The goals of these programs also vary, with most focused on improving access to and increasing the consumption of FVs, preventing or improving diet-related health conditions, or both (Newman et al., 2022).

Oregon Veggie Rx programs are designed to fit the unique context of the region in which they operate, although programs do share similar goals of increasing FV intake and improving diet-related health conditions, and generally operate with a similar approach to delivering benefits that is tailored to the needs of the region. The lack of standardization across Veggie Rx programs presents a challenge to systematic program evaluation and collaboration in pursuit of federal funding (Oregon Community Food Systems Network, 2021b). Nationally, variation in produce prescription programs has

been identified in the literature as a potential area for future development (Cafer et al., 2023; Garfield et al., 2021; Newman et al., 2022).

Funding sources for produce prescription programs also vary. Many programs are financed through private grants, although programs may also receive public funding through the US Department of Agriculture (USDA) Gus Schumacher Nutrition Incentive Program (GusNIP), and/or state-based sources (Rodriguez et al., 2021; USDA National Institute of Food & Agriculture, n.d.). Further, funding sources are often limited in duration, lasting only a few years or less, complicating long term program sustainability and limiting the number of participants able to access produce prescription programs on an ongoing basis (Auvinen et al., 2022; Garfield et al., 2021). Some programs receive funding through their local health system, yet the amount and mechanisms of support may differ, and little is known about the specifics of health system support (Auvinen et al., 2022; Garfield et al., 2021; Hager & Mozaffarian, 2020; Swartz, 2018).

Oregon Medicaid (operationalized as the Oregon Health Plan or OHP) is delivered through Coordinated Care Organizations (CCOs), which are locally governed entities made up of networks of health service providers, insurers, and other organizations that work together within local communities to serve their members. The CCO model emphasizes prevention and management of chronic disease, with a goal of achieving the Triple Aim (Berwick et al., 2008) of improving the quality and experience of care delivery across a continuum of health services while decreasing the cost per capita (Oregon Health Authority, n.d.-c, n.d.-b). Oregon's CCOs are authorized through a Medicaid Demonstration 1115 waiver, a type of waiver issued by the Centers for

Medicare and Medicaid Services. Section 1115 waivers enable states to pilot Medicaid policies that support Medicaid objectives but are not explicitly authorized in the Social Security Act and may cover a variety of areas, including SDoH (Kaiser Family Foundation, 2024). In 2022, the Centers for Medicare and Medicaid expanded its framework for states to use the 1115 waiver to address health-related social needs (HRSN), which are unmet social needs that negatively impact health (Centers for Medicare & Medicaid Services, 2022, 2023). Among the HRSN services that may be included in an 1115 waiver are nutrition supports, services that aim to improve health and food insecurity, which include nutrition counseling and education, medically-tailored meals, pantry stocking, and produce prescriptions up to six months in duration (Kaiser Family Foundation, 2024). Eight states have waiver provisions approved to provide nutrition supports as of [date] (Kaiser Family Foundation, 2024); four of these (Massachusetts, North Carolina, Oregon, and Washington) include coverage for produce prescriptions (Hanson et al., 2024). A fifth state, California, permits coverage of produce prescriptions through a different waiver (Hanson et al., 2024; Sukys et al., 2023).

Between 2020 and 2022, the rate of food insecurity across Oregon was 11.2%, an increase from the 2018 to 2020 rate of 9.1% (Edwards & Beck, 2022; Edwards & McElhaney, 2023). Diet-related disease is also a concern; heart disease was the state's second leading cause of death after cancer in 2022 (Oregon Health Authority Center for Health Statistics, 2022). Addressing poor nutrition as a modifiable risk factor for chronic disease is included in Oregon's current strategic plan (2017) and improving equitable access to nutritious food is a statewide goal identified in the most recent State Health

Improvement Plan (2020). Veggie Rx programs may support state efforts to improve both food insecurity and nutrition-related health.

Oregon's current Medicaid 1115 Demonstration waiver, which was approved in September 2022, will enable CCOs to cover nutrition supports for CCO members upon implementation in 2025 (Oregon Health Authority, 2024). The nutrition support provision of the Oregon waiver will cover up to six months of Veggie Rx program participation for certain priority populations; however, not all CCO members will be eligible (Oregon Health Authority, 2022b, 2024; US Department of Health & Human Services, 2022).

Most Oregon Veggie Rx programs report receiving at least some funding from their local CCO; however, the level of CCO support and amount of funding provided has been anecdotally reported to vary across programs (Oregon Community Food Systems Network, 2021b, 2022b). While some Veggie Rx programs describe ongoing collaboration with their local CCO to finance and/or deliver program benefits, the level of involvement and cooperation varies by organization, leaving some Veggie Rx programs with a potentially untapped funding source and a missed opportunity to better align with the local health system and expand program reach. The addition of Veggie Rx coverage under the 1115 waiver will make it more important to understand existing relationships between Veggie Rx and CCOs as organizations move toward offering services when the nutrition support portion of the waiver is implemented in January of 2025.

Produce prescription programs offer a promising approach to address diet-related health conditions and increase FV intake; however, more research is needed to illuminate the myriad ways that these programs operate, what best practices may look like, and how to further integrate these programs into health systems. A focus of this study was to describe a subset of Oregon's Veggie Rx programs in order to add to the growing literature on program operational characteristics and potential best practices (Cafer et al., 2023; Garfield et al., 2021; Newman et al., 2022). Further, as CCOs increase strategic spending on SDoH and direct specific attention toward providing coverage for nutrition supports as HRSN, there is an opportunity to conduct timely research that may inform both future Veggie Rx program directions and the state's Medicaid spending strategy.

Methods

Design and Setting

This research was conducted as part of a larger case study exploring Oregon's Veggie Rx programs and perceptions of these programs as mechanisms to address SDoH among CCOs, seeking to answer the question: How do Oregon's CCOs perceive and utilize produce prescription (Veggie Rx) programs with regard to addressing SDoH? This multiple-case study of a subset of Oregon's Veggie Rx programs sought to address one aim of the broader study: to describe Veggie Rx programs, including effects of participation in these programs on participant food security and health-related outcomes.

This study combined in-depth, semi-structured interviews with Veggie Rx program leadership and secondary analysis of pre/post survey data previously collected by four Veggie Rx programs as part of a collective program evaluation in 2021. These data were supplemented by secondary analysis of survey data collected by the Oregon Community Food Systems Network (OCFSN) in the spring of 2023 as part of a “Veggie Rx Census” to catalog the current Veggie Rx programs operating in Oregon. Results were integrated across data sources to generate shared findings and themes relevant to the operation of Oregon’s Veggie Rx programs.

The researcher initially sought to recruit only those Veggie Rx programs that collected pre/post survey data as part of a 2021 Veggie Rx program evaluation organized by the OCFSN; however, due to the limited number of programs included in the dataset, this inclusion criterion was omitted to reduce barriers to recruitment and increase the number of programs participating in the case study. Instead, programs were recruited from the 11 that completed the 2023 OCFSN “Veggie Rx Census” survey to include a range of geographic and demographic characteristics. Not all programs that responded to the Census survey operated as Veggie Rx, and not all known Veggie Rx programs responded to the survey; survey data were reviewed to determine which programs operated as Veggie Rx. Survey completion was used to indicate involvement with the OCFSN.

Using the “Veggie Rx Census” survey, a single staff member was recruited from each Veggie Rx program to participate in a virtual, 60-minute recorded interview if they met the criterion that they served as the primary representative/contact for the

program. Interview participation was not incentivized and participants volunteered their time without compensation. Six Veggie Rx program leaders were recruited by email to participate in this study. One program was subsequently excluded due to lack of availability to participate in an interview. This study received approval from the Portland State University Human Research Protection Program (HRPP) Institutional Review Board and was determined to be exempt from human participants review (HRRP #238138-18).

Data Collection and Analysis

Secondary Analysis of Survey Data: Data from the “Veggie Rx Census” survey and the 2021 program evaluation survey were shared with the researcher by the OCFSN. These survey data were used to supplement the data obtained in the interviews with Veggie Rx leaders and to offer a more complete picture of Veggie Rx in Oregon.

The “Veggie Rx Census” survey data were used to elaborate details on program characteristics and to verify program enrollment and benefit information obtained during the semi-structured interviews. Data from the 2021 OCFSN Veggie Rx program evaluation survey were analyzed using the R software program (v4.3.1; R Core Team, 2023) to obtain descriptive characteristics and limited inferential statistics pertaining to food security and participant health. The 2021 program evaluation survey also included three open-ended questions which were analyzed using applied thematic analysis consistent with the interview transcripts.

Interviews with Veggie Rx Leadership: A list of study domains was derived and operationalized from the relevant literature, then concepts of interest were identified and defined for each study domain. An interview protocol was developed based on the

study domains and concepts. The purpose of the interview guide was to ask interviewees specific questions that addressed operational characteristics and other details about their Veggie Rx programs. The major topics covered by the interview guide included Veggie Rx program characteristics, involvement with the local health system, sources of program funding, and barriers to success for program participants.

One interview was conducted with the program director (or equivalent) of each of the five Veggie Rx programs included in the study. Interviews were conducted virtually using Zoom, and audio recordings were transcribed using the Rev human transcription service. A codebook was created using Microsoft Excel to track code development following structural coding based on the interview protocol (Guest et al., 2012). Transcripts were read in Microsoft Word, utilizing the comment and highlight features to identify relevant codes. Exploratory analysis, an inductive, content-driven approach, was used to analyze interview transcripts (Guest et al., 2012). Transcripts were initially reviewed for accuracy and content overview, and identifying information was removed. Transcripts were then coded using the structural codes defined in the codebook, with additional context added from field notes where appropriate. This was followed by a second round of coding to identify subthemes within the structural codes. A final review was conducted to refine subthemes and to identify illustrative quotes. The quotes included in this paper have been edited for clarity and brevity, and redacted where necessary to preserve privacy. Identifiers for Veggie Rx leaders have been randomized to maintain anonymity (VRx A, B, C, etc.) and do not correspond with the Veggie Rx program identifiers (Program 1, 2, 3, etc.).

Results

Results from the study are presented by data source, beginning with findings from secondary analyses of program survey data and concluding with themes from the interviews with Veggie Rx leaders.

Participant Characteristics and Outcomes: Descriptive statistics were calculated for participant age, income, gender, and race/ethnicity using the R summary tools package (Comtois, 2022). See Table 4.1 for characteristics of survey respondents.

Table 4.1. Veggie Rx Survey Respondent Characteristics

| | n | % |
|----------------------------------|----------------|------|
| Age (years) | | |
| < 35 | 7 | 3.48 |
| 35 – 44 | 30 | 16.2 |
| 45 – 54 | 41 | 22.2 |
| 55 – 64 | 33 | 17.8 |
| 65 – 74 | 49 | 26.5 |
| ≥ 74 | 25 | 13.5 |
| | N = 185 | |
| Annual Household Income | | |
| < \$15,000 | 60 | 32.8 |
| \$15,000 – 24,999 | 41 | 22.4 |
| \$25,000 – 34,999 | 24 | 13.1 |
| \$35,000 – 49,999 | 24 | 13.1 |
| \$50,000 – 74,999 | 17 | 9.3 |
| ≥ \$75,000 | 2 | 1.1 |
| Prefer not to answer | 15 | 8.2 |
| | N = 183 | |
| Gender | | |
| Female | 105 | 56.8 |
| Male | 79 | 43.7 |
| Prefer to self describe | 1 | 0.5 |
| | N = 185 | |
| Race and Ethnicity | | |
| White/Caucasian | 106 | 57.6 |
| Hispanic/Latino/Latina/Spanish | 48 | 26.1 |
| American Indian/Alaska Native | 13 | 7.1 |
| Black/African American/Caribbean | 2 | 1.1 |
| Asian | 2 | 1.1 |
| Prefer not to answer | 13 | 7.1 |
| | N = 184 | |

The modal response categories were respondents who were between 65 and 74 years old (26.5%), female (56.8%), White (57.6%), and earning less than \$15,000 annually (32.8%).

Survey data were analyzed in R (R Core Team, 2023) using the lessR (Gerbing, 2021, 2023) and coin (Hothorn et al., 2006) packages. Analyses were conducted to determine whether program participants reported improvements in household food security and/or health while participating in their respective Veggie Rx program. Four Veggie Rx programs reported pre/post survey responses, representing 201 total participants. Three of the four Veggie Rx programs included in the 2021 dataset also participated in an interview as part of the qualitative portion of this study. The questions included in these analyses are listed in Table 4.2.

Table 4.2. 2021 OCFSN Veggie Rx Program Evaluation Survey Questions

| Number | Question | Response Format |
|---------|--|--|
| Q1 | Within the past 30 days, did you worry your food would run out before you got money to buy more? | Never true, Sometimes true, Often true, I don't know |
| Q2 | Within the past 30 days, did the food you bought just not last and you didn't have enough money to get more? | Never true, Sometimes true, Often true, I don't know |
| Q3 | Would you say that in general your health is poor, fair, good, very good, or excellent? | Poor, Fair, Good, Very Good, Excellent, I don't know |
| Q4 | Now thinking about your PHYSICAL HEALTH, which includes physical illness and injury, for how many days during the past 30 days was your physical health NOT good? | Number of days |
| Q5 | Now thinking about your MENTAL HEALTH, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health NOT good? | Number of days |
| POSTQ11 | What aspects of the program were most helpful to you? | Open-ended |
| POSYQ12 | What aspects of the program could be changed or improved in the future? | Open-ended |
| POSTQ13 | Please share any ways in which the Veggie Rx program has impacted your health or wellbeing. | Open-ended |

Respondents were matched across the pre and post surveys using a program specific identifier; analyses were computed in the aggregate to maintain program anonymity. Respondents who answered “I don’t know” to questions 1, 2, and 3 were treated as missing, given the limited number of “I don’t know” responses, which were $\leq 5\%$ of the total responses for each question (Center for Behavioral Health Statistics and Quality, 2018). Further, survey data indicated that at least one participant who responded “I don’t know” to all survey questions had actually declined to participate in the survey which was administered by clinical staff, making it difficult to know whether other “I don’t know” responses were reported for similar reasons. Responses to questions 4 and 5 were reported as integers. Responses to questions 1, 2, and 3 were all reported using Likert scales, only question 3 had sufficient response categories to analyze using a repeated measures t-test (Taylor et al., 2006). Responses to questions 1 and 2 were analyzed using a nonparametric Wilcoxon signed-rank test due to the limited number of ordinal response categories (Wilcoxon, 1945).

Using the lessR package (Gerbing, 2021, 2023), a Wilcoxon signed rank test revealed a significant difference in household food security between the pre and post survey periods. For Q1, $n = 144$, $Z = 4.87$, $p < 0.01$; and for Q2, $n = 143$, $Z = 4.74$, $p < 0.01$. For both questions, the respondents’ level of concern that food would run out or not last during the prior month was significantly improved between the pre and post periods ($p < .001$). For question 1, 21 (14.5%) respondents reported an increased concern that their food would run out before they had money to buy more, 55 (38.2%) respondents showed no difference between the pre and post periods, and 68 (47.2%)

respondents reported a decreased concern. For question 2, 20 (14%) respondents reported an increased occurrence of the food they purchased not lasting between the pre and post periods, 61 (42.6%) respondents reported no difference, and 62 (43.3%) respondents reported that this occurrence decreased.

A repeated measures t-test was computed using the lessR package (Gerbing, 2023; Gerbing, 2021) for Questions 3-5 in order to assess whether participant self-reported health (including overall, physical, and mental) improved between the pre and post survey periods. Participants reported that their overall, physical, and mental health significantly improved in the post survey period. For Q3, $t(144) = 4.15$, $p < .001$, $d = .34$, $CI [.15 \text{ to } .43]$, indicating that there was a small improvement in overall self-reported health that was not likely due to chance. For Q4, $t(71) = -2.95$, $p = .004$, $d = .35$, $CI [-6.75, -1.3]$, indicating that there was a small improvement in participant self-reported physical health that was not likely due to chance. For Q5, $t(74) = -2.55$, $p = .013$, $d = .29$, $CI [-5.53, -.68]$, indicating that there was a small improvement in participant self-reported mental health that was not likely due to chance.

In addition, the 2021 OCFSN Veggie Rx evaluation survey included three open-ended questions (post survey questions 11-13) that asked program participants to share what aspects of participating in their Veggie Rx program were most helpful to them (postQ11, $n=126$), what about their respective program could be changed or improved in the future (postQ12, $n=63$), and generally how participation in their respective Veggie Rx program impacted their health or wellbeing (postQ12, $n=65$). Not all programs that reported survey results posed all three questions to participants as part of the post

survey, and not all programs that did include all three questions required participants to answer each of them. Additionally, some of the written responses included nonspecific answers (N/A, unsure, etc.) which were omitted from analyses.

Open-Ended Response Themes: Several themes emerged from the open-ended survey questions; these were increased consumption of and access to FVs, variety and experimentation, education and support, convenience, and satisfaction and health.

Increased Access to and Consumption of FVs: Most survey respondents noted that participating in their Veggie Rx program allowed them to access FVs, either by increasing their ability to afford them at the farmers market or grocery store, or through the direct provision of CSA boxes. Some respondents noted that FVs were expensive and that participating in their Veggie Rx program increased affordability, while others indicated that having the financial benefit motivated them to buy more FVs than they would have otherwise. Some respondents noted that they appreciated that the program provided them with FVs that were fresh and/or locally grown. One respondent described: *“Having extra food money and it being fresh from [the] farmers market [was most helpful]. It motivated me!”* (Respondent 13). Another explained:

This program has been a life saver, reintroducing me to veggies and fruits while homeless and when I finally got a place to live it brought me back to cooking soups, stews, roasted and cold veggie salad, while all planning meals with the program food. It helped me continue better, healthier meals which in turn helps me control my type 2 diabetes and lower my A1C. (Respondent 54)

However, in addition to the positive feedback, some respondents indicated that FVs were still expensive even with the financial benefits they received through their Veggie Rx program.

Many respondents described that participating in their Veggie Rx program enabled them to increase their consumption of FVs and to improve their diet. This was frequently described as also benefitting others in the household. One respondent noted: *“This program helped me with eating more veggies and I didn't want it to end!”* (Respondent 44). Another shared: *“My family eats more vegetables and my older daughter was trying more vegetables”* (Respondent 185). In addition, a few respondents described wanting to eat more FVs but having limited time to prepare the FVs they received.

Variety and Experimentation: Many respondents described that participating in a Veggie Rx program gave them an opportunity to try a variety of FVs that were new to them or that they might not otherwise have tried. Similarly, many respondents expressed that they were able to experiment with new preparation methods, new recipes, and/or incorporating different FVs into recipes that they already made. One respondent said: *“I liked the variety of choices, it gave me an opportunity to work with different vegetables in staple recipes that I use. The quality was amazing and offered such good variety”* (Respondent 47). Another said: *“I had vegetables and fruit that I wouldn't have normally bought. I enjoyed the addition to our diet. The vegetables did add a lot to our meals”* (Respondent 66).

Education and Support: Many respondents indicated that participating in a Veggie Rx program gave them an opportunity to try a variety of FVs that were new to them or that they might not otherwise have tried. Similarly, many respondents expressed that they

were able to experiment with new preparation methods, new recipes, and/or incorporating different FVs into recipes that they already made.

It helped me appreciate the value of fresh fruit and veggies. It taught me to enjoy the variety of them, opened my imagination to make my own recipes, and I learned about a lot of new vegetables. Enjoyed salads, juices, and soups made out of most of the products I got. (Respondent 97)

I wasn't used it but with all the support ... I have gained knowledge of what to buy and how to eat healthy. My daughter has eaten more vegetables, like the tomato she loved eating it with drops of lemon and I enjoyed more from the market and the products in the store. (Respondent 178)

Convenience: Many respondents reported that the aspect of their Veggie Rx program that was most helpful to them was convenience. Several respondents noted that the physical location(s) where they could shop or pick up their allocation were close to work or home, or were places where they already shopped; however, this was not universal. *"It was too hard to get to [city] with my work hours. I drove from [location] right when I finished work but sometimes wasn't able to make it"* (Respondent 86).

Some respondents experienced challenges accessing pickup or farmers market locations, including issues related to traffic, parking, and scheduling. Accessibility was also a challenge for some participants who described needing additional support while redeeming their benefits at a farmers market, such as better access to shade and places to rest while shopping.

I love this program. Some days were hard to get to the market. I wish the market had water for drinking and a place to sit in the shade. I use my walker throughout the market but really need a place to rest. (Respondent 105)

Satisfaction and Health: Another common sentiment expressed by respondents was the sense of enjoyment that they derived from participating in their Veggie Rx program.

Many respondents described that they or a family member experienced positive physical and mental health outcomes which they attributed to eating more FVs; some described an overall sense of feeling better, and others expressed a sense of personal value that they gained through participation in the program.

It has been very good for my family to be able to eat more fruits and fresh vegetables and it has been very good for our physical health and...mental health, we enjoy our trips to the market. (Respondent 193)

One respondent noted that the program helped support them during times of stress and financial uncertainty:

Veggie Rx has significantly improved our access/affordability to fresh vegetables and fruits for our family. My husband has lost some weight and our granddaughter was exposed to food in its fresh form. Education, healthy cooking, and a source of farm fresh vegetables is a win-win for this family! Thank you! (Respondent 117)

Veggie Rx Program Characteristics

Basic program characteristics were derived from interview transcripts and supplemented where needed from the “Veggie Rx Census” survey responses. Due to the small size of Veggie Rx programs and limited staff capacity, only one interviewee was recruited from each program. Interviews were conducted with one person in a leadership position with each Veggie Rx program. Three of the Veggie Rx leaders interviewed had been in their current role for four or more years, two interviewees had been in their role for less than two years. Most interviewees held a program manager position for which managing the Veggie Rx program was one aspect of their work; one interviewee described managing their organization’s Veggie Rx program as the primary focus of their position.

The programs included in this study operated in urban and/or rural areas and varied in enrollment criteria and the number of participants that they could support during each season/year. Veggie Rx leaders also described different approaches to program duration and the application of benefits. Two programs operated year-round (VRx B and C), two operated for approximately half of the year (VRx A and D), and the fifth (VRx E) operated two shorter sessions from the spring through the fall, with plans to expand offerings in the future.

Table 4.3 presents an overview of program characteristics, including primary service area (urban or rural), duration of program enrollment, number of participants enrolled in 2023, whether benefits were calculated for the participant’s household, and program enrollment criteria.

Table 4.3. Veggie Rx Program Characteristics

| Veggie Rx Program | Primary Area (Urban, Rural) | Program Duration | Approximate Number of Participants in 2023 | Benefits Based on Household Size? | Enrollment Criteria |
|-------------------|-----------------------------|---------------------|--|-----------------------------------|---|
| 1 | Both | 2x 10-week sessions | > 100 | No | Food insecurity and diagnosis with a diet-related health condition |
| 2 | Rural | Year round | > 300 | Yes | Food insecurity only |
| 3 | Urban | 25 weeks | 6 enrolled, can support up to 25 | Yes | Pregnancy (population focus varies annually), food insecurity, and low income |
| 4 | Urban | Year round | 40 | Yes | Diet-related illness and must be a patient at a specific clinic |
| 5 | Rural | 6 months | < 150 | No | Must be a patient at certain clinics, food insecure or diagnosed with a diet-related health condition |

For the purposes of this research, “rural” is used based upon the definition adopted by the Oregon Office of Rural Health: a primary geographic area at least 10 miles from a population center of 40,000 people, and may also include areas considered frontier or remote (counties with fewer than six residents per square mile) (Oregon Office of Rural Health, 2019).

While the leaders of the Veggie Rx programs that participated in this study described a similar set of program goals, they also described variation in how they approached accomplishing those goals. The delivery of benefits was notably different across programs. Two programs offered financial benefits primarily in the form of paper vouchers, two were via a prepaid debit card managed by Fresh Connect³, and one was in the form of a CSA-style box of FVs; however, there were also variations among programs within these categories. For example, one program offered benefits via a Fresh Connect debit card in addition to paper vouchers which were used as an incentive tool to encourage participants to shop at a farmers market (rather than a grocery store). Another program provided paper vouchers to most participants, while participants who resided in specific locations were provided digital coupons instead that could be redeemed through a grocery store rewards program as this was the most convenient redemption option available to residents of that county. Each approach to delivery was influenced by the geographic area and tailored to meet the unique needs of program

³ Fresh Connect is an organization that offers prepaid debit cards to produce prescription program participants, enabling redemption at farmers and mobile markets, as well as grocery stores (*Fresh Connect*, n.d.).

participants. Most programs required referral from a clinic partner, although one organization offered self-referral.

Veggie Rx leaders described a variety of locations where participants could redeem their program benefits. In the case of the program that offered CSA-style FV boxes, participants received their allocation from a single farm. Another program supported the redemption of vouchers only at participating grocery and other retail stores. Three programs required or preferred benefits to be redeemed at specific farmers markets; two of those programs also permitted benefits to be redeemed from participating grocery stores through the Fresh Connect debit card.

A common element of produce prescription programs is the provision of nutrition education. Three Veggie Rx leaders indicated that their program included a nutrition education component, while the other two explained that they had offered nutrition education in the past but did not currently do so due to challenges related to the delivery of this benefit and/or alignment with current program focus. Another aspect of produce prescription programs that has been described as a challenge in the literature is transportation. Most program leaders interviewed for this study reported that their program currently offered transportation support (in the form of rideshare services, DoorDash delivery, or gas station gift cards), or intended to offer some kind of transportation support or benefit in the future. Current and planned transportation components included a variety of approaches, while some interviewees expressed a need to enhance or further refine their approach based on the needs of program participant. Transportation supports were not typically funded through the same

source(s) as other program benefits, requiring program leaders to secure additional grants to offer or expand this component. Table 4.4 summarizes Veggie Rx benefits by program.

Table 4.4. Veggie Rx Program Benefits

| Veggie Rx Program | Delivery Format | Benefit Amount | Benefit Redemption Location(s) | Nutrition Education Component | Transportation Component |
|-------------------|---|-----------------------|---|-------------------------------|--|
| 1 | Paper vouchers | \$27 per week | Farmers market | Yes | Not currently, will offer limited delivery beginning in 2024 |
| 2 | Paper vouchers and digital coupons | \$30/person per month | Grocery store | Not currently | No |
| 3 | CSA box | -- | Single farm | Not currently | Delivery via DoorDash |
| 4 | Fresh Connect Debit card and paper vouchers | \$40/person per month | Farmers market and grocery store, depending on season | Yes | Recently acquired funding to add transportation support |
| 5 | Fresh Connect Debit card | \$80 per month | Farmers market (preferred) and grocery store | Yes | Gas card incentive at end of program |

Veggie Rx Program Evolution

When Veggie Rx leaders were asked to describe how their programs had changed over time, responses addressed both changes in the past, and prospective adjustments that program leaders desired to make in the future. Interviewees described upcoming changes as planned out of a desire to improve the experience for participants and reduce barriers to program engagement. The most common changes discussed were adjusting where and when benefits could be redeemed, and/or adding additional benefits to encourage participation, such as transportation support. One interviewee explained:

We don't provide a transportation specifically, but... the community health workers have told me that this is something that we need to support, we need help with. We were actually just included in the [location-specific grant]. Now we're going to have funds for our participants, for the health equity side of it, which we didn't have prior. We were just kind of getting whatever's left over. But, when we can, we do provide transportation, and we do provide childcare. (VRx B)

One of the programs that required benefits to be redeemed from a specific location noted: *"I want to change the model so...it's more like... 'Here's your balance. You have from this date to this date, spend it how you want it. Here are the locations you can spend it.'" (VRx E)*

Several programs described changing their delivery models over time in an effort to determine what worked best for their organization and for participants. In some cases, this meant that each year looked very different:

We've worked with folks who have diabetes. That was last year, and I think in 2021, too. When we first started it was with folks who were diagnosed with prediabetes... [I]t started with vouchers. Then we went to the CSA model. Then we went to the delivering to their door model. One year we did the delivering to a clinic. Then the last two years, we've delivered...through DoorDash. (VRx A)

Increases in capacity and staff size were the most common changes described by Veggie Rx leaders, followed by increases in the amount of and/or adjustments to the format of benefit redemption, and expansion of the number and types of locations where benefits could be redeemed. Two programs described an intentional push to move away from the "medical model" of requiring a referral from a clinic toward referral from a wider variety of sources, such as social workers, traditional or community health workers, or self-referral.

Community Outcomes

Two Veggie Rx leaders discussed outcomes for the community as a whole, separate from those specific to individual participants. Interviewees described their Veggie Rx programs as a source of connection and community building, helping to strengthen local communities by improving the health of relationships within participant households and communities more broadly. One interviewee emphasized: “[M]ainly it’s to be more united, be within community...within their family, talk about things. Food brings people so close together... It’s not just nutrition education, it’s, how do we incorporate our culture...?” (VRx B) Another interviewee also expressed that program benefits were more than those that could be measured.

[L]ocal impact and connection. I wouldn't say it's always about lowering the A1Cs or doing that... the local impact here, especially...in some of our smallest communities, the impact is so much greater than just having this person eat fruits and vegetables... [I]t really does affect the whole community by increasing the availability, the variety, and by driving down the cost because the store can purchase so much more. [P]eople who participate in the program have this access, but then the whole community also has this access. (VRx C)

Local Food Systems

The level of involvement between Veggie Rx programs and local food systems varied depending on program location and stated goals. Four programs described working directly with their local food system in some capacity, either by organizing or supporting a farmers market for participants to redeem benefits, or by working directly with a farm or farms to obtain FVs for CSA-style delivery. Some program leaders indicated an explicit goal of engaging with the local food system in their community as part of their program and/or organization’s mission.

[Our program] is all about connecting food systems. I'm paying local farms the market-value price so they get the same price that someone [outside of the program] pays for their CSA share as [they do] for this person who doesn't pay anything; they get the same price for the same amount of participants. Then the person who is food-insecure gets to benefit from the same vegetables that the other person gets, too. It is connecting all these different pieces. It's involving the clinics and physicians as well to be more aware of the program. (VRx E)

Another interviewee explained:

I think that engagement with the local food system is something we are interested in supporting... That's not necessarily the case for other programs. They might be totally satisfied with people just going to Walmart and getting their produce there, but because we have a food systems committee and because of the nature of our organization, supporting the food system is integral to our mission. [W]e see this program aligned with that as much as possible. (VRx D)

Only one interviewee did not emphasize that having a connection with local food system was part of their program out of necessity, driven by the geographic area in which the program operated which limited options for participants to redeem benefits.

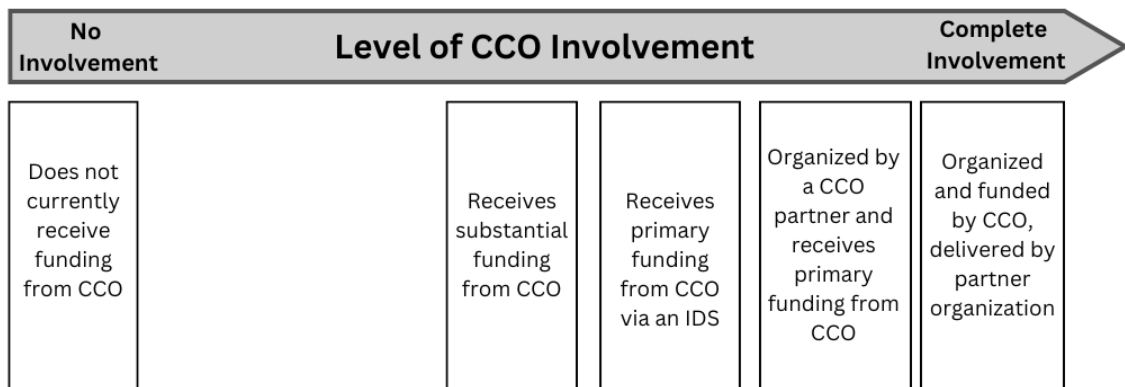
Funding and the Health System

Veggie Rx leaders described a multitude of ways through which their programs received funding, with most noting that at least some level of support came through their local health system. In several instances program funding was also provided by private and foundation grants, as well as local sponsorship. Only one program received their primary funding from a federal GusNIP grant, while the remaining four received most or all of their funding from their local CCO and/or CCO-affiliated organization, including a CCO partner or independent delivery system (IDS). CCO-provided financial support was typically provided through community benefit initiatives (CBIs), funds intended to support community-based interventions that are intended to improve

population health and are available to both members of the OHP and those community members who are not enrolled in Medicaid.

For two programs, the financial support from their local CCO or CCO-affiliated organization had increased markedly for the current season, indicating a growing interest in investment by the health system. Figure 4.1 illustrates the continuum of CCO financial and administrative involvement for the Veggie Rx programs included in this study. The left side of the continuum represents no current involvement between Veggie Rx and their local CCO, while the right side of the continuum represents a high level of interaction between the program and the CCO. Based on the interview conversations with Veggie Rx leaders, a high level of involvement may look different depending on the relationship between the Veggie Rx program and the CCO. The continuum only depicts involvement with a single CCO and does not account for regions where more than one CCO operates within the same service area.

Figure 4.1. Continuum of CCO Involvement with Veggie Rx Programs



Funding sustainability was at least a minor concern for several programs interviewed; however, most programs expressed confidence that their primary funding

sources would continue for the foreseeable future. Several programs indicated that their primary concern about funding was whether they would be able to acquire more investment from funding partners in order to increase program capacity and reach additional community members. This was summarized by one interviewee:

[W]e were [previously] grabbing from all these little places, and it was a little bit of funding here, a little bit of funding there. And when you have that type of funding, it's stressful, because you don't know how much you're going to get. You don't know if they're going to change if they don't agree. But now [CCO-affiliate] is 100% on board. They want more. They want to know how we're going to expand. I think also with the 1115 waiver, this is going to be huge, and I'm super excited. I don't think we're going to have problems with funding this. We just need more funding for more people. (VRx B)

2022-2027 Oregon Medicaid 1115 Demonstration Waiver: Veggie Rx leaders were also asked about their perceptions of Oregon's 2022-2027 Medicaid 1115 Demonstration waiver and whether they anticipated that the nutrition components covered by the waiver would have an effect on their program. Program leaders from the four programs that received funding support from their local CCO or affiliated organization indicated that they engaged in at least some discussions with their CCO or affiliated organization about what implications there may be for their program. The fifth program was not asked to address this question given their lack of involvement with their local CCO.

Interviewees conveyed a range of impressions, from confusion regarding details of the waiver and what (if any) effect the changes were expected to have on program enrollment, to a strong feeling of excitement at the potential for increased funding support to expand their program. Reactions were at least partly related to the target populations of each program, whether they were already serving participants who

would be considered transitional populations for the purpose of the waiver, or whether they hoped to expand to include transitional populations in the future.

Barriers to Veggie Rx

Interviewees were asked to discuss known and perceived barriers to successful participation in their Veggie Rx programs. This referred to whether participants who enrolled in the program were able to redeem program benefits, increase their consumption of FVs, and participate actively throughout the duration of the program without disengaging or withdrawing.

The most common barrier identified was transportation which was discussed by four program leaders. One interviewee indicated that transportation had been a barrier in past years but that they had a solution in place to address it for the 2023 season, yet it was unknown whether transportation support would be continued into the 2024 season, indicating that transportation was an ongoing area of development. Another interviewee explained how transportation barriers could limit participant engagement with the program:

Even if someone was already enrolled, people weren't showing up because gas prices are crazy now and some people just can't physically get out of their home in general, or their person they had that was supposed to pick up their produce didn't. Yes, transportation is the number one barrier, for sure, with this program.
(VRx E)

According to another program leader, the idea of transportation as a barrier was also related to the distance that was necessary for participants to travel in order to redeem program benefits. Other barriers were the limited availability of retail outlets for benefit redemption, and the capacity for existing retail outlets to meet community

demand for FVs, both for program participants and the community more broadly. The interviewee stated:

[The] distance needed to travel to get to the stores [is the transportation barrier]. For instance, [location] has been without a food pantry for a while and their local market closed down. They've had to travel to the [Market] or to [alternate location] to purchase their groceries. Our vouchers must be used within [county], therefore they can't use them in [alternate location]. The [Market] purchases as much produce as they can but it is usually gone within a couple of days... Anyone coming late will have very little produce to choose from. (VRx C)

Another interviewee expressed that while transportation was a barrier to program participation, other factors such as a sense of shame or stigma around enrollment, restrictions on time, and challenges with consistent participant communication all served as barriers to successful program participation.

That's a barrier, transportation. Another barrier is time... If we don't have childcare or something like that, it's hard for these mothers to step away from their families when they're doing all these other things... People are very shameful and embarrassed that their child or themselves has diabetes or pre-diabetes, and they don't want other people to know about it. It's hard for them to open up in the meetings that we have, in the classes that we have sometimes, and it's hard for them. They're just a little shy and quiet because they feel a little shameful. (VRx B)

Participant engagement with the Veggie Rx program was highlighted as a barrier by two interviewees. In the case of one program, the challenge was related to participants not having sufficient capacity and time to engage with the program and redeem benefits. This program leader further explained why limited ability to participate was challenging for the program as a whole:

[B]ecause one of the qualifying factors to participate in the program is food insecurity, sometimes the participants are just facing a wide variety of barriers and just are unfortunately dealing with a lot of chaos in their lives, and it can be difficult to just even...participate in the program, just to even remember that it's

a thing. And any additional barrier in their life can just throw them off because they're just in too vulnerable of spaces.... [U]nfortunately, we enroll once a year, and so if someone drops out of the program or doesn't participate, that money's gone. [W]hile they of course need it the most, they're not necessarily able to utilize it, and so moving to a demographic that's still very much in need but has some foundational infrastructure in place is better for this program because it...utilizes the funds. I'd say transportation is barrier, but so [are] all the things that people in hardship experience. (VRx D)

The second program leader described the same challenge but for different reasons:

The biggest barrier is that...sometimes you're just putting in all of this effort to really motivate them, and then you...don't really see a lot of change, or maybe they don't show up to one of the meetings, maybe three meetings in a row. Around Christmas, a lot of families travel back to Mexico or back to their home country, or with families, and they don't show up to any of the classes. And so just that barrier [is] not a language barrier, but communication barrier. They don't always answer, they have new phones all the time. It's just hard to track them down when they haven't come. (VRx B)

This interviewee described additional barriers to participation specific to their target populations, including social and political barriers.

I think another barrier with families with mixed documentation is that they get a little scared to be involved in things like this. 'And why do I need my name there? And what do you mean?'...They get excited about participating, but they're also concerned. 'I don't want my name out there. Why do I have to do it?' That's something we want to help them with... And another barrier is...shame. People are very shameful and embarrassed that their child or themselves have diabetes or pre-diabetes, and they don't want other people to know about it. It's hard for them to open up in the meetings that we have, in the classes that we have... They're just a little shy and quiet because they feel a little shameful... (VRx B)

Beyond barriers experienced by participants, two leaders also discussed barriers related to obtaining program referrals through the health system. VRx B expressed a desire to expand their capacity to include additional referring clinics so that they could reach a larger population but also explained that the work required to accomplish this

was daunting. VRx D noted that working with partner clinics could be challenging, particularly when staff turnover results in the need to re-train clinic staff or onboard new people each year.

It's really nice when there is not a bunch of turnover every year.... [W]e had a lot of turnover within our clinic leads.... That was incredibly challenging because I'd get someone new suddenly that knew nothing about the program, so I was just training and retraining and someone might be there for a few months and then leave. It was really hard for me to get what I need to run the program from the clinics. That seems to have balanced out a little bit, and hopefully these people will continue to be invested in the program going forward, and that makes a huge difference. Then they're just familiar with the tools and the platforms... It's a little complex and so it takes time for people to get accustomed to the way that the program operates. (VRx D)

Discussion

Leaders of the five Veggie Rx programs described considerable differences in program operations and supporting infrastructure. It became clear that program characteristics, such as benefit format and delivery, program focus, and funding streams, were highly place-specific and necessarily responsive to the goals of each program and the participants whom they served. In instances where food security and access to healthy foods were the highest program priorities, benefits tended to be redeemable across multiple locations, including grocery stores. In comparison, programs that emphasized a focus on addressing health-related conditions or working closely with the local food system tended to direct participants to redeem benefits directly through the local food system, such as through a farmers market or farm direct redemption.

There was little consensus across the program leaders to support the identification of a set of ideal or best practices existed for Veggie Rx in Oregon. While

recent studies on produce prescription programs have concluded that programs might benefit from a list of best practices to standardize delivery (Budd Nugent et al., 2021; Newman et al., 2022; Parks et al., 2018; Stotz et al., 2022), findings from this study indicate that in a geographically diverse state such as Oregon, Veggie Rx programs may be limited in their ability to streamline approaches due to the availability of resources and the unique needs of local populations. In similar regions, the idea of “best practices” should be approached with an intentional focus on flexibility that allows for programs to work with available resources, leveraging and expanding existing networks to strengthen program engagement and participant outcomes, within local or regional contexts (Garfield et al., 2021; Newman et al., 2022; Rodriguez et al., 2021; Stotz et al., 2022). Veggie Rx programs require the ability to adapt program components in order to remain responsive to the needs of their communities and participants (Newman et al., 2022; Stotz et al., 2022). This is particularly important for those programs working within a health system, such as with CCOs in Oregon, as programs need flexibility to operate in a way that works in their respective communities without contributing to or exacerbating concerns about sustainability of funding that may occur with operational pivots.

Some of the barriers identified by Veggie Rx leaders in this study are echoed in the recent literature, such as difficulty working with clinics, providing the training support needed to facilitate clinic referrals, facilitating transportation for program participants to utilize benefits, challenging personal situations, and concerns over sustainability of program funding (Newman et al., 2022; Newman & Lee, 2022; Schlosser

et al., 2019; Stotz et al., 2022; Swartz, 2018). While most of the Veggie Rx leaders interviewed as part of this study reported a high level of benefit utilization/redemption among program participants, some indicated challenges with redemption rates. Limited redemption of benefits could impact other potential participants who may have been unable to enroll due to limited program capacity.

Prior research has indicated the perception of stigma associated with the use of coupons in grocery stores (Barat et al., 2013; Brumbaugh & Rosa, 2009), it has been suggested that coupon stigma could potentially limit benefit redemption in produce prescription programs, particularly where paper vouchers are used and redemption is permitted in grocery stores (Swartz, 2018). While redemption stigma was not explicitly discussed in interviews with Veggie Rx leaders, ongoing efforts among programs to transition away from paper vouchers toward the use of electronic benefits (such as the Fresh Connect debit card or as preloaded rewards on a grocery store mobile application) may support increased utilization of program benefits in Oregon. However, costs associated with implementation of electronic technology remain a potential challenge. Another consideration is how electronic benefit redemption fits with program focus and goals. One of the Veggie Rx leaders who reported use of the Fresh Connect debit card indicated that the technology widely increased redemption locations for participants, particularly within grocery stores; while this was generally perceived as a positive, this particular program had a strong focus on local food system partnership and was grappling with how to maintain that focus as redemption locations expanded.

Produce prescription programs are relatively new interventions used to improve nutrition security and associated health outcomes. As such, securing sustainable funding is another challenge to expanding program capacity (Garfield et al., 2021; Newman & Lee, 2022; Rodriguez et al., 2021; Swartz, 2018). The potential for the use of Medicaid funding to support Veggie Rx programs is an exciting one (Auvinen et al., 2022). While details of this policy and its implementation are still evolving, Oregon's 2022-2027 Medicaid 1115 Demonstration waiver may offer the potential to expand the funding pool available to Veggie Rx programs by creating a dedicated funding mechanism for Veggie Rx programs to bill CCOs, enabling programs to focus on specific populations and, in doing so, increase the total funding available. Interviews revealed variation in how Veggie Rx leaders anticipate that changes to Oregon's 1115 waiver will impact each program, depending on the populations already served. A few program leaders also raised concerns over how they would support some of the transitional populations identified in the new waiver, as these populations may either be less prevalent in their regions or may have additional barriers that could limit the utility of participation in a Veggie Rx program.

Secondary analysis of the 2021 OCFSN Veggie Rx survey data indicated that Veggie Rx programs achieved overarching goals of improving food security and participant health. These outcomes have also been noted in other studies (Bhat et al., 2021; Bryce et al., 2017; Brzozowski et al., 2019; Budd Nugent et al., 2021; Cavanagh et al., 2017; M. Cook et al., 2021; Hager et al., 2023; Heasley et al., 2021; Izumi et al., 2020; J. K. Johnson et al., 2023; Royal et al., 2016; Taher, 2020; Veldheer et al., 2021);

however, there is a pressing need for more rigorous program evaluation to corroborate findings while addressing the limitations of this and prior studies, including the identification of a shared set of evaluation measures to guide programs with limited capacity for evaluation in collecting useful data that can be used to bolster findings (Budd Nugent et al., 2021; Veldheer et al., 2020). Known challenges with existing evaluations include a lack of validated screening tools and biometric data to support health-related outcomes (Veldheer et al., 2020).

The researcher's involvement with the OCFSN and participation in the development of subsequent Veggie Rx program evaluation surveys indicated that Veggie Rx programs in Oregon were hesitant to require the collection of biometric data due to concerns about the time and staff capacity to collect data, and stigma associated with collecting such measures, specifically in the context of the evolving discussion of weight bias (Alberga et al., 2019; Nutter et al., 2016). The lack of interest in collecting biometric data was particularly relevant for those programs that prioritized addressing food insecurity rather than diet-related illness. The secondary analyses of the survey data conducted for this study are included as a means of representing participant perspectives in this work; however, limitations associated with these data limit the ability to make substantiated claims regarding Veggie Rx programs in Oregon. These limitations are addressed in the next section.

Limitations

This study has some limitations. Not all Veggie Rx programs in Oregon were recruited or able to participate in the research. Similarly, not all Veggie Rx programs in

Oregon were able to complete the “Veggie Rx Census” survey used to identify cases for recruitment, a fact that highlights challenges in identifying Veggie Rx programs that are not engaged with the OCFSN. Given the variations among the five programs included in this multiple-case study, it is likely that including additional Veggie Rx programs would have resulted in an even richer dataset and a more comprehensive set of findings. At least one Oregon Veggie Rx program is currently piloting the use of Flexible Funding through their local CCO; however, this program was not included in this study. Given this, it is plausible that other programs not recruited to participate may be using other innovative approaches to funding and/or delivery that were not explored in this work. Future studies may address this limitation by permitting more time and/or options for data collection that maximize the number of programs able to participate.

This study involved primary data collection in the form of semi-structured interviews with Veggie Rx program leaders. An inherent limitation with interviews is constraint on time. Managing the Veggie Rx program was only one component of each interviewee’s position, with most balancing other competing priorities; this meant that interviews were limited to no more than one hour and only limited topics could be covered on the interview guide. In order to account for this, topics addressed in the interviews were identified by a review of the relevant literature in order to maximize the utility of each question. The interview guide was also reviewed by subject matter experts who provided feedback on the content. The use of a single coder for the interview transcripts is another limitation of this work that is necessitated by the design of a dissertation study. Only the researcher coded each interview transcript; however,

the use of structural coding with the interview guide as a coding template was intended to mitigate this limitation.

Secondary analyses of pre/post Veggie Rx evaluation survey data are a limitation of this work. Analyses were limited to the data gathered by Veggie Rx programs for the 2021 evaluation which the researcher did not participate in. Because the evaluation was a single group pre/posttest design, it is not possible to account for confounding factors that influenced participant outcomes beyond those collected with the survey. For demographic categories such as gender and race/ethnicity, analyses were limited to only those responses included in the survey, which excluded more specific categories such as non-binary, more than one race, etc. The format of responses also varied across questions, limiting the potential for statistical testing, and many questions included an “I don’t know” response option which may have enabled respondents to opt out of answering questions even if they were otherwise required. Additionally, the evaluation survey data included a smaller subset of Veggie Rx programs than participated in the interviews, and not all program leaders interviewed represented programs that participated in the 2021 evaluation. Therefore, findings from the evaluation may not be representative of all Veggie Rx programs and may only represent those who were able to complete the evaluation survey. Given concerns about achieving statewide health equity, evaluation data might be compared to program enrollment records to confirm whether findings are representative of all demographic groups.

Limitations related to evaluation data for these types of programs have been well documented in the literature (Cafer et al., 2023; Garfield et al., 2021; Hager &

Mozaffarian, 2020; Rodriguez et al., 2021) which has called attention to the need for consistent, rigorous evaluation data. Unfortunately, evaluation design and data collection are challenges for produce prescription programs, including Veggie Rx, as these programs often operate with limited staff capacity and may lack access to researcher support. Engaging program participants to complete follow up visits for data collection is also a known challenge for produce prescription programs (Stotz et al., 2022).

While the open-ended questions answered by survey respondents offered a wealth of perspectives to analyze as part of this study, one notable limitation is that the 2021 OCFSN Veggie Rx evaluation survey only included perspectives from participants who could redeem their benefits from farmers markets and did not capture perspectives from those who participated in a CSA model or redeemed benefits only from a grocery or retail store. Because of these limitations, analyses of the secondary survey data were used to explore participant outcomes, rather than to draw conclusions about Veggie Rx program effectiveness.

Conclusion

This exploratory, multiple-case study described Oregon Veggie Rx programs and how participation in those programs affected food security and health outcomes for some program participants. This research was conducted as part of a larger dissertation study to answer the question: How do Oregon's CCOs perceive and utilize produce prescription (Veggie Rx) programs with regard to addressing SDoH? Despite the limitations described above, this study does offer an important contribution to the

literature by expanding what is known about produce prescription programs operating in the state of Oregon.

Findings from this specific aim of the larger study indicate that while Oregon's Veggie Rx programs share similar goals and priorities, they vary widely in their approach to accomplishing their work. Variation in the delivery and operations of Veggie Rx programs is the result of operating within a geographically complex state where each region offers a different community context within which programs must adapt. While Veggie Rx program leaders interviewed in this study were confident in the work of their programs and in the individual and community level outcomes associated with participation, these programs relied on the existence of sustainable, scalable funding in order to operate successfully. The availability and reliability of funding sources available to Oregon's Veggie Rx programs varied depending on several factors, including program design, community priorities as dictated by local CCOs, and the relationship between Veggie Rx leadership and the CCO(s) operating in the program's region. Findings from this study may warrant further exploration of Veggie Rx program outcomes at the community level. Though challenging to measure, community outcomes may encourage CCOs to prioritize these programs for continued or expanded CBI funding, or encourage CCOs that do not currently invest in a Veggie Rx program to consider doing so in the future.

As the state of Oregon designs and prepares to implement the nutrition-specific components of the HRSN policies approved in the Medicaid 1115 Demonstration waiver, steps should be taken to ensure that the perspective of Veggie Rx programs is included

throughout the process to ensure that new policies are functional and feasible for both the state and for the programs that may benefit from increased funding. While the Medicaid 1115 Demonstration waiver may offer an avenue for some Veggie Rx programs to expand program capacity and reach additional Oregonians, CCOs should continue to invest in these programs through CBIs and through reimbursement for flexible services for OHP members. Additionally, the state of Oregon should consider the potential utility of produce prescriptions as a tool to address food and nutrition security and explore avenues to provide direct support to existing Veggie Rx programs. Future research should consider what information is still needed to increase interest in these programs at the state level.

Chapter Five – Produce Prescriptions in The Healthcare System: A Case Study of Veggie Rx in Oregon’s Coordinated Care Organizations

Introduction

Oregon has long been a leader in health systems reform. Beginning with the historic passage of legislation in 1989 which led to implementation of the Oregon Health Plan (OHP) in 1994, the policy sought to bring together the public and private sectors in order to provide healthcare coverage to eligible uninsured Oregonians through the expansion of Medicaid eligibility (Berkobien, 2004; Bodenheimer, 1997; Bonetto, 2017). In the years since implementation of this groundbreaking program, Oregon has continued to expand upon its legacy of innovation, taking steps to become a leader in the provision and financing of public healthcare while pursuing the Triple Aim: improving individual and population health, improving the quality of the care provided, and reducing the cost of care (Berwick et al., 2008; Oregon Health Policy Board, 2012). More recently, Oregon’s health system transformation efforts have added an emphasis on the social determinants of health⁴ (SDoH), with CCO 2.0 in 2018 and efforts to address unmet health-related social needs (HRSN) in pursuit of health equity statewide (Oregon Health Authority, 2021b; Oregon Health Authority Health Policy & Analytics Division, 2018).

⁴ The Oregon Health Authority modified the state definition of SDoH in 2019 to add equity, social determinants of health and equity (SDoH-E); this expanded definition includes three components: SDoH, social determinants of equity (SDoE), and health-related social needs (HRSN) (Oregon Health Authority, 2021b). SDoH is used throughout this paper.

Nutrition security is an SDoH of current interest, both nationally and in Oregon (Mozaffarian et al., 2021; Oregon Health Authority, 2017; The White House, 2023; Thorndike et al., 2022). Produce prescriptions, known as Veggie Rx in Oregon, are an approach to supporting food access and increasing fruit and vegetable (FV) intake, that have grown in popularity in recent years. This paper reports on a case study of produce prescription programs, and how CCOs perceive and utilize them.

Background

Health Systems Reform and Oregon’s Coordinated Care Organizations

In 2012 Oregon began providing health insurance coverage and services to Medicaid recipients through Coordinated Care Organizations (CCOs), a unique model intended to support efforts to achieve the Triple Aim by reducing healthcare spending and improving care quality and outcomes (Droppers, 2014; McConnell, 2016; Oregon Health Authority Health Policy & Analytics Division, 2018; Oregon Health Policy Board, 2012). The CCO model built upon the foundation laid by the initial passage of the OHP, furthering Oregon’s health systems transformation efforts by requiring the integration and coordination of benefits and services, adoption of care standards, and local accountability for the allocation of resources to support CCO member⁵ health (Oregon Health Policy Board, 2012). A goal of the CCO model was to ultimately improve the efficiency of Oregon’s public healthcare system (Oregon Health Policy Board, 2012).

⁵ CCOs are responsible for the delivery of care for Oregon’s Medicaid recipients; those eligible for Medicaid are enrolled in the OHP and assigned membership in a CCO based on location.

CCOs are awarded five-year contracts from the State and receive a single, fixed-growth budget from which to coordinate services for their members; as part of their five-year contract, the CCO must provide a range of health services, including physical, oral, and behavioral healthcare, either directly or through partnerships with one or more independent delivery systems (IDS), which are entities responsible for member care delivery (Oregon Health Authority, n.d.-d). CCOs also must meet defined state quality metrics and receive financial incentives for achieving performance benchmarks (Oregon Health Authority, 2021d). Community perspective is an important piece of the CCO model; each CCO is locally governed and convenes a community advisory council (CAC), made up primarily of CCO members in addition to other key interested parties from the community, to provide guidance for the development of internal policy (Oregon Health Policy Board, 2012). Collectively, these organizations cover Oregon's geographic footprint with some limited overlap (Oregon Health Authority, 2019).

CCOs operate locally and under the governance of community partnerships made up of key interested parties who share risk and responsibility in delivering care, achieving goals, and meeting performance and spending benchmarks (Droppers, 2014; McConnell, 2016; Oregon Health Authority, n.d.-d). A hallmark of the CCO model is flexibility; given that these organizations vary widely in terms of the geographic areas and populations that they serve, the model was designed to afford each CCO a high level of flexibility in how they set internal priorities, direct resources, and provide care to their members to respond to local contexts (Droppers, 2014; McConnell et al., 2014; Oregon Health Policy Board, 2012). Membership in Oregon's CCOs has grown steadily

each year since 2019, reaching approximately 1,250,000 members as of December 2022 (Oregon Health Authority, 2023a).

CCO 2.0 and the Social Determinants of Health

The initial CCO model was considered successful in achieving the goals of the Triple Aim, resulting in a reduction in healthcare costs for CCO members over the five-year period from 2013-2017, while improving health outcomes and care quality (Oregon Health Authority Health Policy & Analytics Division, 2018). From the beginning, CCOs were given the flexibility to invest a portion of their global budgets in upstream interventions that would improve member health and lower costs by addressing members' HRSN; however, investments in HRSN were ultimately minimal (McConnell et al., 2014; Oregon Health Authority Health Policy & Analytics Division, 2018; Oregon Health Policy Board, 2012). In the context of this paper, "upstream" refers to social conditions and inequities which influence an individual's living conditions and can ultimately impact their lifestyle behaviors and health outcomes (Oregon Health Authority, 2020a).

For the second round of CCO contracts awarded in 2018, major efforts were made to refine and improve the CCO model in the spirit of continued health systems transformation. Among the recommendations for CCO 2.0 was that CCOs should focus on SDoH, including a requirement that they dedicate a portion of their net income or reserves and increase strategic spending on initiatives related to SDoH and health disparities (Oregon Health Authority Health Policy & Analytics Division, 2018). Further, CCOs were directed to expand and strengthen partnerships with community-based

organizations (CBOs) and demonstrate meaningful engagement among diverse community representatives (Oregon Health Authority Health Policy & Analytics Division, 2018). Fifteen organizations were initially recognized to operate as CCOs by the state of Oregon in 2019 as part of CCO 2.0, with the addition of a sixteenth contract in 2020 (Oregon Health Authority, 2019; Trillium Community Health Plan, 2020).

Given that initiatives and services intended to address SDoH are often considered non-medical in nature, one way for CCOs to direct spending to these interventions is through the use of health-related services (HRS), a spending category for services not covered under OHP that offers an intentional funding mechanism for CCOs to address SDoH and HRSN outside traditional healthcare services (Oregon Health Authority, 2021b, 2021a, 2022a). Under CCO 2.0, CCOs are incentivized to spend part of their global budgets on HRS through the return of a portion of HRS spending as a performance-based financial reward (Oregon Health Authority, 2022a).

HRS funds may be used when the purpose of the service is to improve health outcomes, reduce disparities, or strengthen overall community well-being (Oregon Health Authority, 2021c). HRS funds are distributed in two ways: flexible services (FS; colloquially referred to as “flex funds”), which cover cost-effective services for members that supplement their covered benefits; and community benefit initiatives (CBI), which may be used for services that benefit the communities of CCO members more broadly (Oregon Health Authority, 2021c). CCOs are not expressly required to utilize HRS funds; however, as of 2020, HRS spending was a key factor in determining CCO performance-

based rewards (PBR). As a result, CCOs are incentivized to utilize the HRS at their disposal (Oregon Health Authority, 2021c).

In addition, the 2018 Oregon Legislature stipulated that CCOs that exceed their financial requirements via profit are legislatively required to reinvest a portion of their profits into initiatives that address SDoH and are not related to healthcare (Oregon Health Authority, 2023c). The Supporting Health for All through Reinvestment (SHARE) initiative went into effect in 2020. SHARE funds may not be spent on Medicaid-covered services or any services/benefits covered by Oregon's new 1115 Medicaid demonstration waiver (Oregon Health Authority, 2023c).

2022-2027 Section 1115 Medicaid Demonstration Waiver, HRSNs, and Veggie Rx

Under Section 1115 of the Social Security Act, the US Secretary of Health and Human Services may authorize state experimental, pilot, or demonstration projects with objectives that align with Medicaid program goals through the provision of an 1115 waiver (Centers for Medicare & Medicaid Services, n.d.). Oregon has a long history of using the 1115 waiver mechanism to support health systems innovation, beginning in 1994 which allowed for the implementation of the OHP (Bonetto, 2017; Oregon Health Authority, n.d.-g). The 2012 waiver furthered Oregon's health system transformation efforts with the authorization of the implementation of CCO model, and the 2017 waiver facilitated CCO 2.0's focus on SDoH (Oregon Health Authority, n.d.-g).

The most recent 1115 waiver, approved for October 2022 through September 2027, allows CCOs to take additional steps to address SDoH, in part by increasing the scope of coverage for HRSN, adding coverage of some HRSN as benefits for certain,

covered populations (Oregon Health Authority, n.d.-a). Covered populations eligible to receive HRSN services under the new waiver include: young adults with special healthcare needs, youth and adults discharged from an institutional setting or released from a correctional facility, youth involved with the child welfare system, individuals transitioning from Medicaid to dual Medicaid/Medicare eligibility, individuals at risk of or experiencing houselessness, and individuals with a high risk clinical need residing in an area experiencing extreme weather (Oregon Health Authority, 2023b). The categories of newly covered HRSN include needs that arise during climate emergencies, post-transition housing and housing supports, and nutrition supports and education (Oregon Health Authority, n.d.-a, n.d.-a; US Department of Health & Human Services, 2022). Nutrition benefits covered as HRSN under the 1115 waiver include: nutrition and cooking education, medically-tailored meal delivery for up to six months, meal or pantry stocking, and fruit and vegetable prescriptions (i.e. Veggie Rx) for up to six months (Oregon Health Authority Health Systems Division, 2023). At the time of this study only limited details were available regarding the nutrition-specific HRSN coverage under the 2022-2027 1115 waiver, as implementation of the nutrition services component had been delayed until 2025 (Oregon Health Authority, 2023b, 2023d).

Produce prescription programs, referred to as Veggie Rx in Oregon, are the focus of a rapidly growing area of research. Programs typically involve “prescription” of FVs (provided through enrollment in a cost subsidized program) to individuals at risk of, or who are experiencing, food insecurity and/or diet-related illness (Garfield et al., 2021; Newman et al., 2022). The majority of studies of produce prescription programs have

focused on evaluation, emphasizing participant outcomes (Abel et al., 2022; Afshin et al., 2019; Aiyer et al., 2019; Cavanagh et al., 2017) and the perspectives of healthcare providers (Feinberg et al., 2018; Stotz et al., 2022). More recent additions to the literature show a growing interest in understanding how to best integrate produce prescription programs into health systems (Downer et al., 2020; Garfield et al., 2021; Hager & Mozaffarian, 2020; Harmsen, 2020), but only recently has this interest turned toward understanding the perspectives of health system payors in funding these programs (Auvinen et al., 2022). Studies that center broader organizational perspectives are lacking, and little is known about if or how Oregon's CCOs consider these programs as part of their approach to addressing SDoH, and what potential role Veggie Rx programs may play in the future of health services delivery, particularly in response to Oregon's 1115 waiver which may have broad implications for Veggie Rx programs. This study aimed to add to this growing area of the literature, offering findings which may inform the development of policies under the 2022-2027 Section 1115 Medicaid demonstration waiver.

Methods

Design and Setting

This research was conducted as part of a larger case study exploring Oregon's Veggie Rx programs and perceptions of these programs as mechanisms to address SDoH among CCOs, seeking to answer the question: How do Oregon's CCOs perceive and utilize produce prescription (Veggie Rx) programs with regard to addressing SDoH? This portion of the research sought to address one aim of the broader study: Analyze how

Oregon's CCOs prioritize Veggie Rx programs among other programs that address SDoH, including assessing the effectiveness of, and demand for, Veggie Rx.

Case Selection

At the time of this study, there were 16 CCOs operating across Oregon. In order to contribute to the broader Oregon case study, cases selected for inclusion in this portion of the research were limited to organizations that held active CCO contracts with OHA and had service areas that included the regions served by the Veggie Rx programs that participated in the Aim 1 portion of the study. Not all CCOs recruited to participate in this study had active relationships with the Veggie Rx programs; rather, geographic proximity was used as an indicator of the potential for current or future partnerships. In the event that a Veggie Rx program included in the Aim 1 study served only one area within a county, all CCOs that operated within the county were recruited to participate in the Aim 2 study. Nine of the 16 CCOs were recruited to participate in the study. Due to the unique structure of Oregon's CCOs, it was determined during initial case selection that recruitment should be expanded to add a single IDS that provided coverage to members from one of the CCOs recruited to participate. This IDS was identified during Aim 1 of the broader study as a Veggie Rx funding partner and was determined to have knowledge that would supplement the CCO interview.

This study received approval from the Portland State University Human Research Protection Program (HRPP) Institutional Review Board and was determined to be exempt from human participants review (HRRP #238138-18).

Data Collection and Analysis

Aim 2 data collection was completed independently yet built upon the work completed as part of Aim 1. The Donabedian Model of Care Quality was used as a framework for considering the unique structures and processes involved in the decisions of individual CCOs to partner with Veggie Rx programs to offer produce prescriptions to their members, direct funding to support member participation in Veggie Rx, or allocate resources to other programs (Donabedian, 1966, 1990). When applied in the context of CCOs and Veggie Rx, the Donabedian framework helped to conceptualize the structures and processes in place at the CCO level that influenced how CCOs partnered with Veggie Rx.

Interviews with Organizational Leaders: A list of study domains was derived and operationalized from the relevant literature, and concepts of interest were identified and defined for each study domain. An interview protocol was developed based on the study domains and concepts. The purpose of the interview guide was to ask interviewees specific questions that covered a range of operational characteristics and other details about their organization. The major topics covered by the interview guide included organizational structure and processes, approach to identifying and addressing SDoH in their service areas, knowledge and/or relationship with local Veggie Rx programs, and familiarity with the 1115 waiver.

Interviews were originally intended to occur in two phases with the first round of recruitment of CCO informants based on recommendations from the Veggie Rx programs included in the Aim 1 study, and a second round of interviews with a second

staff member identified during the first round of interviews. Due to limited time for data collection and limited organizational capacity to participate in an interview, only one staff member was recruited per CCO. At the end of the interviews, each interviewee was asked to recommend additional staff members with relevant knowledge to invite to the second round of interviews; however, no additional participants were identified by interviewees. This is discussed in the Limitations section of this paper.

Where possible, CCO staff members in leadership positions with direct knowledge of Veggie Rx programs were identified during the Aim 1 interviews and introduced to the researcher via email. For organizations where an introduction was not possible, the CCO's website was used to identify a staff member with a title that indicated involvement with SDoH and organizational partnerships. Prospective interviewees were invited via email to participate in a one-hour, in-depth semi-structured interview with the researcher. Of the ten organizational representatives recruited (nine CCOs and one IDS), one declined to participate and two did not respond to the invitation or subsequent follow up communications.

Representatives from six CCOs and one IDS were included in the study, collectively referred to as "organizations" throughout this paper. One interview was conducted per organization and each interview was with a single participant, with the exception of Case 6 during which two leaders consented to participate in the interview. Interviews took place from September to November of 2023 and no incentives were provided for participation. Table 5.1 illustrates information about the cases included in

this study, including organization type and the corresponding Veggie Rx program from the Aim 1 study.

Table 5.1. Cases and Interview Participants

| Case | Organization Type | Number of Interview Participants | Identified by Veggie Rx | Corresponding Aim 1 Veggie Rx Program |
|------|-------------------|----------------------------------|-------------------------|---------------------------------------|
| 1 | CCO | 1 | No | 1 |
| 2 | CCO | 1 | Yes | 2 |
| 3 | CCO | 1 | Yes | 5 |
| 4 | CCO | 1 | No | 3 |
| 5 | CCO | 1 | Yes | |
| 6 | CCO | 2 | No | 4 |
| 7 | IDS | 1 | Yes | |

Most of the organizational leaders interviewed held managerial-level positions with oversight of community engagement. The average length of employment was eight years; half of the interviewees had been with their organization for at least a decade, or since CCOs were established in 2012.

The researcher conducted virtual interviews over Zoom, and the audio recordings were then transcribed using the Rev human transcription service. A codebook was created using Microsoft Excel to track code development following structural coding based on the interview protocol (Guest et al., 2012). Transcripts were read and coded in ATLAS.ti 23.3.0 for Mac using the codes from the Microsoft Excel codebook. Exploratory analysis, an inductive, content-driven approach, was used to analyze interview transcripts (Guest et al., 2012). Transcripts were initially reviewed for accuracy and to remove individual and organizational identifying information. Transcripts were then coded using the structural codes defined in the codebook, with additional context added from field notes where appropriate. This was followed by a

second round of coding to identify subthemes within the structural codes. A final review was conducted to refine subthemes and to identify illustrative quotes. The organizations and organizational leaders that participated in this study were assigned alphanumeric identifiers in order to protect individual and organizational confidentiality. The identifiers for interviewees have been randomized to maintain anonymity (Case 1, 2, 3, etc.) and do not correspond with the identifiers used for individual organizations (OL 1, 2, 3, etc.).

Website and Content Review: A review of publicly available websites, reports, and other documents was conducted to add context to data collected from the organizational interviews where appropriate. Originally it was anticipated that a substantial number of documents would be identified and a substantive content analysis would be conducted. However, few documents were obtained and therefore the review was less structured. Instead, the purpose of this review was to provide additional detail on the ways that the CCOs and IDS included in the study promote Veggie Rx to their members, illustrate organizational spending on programs related to addressing SDoH, and contextualize discussion of the 1115 waiver. This review included a keyword search of organizational websites, in addition to review of OHA reports on annual HRS spending, and documents pertaining to the development of the 2022-2027 1115 waiver. Keywords were identified from a review of the relevant literature and interview transcripts, they were selected to include common terms used to identify Veggie Rx programs in Oregon.

Results

Findings from the interviews are presented below with additional context from organizational websites and OHA reports added where appropriate; the key themes that emerged are discussed with illustrative quotes provided throughout. The quotes included in this paper have been edited for clarity and brevity, and redacted where necessary to preserve privacy.

Variability among CCO Structure and Operations

The organizations that participated in this study represented a wide range of operational models and served a variety of geographic areas across the state of Oregon and CCO members from diverse communities. Of the six CCOs, two occupied different regions but operated under the same parent company, and another two provided services within the same geographic area but represented different organizations. While all of the CCOs addressed the operational criteria established by OHA, the ways that the CCOs provided benefits and delivered care to their members varied considerably across organizations.

Some of the organizations provided direct services to their members, such as by operating their own medical clinics; others delivered care through contracted partnerships or IDS. Some of the organizations described their role as that of an insurer, rather than a provider of direct services, while others acted as both insurer and provider, depending on the type of services. All of the CCOs collected and relied upon community input through their CAC; however, some had additional structures for collecting community input layered over the CAC, including the use of agreements with

regional community-based health councils, partnerships with one or more IDS, a shared CAC, and multiple CACs operating within the same service area. These unique models derived from the organizational and/or geographical circumstances of each CCO that influenced how each organization could deliver care.

Addressing Social Determinants of Health and Health-Related Social Needs

Many of the interviewees described their organization's focus on SDoH as an integral piece of their operations and indicated that this predated CCO 2.0. These organizational leaders emphasized that their decisions to address underlying social and economic conditions were made out of a concern for the needs of their members and were not in response to direction from OHA, even if their approach had changed over time. *"[I]nvesting in SDoH has been a focus for us from the beginning. There may not have been the same mechanisms that exist now per our contract, but we... consistently focused on how we can best serve our members"* (OL 6). They continued:

We've always invested one way or another in social determinants of health, even before it was part of the CCO 2.0 contract. I think most CCOs did. The food security issue had come up over the years. It came up very acutely during a rural advisory council committee meeting where rural advisory council members were saying, "In my community, fresh produce is very hard to access, especially for people who are on food stamps, SNAP benefits." [W]e wanted to find some kind of solution for those communities. (OL 6)

We have found, through our conversations with community partners, that it's really that whole person care. It's not just having them go see a PCP or seeing behavioral health or get a dental cleaning; there are multiple factors that contribute to somebody's overall health. [F]rom the beginning, [we] really have valued the things outside of normal service delivery that can benefit a member's health... [W]e've prioritized grants to address local priorities to be able to fund projects that really address the SDoH and health equity side of a member's overall health. (OL 7)

Organizational leaders appreciated how the flexibility of the CCO model enabled them to continue to prioritize SDoH in their work with the goal of improving the health of their members and their broader communities. Leaders also acknowledged the importance of this work in meeting the needs of their members.

But I think that our state has given us permission to be able to spend money that way, because they are invested in the future of Oregon citizens and their health and believe ... if we're good stewards of the money and we're spending it on these SDoH, that we will see the positive health outcomes in the future... [W]e have to have faith. We have to believe in it. (OL 4)

The state of Oregon provides CCOs with general guidance pertaining to how they may invest in HRS in order to address SDoH, though the interpretation of this guidance is left up to the individual CCO and/or IDS (Oregon Health Authority, 2021b, 2022a). OHA reported that in 2022 CCOs invested \$31 million into new SHARE initiatives; in the same year, OHA approved over \$59 million in HRS spending, nearly doubling the 2021 amount of more than \$28 million (Oregon Health Authority, 2023a). The CCOs represented in this study accounted for more than 60% of both the total HRS and SHARE Initiative funding reported to OHA in 2022.

Leaders described that their organizations had to balance and navigate multiple competing priorities in their efforts to address SDoH and HRSNs within their service areas; there were several reasons for this. As expected, given the community-driven nature of the CCO model, these organizations were accountable to respond to the priorities dictated by their local communities through the CAC and, where applicable, other health councils. In some instances, this meant that CCOs were limited in the types of programs to which they could direct funding and how quickly they could respond to

changing needs within their communities. One interviewee discussed challenges related to the timing of the state-required community health assessment (CHA), which only occurs every five years.

One thing that came up was, I think our current cycle is five years, so it was published in 2019, and we'll actually publish our next one early next year. But when you have a... cycle that lasts that long, even though it allows time for a lot of thoughtfulness and project planning and things, the needs changed so much from 2019 to today... How do we then adjust to perhaps make it a shorter cycle? Maybe you just do [an annual community needs assessment and set a] priority once a year like hospitals do?... That sounds like a nightmare to be honest, but I also understand the need to be more nimble to adjust because the needs of our communities can shift really quickly. (OL 3)

Additionally, all interviewees indicated that their current top SDoH priority was housing, as part of a directive from the state which required that all CCOs direct a portion of SHARE initiative spending to housing supports (Oregon Health Authority, 2023c). While no one disputed the importance of housing as a priority, the requirement that CCOs direct resources to housing initiatives influenced how these organizations could allocate resources, in addition to what other priorities they could address simultaneously. “[We have] been involved in addressing SDoH for a long time. I think what's changing is that OHA is becoming more prescriptive about what they want to see...” (OL 5).

Well, housing is a priority because it is a statewide crisis right now ... but we don't say that housing is the only priority or the most important because I think that we as a CCO really look at the availability. And yes, we provide grants for housing through multiple channels, either brick and mortar or temporary rent assistance, things of that nature. But it's not to diminish the other areas that are also important and that we can have a more immediate impact, and then create sustainability through our programs. ... Food insecurity, though, is also a statewide crisis. I don't know if I would say housing is more important. I think

they're equally important, but I do think that there's a lot of spotlight on housing currently. (OL 7)

While acknowledging the importance of addressing SDoH and HRSN for their members, one interviewee expressed the need to support their partners in their approach, while acknowledging the extent of expectations that are placed upon the healthcare system.

[F]or whatever reason, in our country we are more comfortable investing in healthcare as a solution than we are investing in other public programs. A lot ends up put on the Medicaid system to solve, problems that frankly aren't really ours to solve, and yet we don't want to turn away from them if we're given the resources to do [something]. And so, a lot of the work that we've been doing...has been just trying to figure out how do we just support our partners. (OL 8)

Veggie Rx

The five CCOs that partnered with a Veggie Rx program (either directly or via IDS) utilized a combination of funding approaches, including HRS (both CBIs and flex funds) and SHARE Initiative funds. According to the 2022 annual SHARE Initiative spending plans on the OHA website (Oregon Health Authority, 2023c), SHARE funding was used by two of the CCOs included in this study in a way that could support existing Veggie Rx programs. The first CCO utilized SHARE initiative funds to support the entirety of the Veggie Rx program with which they partnered. The second CCO allocated SHARE funds to help build capacity with an organization that operates a Veggie Rx program within their service area.

Leaders from the organizations that supported Veggie Rx described the programs as important pieces of their SDoH work, addressing both food access and member health. *“Honestly, [Veggie Rx program name] is my gold standard. Whenever I*

talk about other programs, I'm like, 'I wish everybody just did the [program name] thing, because they are doing it right.' We're like, 'How can we help...you, so that you can serve more of our members?'" (OL 4). One interviewee shared that their partnership with the Veggie Rx program was so valued that they had recently chosen to expand their level of financial support.

[W]e've been setting aside a budget for it every year because we support it so much as a whole, regardless of the state's criteria. And this is as effective last year outside of the CHIP grant; we weren't funding it through the CHIP grant. We said, "You know what, this can be bigger. This can cover more ground if we fund Veggie Rx separately and just make a budget for it," which is what we did. (OL 2)

[A county] commissioner...came to our board meeting one day and said, "You have no idea what this program has done for our community...it has provided access to healthy foods...for people not on Medicaid, it has provided the accessibility to healthy fruits and vegetables at a reasonable price because [retailers] are getting funding from this program to have them in stock. So we have healthier, less expensive food and access to it locally, rather than having to drive 45 minutes to an hour to have access." And it was a very impactful, and I'm not doing him justice, but it was very impactful that he said that because of the program and because of [CCO] funding within our county, our whole county is benefiting from access to fresh fruits and vegetables. (OL 7)

These organizations also indicated a sense of long-term investment in these programs. The CCOs that described current support of Veggie Rx programs indicated a level of dedication to those programs and a desire to continue funding them into the future.

[W]e saw the merit in Veggie Rx a long time ago, before food insecurity was really getting pushed higher as a priority, because we were aware of our food deserts, we were aware of the lack of education around how to eat food and be nutritious and be healthy. We were aware of the chronic conditions that we're slowly climbing.... Once the [Veggie Rx program] got established here we pretty much jumped all in right away because we saw the merit in it and the fact that there wasn't anything offered like that in [location] and all the gaps that it could fill. We got on board pretty much as soon as they became a thing, and we've

been consistently staying partnered with them year in and year out just because of the fact that we're aware [that Veggie Rx] benefits the entire community and is a program that should exist in our community. (OL 2)

Given that CCO priorities are heavily influenced by community needs, interviewees were asked about the sustainability of their support for Veggie Rx and what might happen if their CACs no longer wanted to prioritize funding Veggie Rx.

[A]t the CCO level, we know that access to healthy food is very important to treat chronic conditions or to prevent chronic conditions. I think if there was a county that said [they] didn't want to fund this, it would be a question of why. (OL 7)

Another interviewee expressed that their response would likely focus on how they could adjust their Veggie Rx program to better serve the community.

We'll meet with [Veggie Rx partner] at the end of the program and we'll look at the data. How many did we serve, what were the barriers, what were the challenges, [are] there any success stories that came out of it, would we want to continue with this population or focus on a different population? (OL 6)

Of the two organizations that did not report a current relationship with a Veggie Rx program, one of the leaders interviewed explained that their decision to not provide funding to Veggie Rx for the current year was due to limited availability of flex funds for 2023; flex funds were the primary funding mechanism that the organization had used to support Veggie Rx participation for their members in past years. The interviewee described having been in contact with the local Veggie Rx program early in the year; however, the flex fund budget was exhausted prior to the beginning of the Veggie Rx season, which began in the late spring. The interviewee commented: *"I think had [Veggie Rx program] maybe circled back [with us later], we maybe would've ... but I think honestly, there's just so many competing priorities"* (OL 3). Prior to 2020 when the

Veggie Rx program took an operational pause, this CCO had provided funding to Veggie Rx for multiple subsequent years.

The second of the organizations that did not partner with Veggie Rx in 2023 provided two, interrelated reasons for this. The first was the unique way that this particular CCO allocated CBI funding which required a recommendation by their health council; the second was because of the structure of their local Veggie Rx program which was fully integrated with a different CCO. In this case, the CCO was unable to direct flex funds to be used for Veggie Rx as the program operated exclusively through a partnership with a different entity. At the same time, even if the Veggie Rx program was not exclusive to another CCO, CBI funds were allocated in a way that required direction from the community.

I think because of the way we do our community investments through the health council, it might be something that is of interest and of value to us [the CCO], but we don't direct those investments. And then the other piece that is a little bit weird is that, because Veggie RX was started by [other CCO]... it is my understanding that they don't really want us to invest in it because it's their sort of banner program... I think the only barrier is that those funding sources run through the health council and we don't direct them; it would have to be at the direction of the health council board, of which we are only one voting member.
(OL 1)

Barriers to Veggie Rx: Despite the general sentiment among organizational leaders that Veggie Rx was an effective program, barriers to successful program utilization persisted. One interviewee explained that Veggie Rx was a time intensive program and not all CCO members who enrolled were able to successfully participate.

I think people assume that if you're going to give free food, that [members will] be lined up waiting for that food. That's just not true. We find that people who need access to food have so many other battles that they are facing every single

day, whether it's housing, mental health, [or] transportation. So, picking up the free food may be very low on their priority list... [T]here has to be clinical buy-in, because the state doesn't make it easy to report out for this funding. There are forms...[with] names, diagnoses, chart notes, why, how this free food connects to their diagnoses and potentially will improve their health outcomes. All of that has to be documented for every single person. And the clinic has to document that which takes time. Recruitment takes time... educating them on how to access [Veggie Rx] takes time... submitting the documentation...takes time. (OL 4)

The interviewee also described challenges from the perspective of participating clinics and food system partners, before touching on retention.

I would say that the retention rate for our patients... is the biggest hurdle, just getting them engaged and involved and coming back every week... even [getting them to eat] what's being given to them and educating them on how to prepare it, store it, eat it, and like it. (OL 4)

Regional factors could also present challenges to successful Veggie Rx participation for CCO members; these included limited access to transportation, and lack of awareness of program and funding availability. In the state's more rural areas, participants might find it challenging to successfully participate in a Veggie Rx program if they did not have consistent access to reliable transportation, such as a vehicle to drive to produce pickup or benefit redemption locations, or dependable and accessible public transit options. A lack of awareness of program availability might keep a CCO member from enrolling in a program such as Veggie Rx, whereas a CBO might be unaware of the financial resources available through the CCO which could keep them from applying for funding for Veggie Rx and other similar programs.

[K]nowledge of resources, that usually is a pretty big hang up. People don't know that flexible services are out there unless they have been referred by our provider. People don't know the CHIP grant exists unless I drive to their business and say, "Hey, let's talk about what funding is available and what [we] might be able to do with a partnership..." Outreach is a really big deal and we do a

substantial amount of [it], but it's a rural area, and I would say that making sure that we reach the whole population is a big challenge that we're constantly battling. (OL 2)

In the case of another CCO, there were not clear barriers to the success of Veggie Rx, but rather opportunities to improve program efficiency.

We don't really encounter any barriers from the [CCO] perspective. I do believe, though, that there's always advancements, like looking at and advancing... moving away from a voucher system to a debit card system. And that would be something that would be great to have. It would be administratively efficient. And from our delivery systems, our providers that are writing the prescriptions, I know they would love it as well. (OL 7)

Veggie Rx Visibility: While most of the organizations that participated in this study had some level of investment in and/or involvement with their local Veggie Rx program, promotion and marketing of the availability of these programs was often minimal. Of the seven organizations, the four organizations that described having a direct relationship with a Veggie Rx program included mention of the program on their websites; however, the information available varied. Of these, only one of the CCOs included any direct links to information about the Veggie Rx program in a member-facing way. Two of the organizations included links to press releases that mentioned Veggie Rx; one of these also included provider-facing information about the program but did not offer member-facing information. The fourth organizational website included a link to an external article about Veggie Rx; however, finding the link required navigating through a list of media articles sorted by year. See Table 5.2 for a summary of the keyword search results.

Table 5.2. Keyword Search Results

| Keywords Searched | Case | Number of Related Results by Keyword | Type of Result | Current Relationship with Veggie Rx |
|---|------|--------------------------------------|--|-------------------------------------|
| Veggie Rx; Produce prescription; Produce Rx | 1* | 0 | -- | No |
| | 2 | 1 (Veggie Rx) | Member information with link to program | Yes |
| | 3 | 2 (all keywords) | External news article (2023) | Yes |
| | 4* | 0 | -- | No |
| | 5 | 1 (Veggie Rx, Produce Rx) | Press release (2018) | Yes |
| | 6 | 0 | -- | Through IDS |
| | 7 | 2 (Produce prescription) | Press release (2022); Provider list of flexible services programs with link to program | Yes |

* Denotes that organizations share a single website

While neither Case 1 or 4 had a current relationship with a Veggie Rx program, they shared an organizational website with a third CCO not included in this study. This third organization had a current funding relationship with a Veggie Rx program, yet despite this the shared website did not return any relevant results during the keyword search.

Waiting for Implementation of the 1115 Waiver

Approval of the 2022 1115 waiver was announced in late September of 2022; however, at the time of this study, implementation of the nutrition and food security component of the HRSN coverage had been delayed until January 2025 (Oregon Health Authority, 2023e). At the time of these interviews, only limited details were available on what the nutrition policies included within the HRSN component of the waiver would look like in practice. It was known that the HRSN services covered by the 1115 waiver would apply to CCO members in periods of life transition, including: youth ages 19-26

with special healthcare needs (e.g. diagnosed with at least one complex chronic condition, serious behavioral health issue, and/or intellectual or developmental disability), youth involved with the child welfare system, people at risk for or who are currently experiencing houselessness, Medicaid recipients transitioning to dual Medicaid and Medicare coverage, formerly incarcerated and institutionalized individuals within 12 months of release, and high risk individuals experiencing federal or state-declared weather emergencies (Oregon Health Authority, n.d.-a, 2023b). The only social risk factor required to qualify for nutrition-related HRSN coverage is an individual with marginal food security as defined by the USDA; “fruit and vegetable prescriptions” are explicitly covered in the waiver, and the limit for participation is up to six months (Oregon Health Authority, 2023b).

Interviewees indicated that their organizations were actively planning to address food and nutrition security in their communities and were considering how to establish new and/or expand existing partnerships to be ready to act once the nutrition component of the 1115 waiver is implemented in 2025. The organizational leaders voiced a wide range of perspectives with regard to the new 1115 waiver and what the new components would mean for their use of Veggie Rx. While all interviewees conveyed a sense of excitement about what the nutrition-related HRSN changes would mean for their ability to meet the needs of their service members, they had markedly different ideas about what those changes would look like once implemented.

I feel like because they're rolling that piece out last, we haven't really heard. We've heard various things, like we know that there's going to be medically-tailored meals; we know that there'd be home food delivery... But again, we're hoping fresh [foods]. We've heard things about Veggie Rx, which people could access Veggie Rx through flex funds too. Maybe the state would reimburse us for Veggie Rx instead of it coming from our global budget? But I think those types of things are still being worked out. (OL 3)

One CCO already intended to strengthen their existing relationship with their Veggie Rx program in order to meet what they expected to see in the nutrition component of the 1115 waiver.

For us, Veggie Rx is probably going to fill that HRSN contract need, because we'll be able to partner with them in order to support those priority populations that are going into the clinics with that food insecurity, pretty much all we're going to have to do is add in a layer of tracking...there's one more question outside of, "Are you food insecure?" And it'll be, "Are you a part of this priority population?" That's pretty much the only thing we have to add to do it. We were already on board, already planning to continue to pay to sustain this project. Now, with the release of the HRSN requirement, that's going to be a really great sustainability tool for Veggie Rx because we'll be able to use it to fulfill that food requirement because it's already meeting the need. We just need to add in the layer of tracking for it. (OL 2)

When discussing the potential implications of the 1115 waiver, several interviewees mentioned that, while they saw the waiver as an exciting opportunity to expand the reach of their work, doing so would also come with administrative challenges.

I think it's going to be really exciting. It's also going to be really challenging... instead of becoming a vendor, [partners have to] become a provider. There are a lot of technical issues. What does that look like? [W]e require doctors to submit claims in order to get reimbursed...but we know our farmers need money upfront to put the seed in the ground to grow the food, to feed our people. I'm not sure what that looks like. I hope that they are listening to farmers and asking farmers and thinking about that... I'm proud of Oregon to be in this space, where we are making this a benefit. So, essentially it is healthcare. It's really exciting to see what happens. (OL 4)

Another echoed the potential administrative burden that the changes covered by the 1115 waiver could mean, while also voicing concern about the potential for CBO burnout in response to the new administrative requirements.

I think the biggest thing that we have identified as a potential concern is administrative burden that [the new 1115 waiver] is going to place on CBOs that are administering this benefit... So [Veggie Rx] will be funded...under HRS as a non-covered service, but for a member that is eligible and identified in the 1115 waiver, they can't actually have that because it's now a covered benefit for them... [I]t is administratively a nightmare for our local community partners. We're looking at options to be able to support them in doing the right thing and charging it to the right bucket, but how are we going to ensure that it doesn't become such an administrative burden that they just say, "we don't want to do this anymore"? (OL 7)

Other organizational leaders expressed more of a wait-and-see approach, preferring to wait until further guidance was released by the state before moving forward. *"Our current energy is really focused on, 'How do we operationalize this body of work?' which is still in the midst of definition"* (OL 8). Other interviewees shared a similar perspective:

I don't think anyone really knows yet. There's still so much that's unknown about [the details of the 1115 waiver]. I think that as [the details are] revealed and as we figure that out, then we can make some really good decisions about what we're going to do [in response]. (OL 6)

I think that when the waiver was announced...everyone was like, "Great, the CCOs are going to pay for everything!" Like all the other CCOs, we are working closely with the state to better understand what the parameters and guidelines are for the waiver. They are all aimed at addressing SDoH in some way, shape or form, but I think it remains to be seen who will be eligible to get services through waiver programs. For example, the housing supports within the waiver. It's not every CCO member, it's members who are in transition who meet this specific description. [F]or those members who qualify for the services, it has the potential of having a great impact. It's just a narrow focus of members. (OL 1)

Another interviewee expressed questions about the anticipated stipulations of the HRSN component of the 1115 waiver and what they meant for the health system.

[T]here's this tension between wanting to both address the needs, because then they show up as healthcare needs over time; they show up as hospitalizations when folks don't have their needs met. But is the right intervention to address that root cause actually a medical intervention? Or is it an investment in something upstream? Often an upstream intervention will be the better solution, but is it really healthcare's job to do that? (OL 8)

HRSN and the Responsibility of the Health System: Interviewees were offered the opportunity to share any final thoughts on topics not covered by the interview guide. Two interviewees, representing the same organization, shared questions about SDoH, HRSN, and whether expanded coverage of HRSN could make truly meaningful progress in efforts to address SDoH. One leader described the need for CCOs to lean into the social needs work covered by the HRSN component of the waiver, while also acknowledging and supporting the efforts of CBOs and other partners that have been invested in long term initiatives intended to address SDoH.

[A]re we addressing SDoH or are we addressing social need? A lot of the things that come up through the health-related social network that we're developing now with the 1115 waiver, a lot of that really is more in the social needs space than the long-term SDoH system structure piece. I think that's an important thing to recognize, acknowledge, and wrestle with, because we have partners within our collaborative who have been fully engaged in the SDoH policy space... We as the CCO are trying to figure out that we need to do both and, how do we show up and do both? (OL 5)

Discussion

The seven organizations that participated in this study represented an array of organizational structures and approaches to prioritizing and addressing SDoH within their service areas. CCOs described a need to balance the priorities established at the

state level with the unique needs of the communities they serve as part of their strategic efforts to invest in SDoH initiatives. Veggie Rx programs were known to each of the leaders interviewed for this study; however, only five of the seven organizations described a current partnership (either directly or through an IDS) with one of the Veggie Rx programs included in the Aim 1 study. Of the two CCOs without current Veggie Rx partnerships, one had provided financial support in the past, but timing and the size of their flex fund budget (the way that they supported Veggie Rx in past years) had affected their ability to partner in 2023. Both CCO leaders indicated that they would be amenable to a future partnership.

Variability across CCOs, service areas, community priorities, and availability of resources contributed to differences in the way that the organizations chose to support and partner with Veggie Rx programs. These factors represent the variety of structures and processes addressed by the Donabedian model, previously discussed. While two CCOs did not currently partner with a Veggie Rx program, leaders from both organizations indicated an openness to do so in the future; however, availability of funding and the need for approval by the local community health council limited their ability to pursue such partnerships at this time.

Given the emphasis that CCOs place on input from their communities through CACs and other councils, efforts to advocate on behalf of Veggie Rx and other novel programs may find greater success by appealing to these community-based entities. To this end, community education may be an effective tool for Veggie Rx to increase visibility among community members which could potentially translate into interest at

the CCO level. However, the limited staff capacity among Veggie Rx programs (discussed in Aim 1) may hinder the ability of these programs to engage in the additional outreach necessary to increase program visibility in a meaningful way which translates into further CCO support. While CCOs may not prioritize marketing/publicizing program availability, these actions may help raise Veggie Rx visibility and awareness among their members. In addition, promoting program availability of and/or funding coverage of these programs on organizational websites could potentially support increased participation. Additionally, with HRSN coverage for Veggie Rx beginning in 2025, providing transparency about program availability may mitigate the potential for member appeals.

Another important consideration for CCOs with regard to Veggie Rx program partnerships is the need to weigh the mission of the Veggie Rx program against the priorities of the health system organization and relevant voices from the community. Some of Oregon's Veggie Rx programs have indicated a desire to move away from the "medical model" often associated with produce prescriptions; this may be incongruent with the needs of the CCOs which must generally tie programs to health outcomes, depending on the funding source utilized. Given that OHA leaves the interpretation of guidance regarding HRS funding up to the individual CCO and/or IDS, CCOs may consider making their interpretation of funding parameters clearly available for Veggie Rx programs and other CBOs to ensure that program operational models and goals align with the health system organization's interpretation of the expectations established by OHA (Oregon Health Authority, 2021b, 2022a).

It may also be beneficial for CCOs open to partnering or expanding their partnership with Veggie Rx programs to engage in discussion with CBOs and other organizations/institutions that already offer (or could offer) these programs to determine what a successful and sustainable Veggie Rx program could look like from both CCO and outside organization perspectives. This recommendation is supported by findings from the literature, where prior research has found that including interested parties, such as health system partners, in program design was critical to support successful clinical referrals and payment processing (Auvinen et al., 2022). For CCOs with a shared service area, there may be opportunities for collaboration between organizations to increase funding sustainability for existing Veggie Rx programs, while reaching additional CCO members through pooled resources. Similarly, CCOs that operate under the same parent organization may be able to learn from each other and adapt successful collaborations with Veggie Rx to their own communities.

Participation in a Veggie Rx program may support efforts to achieve the Triple Aim and increase patient member engagement with the healthcare system (Auvinen et al., 2022; Stotz et al., 2022). However, some organizational leaders noted challenges related to member participation in Veggie Rx, including limited program awareness, unreliable transportation, and program retention. It will be important for organizations that offer Veggie Rx as an option to their members to take steps to support successful member participation and reduce barriers to participation wherever possible. CCOs and other organizations supporting Veggie Rx may increase program awareness by providing member-facing information on their websites, including eligibility requirements and

application information. While some of the Veggie Rx programs interviewed in Aim 1 of this study reported offering transportation support for participants, CCOs may have additional resources available to supplement access for members and/or be able to allocate funding to strengthen transportation supports that already exist. Improving and expanding transportation and/or delivery support is critical to successful participation in a produce prescription program (Little et al., 2022; Newman et al., 2022).

Oregon identified poor nutrition as one of four modifiable risk factors for chronic disease to be prioritized by the OHA as part of the state’s 2017-2025 strategic plan (Oregon Health Authority, 2017). This strategic plan specified that CCOs, state and local agencies, and other healthcare facilities should adopt policies that support access to nutritious foods for all Oregonians (Oregon Health Authority, 2017). While the state strategic plan focused on poor nutrition in terms of excess consumption of sugar sweetened beverages, the 2020-2024 State Health Improvement Plan (SHIP) identified increasing equitable access to healthy foods, specifically FVs, as a key goal for Healthier Together Oregon (Oregon Health Authority, 2020a). Healthier Together Oregon also calls for “maximum investments and collaboration for food interventions,” indicating an interest among state leadership in supporting and expanding the utilization of Veggie Rx (Oregon Health Authority, 2020a, p. 24). Further, in its actions to address food insecurity, the SHIP prioritizes building a resilient food system⁶ to support access to affordable FVs statewide (Oregon Health Authority, 2020a). Produce prescriptions are

⁶ A “resilient food system” is defined as “the ability to produce and access nutritious and culturally acceptable food in the face of disturbance or change” (Oregon Health Authority, 2020a, p. 32).

often associated with supporting local food systems and most Veggie Rx programs partner directly with food systems which could help support the goals established in Healthier Together Oregon (Oregon Community Food Systems Network, 2021b).

While the HRS component of CCO 2.0 gave organizations a clearer path to address nutrition and food access among CCO members, the new 1115 waiver has the potential to reach additional populations that may not previously have had access to Veggie Rx or other similar programs. CCO membership has grown steadily since 2019, indicating the potential for policy changes through the 1115 waiver to have broader impacts over the full waiver period and beyond. To this end, HRSN coverage of Veggie Rx may support efforts to achieve the goals outlined in the SHIP and state strategic plan.

Medicaid 1115 waivers have been identified in the literature as a potential source of sustainable funding for Veggie Rx programs (Auvinen et al., 2022; Garfield et al., 2021). While Oregon's 2022-2027 1115 waiver includes produce prescriptions as a coverable HRSN service, the extent to which this aspect of the waiver will impact Veggie Rx participation and CCO coverage of these programs is still unknown and will necessitate future evaluation. The details of the nutrition-specific HRSN policies were not available at the time of this study pending further information to be released by the OHA; however, interviews with CCO leaders revealed a variety of responses to the existing information about the nutrition-specific HRSN coverage.

Based on information derived from interviews, it is likely that the nutrition-related changes to the 1115 waiver may have unintended consequences for CCOs, IDS partners, and CBOs delivering Veggie Rx programs. The primary consequence of concern

expressed during the interviews was that of increased administrative burden on both the health system and on CBO partners that would now need to account for an additional set of rules pertaining to who qualifies for what services, how those services must be billed, and the duration of program eligibility. As OHA establishes detailed policies for the 1115 waiver implementation, consideration should be given to the potential effects that these policies may have on Veggie Rx and similar nutrition-focused programs operated by CBOs. For example, Veggie Rx programs that serve CCO members based on food insecurity alone without requiring a health-related diagnosis to determine program eligibility may encounter complicated rules regarding billing should some participants be eligible for coverage through the HRSN benefit.

Additionally, time limits for participation in Veggie Rx under the HRSN benefit may present challenges for Veggie Rx programs and CCOs. Based on the amount of time required for improvements to diet-related health outcomes to be realized through participation in Veggie Rx, the six month time limit for CCO member participation may not be sufficient for members that receive services through the HRSN provision of the waiver to see long term health-related benefits such as disease prevention or sustained behavior change (Johnson et al., 2023; Rodriguez et al., 2021). For example, results from a recent study using a microsimulation model suggest that annual produce prescription benefits could contribute to reductions in cardiovascular disease-related events over a five, ten, and 25 year lifetime (Wang et al., 2023). Similarly, Veggie Rx participants who are enrolled due to food insecurity in the absence of, or in addition to, diet-related illness may not have the root cause of their HRSN addressed over the program period,

resulting in loss of access to FVs when their six-month participation period concludes. While some nutrition interventions included in the HRSN coverage protocol, specifically prepared meals and pantry stocking services, are eligible for additional six-month renewals upon state approval, Veggie Rx is not expressly available for renewal if the member still demonstrates need in the current version of the HRSN protocol (Oregon Health Authority, 2024). In lieu of a path to extending Veggie Rx enrollment, CCO members may conclude participation without actually addressing their underlying condition of food insecurity.

Since SHARE funds may not be spent on Medicaid-covered services or any services/benefits covered by Oregon's new 1115 Medicaid demonstration waiver, Veggie Rx programs will need to give additional consideration to the populations that their services target, as members who receive coverage through the HRSN component of the 1115 waiver would be ineligible for participation in a Veggie Rx program supported exclusively by SHARE initiative funding (Oregon Health Authority, 2023c). For Veggie Rx programs that provide benefits to participants on an annual basis, the six-month time limit for members who receive coverage through the 1115 waiver could be a challenging administrative burden and/or limit the number of HRSN participants that the program is able to support. These challenges would likely also affect the CCOs that operate their own Veggie Rx programs as they may need to dedicate additional oversight to tracking participation time.

Further, participation in a Veggie Rx program may not be appropriate or ideal for all populations approved for HRSN coverage through the 1115 waiver, as individuals in

life transitions may have priorities better addressed by other programs, such as medically-tailored meals which may be more convenient compared to a program such as Veggie Rx which requires added effort on the part of the participant to make meals from the food provided. While the inclusion of Veggie Rx in the 1115 waiver is an important step forward for program visibility, questions remain regarding what the implementation process will look like in practice.

Limitations

This study involved primary data collection in the form of semi-structured interviews with organization leaders. To increase participation of organizational leaders, interviews were limited to one hour each which restricted the number of topics that could be covered in the interview, as well as the detail in which each topic could be addressed by the interviewee. In order to account for this, topics addressed in the interviews were identified by a review of the relevant literature in order to maximize the utility of each question. While necessitated by the design of a dissertation study, the use of a single coder for analysis of the interview transcripts is another limitation of this work. Only the researcher coded each interview transcript. The use of structural coding with the interview guide as a coding template was intended to mitigate this limitation.

The focus on Veggie Rx as part of the broader dissertation study created an unanticipated limitation during the data collection for this study; while recruitment was intended to convey an interest in speaking to leaders with knowledge of the organization's approach to SDoH regardless of specific knowledge of Veggie Rx, the emphasis of Veggie Rx in the recruitment protocol contributed to the impression that

interviewees were required to have detailed Veggie Rx knowledge. While the intention of the researcher was to recruit multiple interview participants from each organization, leaders who participated in an interview were hesitant to recommend additional participants due to the limited number of staff members within the organization who had direct knowledge of local Veggie Rx programs. In some instances, participants expressed concern during the recruitment phase of the study that they would be unable to provide sufficient information in response to the interview guide.

A notable limitation of this work is the limited generalizability of findings. On more than one occasion an interviewee used the phrase “when you’ve seen one CCO, you’ve seen one CCO,” reinforcing the variability across CCOs. While findings from this study may offer insight into the operations of six of Oregon’s 16 CCOs, they are not necessarily generalizable to the ten that did not participate, and these findings may not translate to other states with different models of Medicaid delivery. However, given the exploratory nature of this study, the intent was to capture information about a topic with limited existing research. Insights about the provision of a produce prescription program and potential benefits for participant food security and health outcomes may offer general applicability. Despite these limitations, this case study offers novel insights into the utilization and perception of Veggie Rx among a subset of Oregon’s CCOs. At a minimum, this study should offer value to both Veggie Rx programs and CCOs, as well as a snapshot of existing partnerships prior to implementation of the nutrition component of the 1115 waiver.

Conclusion

This exploratory, multiple-case study described Oregon Veggie Rx programs and how participation in those programs affected food security and health outcomes for some program participants. This research was conducted as part of a larger dissertation study to answer the question: How do Oregon's CCOs perceive and utilize produce prescription (Veggie Rx) programs with regard to addressing SDoH? Despite the limitations described above, this study offers an important contribution to the literature by expanding what is known about the relationships of CCOs with produce prescription programs operating in the state of Oregon.

Findings from this aim of the broader study reveal wide variation in the way that Oregon's CCOs utilize and support Veggie Rx in their work to address SDoH for their members of the state Medicaid population. While Oregon's CCOs are dedicated to meeting the expectations established by OHA in terms of investment in programs that address HRSN and SDoH, organizational interpretation of state guidelines resulted in regional variation in prioritization of Veggie Rx programs as a potential approach to addressing food and nutrition security and diet-related chronic illness. Participation in a Veggie Rx program may support Oregon's efforts to achieve the Triple Aim and increase individual engagement with the healthcare system; however, differences in how each CCO approached Veggie Rx engagement and funding contributed to uneven adoption of Veggie Rx across the state and, in some cases, limited the availability of produce prescription programs for CCO members. Limited availability of information pertaining to HRSN policy implementation resulted in lingering questions from health system

leaders and CBOs alike. CCOs may benefit from state-level guidance with regard to investment in Veggie Rx programs, including how to maximize various funding streams to support CCO and community members in accessing Veggie Rx programs to support nutrition security and contribute to improving both individual and population health. Oregon's 2022-2027 Medicaid 1115 waiver holds promise for how CCOs may in future direct funding to Veggie Rx and support member participation in these programs.

Chapter Six – Lessons from a Case Study of Produce Prescriptions and Medicaid in Oregon

Introduction

Poor nutrition is the single leading cause of chronic illness in the US where diet-related health conditions annually account for more than 600,000 deaths (National Center for Health Statistics, 2021). Produce prescription programs offer an intervention to improve health and potentially prevent diet-related illness by strengthening food security and increasing access to fresh fruits and vegetables through partnerships among health and food systems, community-based organizations, and other interested parties. However, challenges to program success persist, including limited sustainability of funding and barriers to individual or household participation.

Produce prescription programs, regionally known as “Veggie Rx,” have operated in Oregon since 2014 (Oregon Community Food Systems Network, 2021b). Oregon’s 2022-2027 Section 1115 Demonstration Medicaid waiver includes coverage of certain health-related social needs (HRSN) pertaining to housing, climate, and nutrition for select member groups covered by the Oregon Health Plan (OHP; Oregon Medicaid). Veggie Rx as an evidence-based nutrition support is among the HRSNs approved in the 1115 waiver (Oregon Health Authority, 2022b). While the inclusion of these programs as covered HRSNs presents a foundation for Veggie Rx to receive formalized support from the health system, questions remain regarding what coverage will look like in practice, how Oregon’s coordinated care organizations (CCOs) will partner with Veggie Rx programs, and how coverage will impact existing programs. This manuscript synthesizes

findings from a case study of Veggie Rx and Oregon’s CCOs to offer policy recommendations to strengthen program sustainability and utilization into the future.

Background

Food insecurity, the condition of having limited or uncertain availability of or access to appropriate food, is a notable social determinant of health (SDoH) with major implications for health systems (Anderson, 1990; Gundersen & Ziliak, 2015; Jia et al., 2021; Tarasuk et al., 2015). Between 2020 and 2022, approximately 11.2% of households in Oregon were food insecure, an increase from 9.1% of households between 2018 and 2020 (Edwards & Beck, 2022; Edwards & McElhaney, 2023). Those who are food insecure typically have less ability to access nutritious foods, including fruits and vegetables (FVs), which can result in unhealthy eating behaviors and contributes to poor dietary quality (Gregory et al., 2019). Nutrition security takes each of these factors into account by considering both an individual’s access to food and the nutritional content of the foods consumed.

Nutrition Insecurity and Diet-Related Illness

Nutrition security is the condition of having stable access, availability, affordability, and utilization of foods, in a manner that is equitable and supports well-being, prevention, and, when necessary, the treatment of disease (Ingram, 2020; Mozaffarian et al., 2021; Thorndike et al., 2022; USDA Food and Nutrition Service, 2022). In Oregon, diet-related illnesses account for a considerable number of deaths each year, with heart disease consistently ranked as the state’s second leading cause of death after cancers (Oregon Health Authority Center for Health Statistics, 2022). Prior to the onset

of COVID-19, diet-related illnesses (heart disease, diabetes, and hypertension) accounted for three of Oregon's ten leading causes of death (Oregon Health Authority Center for Health Statistics, 2022).

A lack of food security is associated with poor overall health, affecting physical, mental, and oral health (Carson & Boege, 2020; Gundersen & Ziliak, 2015; Tarasuk, 2004). Food and nutrition security are also strong predictors of high healthcare costs and utilization (Jia et al., 2021; Seligman et al., 2014; Tarasuk et al., 2015; *The Impact of Poverty, Food Insecurity, and Poor Nutrition on Health and Well-Being*, 2017). This places a substantial burden on health systems which must treat diet-related health conditions, requiring extensive resources to treat chronic diseases that may have been managed or prevented with early intervention (Cook & Poblacion, 2016; Gregory & Coleman-Jensen, 2017; Gundersen & Ziliak, 2015; Jardim et al., 2019; McBrien et al., 2013).

Produce prescription programs enable clinical and non-clinical health systems staff to prescribe fresh produce to patients at risk for, or with a diagnosis of, a diet-related health condition, with a low household income, and/or who are experiencing nutrition insecurity (Gretchen Swanson Center for Nutrition, 2021; Swartz, 2018). These programs can offer a means of bringing together interested parties across food and health systems to build shared understanding in support of improving household food insecurity through the prescription of FVs (USDA National Institute of Food & Agriculture, 2022b). Health system interventions that target nutrition security have been shown to improve chronic health conditions and reduce healthcare costs

(Berkowitz et al., 2014, 2015, 2018; Berkowitz, O’Neill, et al., 2019; Y. Lee et al., 2019). However, while “food is medicine” interventions used within the health system to address nutrition security have gained traction in recent years, their use remains limited, which may be related to the length of time that such programs require before many target outcomes can be realized, including reduced healthcare spending and incidence of chronic disease (Barnidge et al., 2020; Choi et al., 2017; Thorndike et al., 2022).

Nutrition Security and Oregon Health Systems Transformation

Since 2012, Oregon has provided health services and insurance coverage to state Medicaid recipients via CCOs, a unique financing and delivery model intended to support state efforts to achieve the Triple Aim goals of reducing healthcare spending while improving individual care quality and population health outcomes (Berwick et al., 2008; McConnell, 2016; Oregon Health Authority Health Policy & Analytics Division, 2018; Oregon Health Policy Board, 2012). CCOs are unique to Oregon, and are locally governed entities comprised of networks of health service providers working collaboratively to provide health services to their members (Oregon Health Authority, n.d.-c). CCOs rely on cross-sectoral partnerships to support care delivery, and decision-making is shared among health systems, providers, CCO members, and the broader community (Crumley & Houston, 2019).

Beginning in 2018, Oregon’s CCOs were mandated to invest in initiatives intended to address SDoH and the HRSN of their members (Oregon Health Authority Health Policy & Analytics Division, 2018). CCOs may fund SDoH initiatives in several ways

including: health-related services (HRS), which includes flexible services (“flex funds”) and community benefit initiatives; and Supporting Health for All through Reinvestment (SHARE) initiatives. HRS may be used to finance non-healthcare services not covered by Medicaid; flex funds are available for individual CCO members, while community benefit initiatives are intended to support services that benefit the communities of CCO members more broadly without targeting members specifically (Oregon Health Authority, 2021b, 2021a, 2022a). Added in 2020, SHARE initiatives direct CCOs to reinvest a portion of their profits into initiatives that address SDoH and are not directly related to healthcare (Oregon Health Authority, 2023c).

CCOs are financially incentivized, though not required, to spend part of their annual budgets on HRS, while investing in SHARE initiatives is legislatively required for CCOs that exceed a certain level of profit (Oregon Health Authority, 2022a, 2023c). While CCOs are encouraged by the state to “braid funding streams,” defined as combining multiple separate funding sources together to support a single goal (Oregon Health Authority Health Systems Division, 2020), neither HRS nor SHARE initiative funding may be spent on services covered by Medicaid (Oregon Health Authority, 2021b, 2023c). Oregon’s 2022-2027 1115 Medicaid Demonstration waiver, approved by the Federal government in late 2022, increased the existing scope of coverage for HRSN, adding certain nutrition-related, evidence-based HRSN as benefits for specific member populations (Oregon Health Authority, n.d.-a).

The 2022-2027 1115 waiver permits one-time coverage for up to six months of participation in a Veggie Rx program as a nutrition support for CCO members

experiencing food insecurity, provided they belonged to an eligible population. These populations include: young adults ages 19-26 with special healthcare needs, youth and adults discharged from an institutional setting or released from a correctional facility, youth involved with the child welfare system, individuals transitioning from Medicaid to dual Medicaid and Medicare eligibility, individuals at risk of or experiencing houselessness, and individuals with a high risk clinical need residing in an area experiencing extreme weather (Oregon Health Authority, 2023b).

Oregon Veggie Rx

Veggie Rx programs have operated in Oregon since 2014, collaborating through the Oregon Community Food Systems Network (OCFSN) to share information and support statewide program success (Oregon Community Food Systems Network, 2021b). As a collective, the OCFSN defines Veggie Rx as “a medical treatment or preventive service for patients,” following the same eligibility criteria outlined under the GusNIP Produce Prescription Program (PPR) grant guidelines (Oregon Community Food Systems Network, 2021b; USDA National Institute of Food & Agriculture, 2022a). However, a feature of Veggie Rx in Oregon, and produce prescription programs more generally, is an emphasis on program flexibility to meet the unique needs of the communities in which these programs operate. While Veggie Rx programs have shared goals of increasing the consumption of FVs and improving or preventing diet-related health conditions, there is variation in program-level emphasis on clinical diagnoses as a requirement for referral. Most, although not all, Veggie Rx programs receive some

amount of funding from their local CCO; the level and type of support has varied both across and within programs over time.

With the expansion of HRSN coverage to include Veggie Rx for some member populations, in future CCOs will be required to directly offer or have partnerships in place to offer Veggie Rx as an intervention for eligible members. Although coverage for nutrition services under the HRSN component of the 1115 waiver has been delayed until January of 2025, emerging details about coverage for Veggie Rx have slowly been made available (Oregon Health Authority, 2023b, 2023d, 2024). The implementation of nutrition services coverage raises questions regarding what implementation will mean for Veggie Rx programs, CCOs, and the existing and potential future program partnerships.

Methods

This research was conducted as part of a broader, mixed methods case study exploring Oregon's Veggie Rx programs and perceptions of these programs as mechanisms to address SDoH among CCOs, seeking to answer the question: How do Oregon's CCOs perceive and utilize produce prescription (Veggie Rx) programs with regard to addressing SDoH? This portion of the study utilized a qualitative approach to address one aim of the broader study: Compare and contrast elements of Veggie Rx programs with CCO perceptions and utilization of these programs. This study received approval from the Portland State University Human Research Protection Program (HRPP) Institutional Review Board and was determined to be exempt from human participants review (HRRP #238138-18).

Oregon Case Study

The study took place in Oregon and utilized data collected in two distinct phases to pair cases of Veggie Rx programs with geographically proximal CCOs. This manuscript reports findings from secondary analysis of qualitative findings from prior phases of the parent case study. The findings highlighted in this study emphasize the major themes that arose consistently across both the Veggie Rx and CCO interviews, supplemented and contextualized by additional key informant interviews.

Data Collection and Analysis

In an effort to understand the perspectives of the key interested parties involved in the operation and financing of Veggie Rx programs, data for this study were collected through in-depth, semi-structured interviews with Veggie Rx program and CCO leaders, in addition to other key informants with knowledge of partnerships between Veggie Rx programs and CCOs, or the potential for such partnerships. At the time of this research, the OCFSN reported 10 Veggie Rx programs operating in Oregon, and OHA had contracted with 16 CCOs. For this case study, the CCO(s) operating in the same geographic region as the Veggie Rx programs were identified to determine the study population, regardless of whether the CCO had a current relationship with the Veggie Rx program.

A third phase of interviews was conducted with other key informants for this specific study aim to provide additional context and expand the perspectives captured in the findings from the first and second phases. Key informants were identified via snowball sampling of participants during the first two research phases, and through

review of staff directories on organizational websites based on the researcher’s knowledge of Veggie Rx. Key informants were recruited by email to participate in a virtual, hour-long video interview conducted over Zoom. Recruitment for the first and second phases of the study has been described previously in this dissertation.

Interviewees volunteered their time and were not compensated for participation.

Eighteen interviews were conducted between July 2023 and January 2024 with 19 participants across all study phases, representing five Veggie Rx programs, seven CCOs and affiliated organizations, and six additional key informants. The additional key informants who participated in this study included a former Veggie Rx program manager with knowledge of the OCFSN and current Veggie Rx activities; a community health program manager from a large health system and CCO-contracted independent delivery system with knowledge of nutrition security initiatives, including Veggie Rx; a provider of technical assistance to CCOs related to SDoH and HRSN funding; the program director of an additional Veggie Rx program that did not meet all inclusion criteria for the first research phase; an SDoH health system strategist managing the clinic side of a Veggie Rx partnership; and a state-level policy advisor with knowledge of SDoH and health systems transformation. All key informants had been in their role for at least one year, with an overall average of more than three years in their respective roles.

Table 6.1. Study Interviews

| Study Phase | Interview Type | Number of Interviews | Number of Interviewees |
|-------------|-------------------|----------------------|------------------------|
| Phase 1 | Veggie Rx Program | 5 | 5 |
| Phase 2 | CCO | 7 | 8 |
| Phase 3 | Key Informant | 6 | 6 |
| Total | | 18 | 19 |

A list of study domains was derived and operationalized from the relevant literature; concepts of interest were identified and defined for each study domain. Interview protocols were developed based on the study domains and concepts and tailored to each type of interview (Veggie Rx, CCO, and key informant) as has been described previously in this dissertation. The same procedures for analysis and thematic development were used in the third phase as previously described for the first two phases and are repeated here. All interviews were recorded and transcribed using the Rev human transcription service.

Following transcription, a codebook was created using Microsoft Excel to track code development following structural coding based on the interview protocols (Guest et al., 2012). Interview transcripts were read and coded in ATLAS.ti 23.3.0 for Mac using the codes from the Microsoft Excel codebook. Exploratory analysis, an inductive, content-driven approach, was used to analyze interview transcripts (Guest et al., 2012). Transcripts were reviewed for accuracy and to remove individual and organizational identifying information to protect anonymity before being coded using the structural codes defined in the codebook, with additional context added from field notes where appropriate. A second round of coding was completed to identify subthemes, and a final review was conducted to refine subthemes and to identify illustrative quotes. Interview findings from the first and second phases of the research were reviewed to identify overarching themes that arose through the coding. Codes were included if they were prominent across all three phases of the study.

Key informants were assigned alphanumeric identifiers in order to protect individual and organizational confidentiality. The identifiers for interviewees were randomized to maintain anonymity and do not correspond with identifiers used for individual organizations.

Conceptual Frameworks

The analysis draws upon two conceptual frameworks to synthesize case study findings and offer policy recommendations: the Donabedian Model for Evaluating the Quality of Medical Care and the Andersen Behavioral Model of Health Services. The Donabedian model articulates how structures, processes, and outcomes collectively contribute to quality within health services (Donabedian, 1966, 1990), while the Andersen model, developed originally by Aday and Andersen (1974) and revised by Andersen (1995), illustrates the myriad of factors that influence individual health and determinants of individual utilization of health services.

The Andersen model overlaps with the Donabedian model in its emphasis on both process and outcome measures in the evaluation of access to health services; however, in contrast with the Donabedian model, utilization is the primary measure of access to services (Aday & Andersen, 1974; Andersen et al., 1983). While outcome measures alone may be useful in evaluating care or service quality, they are limited by their level of relevance in relation to the goals of the care or service that is provided; therefore, structural and process measures acknowledge the environmental factors that need to be considered (Donabedian, 1966). Additionally, outcomes may not be

immediately apparent and do not necessarily rule out the involvement of other factors (Donabedian, 1966).

The Donabedian model offers a framework for considering the unique structures and processes involved in the delivery of Veggie Rx programs for CCOs that collectively contribute to the experience of quality in health services, while the Andersen framework conceptualizes how health policy affects access to these programs through the effect of policies on CCOs and their members.

Results

Several key themes emerged throughout interviews with the Veggie Rx program and CCO leaders, later reinforced by conversations with key informants: flexibility, program fit, barriers to success, and considerations for HRSN coverage. Supporting quotes have been included elsewhere in this dissertation, therefore only the themes themselves are discussed here; since the emphasis is on synthesis of findings to identify emerging themes, no attempt has been made to report the number of quotes that contributed to each theme.

Theme 1: Flexibility

The importance of flexibility was critical, and a prominent theme across the interviews of both CCOs and Veggie Rx programs included in this case study. Veggie Rx program representatives described flexibility as having the ability to adapt the design of their program operations to meet the unique needs of the communities in the regions they serve. CCOs required flexibility for similar reasons, as the CCO model itself is designed to offer these organizations substantial flexibility in meeting requirements in

ways that translate to meet the needs of the members residing within their service areas.

Flexibility was important to the work of Veggie Rx programs and was highlighted by wide ranging variation in how each program structured and delivered benefits to participants. Most of the Veggie Rx program leaders described changing certain aspects of their programs over time in response to participant or community feedback, indicating a level of responsiveness that was integral to program operations and goal attainment. Given that Veggie Rx programs operated in unique geographic regions across Oregon, program leaders indicated that it was necessary to have the flexibility to adapt program elements to their specific contexts and the needs of local communities. Relatedly, Veggie Rx programs evolved over time as leaders implemented changes intended to improve participant experience and reduce barriers to engagement. The need to adapt program elements to reduce barriers for participants was also highlighted in discussion of the COVID-19 pandemic, which required several Veggie Rx programs to adapt operational models to prioritize contactless delivery of benefits (such as through DoorDash). For the Veggie Rx programs that trialed direct-to-consumer delivery during the pandemic, in some cases these changes have continued to be refined as programs described an increase in benefit redemption and found that many participants preferred the convenience offered by a delivery model.

For CCOs, flexibility was discussed in the context of the organizations' ability to allocate funding to programs such as Veggie Rx as part of their approach to addressing SDoH. While CCOs generally appreciated the flexibility, they had with regard to the ways

they were able to respond to the needs of the communities within their service areas, in some cases these organizations were also limited by the priorities established by their community advisory councils. CCO leaders described that, if nutrition security had not been identified as a community priority as part of the local community health improvement plan (CHIP), the organization could be limited in the financial mechanisms available to support Veggie Rx. While CCOs may use HRS flex funds to support participation in Veggie Rx on an individual member basis, these may amount to a minimal amount of support that may not be compatible with all Veggie Rx programs. OHA requires that both community benefit initiatives and SHARE funds align with the priorities outlined in the CHIP, in addition to following any directives from state leadership regarding specific priorities, such as the current (2024) statewide prioritization of housing-related services. In the case of Veggie Rx, CCOs may be limited in their ability to support and/or the level of support they can provide to Veggie Rx programs, even where the use of Veggie Rx is of interest to the CCO and its members.

When considered across all interview groups, flexibility was an important theme that came up for both Veggie Rx program and CCO leaders for similar reasons. Veggie Rx program leaders discussed the importance of having flexibility to adapt program components to meet the needs of their participants, while CCOs described limitations that existed within the inherent flexibility of the CCO model.

Theme 2: Program Fit

The second theme was the importance of determining program fit. In the context of this paper, “fit” refers to the perceived match between a Veggie Rx program

and the participant, and the idea of fit between the Veggie Rx program and local CCO(s) is discussed.

Interviewees across all three interviewee groups discussed the idea of identifying the correct fit between Veggie Rx programs and participants as a critical factor to achieving program goals and supporting successful participation and engagement. Interviewees expressed that while Veggie Rx programs can support participants in improving their health and increasing their consumption of fruits and vegetables, participation in these programs may not be appropriate for everyone who meets eligibility criteria. Veggie Rx was viewed as one of many tools that could be used to address nutrition security; while it may be effective for many, it cannot meet every need and may be too specific for some participants.

Successful Veggie Rx participation may be hindered by a multitude of barriers, such as unreliable transportation or incongruence with lifestyle or dietary preferences. While Veggie Rx programs may offer resources to address some of these barriers, it is important to enroll participants who are willing and able to utilize program benefits. To support participant fit, interviewees discussed the importance of adequate staff education for clinic partners providing Veggie Rx referrals. Referring staff members needed to be thoroughly trained in the specifics of the program and able to assess whether a potential participant was likely to encounter barriers that would hinder successful engagement. Additionally, program and clinic staff need to proactively identify barriers to individual/household participation and seek appropriate solutions.

Not all Veggie Rx programs described taking a fit-focused approach to participant recruitment, as some Veggie Rx programs preferred to operate a model that provided benefits to the largest possible number of participants. However, program fit was still important to these programs, it was simply approached differently. For these programs, the importance of program fit was relevant to the structure of the program itself and the mechanism of benefits provided to participants. These programs emphasized the need to meet the needs of the specific communities that they served, resulting in less restrictive eligibility criteria and a larger number of redemption options for program benefits.

The idea of establishing program fit also extended to the relationship between Veggie Rx and CCOs. Veggie Rx programs do not adhere to a single operational model, and while programs may share similar goals of improving participant health, not all programs require referral through the health system or a diet-related health diagnosis to be eligible to participate. Additionally, not all programs prioritized the collection of biometric data from participants or required follow-up visits post-participation; some instead only measured changes in food security and fruit and vegetable intake. These programs could be viewed as not aligned with the goals of CCOs which are typically focused on collecting health data to track and measure outcomes (and are mandated to collect such data for reporting on key metrics to OHA). Therefore, these programs may be less likely to seek and/or receive funding through the health system, even if program outcomes are the same as those with more clinic-focused referral and tracking.

Theme 3: Barriers to Success

The third theme was the existence of barriers to Veggie Rx success and the need to take steps to address and mitigate those barriers. Barriers were described in two primary categories: those affecting the success of the Veggie Rx programs themselves, and those encountered by program participants. These barriers can be classified as structural, process, and personal.

Structural barriers most often applied to program participants and included: unavailable or unreliable transportation to redeem program benefits, limited locations for redemption and/or limited availability of produce at retail outlets, lack of awareness and knowledge of Veggie Rx, and stigma associated with program participation. Structural barriers specific to the Veggie Rx programs included availability of technology and program infrastructure, in addition to program operational cost.

Process-related barriers included limited clinic partners and clinic capacity which negatively affected Veggie Rx referrals through the health system, as well as limited funding sustainability and program financial support which made it difficult for programs to increase internal capacity. Personal barriers to participation included: limited time to prepare or a lack of familiarity with the foods received, a lack of participant engagement with the program, and competing life priorities limiting individual ability to engage. Personal barriers were typically related to the perception of identifying program fit and therefore could not always be mitigated, while structural and process barriers could potentially be addressed by providing support and/or resources to participants and clinics. However, addressing process-related barriers also

required support from the health system, meaning that Veggie Rx programs could not necessarily resolve them without the support of external partners.

In order to achieve program goals and support successful participation, Veggie Rx programs must account for a wide range of barriers at the program and individual/household levels. While some of these barriers could be mitigated through prioritizing program fit, identifying and implementing effective solutions to all requires cross-sectoral support.

Theme 4: Considerations for HRSN Coverage

The final theme to emerge across interviews was the new Oregon 1115 Medicaid waiver and the impending HRSN coverage for Veggie Rx program participation. While all interviewees were aware of these changes to HRSN coverage, delays in state-provided details on program implementation resulted in varied reactions and expectations among Veggie Rx and CCO leadership. Interviewees expressed a range of expectations for HRSN coverage, including excitement, cautious optimism, skepticism, and frustration.

While some programs expected that OHP coverage of Veggie Rx would support increased capacity and program sustainability, others anticipated being less impacted by HRSN coverage, depending on the communities served by the program and whether they included populations covered by the waiver. Concerns over administrative challenges for both Veggie Rx programs and CCOs were also raised during interviews, as coverage for Veggie Rx as a nutrition support would mean that any community-based organization (CBO) delivering a Veggie Rx program would now be required to become established as a CCO service provider. Questions were raised regarding how intentional

the nutrition support component and inclusion of Veggie Rx programs as a covered service had been, as the six-month time limit would not align with all existing programs which operated with notably different durations. It was also raised that the specific populations to which HRSN coverage would apply may not be the most ideal clients for existing Veggie Rx programs, given that populations in periods of transition may have competing HRSNs and/or lack the capacity to fully participate.

A final concern was the medicalization of social needs and the perceived responsibility of the health system to address these needs. Some interviewees questioned whether fully integrating HRSN-focused programs into the health system could truly address social needs without targeting their root causes. Others questioned whether CCO members seeking HRSN coverage would be able to maintain autonomy to identify the solutions most appropriate for their needs, rather than being directed by the health system, as Veggie Rx programs themselves operate in contrast to the paternalistic dynamic that often exists within health systems (Swartz, 2018).

Medicalization of social needs was of particular concern where there was still insufficient support to increase capacity to address them, both within the health system and for community partners facilitating the work.

Discussion

Four interrelated themes emerged during the analysis: flexibility, program fit, barriers to success, and considerations for HRSN coverage. Each of these themes have implications for Veggie Rx programs and Oregon's public healthcare system.

Additionally, each of these themes can be mapped onto one or more components of the

Donabedian and Andersen frameworks previously introduced. While all four themes are related to the structure component of the Donabedian model, all but HRSN coverage fit into the process component as well. Finally, barriers to Veggie Rx and HRSN coverage align with the environment component of the Andersen model.

Flexibility was a key feature of how both Veggie Rx programs and CCOs addressed the needs of their participant and member communities. Prior research has found that the adaptability of Veggie Rx programs may act as a facilitator to their integration into the health system (Auvinen et al., 2022). However, this study found that a shared organizational emphasis on flexibility also had potential to place Veggie Rx programs and CCOs in conflict with one another and even limit opportunities for collaboration where program goals were not specific to outcomes directly measurable by the health system (Cafer et al., 2023). With impending HRSN coverage for Veggie Rx, it will become even more important for these programs to align with CCO expectations in order to maximize funding streams and to access resources required to support capacity development. However, given that flexibility is a cornerstone of the CCO model of care delivery, it should also be central to state efforts to incorporate HRSN coverage into the health system; as a result, Veggie Rx programs will need to retain their ability to deliver program benefits in a way that aligns with community needs without being expected to conform to CCO expectations.

Oregon is a state with wide geographic variability; a “one-size-fits-all” approach will not work if applied to the delivery of Veggie Rx programs, just as it cannot work for CCOs. Therefore, OHA should engage CBOs and other organizations actively delivering

Veggie Rx programs to receive regular input. This will help ensure that evaluation activities account for the relevant regional and local contexts that may affect program design and associated outcomes. Additionally, Veggie Rx programs may be better able to measure outcomes of specific interest to CCOs if a statewide evaluation infrastructure is offered, such as by OHA, as Veggie Rx programs typically operate with very limited staff capacity to conduct evaluation efforts (Carlson & Oregon Community Food Systems Network, 2023). With regard to the theme of fit between Veggie Rx programs and health systems, programs with a focus on food security/access without requiring clinic-based referral or diagnosis may not be aligned with health system priorities which may limit the potential funding streams available to them (Auvinen et al., 2022). Veggie Rx programs and CCOs must come to a mutual understanding regarding program and organizational goals while still allowing Veggie Rx programs the flexibility to operate in a way that is also appropriate for the needs of the communities served.

Barriers to participation in Veggie Rx have been well established in the literature and were previously discussed in this dissertation. Briefly, these included transportation, limited locations to redeem program benefits, and the time to participate in program activities and to prepare FVs for consumption. Research that explores factors contributing to Veggie Rx success and the barriers to achieving success is still limited; however, many of the barriers identified during this study have also been found in prior studies (Auvinen et al., 2022; Cafer et al., 2023; Izumi et al., 2018; Newman & Lee, 2022). Overcoming these barriers will necessitate collaborative, cross-sectoral solutions

that address the various structural, process, and personal barriers present (Auvinen et al., 2022; Cafer et al., 2023; The Produce Rx Evaluation & Policy Collaborative, 2021). In the case of transportation, findings from research specific to Veggie Rx indicate that participation may be best supported by offering multiple options to address a variety of participant needs (Izumi et al., 2018).

Appropriating health system funding to finance nutrition-related HRSN interventions is of current interest to policymakers (Bleich et al., 2023; Garfield et al., 2022; Hanson et al., 2024; McConnell et al., 2023). At the federal level, produce prescription programs are a growing part of the Produce Prescription Program component of the Gus Schumacher Nutrition Incentive Program, while several states, including Oregon, are actively piloting support for these programs via Medicaid 1115 waivers (Bleich et al., 2023; Hanson et al., 2024). While implementation of the nutrition HRSN component of the Oregon 1115 waiver has been delayed to January of 2025 (Oregon Health Authority, 2022b, 2023d, 2024), this may offer additional time for Veggie Rx programs to expand their capacity to prepare for enrolling newly eligible participants who receive HRSN coverage. The requirement that these organizations establish themselves as service providers will place additional requirements on, and may create administrative burden for, organizations that already operate with limited staff capacity; however, CBOs will have the ability to access capacity-building grants as part of the HRSN coverage expansion (Oregon Health Authority, 2023f).

Given that CCOs may not use HRS or SHARE initiative funds on otherwise covered services, the addition of HRSN coverage for only certain populations may affect how

Veggie Rx programs receive funding, particularly if these programs serve multiple communities that include populations both covered and not covered by the waiver. Therefore, HRSN coverage for Veggie Rx may complicate the existing funding approaches for those programs that already partner with their local CCO(s). While the explicit inclusion of Veggie Rx creates an opportunity to increase program sustainability, a prominent barrier for these programs (Auvinen et al., 2022; Cafer et al., 2023), there could be unintended complications for OHP members not included in the waiver. With Veggie Rx as a covered service, CCO members will have grievance and appeal rights should such programs not be made available to them (Oregon Health Authority, 2024); this could result in CCOs and/or Veggie Rx programs choosing to focus only on those covered populations, potentially excluding members who would otherwise benefit from participation. Given OHA's commitment to supporting equity through Medicaid delivery, such complications could contribute to inequities in access to Veggie Rx.

Policy Recommendations

Nutrition interventions that emphasize “food is medicine” typically seek to prevent and, more often, treat disease; however, outcomes of interest to health systems may require a lengthy amount of time to be seen, if at all. This time lag may contribute to the development of policies that may seem shortsighted and potentially lack consideration of all the factors necessary for a successful Veggie Rx program. The interrelated nature of the themes that arose from this case study resulted in several key policy recommendations in three categories based on the Donabedian and Andersen conceptual frameworks: structure and process policy recommendations, which derive

from the Donabedian model, and environment-related policy recommendations which derive from the Andersen model. Together, these frameworks help to conceptualize the aspects of Veggie Rx program delivery and CCO partnership that are most critical to emphasize when considering potential policy recommendations.

Structural Policies

Based on findings from this case study, structural policies encompass those that shape the structure and operational models of Veggie Rx programs. Veggie Rx programs need flexibility to operate in the best interest of their communities; however, all Veggie Rx programs should, at a minimum, agree on an overarching set of shared goals, minimum eligibility criteria, and desired outcomes to streamline statewide understanding and evaluation of these programs and to maximize opportunities for collaboration with health system partners (Auvinen et al., 2022; Cafer et al., 2023; The Produce Rx Evaluation & Policy Collaborative, 2021). While this may be a challenge in practice, the history of Veggie Rx collaboration through the OCFSN may offer a means of convening programs in pursuit of developing shared consensus. Similarly, there may be some criteria related to the 1115 waiver which would motivate the programs to adopt shared goals in order to meet OHA requirements and maximize funding streams. Additionally, Veggie Rx programs, in collaboration with CCOs, should create clear criteria for establishing program fit so that health systems may incorporate these into referral processes. This could potentially be motivated by directive from OHA or legislative mandates and tied to HRSN coverage or other funding specific to Veggie Rx programs or CCOs.

Process Policies

Process policy recommendations focus on the delivery of Veggie Rx through CCO partnerships; therefore, the recommendations offered here focus on CCO-specific processes and how the CCOs interact with Veggie Rx programs. Veggie Rx programs and CCO champions of Veggie Rx should consider focusing advocacy efforts on reaching the right audience. By focusing on community advisory councils and/or other governing councils, it may be possible to raise awareness of these programs and advocate for their inclusion in community priorities (Garfield et al., 2022; Sukys et al., 2023). Findings from this evaluation (discussed elsewhere in this dissertation) indicate that Veggie Rx can become a “pet project” of one staff member within a health system/organization; however, this creates a risk that collaboration may be hindered should that champion leave. CCOs with active Veggie Rx champions should take steps to ensure that effective information-sharing pathways are established, and systems are in place to prevent program relationships from becoming overlooked in the event that the champion transitions to a different role or exits the organization.

When partnering with external Veggie Rx programs, CCOs should provide transparency regarding funding streams used to support Veggie Rx programs, as this information may benefit other Veggie Rx programs in designing or adapting operational models. CCOs should also provide member-facing information about the availability of Veggie Rx programs as this may help increase visibility and awareness of programs, as well as allow members to self-select which could help address program fit.

Environment Policies

Finally, policy recommendations related to the environment should consider the context of the state and federal level policy environments. These recommendations are specifically intended for state agencies leading health systems reform and the implementation of HRSN coverage as a component of Medicaid. State leadership should consider establishing a statewide infrastructure to support Veggie Rx delivery for CCO members, including coordination and program evaluation efforts (Bank et al., 2023; Garfield et al., 2022). States with existing produce prescription programs, such as Washington, may offer lessons on establishing statewide infrastructure to facilitate program delivery (Washington State Department of Health, n.d.).

CCO flexibility is important but, as seen with HRS investment, can lead to uneven implementation. OHA could sponsor a Veggie Rx learning collaborative to convene interested parties and support collaboration. Veggie Rx programs have a long history of collaborating, so it is possible that CCOs could learn from those who are already working with Veggie Rx. In a state as geographically diverse as Oregon, flexibility is a key component of public health systems delivery.

OHA should consider and/or clarify the potential impact of HRSN coverage on existing Veggie Rx and CCO relationships and ensure a mechanism is in place to address challenges related to changing funding streams. Capacity grants are a useful strategy, but still require Veggie Rx programs to do considerable initial work to acquire funding needed to expand internal capacity. Additionally, produce prescriptions require time to develop evidence of desirable outcomes; the short duration of six months of funding

may not allow for substantive evidence and should be considered during HRSN evaluation efforts. Future iterations of the Medicaid 1115 waiver might consider offering clear paths to longer periods of Veggie Rx participation, depending on the needs of the member. Finally, the importance of program fit must be included in evaluation efforts to ensure that priority populations are the most well positioned to benefit from participation.

Limitations

This study had some limitations that affect the interpretation and generalizability of the findings. This study involved primary data collection in the form of semi-structured interviews which were limited to one hour each; therefore, the breadth and depth of topics that could be covered in the interview were restricted. In order to account for this, topics addressed in the interviews were identified by a review of the relevant literature in order to maximize the utility of each question. The researcher was the single coder for each interview transcript. While necessitated by the design of a dissertation study, the use of a single coder for analysis of the interview transcripts is another limitation of this work. The use of structural and iterative coding with the interview guide as a coding template was intended to mitigate this limitation.

Findings from this study are specific to Oregon which may limit generalizability to other states. While efforts were made to include as many cases as possible, it was not possible to speak with all Veggie Rx programs or CCOs during the study period. Given the differences in how Veggie Rx programs and CCOs operate depending on their location and the needs of the communities they serve, the findings from this study may

not be representative of all programs and organizations. However, findings from this study still offer valuable insights into the operation and funding of Veggie Rx programs in Oregon and may be useful to inform future research studies on this topic in Oregon and elsewhere. Findings may also be applicable for other states pursuing or considering Medicaid coverage for HRSN via an 1115 Demonstration waiver.

Conclusion

This research was conducted as part of a larger study to answer the question: How do Oregon's CCOs perceive and utilize produce prescription (Veggie Rx) programs with regard to addressing SDoH? Despite the limitations described above, this study offers an important contribution to the literature, expanding what is known about the relationship of CCOs with Veggie Rx programs operating in the state of Oregon.

Synthesis of the data collected throughout this study revealed opportunities to strengthen and expand the work of Veggie Rx programs through partnerships with CCOs. In-depth interviews with Veggie Rx program leaders, CCO leadership, and additional interested parties revealed four distinct, but interrelated themes: the importance of flexibility for both Veggie Rx programs and Oregon CCOs; ensuring an appropriate level of program fit between Veggie Rx and participants, as well as between Veggie Rx and CCOs; existing barriers to the success of Veggie Rx and the need to address those barriers; and considerations for HRSN coverage under Oregon's Medicaid 1115 waiver. Collectively, these themes offer practical and actionable recommendations for CCOs, Veggie Rx programs, and state agencies as Oregon moves toward expanding the integration of Veggie Rx into the public health system.

Chapter Seven – Conclusion

This chapter serves as a conclusion to the dissertation, offering a summary of findings from all study phases and a brief discussion of the relationship between the key study themes synthesized in Chapter Six and the research question and aims. The information included in this chapter is intended to inform future research, policy, and practice related to Veggie Rx in Oregon and the US more broadly.

Study Purpose and Findings

This research was conducted as part of an exploratory, mixed methods case study of Oregon’s Veggie Rx programs and perceptions of these programs within CCOs as mechanisms to address SDoH. The study sought to answer the question: How do Oregon’s CCOs perceive and utilize produce prescription (Veggie Rx) programs with regard to addressing SDoH?

This question was answered through study of the following aims:

1. Describe Veggie Rx programs and how participation affects food security and health outcomes for program participants.
2. Analyze how Oregon’s CCOs prioritize Veggie Rx programs among other programs that address social determinants of health, including assessing the effectiveness of and demand for Veggie Rx.
3. Compare and contrast elements of Veggie Rx programs with CCO perceptions and utilization of these programs.

The purpose of this study was to add to the body of knowledge about produce prescription programs, their integration with and perception within health systems, and the potential of these programs for improving nutrition security. The ultimate goal of this dissertation was to understand how Oregon’s CCOs perceive, participate in, and finance Veggie Rx programs.

Synthesis of the Dissertation Papers

Each manuscript included in this dissertation (Chapters Four, Five, and Six) was written to correspond with one of the aforementioned research aims. Chapter Four, A Case Study of Veggie Rx in Oregon, addressed Aim 1 of the study; Chapter Five, Produce Prescriptions in the Healthcare System: A Case Study of Veggie Rx in Oregon's Coordinated Care Organizations, addressed Aim 2; and Chapter Six addressed Aim 3 and offered a detailed synthesis and discussion of the findings from Chapters Four and Five. Collectively, findings across the study aims provide a foundational understanding of how Oregon's CCOs perceive and utilize Veggie Rx programs as an approach to addressing SDoH.

Conceptual Frameworks

Two key conceptual frameworks informed the dissertation study, the Donabedian and Andersen models, which have been described in detail in Chapters Two and Six (Aday & Andersen, 1974; Andersen, 1995; Donabedian, 1966, 1990). The Andersen model offers a complex framework for considering how individual and system factors influence health outcomes; however, the model focuses on individual and population level factors, with limited attention to the mediating and moderating effects of organizations and institutions. While the Donabedian model describes a more general reinforcing cycle of structures, processes, and outcomes, which can be applied to individual behaviors and population characteristics, it does not distinguish internal and external structural elements when dealing with organizations operating within larger contexts. For this dissertation, a limitation of applying the Donabedian model was that

the structural component included all structural elements pertaining to Veggie Rx programs, CCOs, and the state policy environment. Similarly, a limitation of the Andersen model was the emphasis on health behaviors without closely evaluating system structural and process elements. By situating the Donabedian model within the environment component of the Andersen model, these different structural aspects, particularly the state and federal policy environments, can be intentionally considered.

Aim 1

Describe Veggie Rx programs and how participation affects food security and health outcomes for program participants.

Aim 1 was accomplished through a case study of Oregon Veggie Rx programs, using semi-structured interviews with Veggie Rx program leaders and secondary analysis of data included in two surveys conducted through the OCFSN; one survey included participant outcomes collected in 2021, and the second was a “census” of statewide Veggie Rx program characteristics collected in 2023.

Findings from Aim 1 suggested that participating in a Veggie Rx program had positive implications for food security and health, and that these programs benefitted participants and the community more broadly. For example, in the state’s more rural areas, Veggie Rx programs increased demand for FVs which encouraged businesses to increase offerings and improved availability for non-participants as well.

Aim 2

Analyze how Oregon's CCOs prioritize Veggie Rx programs among other programs that address social determinants of health, including assessing the effectiveness of and demand for Veggie Rx.

Aim 2 was accomplished through a case study of Oregon's CCOs using semi-structured interviews with CCO leaders with knowledge of the organizational approach to addressing SDoH. The original intent of Aim 2 included content analysis of CCO policy documents regarding SDoH; however, these documents were unavailable, so a limited review was conducted of organizational websites and state spending reports to offer added context to interview themes.

Prominent themes included the variability of the structure and operations of each CCO and the varied approaches that organizations took to addressing SDoH, perceived barriers to funding Veggie Rx, and implications for the health system with regard to impending HRSN coverage for OHP. Interestingly, of those CCOs that provided funding to support Veggie Rx, none did so in an identical way, highlighting the inherent variability of and flexibility among CCOs.

Aim 3

Compare and contrast elements of Veggie Rx programs with CCO perceptions and utilization of these programs.

Aim 3 was accomplished through a cross case synthesis of the findings from Aims 1 and 2, in addition to semi-structured interviews with interested parties with knowledge of Veggie Rx programs and their interaction with health systems. Findings

were synthesized into main themes, with context that emerged during key informant interviews added where relevant, comparing and contrasting how these themes applied to Veggie Rx programs and to CCOs. These themes were then used to derive policy recommendations to strengthen Veggie Rx utilization among and integration with CCOs.

Four distinct, but interrelated themes emerged: the importance of flexibility for both Veggie Rx programs and Oregon CCOs; ensuring an appropriate level of program fit between Veggie Rx and participants, as well as between Veggie Rx and CCOs; existing barriers to the success of Veggie Rx and the need to address those barriers; and considerations for HRSN coverage under Oregon's Medicaid 1115 waiver. Each of the themes was relevant to both Veggie Rx programs and to CCOs; however, the implications of each theme were different depending on which unit of analysis was considered. Chapter Six includes a detailed discussion of each theme.

Revisiting the Research Question

The research question was: *How do Oregon's CCOs perceive and utilize produce prescription (Veggie Rx) programs with regard to addressing SDoH?* The following discussion summarizes the overall findings with respect to this question. CCOs were aware of Veggie Rx programs operating in Oregon broadly and within their service areas and seemed to view the programs favorably; however, they described limitations in their ability to utilize Veggie Rx as a tool for members due to availability (or lack) of funding streams and interpretation of state guidelines. Utilization and funding of Veggie Rx by CCOs was related to two key factors: direction from the organization's governance entities (i.e., CACs, state leadership, etc.) which were tied to CHIPs, and internal

knowledge of and/or interest in the program. The emphasis of the CCO model on community-identified priorities affected the way that SDoH were prioritized across CCOs, which had implications for how the organizations directed attention and resources internally. CCOs required direction from their CACs and adherence to CHIPs and/or state-indicated SDoH priorities. CCOs also described utilizing Veggie Rx in different ways, depending on local priorities and internal interest in the programs among staff. This resulted in varied approaches to collaboration and funding that were not readily categorized or classified as they reflected the inherent flexibility built into Oregon's CCO model. For some CCOs, Veggie Rx played a key role in how the organization addressed food and nutrition security, others chose to invest in alternate programs and/or resources to accomplish the same goal, while some organizations described directing their focus toward other areas entirely.

Implications for Policy and Practice

Findings from this study offer implications for health systems and policy within the state of Oregon and beyond. As Oregon moves forward with the 2022-2027 Medicaid Section 1115 waiver, policymakers within OHA may use these findings to inform CCO policy specific to Medicaid investment in Veggie Rx programs. Veggie Rx program leadership may use the findings to inform organizational efforts to collaborate with local CCOs, or to inform adjustments in program characteristics. The OCFSN may use the findings to help direct advocacy efforts. CCOs may use the findings to inform current or prospective Veggie Rx partnerships, and to consider which funding stream(s) are most appropriate in the local context. Finally, findings from this study may

contribute to the growing literature on prescription produce programs and their utilization within health systems, which may become increasingly important as nationwide awareness and popularity of these programs increases.

Summary of Policy Recommendations

A complete discussion of policy recommendations derived from the study findings was included in Chapter Six. As described in Chapter Two, addressing nutrition security is ultimately a wicked problem (Rittel & Webber, 1973), meaning that it cannot be resolved in a vacuum or through a single policy solution. Therefore, the policy recommendations presented here offer a selection of potential solutions to strengthen Veggie Rx utilization and partnership with CCOs developed through consideration the study findings.

The policy recommendations were provided in three distinct categories based on the modified Donabedian and Andersen conceptual frameworks (Figure 7.1): structure and process, based on the Donabedian model; and environment-related, based on the Andersen model (Aday & Andersen, 1974; Andersen, 1995; Donabedian, 1966). Together, these frameworks helped to conceptualize the aspects of Veggie Rx program delivery and CCO partnership that are most critical to emphasize when considering potential policy recommendations. These recommendations are summarized in Table 7.1.

Table 7.1. Summary of Policy Recommendations

| Category | Structure | Process | Environment |
|------------------------|---|--|---|
| Description | Policies that shape the structure and operations of Veggie Rx programs | Policies related to CCO-specific processes and interactions with Veggie Rx | Policies related to state agencies and health systems reform |
| Recommendations | <p>Veggie Rx programs should collaboratively identify minimum eligibility criteria, measurable outcomes, and program goals, while allowing flexibility to account for local and regional contexts.</p> <p>Programs should collaborate with CCOs to establish clear criteria for evaluating program fit to guide referral processes.</p> <p>Veggie Rx programs should strategize with the OCFSN on coordinated advocacy efforts, including those that target CACs and other potential Veggie Rx champions, as well as to address capacity limitations.</p> | <p>Advocacy efforts should be directed toward CCO governing entities, including community advisory councils and similar structures.</p> <p>CCOs with an internal “Veggie Rx champion” should establish systems to maintain program relationships in the event of staff transitions.</p> <p>CCOs should provide transparency around funding of Veggie Rx.</p> <p>CCOs should offer member-facing information on Veggie Rx partnerships.</p> | <p>Statewide infrastructure to support Veggie Rx as a CCO-provided service should be established, including evaluation and coordination.</p> <p>Learning collaboratives should be offered to support even adoption and implementation across CCOs.</p> <p>OHA should consider commissioning research to understand unintended impacts of HRSN coverage on Veggie Rx coverage.</p> <p>State leadership should consider learning from other states with statewide Veggie Rx programs.</p> |

Directions for Future Research

While this case study adds a valuable contribution to the growing literature regarding Veggie Rx and the use of produce prescription programs within health systems, additional research is needed to further establish the utility of these programs as a covered Medicaid service and to expand the base of evidence supporting program

outcomes. Several areas for further study were identified and are discussed below with research study ideas presented for each, including:

- establishing best practices for determining program fit;
- exploring how local contexts impact program design and outcomes;
- strengthening evidence of Veggie Rx program outcomes, and;
- evaluating the implications of HRSN coverage on Veggie Rx program operations and participation.

The literature is not well developed around best practices for determining produce prescription “program fit” as part of the referral/recruitment process.

Interviews revealed that determining the potential fit was of varied importance to programs and had implications for participant engagement. Future studies should explore potential best practices for program referral and recruitment, as well as useful criteria to evaluate program fit. Potential directions for these studies could include: identifying barriers to individual/household participation, and how those barriers affect program engagement and completion of the program; exploring factors that influence a participant’s decision to withdraw from a program once enrolled; and determining actions that Veggie Rx programs could or do take to support participant retention.

Specific to HRSN coverage, future studies should explore Veggie Rx effectiveness for priority populations as compared to other available nutrition-related interventions, and whether outcomes related to participation differ among CCO members who do and do not fall into a priority population as stipulated by the waiver (McConnell et al., 2023). Additionally, these studies could explore potential ways to support sustained FV intake once the CCO member’s six-month HRSN coverage of Veggie Rx concludes. Further, given OHA’s emphasis on addressing structural drivers of health inequities, future

studies should consider the implications of HRSN coverage for historically and currently marginalized populations. CRT was briefly discussed in Chapter Two; while application of CRT principles to study findings is outside of the scope of this dissertation, which primarily emphasized organizational perspectives, future studies of Veggie Rx in Oregon should further consider how to incorporate principles of CRT into both design and analyses.

In Oregon (and elsewhere as appropriate), future state evaluation efforts might consider exploring ways to evaluate Veggie Rx success as an HRSN with study designs that account for local contexts, including the length of time required to see all desirable participation-related outcomes. Studies could build upon the work of Wang and colleagues (2023) to predict longer term outcomes. Additionally, studies might explore the different Veggie Rx operational models (i.e., CSA, farmers market redemption, grocery store redemption, etc.) and whether individual outcomes vary by delivery format and/or the inclusion of other program components, such as nutrition and cooking education opportunities. Future studies in this area might incorporate the conceptualization of food access adapted from the Human Right to Food (United Nations Office of the High Commissioner for Human Rights, 2010) and the Penchansky and Thomas (1981) model of access, introduced in Chapter Two (refer to Figure 2.3).

The need for more robust evidence demonstrating outcomes associated with produce prescription program participation is well established in the literature (Auvinen et al., 2022; Cafer et al., 2023; Little et al., 2022; Stotz et al., 2022; Swartz, 2018). While the OCFSN has supported statewide evaluation of Veggie Rx since 2019, the variation in

how each program collects participant data and annual changes in which programs administer the evaluation survey has resulted in data with limited options for robust analytic techniques. Given that part of the reason for the data variability is limited staff capacity to develop and administer the evaluation survey, a statewide evaluation study could support collection of streamlined participant data to which stronger analytic techniques might be applied. Additionally, calls from Veggie Rx program leaders indicated that robust qualitative data is desired to illuminate the experiences of program participants. Qualitative and mixed-methods studies may be useful when approaching policymakers, who may prefer to hear individual stories that illustrate program outcomes.

Finally, an Oregon-specific evaluation of Veggie Rx utilization would be valuable as HRSN coverage expands access to these programs among CCO members. Given that funding sustainability is a key barrier to Veggie Rx operations (Cook et al., 2021), future studies should consider the impact of the addition of Veggie Rx coverage as an HRSN on program enrollment and eligibility criteria, the amount and types of funding provided to these programs by CCOs, and equitable access to program benefits. The Chase and Grubringer (2014) Levels of Human Health and Food Systems framework introduced in Chapter Two might offer a practical model for a statewide evaluation of Veggie Rx, while components of the aforementioned conceptualization of food access may align well with OHA-specified goals of having HRSN services be culturally appropriate.

Assumptions and Limitations of the Dissertation

Assumptions and limitations of the dissertation study as a whole are discussed in this section. Limitations specific to each study aim are detailed in the respective chapters (Four, Five, and Six).

Assumptions

This dissertation relied on several key assumptions. It was assumed that the researcher would have access to all data sources, and that the researcher would receive engagement from the Veggie Rx programs and CCOs invited to participate in the study. It was also assumed that the dissertation could be completed within a year. This timeline, as well as the resources of the researcher, had implications for the number of interviews that could be completed and therefore limited the number of cases that could be included in the study.

The researcher holds personal beliefs and biases that may have influenced research activities and study findings. The effects of these were minimized through use of the theoretical frameworks and research design outlined in this chapter. Still, the researcher adopted a “human right to food” approach in their design of this work, which may have had implications for how the findings were framed.

Limitations

This study had some limitations that may affect the interpretation and generalizability of the findings. This study involved primary data collection in the form of semi-structured interviews which were limited to one hour each; therefore, the breadth and depth of topics that could be covered in the interview were restricted. In order to

account for this, topics addressed in the interviews were identified by a review of the relevant literature in order to maximize the utility of each question.

As a dissertation study, this work was inherently the work of a single person. Although the researcher sought feedback from members of the dissertation committee, the design and methods were the work of one person and lacked the benefits of collaboration. The researcher was the single coder for each interview transcript. While necessitated by the design of a dissertation study, the use of a single coder for analysis of the interview transcripts is another limitation of this work. The use of structural and iterative coding with the interview guide as a coding template was intended to mitigate this limitation.

Specific to the OCFSN survey described in Chapter Four, analyses were limited by the data available. Limitations of the survey dataset described earlier in this chapter meant that participant data were collected several years ago and may have contained unobserved bias from the COVID-19 pandemic. The survey tool developed by the OCFSN had not been validated, and the small number of responses available in the dataset meant that the use of findings from the quantitative analyses were limited to enhancing the case study in Aim 2.

The use of the Andersen and Donabedian frameworks as the primary analytic frameworks may present a limitation to this work, as the focus of this study on the organizational relationship and related factors limited the ability of the researcher to further explore the person-centered components of the models (Donabedian's outcomes, including participant satisfaction; and several of the Andersen components).

The Chase and Grubringer (2014) Levels of Human Health and Food Systems framework might have offered an additional or alternate option, and the adapted Chase and Grubinger framework (previously presented in Figure 2.5) might have provided a more comprehensive model to consider each of the unique environmental levels (macro, physical, and social) than was offered by the combination of the Donabedian and Andersen models. A third framework was not included in order to limit the scope of the study but could certainly be considered in future research.

Findings from this study are specific to Oregon which may limit generalizability to other states. While efforts were made to include as many cases as possible, it was not possible to speak with all Veggie Rx programs or CCOs during the study period. Further, CCO leaders who participated in the Aim 2 interviews were limited to those with direct knowledge of Veggie Rx and, where relevant, the organization's use of these programs. Nonetheless, Veggie Rx programs and CCOs were selected to include geographic and demographic variation and represented the majority of Oregon's 36 counties. Given the differences in how Veggie Rx programs and CCOs operate depending on their location and the needs of the communities they serve, the findings from this study may not be representative of all programs and organizations. However, findings from this study still offer valuable insights into the operation and funding of Veggie Rx programs in Oregon, contribute to the growing literature on this topic, and may be useful to inform future research studies on this topic in Oregon or elsewhere.

This study explored early perceptions of HRSN coverage among CCOs and Veggie Rx programs, therefore it was not possible to account for all emerging details of

nutrition support coverage through the waiver. Since data collection concluded in January of 2024, OHA has held informational meetings with CBOs regarding HRSN coverage and released additional details about coverage and supporting grant programs. While discussion of this emerging information is not included in this dissertation, findings from this study may still be applicable to other states pursuing or considering Medicaid coverage for HRSN via an 1115 Demonstration waiver.

As an exploratory study, it is not appropriate to use these findings to make broad claims about all Veggie Rx programs or CCOs. Given that not all organizations statewide (Veggie Rx or CCO) participated in the study, these findings are unlikely to be representative of all experiences and partnership arrangements, however they do represent a variety of programs utilizing an array of operational models. Additionally, the exploratory nature of this study meant that there was no existing literature from which to draw best practices for the research design and proposed activities. The study aims were designed with the goal of triangulating the research question, although challenges in synthesizing the various data sources and perspectives limit the findings. Still, this study does present novel findings on the use of produce prescriptions by health systems and expands what has previously been established in the literature.

Dissemination Plan

Upon successful completion of the dissertation defense, the manuscripts written for this dissertation (Chapters Four, Five and Six) will be revised to be submitted for publication. The current titles of the manuscripts and potential journals targeted for submission are included in Table 7.2.

Table 7.2. Manuscript Titles and Target Journals

| Aim | Working Title | Potential Target Journals |
|------------|--|--|
| 1 | A Case Study of Veggie Rx in Oregon | Journal of Agriculture, Food Systems, and Community Development; Public Health Nutrition |
| 2 | Produce prescriptions in the healthcare system: A case study of Veggie Rx in Oregon’s coordinated care organizations | Journal of Hunger & Environmental Nutrition; Preventing Chronic Disease |
| 3 | Lessons from a case study of produce prescriptions and Medicaid in Oregon | Health Affairs; Public Health Nutrition |

The researcher will make a presentation to the OCFSN to present the study and key findings relevant to Veggie Rx practice; this is both a key component of the dissemination of the study’s findings and an opportunity to validate findings with members of the OFCSN. The presentation will be scheduled to occur as part of the Veggie Rx working group’s quarterly meeting schedule, likely in August of 2024. The researcher may also pursue conference presentations as opportunities are identified.

Conclusion

As produce prescription programs continue to grow in popularity and awareness on the national scale, Oregon is poised to expand access to these programs through HRSN coverage for certain Medicaid populations. While this development has created the opportunity to increase Veggie Rx sustainability, questions remain regarding how to best support Veggie Rx and CCO partnerships and what these changes will mean for program operations. As one of the first states to utilize the Medicaid 1115 Demonstration waiver in a way that includes explicit coverage of these programs, and as a state known for innovative policy solutions to improve population health, Oregon is poised to expand access to the potential benefit to many Oregonians, and to offer

valuable lessons for states considering similar actions now or in the future.

Understanding CCO perceptions and utilization of Veggie Rx offers a relevant foundation from which to further health systems transformation efforts toward addressing food-related SDoH and HRSNs.

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Appendix A – Interview Recruitment and Protocols

Appendix A.1. Case Selection and Inclusion Criteria

Several current Veggie Rx programs meet the inclusion criteria; however, final selection and recruitment will be informed by findings from the key informant interviews. Inclusion criteria by type of interview are described in Table A.1.

Table A.1. Inclusion Criteria by Interview Type

| Aim | Interview Type | Target # | Inclusion Criteria |
|-----|------------------------------|----------------------|---|
| All | Key Interested Party | 2-4 | Interested party who has worked or currently works for a Veggie Rx program and/or Oregon CCO. |
| 1 | Veggie Rx Program Leadership | 1-2 per organization | Staff member serves as the primary representative for the Veggie Rx program, given that many organizations that operate a Veggie Rx program may have few staff members, there may only be one primary leader per organization. No minimum time with the organization is specified for the same reason. |
| 2 | CCO SDoH Leadership | 2-3 per organization | Staff member has been employed by CCO for at least one year. Staff is knowledgeable about organizational approach to SDoH and/or flex fund spending. |

Appendix A.2. Email Recruitment Script for Interviews with Interested Parties

Subject Line: Research Study on Veggie Rx & CCOs in Oregon: Invitation to Participate in an Interview

Email Primary Contact:

FROM: Alexandra Kihn-Stang, MScN, Student Investigator, OHSU-PSU School of Public Health

Hello. My name is Alexandra Kihn-Stang; I am a doctoral student in the OHSU-PSU School of Public Health (SPH) in Portland, and I am conducting a study for my dissertation research. My dissertation chair is Sherril Gelmon, DrPH, Professor of Health Systems Management & Policy in the OHSU-PSU SPH. My dissertation seeks to answer the question: "How do Oregon's CCOs perceive and utilize prescription produce (Veggie Rx) programs with regard to addressing social determinants of health?"

I am inviting you to participate in an interview in your role as an interested party with knowledge of the Veggie Rx program in Oregon and how these programs are supported by the health system. The purpose of this interview is to learn more about how Veggie Rx programs can be integrated into Oregon's health system. I am conducting interviews with individuals in leadership roles at select Veggie Rx programs and individuals in leadership roles at select CCOs who have knowledge of their organization's approach to addressing social determinants of health within their service areas. I would like to speak with you to gather important background and context, and to seek your guidance on who I should speak with at these organizations.

Please respond to this email to indicate whether you agree to participate, or if there is someone else at your organization who would be better suited to participate in this interview. If you are interested in participating, I will arrange a time for us to have up to a 60 minute confidential interview in the format of your choosing, either [virtual/in-person], at your convenience but ideally by [date].

Everything you say during the interview will remain confidential, and nothing that you say will be attributed to you or your organization in any reports or presentations of our findings. What you say will also not affect your relationship with either the researcher, the OHSU-PSU School of Public Health, any CCO(s), OHSU, PSU or other Veggie Rx programs. Your organization, name and any other identifying information will be removed from the interview transcript and the recording will be destroyed once the interview is transcribed. No one aside from myself (and my dissertation chair, as necessary) will listen to the interview recording or read the transcription.

This study is following the guidance provided by the Portland State University (PSU) Human Research Protection Program (HRPP). This study has been approved by the PSU Institutional Review Board (IRB HRRP #238138-18). If you have concerns about your rights as a research participant, please contact the PSU IRB at 503-725-5484 or psuirb@pdx.edu. If you have concerns about this research, please contact me at or kih@pdx.edu or my dissertation chair, Dr. Gelmon at gelmons@pdx.edu or 503-725-3044.

Thank you in advance for your support of this work.

Appendix A.3. Email Recruitment Script for Interviews with Veggie Rx/CCO Leadership

Subject Line: Veggie Rx & CCOs in Oregon: Invitation to Participate in an Interview

Email Primary Contact:

FROM: Alexandra Kihn-Stang, MScN, Student Investigator, OHSU-PSU School of Public Health

Hello. My name is Alexandra Kihn-Stang; I am a doctoral student in the OHSU-PSU School of Public Health (SPH) in Portland, and I am conducting a study as my dissertation research. My dissertation chair is Sherril Gelmon, DrPH, Professor of Health Systems Management & Policy in the OHSU-PSU SPH. My dissertation seeks to answer the question: "How do Oregon's CCOs perceive and utilize prescription produce (Veggie Rx) programs with regard to addressing social determinants of health?"

I would like to invite you to participate in an interview in your role as the [program director/administrator of a Veggie Rx program OR CCO director of community health/health equity/social determinants of health]. The purpose of this interview is to learn more about how Veggie Rx programs can be integrated into Oregon's health system. I am conducting interviews with individuals in leadership roles at select Veggie Rx programs, and individuals in leadership roles at select CCOs who have knowledge of their organization's approach to addressing social determinants of health within their service areas.

Please respond to this email to indicate whether you agree to participate, or if there is someone else at your organization who would be better suited to participate in this interview. If you are interested in participating, I will arrange a time for us to have a 60 minute confidential interview in the format of your choosing, either [virtual/in-person], at your convenience but ideally by [date].

Everything you say during the interview will remain confidential, and nothing that you say will be attributed to you or your organization in any reports or presentations of our findings. What you say will also not affect your relationship with either the researcher, the OHSU-PSU School of Public Health, your CCO(s), OHSU, PSU or other Veggie Rx programs. Your organization, name and any other identifying information will be removed from the interview transcript and the recording will be destroyed once the interview is transcribed. No one aside from myself (and my dissertation chair, as necessary) will listen to the interview recording, or read the transcription.

This study is following the guidance provided by the Portland State University (PSU) Human Research Protection Program (HRPP). This study has been approved by the PSU Institutional Review Board (IRB), HRRP #238138-18. If you have concerns about your rights as a research participant, please contact the PSU IRB at 503-725-5484 or psuirb@pdx.edu. If you have concerns about this research, please contact me at or kih@pdx.edu or my dissertation chair, Dr. Gelmon at gelmons@pdx.edu or 503-725-3044.

Thank you in advance for your support of this work

Appendix A.4. Research Information Sheet/Interview Consent Form

Title of Research Study: Toward Veggie Rx Integration: Program Perception Among Oregon's Coordinated Care Organizations

Investigator: Alexandra Kihn-Stang, MScN, Student Investigator, OHSU-PSU School of Public Health

Dissertation Chair: Sherril B. Gelmon, DrPH, Professor of Health Systems Management & Policy, OHSU-PSU School of Public Health

As a/the [position of interviewee], you have been identified as having expertise and insights about Veggie Rx and/or Coordinated Care Organizations (CCOs) in Oregon and are being asked to participate in a research study. I am a doctoral student in the PhD program in Health Systems & Policy at the OHSU-PSU School of Public Health and am conducting this research as my dissertation. My work is supervised by my dissertation chair, Sherril Gelmon, DrPH, Professor of Health Systems Management & Policy in the OHSU-PSU SPH.

The purpose of this study is to learn more about how Veggie Rx programs can be integrated into Oregon's health system. My dissertation seeks to answer the question: "How do Oregon's CCOs perceive and utilize prescription produce (Veggie Rx) programs with regard to addressing social determinants of health?" I am conducting interviews with individuals in leadership roles at select Veggie Rx programs, and individuals in leadership roles at select CCOs who have knowledge of their organization's approach to addressing social determinants of health within their service areas.

If you consent to participate, your responses will be confidential. If you are interested in participating, I will coordinate with you to arrange a time for an interview, at your convenience but no later than [date]. The interview will last up to 60 minutes, depending on the length of your answers. Interviews may be held in person or as a virtual meeting via Zoom. It is possible that I may reach out to you for follow-up or clarifications after the interview.

Interviews will be audio-recorded. The interview data will be transcribed for subsequent qualitative analysis, and will be stored in a secure, password-protected database. The recording and notes will help me to accurately represent our discussion. No other individual other than me (and my dissertation chair, as necessary) will hear the recordings or see the written transcripts. All written syntheses and quotes will be blinded and presented without attribution to you or any other respondent we are interviewing. If you would like the recording stopped at any time, please indicate this and we will turn off the recording. If there is information that you tell me that you do not wish repeated, please indicate this so that we do not include those comments in any summaries or reports that we develop from this interview. Quotes will be selected to illustrate broader themes and will be presented without attribution to individuals.

All information collected about you during this study and that could identify you will be kept confidential to the extent possible. You will be assigned a study identification number to be used in place of your name in the research database and study records. Your identity and any personal identifying information will not appear in the interview transcripts or any published documents arising from this research. Research records connected to you will be stored for no more than three years in a secure place, and then destroyed. Only myself and my dissertation chair will have access to the study database. Additionally, individuals with the Portland State University Institutional Review Board will have access to the information as necessary, and regulatory agencies responsible for the oversight of research may inspect records related to this study.

By agreeing to participate in this study you are giving your permission for me to collect information about you as described above. I will use your information for this study until it is over. If you change your mind, you may request that I stop using your information; however, information that has been de-identified and can no longer be linked to you at the time of your request may continue to be used. I will take appropriate measures to keep your study information private and secure, but there is always the potential risk of a loss of confidentiality.

Your participation in this study is voluntary; you do not have to answer any question that you do not want to answer and may still remain in the study. You may also stop the interview at any time. Whatever decision you make about participation, there will be no penalty to you, and no loss of benefits to which you were otherwise entitled. Your participation will not have any impact on your relationship with either the researcher, the OHSU-PSU School of Public Health, your CCO(s), OHSU, PSU or other Veggie Rx programs.

The potential risks or discomforts of the study are expected to be minimal. You will not directly benefit from your participation in the research, but the results of the research may contribute to knowledge about Veggie Rx in Oregon, and to future health systems reform in Oregon. **You will not be paid for participating in this research study.**

This work follows the guidance provided by the Portland State University (PSU) Human Research Protection Program (HRPP). The research protocols have been approved by the PSU Institutional Review Board (IRB HRRP #238138-18). If you have concerns about your rights as a research participant, please contact the PSU IRB at 503.725.5484 or psuirb@pdx.edu. If you have questions, concerns, or complaints about this research, please contact Dr. Gelmon at 503-725-3044 or gelmons@pdx.edu, or Alexandra Kihn-Stang at 541-517-4933 or kih@pdx.edu.

Thank you for your contribution to this dissertation.

Consent to Participate:

By proceeding you are confirming that you are 18 years of age or older, have read the above information, and voluntarily give your consent to participate in this study. You may save, request, or print a copy of this information sheet for your records.

Appendix A.5. Semi-Structured In-Depth Interview Guide for Key Informant Interviews

Introduction:

Hello. My name is Alexandra Kihn-Stang; I am a PhD candidate in the Health Systems & Policy PhD program at the OHSU-PSU School of Public Health in Portland.

This interview is intended to inform my dissertation which seeks to answer the question: “How do Oregon’s CCOs perceive and utilize prescription produce (Veggie Rx) programs with regard to addressing social determinants of health?” There are no correct or incorrect answers to these questions. Everything you say will remain confidential, and nothing will be attributed to you by name in my written dissertation or any future written or oral projects related to it. What you say will also not affect your relationship with your CCO(s), OHSU, PSU, or the School of Public Health.

This interview will take 45-60 minutes. If it is acceptable to you, I will record our conversation in order to capture what you say accurately. Your name and any other identifying information will be removed from the interview transcript and the recording will be destroyed once analysis is complete. No one aside from me and the transcriptionist will listen to the recording, and only my dissertation chair and I will have access to the transcription.

- Do you have any questions for me? ___
- I have previously provided you with the interview and consent information; do you agree to participate in this interview? ___
- Before we begin, is it acceptable to record our conversation? ___

Questions: [Not all interviewees will be asked all questions. For example, if an interviewee is not currently or has not previously been affiliated with a CCO then CCO-focused questions will be omitted from the interview.]

- 1a. Please tell me about your involvement with Veggie Rx.
 - a. Probe: Do you currently or have you previously worked for an organization that offered a Veggie Rx program?
 - b. Probe: Please describe your current/former role.
 - c. Did/does the Veggie Rx program you work/worked for receive support from the local CCO(s)?
 - d. Probe: Please tell me more about that.

- 1b. Please tell me about your involvement with Oregon’s CCOs.
 - a. Probe: Do you currently or have you previously worked for a CCO?
 - b. Probe: Please describe your current/former role.
 - c. Did/does your current/former CCO support any Veggie Rx programs?
 - d. Probe: Please tell me more about that.

2. I would like to know some details about the history of Veggie Rx in Oregon, and have some specific questions:
 - a. Please tell me about how Veggie Rx fits into the broader landscape of nutrition assistance support/programs in Oregon.
 - b. What is your perspective on the role that Veggie Rx could play in supporting food and nutrition security for Oregonians into the future?
3. Are you familiar with the 2022 Oregon Medicaid Section 1115 Demonstration waiver?
[If no, then interviewer will describe.]
 - a. What are your thoughts on how the added provisions for CCOs to fund additional nutrition-related supports could affect collaboration with Veggie Rx programs in the future?
4. Are you aware of any current collaborations between Veggie Rx programs and CCOs?
 - a. Probe: If so, please tell more about that.
5. Based on your knowledge of Veggie Rx in Oregon, are there any programs that you would recommend that I ask to participate in this study?
 - a. Are there any programs that you would recommend I not include in this study?
 - b. Probe: Please tell me more about that.
6. Based on your knowledge of Oregon's CCOs, are there any specific CCOs that you would recommend that I ask to participate in this study?
 - a. Are there any specific CCOs that you would recommend I not include in this study?
 - b. Probe: Please tell me more about that.
7. Are there other specific organizations or people that you think I should speak with to learn more about Veggie Rx and integration with CCOs in Oregon?
8. Is there anything that I haven't asked about that you think would be important for me to know?

Thank you for taking the time to talk with me today. I hope to have analyses completed and preliminary findings available by early in 2024 and will be happy to share a summary with you at that time.

Appendix A.6. Semi-Structured In-Depth Interview Guide for Veggie Rx Leadership

Introduction:

Hello. My name is Alexandra Kihn-Stang; I am a PhD candidate in the Health Systems & Policy PhD program at the OHSU-PSU School of Public Health in Portland.

This interview is intended to inform my dissertation which seeks to answer the question, “How do Oregon’s CCOs perceive and utilize prescription produce (Veggie Rx) programs with regard to addressing social determinants of health?” There are no correct or incorrect answers to these questions. Everything you say will remain confidential, and nothing will be attributed to you by name in my written dissertation or any future written or oral projects related to it. What you say will also not affect your relationship with your CCO(s), OHSU, PSU, or the School of Public Health.

This interview will take 45-60 minutes. If it is acceptable to you, I will record our conversation in order to capture what you say accurately. Your name and any other identifying information will be removed from the interview transcript and the recording will be destroyed once analysis is complete. No one aside from me and the transcriptionist will listen to the recording, and only my dissertation chair and I will have access to the transcription.

- Do you have any questions for me? ___
- I have previously provided you with the interview and consent information; do you agree to participate in this interview? ___
- Before we begin, is it acceptable to record our conversation? ___

Questions:

1. Please tell me about your role at _____.
 - a. Probe: How long have you worked here?
 - b. Probe: Please describe your involvement with the Veggie Rx program.
2. I would like to know some details about the design of your Veggie Rx program, and have some specific questions:
 - a. Does your program target any specific populations/communities? Which ones?
 - b. How many participants are you able to support each season? What are your enrollment criteria?
 - c. How many weeks does the program run each season?
 - d. What are the benefits offered, and where and how are they redeemed?
 - e. In what ways has your Veggie Rx program changed since it began operating?

3. Does your Veggie Rx program offer other benefits beyond vouchers/produce boxes/etc.?
 - a. Probe: Is there an educational component (such as cooking classes)? If so, please briefly describe it.
 - b. Probe: Do you provide recipes or cooking and storage tips? If so, via what mechanism(s) (website, email, print, etc.)?
 - c. Probe: Does your program include transportation support or delivery? If so, please describe briefly.
4. What are the intended outcomes of your Veggie Rx program for participants? How do you track these outcomes?
5. How do you monitor/track and report these outcomes?
 - a. Probe: Are there any barriers in your community that keep participants from achieving these outcomes?
 - b. Probe: Are participants satisfied with your Veggie Rx program? How do you track satisfaction? How are the results reported and to whom?
6. Please describe examples of how your Veggie Rx program is connected to your local food system.
 - a. Probe: You mentioned that participants may redeem benefits from a farmers market/grocery store/ _____; what kinds of partnerships do you have with these sites?
 - b. Probe: Are benefits able to be redeemed across multiple locations?
7. Does _____ partner with any local health centers/clinics as part of the Veggie Rx program?
 - a. Probe: If so, please describe the referral pathways between the clinic(s) and your program.
 - b. Probe: Please tell me about the relationship(s) between _____ and your partner clinic(s).
 - c. Probe: Does/do the clinic/s collect any physical and/or behavioral health data from participants as part of the Veggie Rx program? How? What is done with those data (collection, reporting, use for program improvement, etc.)?
8. Please tell me about how your Veggie Rx program is funded.
 - a. Probe: What kinds of grants do/have you receive(d)?
 - b. Probe: Do you receive any support through the broader health system (clinic partners, OHA, local government, etc.)?
 - c. Probe: Is sustainability of funding a concern for you? If yes, what do you hope to do to address it?

9. Does your organization partner or receive support from your local CCO(s)?
 - a. Probe: Please tell me more about that partnership or support. How does it work? What does the CCO provide? (Flex funds for services or community investment dollars)
 - b. Probe [if no to probe A]: Have you tried to connect with your local CCO(s) before? What happened? Why or why not?
 - c. Probe [if no to probe A]: Are you considering trying to partner with your local CCO(s) in the future? What would need to happen to make that partnership happen?

10. Are you familiar with the 2022 Oregon Medicaid Section 1115 Demonstration waiver?
[If no, then interviewer will describe.]
 - a. Probe if yes: Has there been any discussion within your organization about what the waiver could mean for Veggie Rx participation among CCO members?
 - b. Probe if yes: Have you approached or been approached by your local CCO(s) with regard to the new demonstration waiver?

11. Are there specific organizations or people that you think I should speak with to learn more about Veggie Rx in Oregon?

12. Is there anything that I haven't asked about that you think would be important for me to know?

Thank you for taking the time to talk with me today. I hope to have analyses completed and preliminary findings available by early in 2024 and will be happy to share a summary with you at that time.

Appendix A-7: Semi-Structured In-Depth Interview Guide for CCO Leadership

Introduction:

Hello. My name is Alexandra Kihn-Stang; I am a PhD candidate in the Health Systems & Policy PhD program at the OHSU-PSU School of Public Health in Portland.

This interview is intended to inform my dissertation which seeks to answer the question, “How do Oregon’s CCOs perceive and utilize prescription produce (Veggie Rx) programs with regard to addressing social determinants of health?” There are no correct or incorrect answers to these questions. Everything you say will remain confidential, and nothing will be attributed to you by name in my written dissertation or any future written or oral projects related to it. What you say will not affect your relationships with the Veggie Rx programs, OHSU, PSU, or the School of Public Health.

This interview will take 45-60 minutes. If it is acceptable with you, I will record our conversation in order to capture what you say accurately. Your name and any other identifying information will be removed from the interview transcript and the recording will be destroyed once analysis is complete. No one aside from me and the transcriptionist will listen to the recording, and only my dissertation chair and I will have access to the transcription.

- I have previously provided you with the interview and consent information; do you agree to participate in this interview? __
- Before we begin, is it acceptable to record our conversation? __
- Do you have any questions for me? __

Questions:

1. Please tell me about your role at _____ CCO.
 - a. Probe: How long have you worked here?
 - b. Probe [if needed]: Please describe your involvement with the work that your CCO does with regard to social determinants of health.
2. Please tell me about _____ CCO.
 - a. What is your service area?
 - b. What performance metrics related to social determinants of health do you focus on?
 - c. Has your CCO adopted any health measures specific to social determinants and health equity? If so, what are they and how are they tracked?
 - d. Does your CCO have any other internal metrics or indicators related to social determinants of health that you track beyond those required by the state?
 - e. Probe [if answer to d is yes]: What are they? How did you identify them?

3. What community health outcomes are of the greatest importance to your CCO?
 - a. Were these priorities identified as part of your community health improvement plan/community health assessment? If not, how were they identified?

4. Please tell me about your organization's approach to addressing social determinants of health within your service area.
 - a. Does your organizational strategy focus on any specific determinants?
 - b. Please describe how your organization uses health-related services, flexible services, and/or community benefit initiatives to address social determinants.
 - c. Please describe any contracts or other formal agreements that your organization has with partners to address social determinants.
 - d. Please describe the role of your community advisory council (and Tribal advisory committee, if applicable) with regard to social determinants spending.
 - e. Are there any barriers in the communities you serve that prevent your organization from addressing any these determinants?

5. Is food security a major issue for your CCO (individual members or this region in general)?
 - a. Is healthy food access an issue for members of your CCO?
 - b. Does your CCO prioritize food security/healthy food access for members?
 - c. Do you have any specific programs that address food security/healthy food access?
 - d. Does your CCO have any interactions with your local food system?
 - e. Probe [If answer to d is yes]: Please provide an example.

6. Are you familiar with the Veggie Rx program(s) operating within the community? [Interviewer will provide details on local programs if response is no including number of programs and names).]
 - a. Probe: Does your CCO provide funding or other support to any of your local Veggie Rx program(s)?
 - b. Probe [if answer is no to probe a]: Is partnering with Veggie Rx program(s) something your CCO might consider in the future?
 - c. Probe [if answer is no to probe a]: What are the key barriers to working with Veggie Rx? (Information, data, etc.)
 - d. Probe: Does your CCO support any other evidence-based nutrition support programs? If so, please describe.

7. I trust you are aware of the 2022 Oregon Medicaid Section 1115 Demonstration waiver. [If not, explain.] What effect has this had on your CCO's approach to addressing social determinants of health?
 - a. Probe: Has the new waiver led to any changes in your strategy with regard to social determinants?
 - b. Probe: Are there any specific evidence-based nutrition programs that _____ intends to offer to CCO members as part of the new waiver?
8. Are there other people at your CCO who you think I should speak with to learn more this?
9. Is there anything that I haven't asked about that you think would be important for me to know?

Thank you for taking the time to talk with me today. I hope to have analyses completed and preliminary findings available by early in 2024 and will be happy to share a summary with you at that time.