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From Grocery Stores to Daycares: Analyzing the Desirability and Feasibility of a Proposed Intervention to Mitigate Child Hunger in North Philadelphia

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From Grocery Stores to Daycares: Analyzing the Desirability and Feasibility of a Proposed Intervention to Mitigate Child Hunger in North Philadelphia

Abstract

The purpose of this study was to ascertain whether a proposed program with the goal of mitigating child hunger in North Philadelphia would be desirable, or accepted by key stakeholders, and feasible, meaning financially viable to implement. The program being considered is grocery stores selling to daycares, at a discounted price, excess edible and redistributable produce to be distributed to the children enrolled in the daycare, providing them with fresh and nutritious fruits and vegetables. To determine whether the proposed program is desirable, a qualitative analysis was completed on a series of semi-structured interviews conducted with representatives of relevant stakeholder groups in the community. A cost-benefit analysis of the proposed program, assessing two different versions of the initiative, was conducted in order to determine its feasibility. The results of the analyses show that the program is desirable, being viewed positively by a majority of the stakeholder groups interviewed. Similarly, the proposed program was determined to be feasible overall. However, both versions of the program are only feasible for large grocery retailers, with only one of the versions being financially feasible for small- to medium-sized grocers. These results indicate that the program may be considered further, however several logistical and promotional challenges would need to be addressed prior to its possible application.

Keywords

child hunger, philadelphia, food reallocation, food waste, social impact, produce, surplus food, excess food, circularity, food disposal

Disciplines

Advertising and Promotion Management | Business | Business Administration, Management, and Operations | Business Law, Public Responsibility, and Ethics | Entrepreneurial and Small Business Operations | Food Studies | Nonprofit Administration and Management | Operations and Supply Chain Management | Other Business | Strategic Management Policy

FROM GROCERY STORES TO DAYCARES: ANALYZING THE DESIRABILITY AND
FEASIBILITY OF A PROPOSED INTERVENTION TO MITIGATE CHILD HUNGER IN
NORTH PHILADELPHIA

By

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An Undergraduate Thesis submitted in partial fulfillment of the requirements for the
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Executive Summary

The purpose of this study was to ascertain whether a proposed program with the goal of mitigating child hunger in North Philadelphia would be desirable, or accepted by key stakeholders, and feasible, meaning financially viable to implement. The program being considered is grocery stores selling to daycares, at a discounted price, excess edible and redistributable produce to be distributed to the children enrolled in the daycare, providing them with fresh and nutritious fruits and vegetables. To determine whether the proposed program is desirable, a qualitative analysis was completed on a series of semi-structured interviews conducted with representatives of relevant stakeholder groups in the community. A cost-benefit analysis of the proposed program, assessing two different versions of the initiative, was conducted in order to determine its feasibility.

The results of the analyses show that the program is desirable, being viewed positively by a majority of the stakeholder groups interviewed. Similarly, the proposed program was determined to be feasible overall. However, both versions of the program are only feasible for large grocery retailers, with only one of the versions being financially feasible for small- to medium-sized grocers. These results indicate that the program may be considered further, however several logistical and promotional challenges would need to be addressed prior to its possible application.

Introduction

According to Children's HealthWatch, child hunger in North Philadelphia has more than tripled between 2006 and 2016 among families where parents work 20 or more hours a week (2017). Standing close to a percent higher than the national rate at 9.7%, the child hunger rate in North Philadelphia is only projected to increase in the upcoming years. Paradoxically, calculations by Thomas O'Donnell, the Sustainability Coordinator for the US Environmental Protection Agency, show that the amount of surplus food wasted in Philadelphia is enough to feed all of the food insecure people ineligible for government assistance in the city four times over (WHYY, 2016). And, while consumers are a source of waste, the Philadelphia Streets Department found that the wide majority of the waste going to local landfills, approximately 78%, is from commercial sources such as grocery stores and restaurants (The Philadelphia Inquirer, 2017). This paradox follows the premise that hunger in current society functions not as

a result of scarcity, but rather a function of inequality and inefficiency (Holt-Giménez, Shattuck, Altieri, Herren, & Gliessman 2012).

On the assumption that hunger could be mitigated through redistribution of surplus food resources, this study analyzes whether a proposed intervention between daycares and grocery stores is a viable way of mitigating child hunger in North Philadelphia. The proposed intervention encompasses grocery stores selling to daycares, at a discounted price, edible and redistributable produce that would otherwise be routed to landfills due to excess supply or the supposed unmarketable appearance of the food products. In essence, the research will aim to answer the question: *Would grocery stores reselling edible and redistributable surplus produce to daycares be a feasible and desirable intervention for mitigating child hunger in North Philadelphia?* To assess the proposed intervention’s feasibility and desirability, the research will address whether the proposed intervention would be accepted by key stakeholders in the city and whether there is a business case for grocery stores to engage in this specific transaction of food resources. The conducted research assesses two hypotheses; namely, that the proposed intervention is feasible after accounting for costs, and that the proposed intervention overall will not be desirable despite some stakeholder subgroups finding the intervention beneficial.

The purpose of this research is to provide a case study for the attractiveness, from a community and business perspective, of circular economies reducing social inefficiencies and inequities in an urban environment. Circularity refers to the comprehensive and sustainable use of resources and minimization of waste. In this case, the circular program hinges on a market inefficiency--that children demand proper nutrition in order to sustain their growth and contribute to the city’s society, and that grocery retailers possess surplus food for which they incur an unnecessary cost when diverting to landfill.

Literature Review

Background on Food Deserts

According to the US Department of Agriculture (USDA), food deserts are “parts of the country void of fresh fruit, vegetables, and other healthful whole foods, usually found in impoverished areas.” A 2019 report by the City of Philadelphia and the Philadelphia Department of Public Health indicated that there are 88,939 people in the North Philadelphia region, made up

of Districts 6, 7, and 9¹, which have low-to-no access to high-produce supply stores. These individuals make up approximately 43% of all individuals in low-to-no access neighborhoods in Philadelphia. According to the same report, the North Philadelphia region also has 302, 612 people in areas with an overabundance of unhealthy food, about 31% of all Philadelphians in overabundance of unhealthy food areas.

A study sponsored by PolicyLink and the Food Trust summarized the existing research around food deserts, reviewing more than 132 studies, and found that those disproportionately affected by food deserts include low-income communities and communities of color (Treuhaft, Karpyn, 2010). Studies such as the one conducted by Latetia Moore and her colleagues have shown that individuals located in food deserts have a poorer diet, with participants in food deserts 25–46% less likely to have a healthy diet than those with the most stores (Moore, Roux, Nettleton, Jacobs, 2007).

Although many studies assess food deserts using spatial distribution, a paper published in *Public Health Nutrition* challenged the notion that quantification of food deserts by geographic distance to grocery stores or via store concentration measures is comprehensive (Bodor, Rose, Farley, Swalm, Scott, 2008). The scholarly work uses in-store food availability and store access to assess the role that sufficiently stocked small food stores have on fruit and vegetable consumption. A working paper by Jessie Handbury and her colleagues investigates further the concept of in-store food availability, launching a rigorous look into the role of access as an explanation for why low-income households purchase less healthy food than their wealthier and more educated counterparts (Handbury, Rahkovsky, Schnell, 2015). The study found that access-improving policies could improve the nutritional consumption of individuals located in food deserts by close to a third, but more emphasis should be put on improving the nutritional content of sales themselves.

“Understanding the Food Environment in a Low-Income Urban Setting: Implications for Food Store Interventions” examines further the role that not only policy, but grocery stores themselves could have in facilitating an increase in nutrition (Gittelsohn, Franceschini, Rasooly, Ries, Ho, Pavlovich, Santos, Jennings, S, Frick, 2008). The study found that grocery stores have the potential to create a positive impact on communities in food deserts.

¹ According to Amott in the Encyclopedia of Greater Philadelphia, “Where exactly North Philadelphia begins and ends is a matter of debate.” Districts 6, 7, and 9 capture North Philadelphia up to the Northeastern most District 10.

Food Waste in Grocery Stores

“On the Measurement of Food Waste”, a paper published in the *American Journal of Agricultural Economics*, explains that a “limitation of the limited literature on food waste is that the definitions of food waste differ substantially, which results in wildly differing estimates” (Bellemare, Cakir, Peterson, Novak, Rudi, 2017). Bellemare and his colleagues suggest that food waste findings are overstated in academia and the focus on food reallocation has negative consequences for public policy. While there are varying estimations of excess food, Bellemare et al.’s conclusions are opposed in this thesis due to food reallocation’s opportunity as a significant short-term solution while a longer-term policy solution is in the works.

While the study of food waste has been neglected-- and at times rejected-- by academics, organizations such as the UN have zeroed in on global food waste in recent years. Nonprofit organizations such as the Natural Resources Defense Council (NRDC) and Rethink Food Waste Through Economics and Data (ReFED) are active in studying food waste along the supply chain.

However, similarly to differences in the academic community, there is disagreement between specialized nonprofits about the opportunity that grocery stores have in food waste reduction. The NRDC reported that retailers have an opportunity to recover \$15 billion annually in unsold fruits and vegetables alone (2012). On the other hand, ReFED released its 2018 US Food Waste Investment Report which cites that food waste represents a total \$18.2 billion opportunity for grocery retailers.

The ReFED report features several case studies of food waste recovery, redistribution, and prevention, especially highlighting the role of government, foundations, and private players have in supporting food waste programs (2018). To emphasize the effect that government can have on food waste reduction, it references the 2014 Massachusetts landfill ban which gained \$175 million of industrial activity and diverted 260,000 tons of food waste from landfills via several food waste reduction programs.

Food Waste Reduction Programs

The three most frequently mentioned food recycling programs in literature are: 1) charitable donations to nonprofits who then take ownership of the food and complete their own distribution process to the civilian population, 2) transforming the food waste into alternative energies via government sponsored plants, or 3) composting.

A study on food waste in 612 Austrian retail outlets was conducted by Lebersorger and Schneider, which found that only 7% of food loss was donated, while much of the produce in the grocery stores studied was discarded for arbitrary reasons (2014). For example, 75% of fruits and vegetables were discarded solely due to apparent flaws such as dents in the produce. Criticism of this study comes from a paper conducted on in-store logistics relating to unsaleable products, which argues that Lebersorger and Schneider's study is "of a purely descriptive nature" (2016). According to Holweg and his colleagues, although studies on waste management and reverse logistics exist, their research is one of the only that focuses on the operational mechanics of food waste and the opportunities to redistribute the edible share of food waste. The paper rejects the notion that unsaleable products are waste resources, and offers evidence from 32 grocery stores that redistribution yields various benefits including cost savings. They find, similarly to Lebersorger and Schneider, that between 50 and 70% of all unsaleable fruits and vegetables were still edible, of which the majority would still be redistributable.

An article posted in the *Environment* studied a partnership between Ukrop's Super Markets and Watkins Nursery, a landscaping firm, in Richmond, Virginia. The supermarket transports its fruit and vegetable food waste to the nursery, where it decomposes into fertilizer that the supermarket sells to its customers. The supermarket saves \$30 per ton of food waste that is diverted from landfill with up to 7.5 tons diverted daily, while the nursery retains a portion of the fertilizer for its own operations. Composting is again mentioned in an article posted in the *Food & Beverage Industry News* in 2016 outlining how Australian communities repurpose food waste in circular economies.

Furthermore, other Australian communities such as Cowra on the Lachlan River utilize food waste as inputs for anaerobic digestion and thermal recovery plants, with state governments supporting the installation of on-site facilities. Similarly, a case study on Kroger's food waste reduction programs delineates how the chain uses food waste to produce alternative energy (Warshawsky, 2016). Kroger performs anaerobic digestion on-site to transform 150 tons of unsaleable food daily into renewable energy, powering 20% of its distribution center. While the composting initiative is financially feasible given a fitting partner, biogas initiatives are typically quite capital intensive, with Warshawsky voicing his doubt that Kroger's "project could be developed elsewhere given its costs to develop."

Food Programs at Daycares

According to Chriqui et al., over 3.6 million children receive food in daycares that participate in the Child and Adult Care Food Program (CACFP) (2017). This program, funded by the USDA, provides at least one meal per day that meets specific nutritional standards to children enrolled in eligible daycares. The study found that most centers participating in the program purchased food and beverages from food service providers, local grocery stores, warehouse stores, or from more than two sources. Interestingly, the study found that independent daycares participating in the program were more likely to purchase food from local grocery stores.

While the research conducted by Chriqui and their colleagues demonstrated the range of the CACFP and pre-existing relations with grocery stores, a different study analyzed why some daycares choose to opt out of it. Analyzing the attrition of New Jersey daycares from the New Jersey Family Day Care Food Program, a branch of the CACFP, Freeman-Wright found four main conditions which prevent daycares from staying with the program (2015). Regulatory changes, economic constraints, abusive power, and educational limitations were linked to approximately 52% of FDCFP sponsoring organizations terminating their enrollment in the food program, despite the participants in the study referencing the program's importance. Besides a recommended reform within the food program, no alternatives or reference to reallocation of excess food for daycares was mentioned in the research.

The findings in "Quantification of Food Waste in Public Catering Services -- A Case Study from a Swedish Municipality" show that preschools themselves have a lower level of food waste than schools or elderly care homes (Eriksson M., Osowski, Malefors, Bjorkman, Eriksson E., 2017). Furthermore, the study conducted by Eriksson and his colleagues provides further insight into daycare food programs, finding that kitchens which prepare all meals themselves are more efficient in increasing consumption levels of daycare children than satellite kitchens, which receive warm food from an external source, due to the latter having 42% more food uneaten by children.

Contribution to Academic Literature

This research contributes to a gap in the academic literature surrounding food waste. In a summary of the academic research on food waste, Warshawsky's publication in *The Geographical Journal* points to food waste being "historically neglected or misunderstood by

scholars” (2003). More granularly, there wasn’t any research found on how civilians perceive food waste or respond to the idea of consuming unmarketable grocery products. This research assesses the responses of several nonprofit, government, and commercial organizations to the consumption of surplus and unmarketable produce. The analysis done identifies trends regarding the attitudes of key organizations on mitigating hunger through redistribution of excess edible and redistributable food resources.

Another foreseen contribution to literature is partially filling a gap in the knowledge about reselling edible and redistributable food waste in a business to business transaction, as opposed to donation or partnership. Through the interviews, the research compares key stakeholders’ attitudes towards the sale of surplus food to their attitudes toward surplus food donations. Moreover, through the assessment of the proposed intervention’s feasibility, the research illuminates whether reselling surplus produce could provide financial benefits in inventory management for businesses, which could later be compared to the benefits of food donation.

Policy Review

Policy on Selling Produce in Grocery Stores

The federal government does not regulate grocery stores unless they are involved in interstate commerce, therefore leaving the regulation of retail locations to the state (Harvard Law School Food Law and Policy Clinic, 2017). However, the majority of states adapt the FDA Food Code or use it as a baseline to regulate their grocery stores. In the state of Pennsylvania, the FDA Food Code is the basis for grocery retailer regulations (PennState, 2018). The Pennsylvania Department of Agriculture states that the FDA Food Code is the “model for safeguarding public health” (PDA, 2017). Therefore, an analysis of the 2017 FDA Food Code, the latest version, was performed for regulation on produce within grocery stores.

Whole, uncut, raw fruits and vegetables in the shell that require peeling or hulling before consumption are not considered “ready-to-eat food” (FDA Food Code, 2017). This categorizes them as one of the least heavily regulated fresh food items. Similarly, raw, uncut produce, whether in shell or not, have historically been excluded from regulations that apply to the “time/temperature control” food product category (TCS), as noted in Annex 2 of the Food Code.

Due to this, it is assumed that the decision of when to dispose of raw, uncut fruits and vegetables is left up to the retailer.

Another document from the FDA, the Food Safety Modernization Act (FSMA), has a section entitled Current Good Manufacturing Practice, Hazard Analysis, and Risk-Based Preventive Controls for Human Food (FDA, 2018). The Act requires that corrective action be taken to evaluate the food product for safety and prevent it from entering commerce if the retailer can't confirm that the food product is not adulterated following the identification of a hazard. This document strengthens the requirement under 6-404.11 of the FDA Food Code by adding that adulterated food products cannot be resold following segregation into a designated area. However, since damaged food products are not hazardous-- merely conventionally unmarketable due to visual appearances-- this requirement should not apply to them.

Policy on Grocery Stores Donating Food

The Bill Emerson Good Samaritan Food Donation Act, also known as the Emerson Act, is the primary federal policy regarding food donations (Harvard Law School Food Law and Policy Clinic, 2017). The policy ensures that food donors and nonprofits that distribute the donations, are protected against civil and criminal liability. The Act specifies that the food products must comply with quality and labeling standards to be protected, but do not have to be “readily marketable due to appearance, age, freshness, grade, size, surplus or other conditions” (Food Donation Connection, 2018). There are also restrictions placed upon the donation process, including that the food be donated to a nonprofit in good faith, that the nonprofit distribute the food to those in need, and that the persons receiving the food receive it free of cost (Harvard Law School Food Law and Policy Clinic, 2017).

Although the Emerson Act serves as a foundation and can't be overridden by states, Pennsylvania enacted an additional food donation policy. Pennsylvania's Donated Food Limited Liability Act allows the persons receiving the food to be charged a nominal fee for the food products. The tension rests with the state provision allowing a nominal charge, while the federal policy prohibits the food products from having a monetary cost associated with them. Thus, organizations that must charge a fee for their food products in order to cover transportation, preparation, and storage costs are compelled to purchase ingredients instead of working with

donated food products. Otherwise, if a fee is not charged, either food donors or charitable organizations have to bear the additional costs.

While food donation is an attractive choice for grocery retailers, the presence of legal risk and taking on additional expenses due to not charging a fee may deter some from participating.

Policy on Daycares Providing Food

Although there are distinctions between the types of daycares, namely childcare centers, group child care homes, and family child care homes, the nutrition regulation surrounding them are identical. The Office of Child Development and Early Learning (OCDEL) Checklist to Support Certification Compliance indicates that the daycares must provide nutritious meals or snacks to children who receive care for 4 or more consecutive hours (PA Key, 2018). The checklist also includes that the food stored, prepared, or served must be clean, wholesome, free from spoilage, free from adulteration and safe for human consumption. It is worth noting that the statement does not include “damaged” food products, which are mentioned in the FDA Food Code. The lack of “damaged” food products mentioned in the statement leads to the assumption that the introduction of edible, redistributable excess food products from grocery retailers would not be criminalized.

Besides regulations on the handling and preservation of food products within the daycare, the checklist also includes the breakdown of a nutritious meal served for children of toddler age or older. For a breakfast meal, there must be at least one item from three of the following four food groups present: dairy products, protein, fruits and vegetables, and grain. For a lunch or dinner meal, there must be at least one item from all four food groups present. Therefore, there is a necessity for daycares to have access to produce in order to provide a proper meal to children in their care.

Government Resources for Daycares

The Child and Adult Care Food Program (CACFP) offers reimbursements for meals provided to children hosted in non-residential childcare homes. The program provides assistance to nonprofit child centers, for-profit child centers that meet certain requirements, as well as family and group daycares (PDE, 2019).

Although the CACFP can be effective for those who qualify for it, the 38,000 low-income children cared for by Relative/Neighbor (R/N) providers in Pennsylvania can't reap the benefits of this program (Public Citizens for Children and Youth, 2019). R/N providers "care for some of the poorest children in Pennsylvania and receive the lowest child care subsidy level", with R/N providers receiving a maximum of \$15 per child while child care centers can receive a maximum of \$42 per child (Drexel Center for Hunger-free Communities and PCCY, 2011).

The Child Nutrition Programs of Nutritional Development Services (NDS) provides meals directly to childcare centers at no cost, at a reduced price, or at full price (Healthy Meals for Children). The requirements for participation in the program are for childcare centers to host an average of 30 children and possess the kitchen equipment necessary to store and prepare food. To qualify for reduced or no-cost meals, the daycares must either be nonprofits or have at least a quarter of the participating children receiving a subsidy from the Child Care Works Subsidized Child Care Program.

The Child Care Works Subsidized Child Care Program, under Child Care Information Services (CCIS), is a federal and state funded childcare program that assists low-income families by subsidizing a portion of the household's childcare expenses (PA Department of Human Services, 2019). The Child Nutrition Programs, while taking a different approach to improving children's health, is similar to CACFP because it excludes R/N providers due to its size requirements. In fact, it is likely even more exclusive than CACFP since its size requirement also excludes a portion of family and group childcare homes.

Programs which directly assists the family with the purchase of nutritious food, such as the Supplemental Nutrition Assistance Program (SNAP) also do not serve undocumented immigrants (Food and Nutrition Service, 2013). The Food and Nutrition Act of 2008 limited SNAP benefits so that exclusively US citizens and certain lawfully present immigrants are eligible for the program, thus similarly excluding vulnerable communities in Philadelphia.

Overall, there are programs and benefits which make food options more accessible for children, however they are not all encompassing.

Methodology

To assess the desirability of the proposed intervention, I conducted a predominantly deductive qualitative analysis. I conducted 8 semi-structured interviews² with representatives of daycares, grocery stores, and nonprofits, as well as civil servants in North Philadelphia. Although qualitative research has been historically associated with hypothesis generation as opposed to hypothesis testing, conducting a qualitative study was necessary for this study because the questions asked in the interviews varied from yes/no questions to requiring open-ended explanations (Sullivan and Sargeant, 2011). Moreover, a qualitative study is most beneficial for exploring the process of potential implementation of the proposed program, as well as its desirability. One of the goals of the research is to identify ex ante unknown challenges and risks to the adoption of the program.

A benefit of using a hypothesis-driven approach is that it allows assumptions to be refuted or verified with the aid of non-numerical tools (Chigbu, 2019). Given the research question and the researcher's own bias as a life-long resident in the city, it would have been misleading to conduct the fieldwork and analyses without acknowledging the expectation of an outcome. By acknowledging the initial expectation in the research process, its validity was assessed through an analysis of whether there was sufficient evidence to support it.

Some academic literature contests the use of hypotheses in qualitative research, claiming that qualitative research should only be inductive since the results are context-specific and ungeneralizable to a different or broader population (Bluhm et al., 2011). Due to the use of deductive reasoning in the qualitative research, scholars claim there is difficulty in “framing a qualitative hypothesis”, especially including variables that are easily understood and able to be explained (Chigbu, 2019). Others claim that the “established criteria for scientific rigour in quantitative research cannot be applied to qualitative studies” (Hamberg et al., 1994). However, alternative assessments of reliability in the information gathered from qualitative study have been put forth, including credibility, dependability, confirmability and transferability. Although not being able to generalize results without using quantitative methods is a valid weakness of the qualitative method, this research’s primary function is as a case study, which eliminates the need for generalizability.

² Exhibits 1-3 in the Appendix are the proposed interview guides

According to Kohlbacher, case study research is best used “when the investigator has little control over events, and when the focus is on a contemporary phenomenon within some real-life context”, which was an appropriate fit for the research conducted (2005). Additionally, the case study can be employed when there are more variables than data points available, which results in reliance on multiple sources of evidence and allows for qualitative and quantitative methods to be used. Although the bulk of the research is centered on qualitative analysis of interviews with stakeholder groups, an assessment of the financial feasibility of the proposed interventions through a cost-benefit analysis which accounts for risks and opportunity costs was also conducted. The case study research strategy gave way to a mixed methods analysis.

The interviews conducted asked a series of questions falling into the categories of general information, questions assessing their awareness and attitudes regarding child hunger, and questions inquiring about their opinion on the proposed intervention and understanding what would influence that opinion. These core questions informed how desirable the proposed intervention was to the different stakeholder groups.

The interviews between stakeholder groups also deviated from each other. The proposed interview structure for daycare representatives included questions about the food programs already in place at the daycares, if they have them, and their opinion on government sponsored food programs. The interview guide for grocery store managers and representatives included questions on unmarketable fruits and vegetables, particularly their process for storing, handling, and disposing of the produce. The grocery store representatives were also asked about the financial expenditure associated with food waste management and their involvement with food donation. The interview guide for civil servants, nonprofit representatives, and representatives of religious institutions also included an additional question for the interviewees about their organization’s engagement with the North Philadelphia community to proactively mitigate child hunger. These additional questions informed how feasible the proposed intervention is, from looking at the alternatives to the proposed initiative when interviewing daycares representatives, nonprofit representatives, religious institution representatives or civil servants, to looking at financial feasibility from the perspective of the grocery retailer.

To assess the interviews once they were conducted, framework analysis was employed. This form of analysis was most applicable to the research because of its “applicability to experiential research questions”, as suggested by a University of London paper on qualitative

research methods (Parkinson, Eatough, Holmes, Stapley, Target, Midgley). The paper elaborates on framework analysis being most effective for research questions which are contextual, diagnostic, evaluative, and strategic-- all of which were questions integral to understanding the desirability of the proposed intervention. To assist the application of framework analysis to the interviews conducted, a computer-assisted qualitative data analysis software (CAQDAS), NVivo, was used. In using NVivo, the researcher coded the transcribed interviews into several categories. These categories included: awareness of child hunger, opinions on drivers of child hunger, engagement with the North Philadelphia community, initial program reaction, perceived program risks, and perceived program benefits. The researcher then compared and juxtaposed the coded items using the software to identify trends in responses, as well as unique responses. The influence data collected during the interviews was also used to create a stakeholder mapping via NodeXL software, which shows the influence other parties' opinions have on stakeholders.

To assess the feasibility of the proposed intervention, I conducted a cost-benefit analysis. The cost-benefit analysis, as defined by Walcott et al., is “the systematic analysis of the relationship between costs and outcomes for a given program” (2018). This analysis would give the most straight-forward estimation of whether the program benefits would outweigh the costs incurred by a grocery store engaging in the proposed initiative. In using the cost-benefit analysis, the program outcomes were expressed in dollars, as opposed to natural units as they would have been if a cost-effectiveness analysis was conducted. The use of currency as opposed to natural units was deemed more appropriate for the current study, since the proposed program involves major commercial stakeholders—namely daycares and grocery retailers.

The data for the cost-benefit analysis was taken from public resources, such as the EPA Excess Food Opportunities Map, as well as some figures which were provided by the stakeholder representatives interviewed. The cost-benefit analysis compares two scenarios to a benchmark, the Baseline Scenario. The Baseline assesses the net revenue of the disposal of excess edible and redistributable produce for small- and medium-size grocery retailers, as well as large grocery retailers, as they are without the proposed program. Each of the following scenarios similarly assess the proposed program for small- and medium-sized businesses as well as large retailers. The second scenario assesses the net revenue of the proposed program with the grocery store incurring all costs associated with transporting and delivering the surplus produce sold to daycares. The third scenario, however, assesses the net revenue of the proposed program with an

intermediary taking on costs associated with the transportation and delivery of the excess produce. The net revenues of the baseline, second, and third scenarios were compared in order to determine the feasibility of the proposed program.

Hypotheses³

The first hypothesis hinges on a landscape analysis of North Philadelphia conducted, which identifies five stakeholder groups. These stakeholder groups are: local nonprofits, city government, religious institutions, grocery stores, and daycares. The hypothesis for the research question is that the proposed intervention overall will not be desirable, despite some stakeholder subgroups finding the intervention beneficial. The researcher hypothesizes that there is a potential for acceptance of the proposed program from local nonprofits because they tend to have a number of different initiatives, with at least one of these initiatives having common ground with the proposed program. Overall, however, the nonprofits may have very strong philosophies on what works and what does not work in Philadelphia, and may not be as willing to entertain different approaches. If religious representatives do not object to the re-selling portion of the proposed program, they may be more accepting of the proposed intervention.

Childcare centers have more financial resources, greater access to government-sponsored food programs, and greater visibility than group and family childcare homes, as well as R/N providers. As such, they would potentially find the proposed program undesirable in comparison to the one they are already enrolled in. However, childcare centers with less confidence in the food programs they participate in could be more interested in the proposed program. Further, the two categories of daycares that could find the proposed program more desirable, group childcare homes and family childcare homes, are more difficult to identify and contact. This could result in childcare centers being overweighed, which could negate the desirability of the program.

In regard to city government, it is possible that they are more open to innovative and unorthodox practices in order to chip away at the primary issue of child hunger. Due to this, they may find the proposed program more desirable. Grocery stores may also find the proposed program more desirable because it allows them to reduce the amount of edible and redistributable produce they waste, lowering their costs while contributing to the communities

³ These hypotheses will not be used in formal hypothesis testing, but will rather guide the qualitative and quantitative analyses conducted

they are in. An assessment of the policy surrounding food donation may also contribute to the desirability of the proposed intervention for grocery retailers, if the intervention is perceived as an alternative to a food donation program. The conflict between the wording of federal and state regulation leads to questions on the liability protections that grocery stores have when donating produce. This difference, amid other regulatory bottlenecks, may cause grocery retailers to hesitate to implement a food donation program. Since the ambiguity surrounding donation would be circumvented with the proposed intervention, the intervention may be more desirable for grocery stores.

My second hypothesis for this research question is that the proposed intervention is feasible. A review of the policy surrounding the timely sale and disposal of produce revealed that there are no formal regulations on the time at which produce should be sold or disposed of at grocery stores. This reduces the likelihood that the proposed intervention is unfeasible from a policy perspective. Moreover, although there is guidance for daycares to ensure the food they have stored, prepared, or served be clean, wholesome, free from spoilage, free from adulteration and safe for human consumption, there is no mention of “damaged” food products in the documents reviewed. The lack of “damaged” food products mentioned in the statement leads to the assumption that the introduction of edible, redistributable excess food products from grocery retailers would not be criminalized, which further decreases the chance that the proposed intervention is unfeasible.

Further, although the academic literature surrounding food waste management is minimal, the existing literature points towards the financial feasibility of food waste reduction programs. A study by Holweg and his colleagues offered evidence from 32 grocery stores that redistribution of excess produce yields various benefits, including cost savings (2016). They found that between 50% and 70% of all unsaleable fruits and vegetables were still edible, of which the majority were still redistributable. Moreover, non-academic reports by nonprofits such as ReFED claim that redistribution of food waste represents a total \$18.2 billion opportunity for grocery retailers (2018). Therefore, there is an opportunity for the proposed program to generate non-negative net revenue after accounting for expenses.

Results

I. Interview Analysis

Trends Identified Through Framework Analysis

Perceptions of Child Hunger

The majority of stakeholders (87.5%) interviewed were not aware that child hunger tripled in North Philadelphia from 2006 to 2016. While nonprofit representatives were across the board unsurprised about the state of child hunger in North Philadelphia, they did not know the specific statistic. Similarly to nonprofit representatives, the grocery store representative, the daycare representative, and religious institution representatives did not know the specific statistic about child hunger in North Philadelphia. However, the grocery store representative did indicate that they knew the child hunger rate was a problem. Only the city government representative was aware about the rate of child hunger in North Philadelphia tripling over the ten-year period.

While the nonprofit representatives interviewed were not aware of the troubling North Philadelphia statistic, they all engaged heavily with the North Philadelphia community in various fashions. The representatives mostly benefited the children through their interaction with the children's parents, whether that was through connecting their parents with food, employment, or both. Likewise, the city government representative indicated that their organization engages heavily with the North Philadelphia community to proactively mitigate child hunger. In contrast, the grocery store representative's company had not worked with North Philadelphia specifically in the past, although they worked with other communities in Philadelphia where their stores are located. The religious institution representatives had a mixed response, with one representative not engaging with the community and the other engaging quite heavily. The representative that engaged with the North Philadelphia community, like the nonprofit representatives, frequently distributed donated food items to the children's families.

Unanimously, the group stakeholders identified economic drivers of child hunger. The city government representative stated that "economic issues" were major drivers. The nonprofit representatives referenced unemployment and poverty in affected children's families, with the religious institution representatives similarly stating that families lack sufficient financial resources. One nonprofit representative and one religious institution representative also signaled that money management may be a potential economic driver, with the latter mentioning that families may not be utilizing their available funds in the "wisest of ways". Like the nonprofit

representatives, the grocery store representative indicated that unemployment could be a driver of child hunger, while the daycare representative identified produce affordability as a driver.

While economic factors were the most widely mentioned driver of child hunger, there were also other drivers that were mentioned by the stakeholder representatives. The grocery store representative included the social driver of family disunity as a potential cause, with the daycare representative similarly pointing to family structure as a cause. The daycare representative indicated several other social drivers as well, including lack of knowledge on how to prepare a nutritious meal and social class. Access, or the lack thereof, was another major driver discussed by the representatives interviewed. Nonprofit representatives, the daycare representative, and the grocery store representative stated lack of access to nutritious food as a driver, with one nonprofit representative also mentioning the rise in obesity being linked with the rise in child hunger. The city government official also mentioned lack of access to stable living conditions and housing as a driver, with the daycare representative stating lack of quality childcare. Uniquely, the city government representative also pointed to political causes, including the way food stamps are allocated, as an additional driver of child hunger.

Perspective on Program

A trend in the interview responses were the majority (80%) of stakeholders using positive language in their initial reaction to the program. For example, the nonprofit representatives employed positive language when speaking about the potential of the proposed program despite their identification of some risks, with one representative stating that the program “would be perfect, an ideal option”. Similarly, the daycare representative and religious institution representatives used positive language. As an extension of their responses, the nonprofit representatives, religious institution representatives, and the daycare representative rated the program either “positively” or “very positively”, as indicated in Table 1 below.

Table 1. Numerical ranking of stakeholder groups’ reactions to the proposed program on a scale of 1-5, with 1 being “very negatively”, 3 being “no effect” and 5 being “very positively”

City Government	2.00
Government Representative 1	2.00
Daycares	5.00
Daycare Representative 1	5.00
Grocery Stores	3.00
Grocery Store Representative 1	3.00
Nonprofits	4.67
Nonprofit Representative 1	4.00
Nonprofit Representative 2	5.00
Nonprofit Representative 3	5.00
Religious Institutions	5.00
Religious Institution Representative 1	5.00
Religious Institution Representative 2	5.00
Average of Individual Scores	4.25
Average of Group Scores	3.93

Unlike most of the stakeholders interviewed, the grocery representative’s initial reaction to the program included more neutral language. The representative indicated that they were “not opposed” to a program like the one being proposed. However, the city government representative responded with primarily negative language and voiced their overall disapproval of the proposed program. The representative indicated that the program may be “exacerbating inequality”, believing that it furthered the mindset that individuals from a wealthier class get perfect produce while individuals from a lower class get “second hand” produce. The city government specified that this would be the case although “it’s perfectly fine food and everyone knows it’s fine to eat”. Consequently, the representative rated the program as a 2 on the 5-point scale as shown in Table 1, viewing it “negatively”.

When asked about the perceived benefits of the proposed program, most representatives (87.5%) responded with indications that the program would provide fresh produce to those who need it. The grocery store representative even stated that “getting fresh food into the hands of kids is very beneficial to everybody”. Half of the stakeholders interviewed also mentioned that a benefit of the program would be reducing food waste. Uniquely, both religious institution representatives identified an additional benefit to the program which was not mentioned by the other stakeholders. Both representatives identified emotional benefits to those involved in the

program, whether that is building relationships with the community or creating a model for those involved and others on humanitarianism.

Risks identified by the representatives interviewed were varied and differed from each other, even within groups. One risk that was mentioned more than once (37.5%) was risk associated with food safety, mentioned by a nonprofit representative and both religious institution representatives. Other risks that nonprofit representatives stated included daycares not having proper equipment to handle or cook the produce, as well as risks associated with whether re-selling would be protected by Good Samaritan laws and whether daycares would “buy in” to the program even though they do need the produce. As for risks, the grocery store representative overlapped somewhat with one of the nonprofit representatives in that they also identified the Good Samaritan law risk. When speaking of Good Samaritan laws, the representatives reference the Bill Emerson Good Samaritan Food Donation Act as well as Pennsylvania’s Donated Food Limited Liability Act. The grocery representative indicated that they would not be willing to participate in the program unless they were covered by these Good Samaritan laws.

The city government representative presented one risk of the program being daycares’ overdependence on a “band-aid” solution, which they viewed as market-based solutions such as the current proposed program. They explained that if an innovation decreased the quantity of excess produce generated by grocery stores, this would leave daycares without the proposed channel of fruits and vegetables. While the daycare representative did not mention this kind of risk, they did mention in addition to food safety risk that daycares and the parents of children they serve may not trust the source of the produce. Namely, they may not trust the grocery stores providing the fruits and vegetables. The daycare representative also suggested several risks which could affect the “social environment of the childcare program”, including children getting bullied for participating in the program or members of the community coming in conflict with each other over which daycare receives what kind of produce.

In regard to whether it would matter to the stakeholders if the fruits and vegetables were free to daycares as opposed to sold at a discounted price, a minority of the stakeholders indicated that it would matter (28.6%)⁴. One of the religious institution representatives stated that they would be even more encouraged by the program if the produce was donated. The daycare

⁴ The grocery store representative was not asked this question. Exhibit 2 in the Appendix presents the interview guide for Grocery Store Managers / Representatives.

representative also indicated that the program would be more favorable if the produce was provided for free, however also stated that there is a risk associated with that scenario. The representative stated that there is a stigma associated with getting free items, which could potentially hinder the program's acceptance if the produce was free instead of discounted.

This stigma was recognized by one of the religious institution representatives, who believed that selling discounted produce is an option that should be considered for the community. They indicated that actually purchasing items that are needed gives individuals, in some ways, a "sense of dignity and ownership". This was a sentiment shared by the nonprofit representatives. Unanimously, the nonprofit representatives did not have an issue with the program including a purchasing component. In all of the interviews, the nonprofit representatives identified a segment of individuals who would prefer to pay a reduced fee for their food products instead of receiving them for free. While one nonprofit representative indicated that a free program would be generally better, they stated that it depended on the situation and similarly pointed to some individuals wanting to purchase their own produce. The city government representative was indifferent, noting that it would not change their view of the program.

On balance, averaging across representative's reactions to the proposed program, the results indicate that stakeholders react "positively" to the program as shown in Table 1. Due to there being an unequal number of representatives interviewed for each stakeholder group, averaging across the stakeholder groups may offer a more accurate picture. However, even this figure is indicative of stakeholder groups viewing the proposed program very close to "positively" overall.

Commentary on Program Features

Although the stakeholders' overall reactions to the proposed program were positive, the stakeholders reacted differently to specific program features that would be considered for such an initiative. The program features that the stakeholders were asked to consider were:

- The partnership is not reimbursed through a government sponsored food program
- The partnership costs less than buying fruits and vegetables through a government sponsored food program

- The fruits and vegetables are delivered as ingredients (i.e. they are not cut or prepared in any other way)
- The appearance of the fruits and vegetables
- The fruits and vegetables are from a local grocery store
- The fruits and vegetables are from a chain grocery store

On balance, the representatives reacted most positively to the proposed program costing daycares less than buying fruits and vegetables through a government sponsored food program. At an average ranking of 4.71 on a 5-point scale, the stakeholders reacted nearly “very positively” to this program feature, as shown in Table 2 below. On average, the stakeholders reacted “positively” to the program feature of fruits and vegetables coming from a local grocery store. The other program features ranged from being perceived more neutrally or more positively on average, except for the feature concerned with the appearance of the fruits and vegetables. While the other program features ranked between a 3 and 4 on average, the appearance of the fruits and vegetables averaged to a 2.86.

Only one of the nonprofit representatives ranked the appearance of the fruits and vegetables at a 5. The other stakeholders interviewed ranked this feature at a 3 or lower. Commentary on this feature was mainly concerned with the chance that children may not find the produce appealing or the freshness of the produce itself. One nonprofit representative put it simply. Taking a banana as an example, they indicated that “although the banana is good, it may have spots and not everyone likes a banana with spots”. The city government representative indicated that the appearance of the fruits and vegetables mattered due to the mindfulness around serving individuals meals with dignity. One of the religious institution representatives indicated that, in so far as the appearance of the produce would indicate rotteness, it would matter quite a bit. However, if the appearance indicated “merely cosmetic effects”, then they stated it wouldn’t matter at all.

Table 2. Cumulative numerical ranking of program features’ influence on stakeholders’ reactions to the program on a scale of 1-5, with 1 being “very negatively”, 3 being “no effect” and 5 being “very positively”.

	A : The appearance of the fruits and vegetables	B : The fruits and vegetables are delivered as ingredients	C : The fruits and vegetables are from a chain grocery store	D : The fruits and vegetables are from a local grocery store	E : The partnership costs less than buying fruits and vegetables through a government sponsored food program	F : The partnership is not reimbursed through a government sponsored food program
NP Representative 1	3	2	3	5	4	3
NP Representative 2	3	5	4	3	5	4
NP Representative 3	5	4	4	4	5	5
RI Representative 1	3	4	3	4	5	2
RI Representative 2	3	5	3	3	5	3
Daycare Representative 1	2	5	5	5	5	3
CG Representative 1	1	1	3	4	4	3
Average	2.86	3.71	3.57	4.00	4.71	3.29

A breakdown of the program feature reactions by stakeholder group indicated that representatives’ reactions to the different potential program features varied amongst each other within the nonprofit group. For four of the potential features, the responses of nonprofit representatives had a standard deviation of one or less than one, indicating a higher degree of consensus among the nonprofit representatives. These features were: the partnership not being reimbursed through a government sponsored food program, the partnership costing less for daycares than buying fruits and vegetables through a government sponsored food program, the produce coming from a chain grocery store, and the produce coming from a local grocery store. Nonetheless, the nonprofit representatives did have interesting commentary on these features.

One of the nonprofit representatives indicated that the partnership not being reimbursed through a government sponsored food program “very positively” influenced their opinion about the program. The representative explained that they associate government programs with restriction, indicating that some of the individuals who need the program wouldn’t have access to the program if it was government sponsored. Similarly, the same nonprofit representative indicated that the cost of the program being less than that of a government sponsored food program would “very positively” influence their opinion because it would increase the program’s accessibility.

Another nonprofit representative had insightful commentary about the role of the local and chain grocery store. The representative noted that the chain grocery store has more validity, while local stores such as bodegas may be perceived by the community as being lower quality. The exception they noted, however, was that trust between a local store and the community was

stronger if the store was “ingrained in the neighborhood” and had rapport with customers. Another nonprofit representative gave a different perspective, noting that they didn’t think the difference between chain and local mattered to the potential beneficiary of the program.

The two program features which had the most divergence among the nonprofit representatives were: the appearance of the produce and the produce being delivered to the daycare as ingredients, as shown in Table 3. The representatives’ views of the features ranged from “negatively” influencing to “very positively” influencing their perception of the program. To give an example of the difference between their perspectives, one representative indicated that the preparation of “institutional” food poses much more of a challenge than that of other organizations and indicated this feature would “negatively” influence their view of the program. On the other hand, a different representative did not mention this as a risk and indicated that this feature would “very positively” influence their opinion of the program overall.

Table 3. Nonprofit representatives’ numerical ranking of program features’ influence on their reaction to the program on a scale of 1-5, with 1 being “very negatively”, 3 being “no effect” and 5 being “very positively”

	A : The appearance of the fruits and vegetables	B : The fruits and vegetables are delivered as ingredients	C : The fruits and vegetables are from a chain grocery store	D : The fruits and vegetables are from a local grocery store	E : The partnership costs less than buying fruits and vegetables through a government sponsored food program	F : The partnership is not reimbursed through a government sponsored food program
NP Representative 1	3	2	3	5	4	3
NP Representative 2	3	5	4	3	5	4
NP Representative 3	5	4	4	4	5	5
Average	3.67	3.67	3.67	4.00	4.67	4.00

In contrast, the religious institutions representatives had very similar reactions to the program features, as shown in Table 4. One slight divergence between the two representatives was that one viewed purchasing locally more favorably than purchasing the produce from a chain grocery store, while the other stated that the source did not matter to them at all. Similarly, one of the religious institution representatives indicated that they would positively view the government reimbursing the daycares for utilizing the program, while the other representative was unsure about the effect this would have and responded neutrally by giving the feature a 3 on the 5-point scale.

Table 4. Religious Institutions Representatives’ numerical ranking of program features’ influence on their reaction to the program on a scale of 1-5, with 1 being “very negatively”, 3 being “no effect” and 5 being “very positively”

	A : The appearance of the fruits and vegetables	B : The fruits and vegetables are delivered as ingredients	C : The fruits and vegetables are from a chain grocery store	D : The fruits and vegetables are from a local grocery store	E : The partnership costs less than buying fruits and vegetables through a government sponsored food program	F : The partnership is not reimbursed through a government sponsored food program
RI Representative 1	3	4	3	4	5	2
RI Representative 2	3	5	3	3	5	3
Average	3.00	4.50	3.00	3.50	5.00	2.50

The grocery store representative was presented with alternative program features which were more relevant to business operations, as shown in Table 5. The representative’s reaction to the features were polarized, with one feature “very negatively” influencing their opinion of the program and the others “very positively” affecting their view of the program. The feature which was most negative for the representative was the partnership needing to be approved by a government sponsored food program, while the ones positively influencing the representative included the program reducing cost associated with food disposal, delivering the produce as ingredients, and the program potentially lowering the child hunger rate in North Philadelphia. The representative’s response towards the first feature is likely connected to their comments regarding their attitude towards the government’s influence, which is discussed further below.

Table 5. Grocery representatives’ numerical ranking of program features’ influence on their reaction to the program on a scale of 1-5, with 1 being “very negatively”, 3 being “no effect” and 5 being “very positively”

	A : The partnership would need to be approved by a government sponsored food program	B : The partnership would reduce the cost associated with disposing of unmarketable fruits and vegetables	C : The fruits and vegetables would be delivered as ingredients	D : The partnership would potentially lower child hunger in North Philadelphia
GS Representative 1	1	5	5	5

Influencing Parties

How the stakeholders’ reactions to the proposed program are influenced by the opinions of other groups has an impact on the acceptance of the program as a whole. On average, the group whose opinion would have the most influence on stakeholders’ reactions is the parents of children enrolled in the daycare participating in the program. Overall, parents ranked highly at 4.4 on the 5-point scale for the stakeholders, as shown in Table 6 below. In contrast, the group

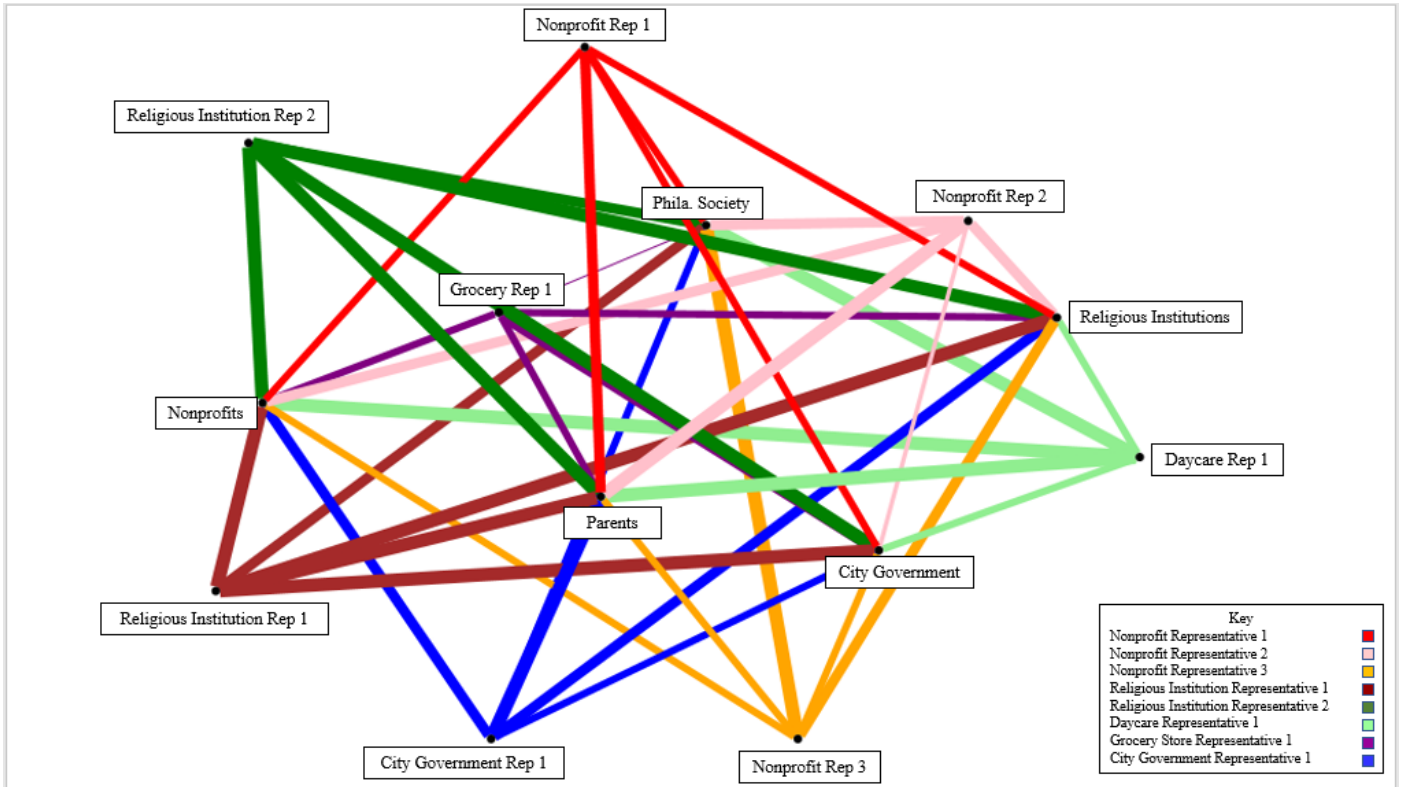
whose opinion had the least influence on stakeholders’ reactions to the program was broader Philadelphian society, which ranked at a 3.4. This is indicative of the stakeholders feeling much more neutrally about public opinion on the program, whether it is supported by the average Philadelphian citizen or not.

Table 6. Numerical ranking of varying parties’ influence on their reaction to the program on a scale of 1-5 by group, with 1 being “very negatively”, 3 being “no effect” and 5 being “very positively”

	Parents of children enrolled in the daycare	City government / city government officials	Churches and other religious institutions	Local non-profits	Broader Philadelphian society
City Government	5.00	3.00	4.00	4.00	3.00
Daycares	5.00	3.00	3.00	5.00	5.00
Grocery Stores	3.00	5.00	3.00	3.00	1.00
Nonprofits	4.00	2.67	3.67	3.33	4.00
Religious Institutions	5.00	5.00	5.00	5.00	4.00
Average	4.40	3.73	3.73	4.07	3.40

The parties’ influences on all representatives are included in Exhibit 1 below, which presents the magnitude of the influence on representatives by the width of the edge. In other words, the greater the influence on a representative, the thicker the edge. As shown, one of the most highly positive influences, aside from parents on most of the representatives, is the city government on the grocery store representative and religious institution representatives. Another highly positive influence is local non-profits on the daycare representative and the religious institution representatives. The most negative influences are city government on one of the nonprofit representatives, as well as broader Philadelphian society on the grocery store representative.

Exhibit 1. Influence mapping with thickness of edge width representing magnitude of influence on a scale of 1-5, with 1 being “very negatively”, 3 being “no effect” and 5 being “very positively”



The inverse relationship between some nonprofit representatives reacting critically and dismissively to city government opinion, while grocery stores being most influenced by city government opinion, may indicate a conflict for cooperation between grocery stores, nonprofits, and city government if the proposed program were implemented. The grocery store representative indicated that they were not willing to “fight politicians and bureaucrats”. They stated that if the city government disapproved of the program, they would not continue with it. Meanwhile, one of the nonprofit representatives stated that they “don’t care what the city government says”, clarifying that as long as the program is legal and effective then they would continue with it.

The city government representative was more influenced by local nonprofits, ranking them at a 4 on the 5 point-scale, than the grocery store representative was influenced by local nonprofits, giving them a 3 on the scale. However, when asked what additional groups the city

government representative would be affected by, they indicated that they would be affected by the opinions of businesses, entrepreneurs, and chains. Thus, city government officials are highly influential for grocery stores, but their opinions on the proposed program may be swayed by local nonprofits if there was disagreement among the groups.

Another potential conflict to be aware of is how daycares and grocery stores are affected differently by broader Philadelphian society. The daycare representative indicated that they are highly influenced by public opinion, ranking public opinion as a 5 on the 5-point scale. One comment that the daycare representative made is that “social media” would influence their view of the proposed program. In contrast, the grocery store representative stated that they “couldn’t care less about broader society”. Therefore, public opinion has the potential to highly influence only one of the major stakeholders in the proposed program, which could create a disjoint between the two parties.

High-Level Takeaway of the Interview Analysis

On balance, the results of the interview analysis show that the proposed program is a desirable initiative. On average, the group stakeholders interviewed viewed the program “positively”, despite some groups viewing the program more positively than others. Although the stakeholders identified some program risks, there was a general consensus that the proposed program would put fresh produce into the hands of children that need it and is a viable way of decreasing the amount of edible and redistributable produce wasted by retailers.

II. Cost-Benefit Analysis

Baseline Scenario

The baseline scenario for grocery retailers is simply disposing of their excess food through third party vendors which take the material either to landfill, transfer, waste-to-energy facilities, or organic recycling and composting facilities. The baseline scenario does not account for any additional actions that may be taken by grocery stores, such as food donation, self-hauling to a disposal site, or other. A high case and a low case were created to capture the range of possible costs that grocery stores incur due to the removal of their surplus food products. To assess how much of the excess food volume was safe to consume, an assumption of 50% edible produce was taken from Holweg et. al’s calculations (2016). In the low case, the figure of 10%

edible food products was used as per the Community Environmental Council's Santa Barbara case study (2015).

In order to assess the volume of excess food that grocery businesses in Philadelphia could have, the maximum value for food disposal volume for grocery retailers in the high case and the minimum value for food disposal in the low case were taken from the EPA Excess Food Opportunities Map, which estimates food waste for a variety of actors nationally. The data assessed from the EPA Excess Food Opportunities Map was filtered to include only businesses in Philadelphia area codes and within three categories, Supermarkets and Other Grocery (except Convenience) Stores, Fruit and Vegetable Markets, Fresh Fruit and Vegetable Merchant Wholesalers. The data taken from the Food Wholesale and Retail tab following filtration encompassed 431 unique grocery businesses that handle fresh fruits and vegetables.

To ascertain which businesses had small- to medium- operations and which had large scale operations, the data was divided into whether the maximum excess food estimate in tons per year did or did not exceed 117 tons. If the maximum excess food estimate did not exceed 117 tons, the business was classified as small- to medium- size. This number was chosen as a threshold because most (97.68%) of businesses listed had a maximum excess food estimate of 117 tons. To assess the minimum volume of food disposal for small- to medium- size grocers, an average was taken of the low excess food estimate, which was 1.003 tons per year. This value was taken as one extreme, the low volume of excess food in the low baseline case. Similarly, the other extreme, the high volume of excess food in the high baseline case, was taken as the average of the high excess food estimates for the 10 businesses that had estimates over 117 tons per year. This high-volume average was 318.5 tons per year.

However, it was assumed that the range of, on average, 1.003 to 117 tons per year proposed by the EPA Excess Food Opportunities Map was too wide and the maximum figure too unrealistic for small- to medium-sized businesses. For a store to generate 117 tons of excess food per year, they would have to produce on average approximately 660 pounds of surplus produce every day, if one assumes the grocer has 355 business days in a year. To be more realistic, the maximum food disposal of the small- to medium-size business was assumed to be 15% of the 117-ton figure, which is approximately 17.55 tons or 35,100 pounds per year. This would result in an average of 100 pounds of surplus produce every day. For large businesses, this same figure was assumed to be the minimum level of food disposal per day.

To calculate how much disposing of excess food costs businesses, it is necessary to determine a disposal fee. Tipping fees, as they are usually called, vary dramatically across the United States. According to the Environmental Research & Education Foundation, the 2019 national average solid waste tipping fee was \$55.36 per ton. However, the tipping fees for the Northeast region, which includes Pennsylvania, are typically higher due to a greater demand for space in the densely populated area (Tatu, 2015).

According to the Waste Business Journal's "Summary of Waste Disposal Pricing and Volumes by Type of Facility and State and Region, from August 2019", the average solid waste disposal tipping fee in Pennsylvania is \$85.89, over 55% higher than the average national rate. This average solid waste disposal tipping fee averages across landfill, transfer, and waste-to-energy. This figure was modified as the tipping fee used in the baseline scenario. For the high case, the figure was decreased by 10% to account for economies of scale resulting in the probable decrease in price associated with a higher waste volume. For the low case, the figure was increased by 10% to account for a lower waste volume. Moreover, it was assumed that Pennsylvania's average tipping fee includes hauling costs, which are the cost of transporting excess food from businesses to landfills or other waste facilities, as well as host fees. Host fees are taxes paid by landfill operators for utilizing large tracts of land that are often passed on to customers, such as Pennsylvania's Act 101 Recycling Fee, Act 68 Environmental Stewardship fee, and Act 90 Disposal Fee (Balik and Flynn, 2016).

However, not all grocery retailers utilize third party vendors that transfer excess food products to landfill, transfer facilities, or waste-to-energy facilities. As stated by "Landfill Tipping Fees in California", it is not typical to track what percentage of green waste is sent to diversion facilities, such as organic recycling and composting (CalRecycle, 2015). According to the EPA, of the 40.7 million tons of food waste produced in 2017, only 2.6 million tons of excess food was composted, making up 6.3% of total food waste. As the Philadelphia Streets Department specifies, commercial entities in Philadelphia are not currently required to compost (2018). Supposing that grocery stores utilize green waste disposal at a higher rate than other businesses, it is assumed that 20% of excess food is disposed of through green waste disposal and the other 80% is disposed of through landfill, transfer, and waste to energy facilities.

The standard green waste disposal tipping fee utilized in the baseline scenario is \$45 per ton, as was indicated by the Grocery Store Representative interviewed for this study. The

representative’s organization utilizes organic recycling services for their excess food disposal. To verify the validity of this figure, it was benchmarked against California’s average green waste tipping fee of \$40 per ton (CalRecycle, 2015). Due to a lack of information found on Pennsylvania’s average green waste disposal tipping fee, and since Northeastern fees are typically higher than Pacific fees, the \$45 per ton figure was taken and modified for the purposes of this cost-benefit analysis. For the high baseline case, the figure was decreased by 10% to account for the probable decrease in price associated with economies of scale. For the low case, the figure was increased by 10% due to a lower waste volume.

The results of the cost-benefit analysis of the baseline scenario, as shown in Table 7, indicate that excess food disposal does not constitute a large expense for small- and medium-sized businesses. Even in the high baseline case, food disposal costs only in the hundreds of dollars, \$613.73 annually, for small- and medium- sized grocers. In the low case, this expense is practically negligible, only costing these businesses \$8.57.

Table 7. High and low estimates of small- to medium- scale grocery store food disposal costs

High Case				Low Case			
	Per retailer waste (tons/year)						
x	Tons/year of edible food wasted	50%		10%			
	Solid waste disposal tipping fee (x80%)	\$77	\$ (542.65)	\$94	\$ (7.58)		
+	Green waste disposal tipping fee (x20%)	\$41	\$ (71.08)	\$50	\$ (0.99)		
	Food waste disposal cost		\$ (613.73)		\$ (8.57)		

For large-scale grocery retailers, the food disposal expense has higher significance. In the high baseline case, as shown in Table 8, grocery retailers can bear up to \$11,138.07 in costs annually. Given, as one of the Nonprofit Representatives indicated in their interview, that grocery stores have “razor thin” profits, an expense in the tens of thousands of dollars has weight for these businesses. Nevertheless, taking the low case into consideration, if one assumes minimum excess food products for disposal by grocery retailers, then similarly to both baseline cases for the small- and medium- sized businesses the cost is not significant for the business. As previously stated, these costs would increase if hauling costs and landfill taxes were assumed to not be included in the tipping fees and were consequently added to the calculations.

Table 8. High and low estimates of large-scale grocery store food disposal costs

High Case				Low Case			
	Per retailer waste (tons/year)						
x	Tons/year of edible food wasted	50%		10%			
	Solid waste disposal tipping fee (x80%)	\$77	\$ (9,848.15)	\$94	\$ (132.65)		
+	Green waste disposal tipping fee (x20%)	\$41	\$ (1,289.93)	\$50	\$ (17.37)		
	Food waste disposal cost		\$ (11,138.07)		\$ (150.02)		

The Proposed Program without an Intermediary

To assess the feasibility of the proposed program without an intermediary and with grocery stores shouldering the financial burden of the program, it was crucial to find a cost model which was relevant for the Philadelphia region. The proposed program expenses were based on the financial needs of food runners assessed in a 2017 study done by Thomas O'Donnell for Uplift Solutions, Inc. The paper, "Food Runner", assesses the "feasibility of launching a sustainable Philadelphia food delivery business serving hunger relief and other companies that can take advantage of surplus food". The proposed program in this study is based on the lean startup model developed in O'Donnell's paper. One key difference between the model proposed in "Food Runner" and the proposed program model is that the former is a stand-alone business operation, whereas the former is assumed to be an extension of the grocery store selling the surplus produce. Therefore, the expenses associated with the program are assumed to be incurred by the grocery retailer. Due to this, there are some items included in O'Donnell's lean startup model that would not be included in the proposed program model, such as telephones, supplies, and marketing materials.

From the original lean startup calculations, a manager is needed to run the proposed program and coordinate with both store management and daycare staff. Thus, the cost of an annual salary of \$20,000 for the program manager should be considered, as shown in Table 9. Similarly, food storage equipment, insurance, and vehicle reimbursement charges all should be included in the proposed program as operational necessities. Although a part-time driver is needed to deliver the surplus produce, paid an hourly fee of \$20 per hour, the hours driven differ between the original model and the proposed program model. While the original model called for eight hours to be devoted by the driver about 5 times a week, the proposed program assumes logistically for the grocery retailer to be able to sort and collect surplus produce for delivery to daycares twice a week. This reduces the cost of the driver to \$16,640 annually.

Moreover, although there are 11 stops per day assumed in the lean startup model, the paper indicates that 2 stops per hour in an 8-hour day, or 16 stops per day, would be the optimal scenario. Thus, the proposed program assumes 16 stops per day which changes the mileage per delivery day figure, and thus vehicle reimbursement, from the original model. The total expenses

incurred from the proposed program’s lean model is \$46,678, which exceeds the maximum surplus food disposal cost already incurred by the grocery retailer by about 4 times.

Another expense incurred outside of the lean program model is that of culling, which is the process of sorting through produce in order to set aside the unmarketable items. According to the Grocery Store Representative interviewed, this sorting would take a clerk about an hour per day. Given a grocery clerk is typically paid \$7.25 per hour at the lower end, the additional labor cost associated with the proposed program would be approximately \$2,574.

Table 9. Proposed program expenses and logistics for all cases.

Proposed Program Expenses	
Cost per stop	\$ 28.05
Manager	\$ 20,000
Driver (\$20/hr)	\$ 16,640
Food Storage	\$ 250
Vehicle Reimbursement (\$.55/mile)	\$ 2,288
Insurance	\$ 7,500
	\$ 46,678
Number of deliveries per week	2
# of drivers	1
Mileage per delivery day (Stops x 2.5 mi.)	40
Hours per delivery day (Stops x 30 minutes)	8
Stops per delivery day	16

The potential revenue calculations were based on the volume of edible excess produce identified in the baseline scenarios as well as the price of produce per unit weight. The price of produce per unit weight was adjusted from a report produced by the USDA called “How Much Do Fruits and Vegetables Cost?” (Stewart et al., 2011). The report utilized 2008 Nielsen Homescan data to find the average price per pound of fresh and processed fruits and vegetables at retail stores. The data from the report was filtered to assess the produce prices of 57 fresh-only fruits and vegetables, of which 22 were fruits and 35 were vegetables. These prices were then adjusted for inflation, based on the US Bureau of Labor Statistics identification of prices for food being 22.31% cumulatively higher in 2020 versus 2008. The inflation in food grew at a higher average rate year-over-year from 2008 to 2020 than overall inflation, 1.69% compared to 1.53%.

The inflation-adjusted prices for the 57 fruits and vegetables were then averaged to find the general price per pound for produce of \$2.45. To reduce the financial burden of the fresh produce, the average was discounted by 75% to \$0.61, as shown in Table 10. Multiplied by the volume in each scenario, this produced a total revenue projection for the program assuming that every pound of produce would be sold at the discounted price to daycare centers.

Table 10. Example of proposed program revenue calculation, for high case in small- to medium-sized grocers

Revenue of Proposed Program	
Revenue per stop	\$ 6.46
Inflation-adjusted \$/lb of produce	\$ 2.45
x Price reduction (.25 multiplier)	\$ 0.61
x Lbs/year of edible excess produce	17550
Total revenue of program	\$10,749

As shown in Table 11, the net revenue of both the high and the low scenarios were negative as a result of the high cost associated with the transportation and delivery of the produce at -\$39,116 for the high case and -\$48,032 for the low case. Moreover, the revenue brought in by the re-selling of the excess edible and redistributable produce was not enough to cover the cost of the program itself. In order to break even on the program assuming the high case of the smaller- and medium- scale retailer scenario, the price on the produce would need to be above the average price of produce per pound, at \$2.84, which defeats the entire purpose of the program. As a result, the proposed program without an intermediary for a small- or medium- size grocery store would not be feasible given the current assumptions.

Table 11. High and low estimates of small- to medium- scale grocery store profits with proposed program and without an intermediary

High Case			
	Per retailer waste (tons/year)		17.55
x	Tons/year of edible food wasted	50%	8.78
	Solid waste disposal tipping fee (x80%)	\$77	\$ (542.65)
+	Green waste disposal tipping fee (x20%)	\$41	\$ (71.08)
	Food waste disposal cost		\$ (613.73)
	Proposed program cost (lean model)		\$ (46,678)
+	Additional labor cost per hour	\$7.25	\$ (2,574)
	Total cost of disposal and program		\$ (49,865)
+	Total revenue of proposed program		\$ 10,749
=	Total net revenue		\$ (39,116)

Low Case			
	Per retailer waste (tons/year)		1.003
x	Tons/year of edible food wasted	10%	0.10
	Solid waste disposal tipping fee (x80%)	\$94	\$ (7.58)
+	Green waste disposal tipping fee (x20%)	\$50	\$ (0.99)
	Food waste disposal cost		\$ (8.57)
	Proposed program cost (lean model)		\$ (46,678)
+	Additional labor cost per hour	\$7.25	\$ (2,574)
	Total cost of disposal and program		\$ (49,260)
+	Total revenue of proposed program		\$ 1,229
=	Total net revenue		\$ (48,032)

However, the prospects of the program change for the larger-scale grocery retailer. As shown in Table 12, while the net revenue of the low scenarios is negative at -\$47,252, the net revenue of the high case is positive at \$134,691. The difference between the two scenarios is that, similarly to both cases for small- and medium- size businesses, the high cost associated with the transportation and delivery of the produce swallows the low amount of revenue generated by the program. On the other hand, for the high case of the large-scale business, the revenue brought in by re-selling excess edible and redistributable produce was greater than enough to cover the cost of the program itself. In fact, to just break even on the program, the price on the produce could be lowered even further to \$0.19 per pound. This would be slightly over a 92% reduction in price from the average price per pound on produce. As a result, the proposed program without an intermediary for a large grocery store would not be feasible in the low case, but would be not only feasible but profitable in the high case.

Table 12. High and low estimates of large-scale grocery store profits with proposed program and without an intermediary

High Case			
	Per retailer waste (tons/year)		318.50
x	Tons/year of edible food wasted	50%	159.25
	Solid waste disposal tipping fee (x80%)	\$77	\$ (9,848.15)
+	Green waste disposal tipping fee (x20%)	\$41	\$ (1,289.93)
	Food waste disposal cost		\$ (11,138.07)
	Proposed program cost (lean model)		\$ (46,678)
+	Additional labor cost per hour	\$7.25	\$ (2,574)
	Total cost of disposal and program		\$ (60,390)
+	Total revenue of proposed program		\$ 195,081
=	Total net revenue		\$ 134,691

Low Case			
	Per retailer waste (tons/year)		17.55
x	Tons/year of edible food wasted	10%	1.76
	Solid waste disposal tipping fee (x80%)	\$94	\$ (132.65)
+	Green waste disposal tipping fee (x20%)	\$50	\$ (17.37)
	Food waste disposal cost		\$ (150.02)
	Proposed program cost (lean model)		\$ (46,678)
+	Additional labor cost per hour	\$7.25	\$ (2,574)
	Total cost of disposal and program		\$ (49,402)
+	Total revenue of proposed program		\$ 2,150
=	Total net revenue		\$ (47,252)

The Proposed Program with an Intermediary

If the proposed program was operational without the grocery retailer responsible for the transportation and delivery costs, as is often the case with food donation programs, then that would allow the majority of the program cost to be written out of the net revenue calculation. In this scenario, the cost associated with paying a fee for a third party, or intermediary, is not addressed. This is due to the possibility of pro-bono delivery services being made available to the grocery stores, which will be discussed in greater detail as a risk and consideration. Nonetheless, the additional labor cost will be incurred by the participating grocery store regardless of whether transportation and delivery service is outsourced by the retailer or not.

Given this scenario, the prospect for the program to small- or medium-scale grocery stores shifts. If the program is pursued with an intermediary, the high case for grocery stores develops a positive net revenue of \$7,562 as shown in Table 13. However, the program assuming the low case for small- or medium-sized businesses continues to have a negative net revenue, which in this instance is -\$1,354. Interestingly, the positive net revenue of the high case is not just negligibly positive—its value is in the thousands of dollars. Therefore, the results indicate that, even with an intermediary, the program is not feasible for the low case; however, it is feasible for small- to medium-sized businesses in the high case.

Table 13. High and low estimates of small- to medium- scale grocery store profits with proposed program and with an intermediary

High Case				Low Case			
	Per retailer waste (tons/year)		17.55		Per retailer waste (tons/year)		1.003
x	Tons/year of edible food wasted	50%	8.78	x	Tons/year of edible food wasted	10%	0.10
	Solid waste disposal tipping fee (x80%)	\$77	\$ (542.65)		Solid waste disposal tipping fee (x80%)	\$94	\$ (7.58)
+	Green waste disposal tipping fee (x20%)	\$41	\$ (71.08)	+	Green waste disposal tipping fee (x20%)	\$50	\$ (0.99)
	Food waste disposal cost		\$ (613.73)		Food waste disposal cost		\$ (8.57)
+	Additional labor cost per hour	\$7.25	\$ (2,574)	+	Additional labor cost per hour	\$7.25	\$ (2,574)
	Total cost of disposal and program		\$ (3,187)		Total cost of disposal and program		\$ (2,582)
+	Total revenue of proposed program		\$ 10,749	+	Total revenue of proposed program		\$ 1,229
=	Total net revenue		\$ 7,562	=	Total net revenue		\$ (1,354)

Similarly to the high and low case for small- and medium- sized grocery stores, the proposed program is net positive for the high case and net negative for the low case for large grocery stores that partner with an intermediary. In the high case, the total net revenue is naturally quite higher than it was in the scenario without an intermediary at \$181,369, as shown in Table 14. For the low case, the net revenue is just a few hundred dollars in the red at -\$547. However, due to the negative net revenue being more negative than it would have been just disposing of the edible and redistributable excess produce, the proposed program would be unfeasible for larger grocery stores in the low case. In the high case, as before, the proposed program would be not just feasible, but clearly profitable, given a large grocery store partners with an intermediary. As previously stated, these results are due to the current assumption that the intermediary will not charge the grocer for its delivery services.

Table 14. High and low estimates of large-scale grocery store profits with proposed program and with an intermediary

High Case				Low Case			
	Per retailer waste (tons/year)		318.50		Per retailer waste (tons/year)		17.55
x	Tons/year of edible food wasted	50%	159.25	x	Tons/year of edible food wasted	10%	1.76
	Solid waste disposal tipping fee (x80%)	\$77	\$ (9,848.15)		Solid waste disposal tipping fee (x80%)	\$94	\$ (132.65)
+	Green waste disposal tipping fee (x20%)	\$41	\$ (1,289.93)	+	Green waste disposal tipping fee (x20%)	\$50	\$ (17.37)
	Food waste disposal cost		\$ (11,138.07)		Food waste disposal cost		\$ (150.02)
+	Additional labor cost per hour	\$7.25	\$ (2,574)	+	Additional labor cost per hour	\$7.25	\$ (2,574)
	Total cost of disposal and program		\$ (13,712)		Total cost of disposal and program		\$ (2,724)
+	Total revenue of proposed program		\$ 195,081	+	Total revenue of proposed program		\$ 2,150
=	Total net revenue		\$ 181,369	=	Total net revenue		\$ (574)

High-Level Takeaway of the Cost-Benefit Analysis

Overall, the proposed program is not financially feasible for a small- to medium-sized grocery store without an intermediary, but may be feasible for a large retailer without an intermediary. The net revenue of both the high and the low scenarios were negative for small to medium-size grocery stores as a result of the high cost associated with the transportation and delivery of the produce. However, the proposed program without an intermediary for a large grocery store would be feasible in the high case, though not in the low case. If the high and low cases were weighted as equally likely, then the value of the proposed program without an intermediary would still be positive at around \$43,720.

If an intermediary were responsible for delivery and transportation, then the program may be feasible for both small- to medium-sized grocery stores as well as large grocery stores. If the program is pursued with an intermediary, the high case for small- to medium-scale grocery stores develops a positive net revenue, although the low case still has a negative net revenue. If the high and low cases were weighted as equally likely, then the value of the proposed program would be positive at approximately \$3,104. Similarly, the proposed program is net positive for the high case and net negative for the low case for large grocery stores that partner with an intermediary. However, weighing the high and low cases equally, the value of the proposed program for large grocers would have a positive net revenue of around \$90,398.

Discussion

I. Risks & Considerations

Daycare Risks

A category of risk that repeatedly surfaced throughout the interviews was logistical challenges with regard to delivering produce to daycares unprepared. For one, many daycares lack the proper equipment to prepare food. This equipment may be inclusive of refrigeration units, ovens, and other kitchen tools. Specifically, if a large quantity of produce is delivered at one time, it may be difficult to correctly store in order to preserve its freshness and reduce the possibility of cross-contamination of food products, among other issues.

This leads into another key risk, which is the lack of safe food handling training that daycare managers and staff should have in order to prepare the food. It is imperative that daycare staff, when preparing meals and snacks for children, follow certain food safety guidelines. These include procedures such as proper hand-washing techniques and correctly washing the food products prior to preparation, as well as sanitizing the surfaces where the food is prepared and served. This training is integral in order for the program to be successful because the consequences of daycare staff not following these guidelines can be severe, as food-borne illnesses could be caused by harmful bacteria from something like an improperly washed hand towel coming into contact with the food products.

Due to daycare staff often not having the required training to prepare food, those daycares that do serve a form of food to the children in their care rely on prepared food. This may come in the form of store-bought snacks or pre-prepared meals. Due to this reliance, even if daycare staff had the proper kitchen equipment and food safety training, they may simply not know how to handle certain foods. A nonprofit representative interviewed employed the example of daycare staff being given onions and peppers, and not knowing what to prepare for the children that integrates those two fresh ingredients.

Produce Delivery Risks

A risk of the proposed program relates to the delivery of the surplus produce from the grocery store to the daycare center. As indicated by the grocery store representative and a nonprofit representative, grocery stores are not willing to take on the additional expense of transporting the produce from their facility to the daycare facility. This ultimatum is due to the

already “razor thin” profits of the grocery store industry, as indicated by one of the nonprofit representatives. The results of the cost-benefit analysis also indicate that it is not feasible for small- to medium-sized grocery retailers to take on the expenses associated with transporting and delivering the produce.

There are several considerations that should be taken into account for this risk. One consideration could be the use of alternative transportation and delivery methods which may reduce this cost if grocery stores decide to take on the responsibility. An example is the bicycle transportation model used by Wash Cycle Laundry, which utilizes bikes to transport laundry instead of vehicles. Another potential modification to the proposed program is the inclusion of a third-party delivery service provider. This service provider would have three primary functions: loading the surplus food into their truck, driving the surplus food to the daycare centers, and unloading the surplus food into the daycare centers. To assess the feasibility of an additional partner, a separate analysis must be conducted. Firstly, it is necessary to assess which party would be willing to take on the additional financial burden in order to pay for the service-- the grocery retailer deducting from their minimal profits, something they are extremely hesitant to do, or the daycare center taking on a higher price, which would be counterintuitive to the purpose of the program. As indicated by O’Donnell in “Food Runner”, however, both charging the generator of the surplus food items and charging the receiver of the excess food products are possibilities for earned revenue (2017).

Nonprofit food delivery services are available in the region; however, this would shift the role of local nonprofits from general stakeholders to direct partners of the program. The nonprofit would be taking on the financial burden of transportation on themselves, which is something they may or may not be willing to do. The delivery of fresh produce this way creates another inherent risk, which is the frequency and consistency of produce delivery to the daycare center. Although the grocery store representative interviewed indicated that their store makes food donations “every day, seven days a week”, there is uncertainty for stores which do not participate so frequently in food donation in whether they would be able to provide surplus produce to the daycare centers twice a week. There is also uncertainty with regard to the amount of surplus produce delivered, and what type of fruits and vegetables would be delivered.

A different consideration for this issue is the use of a distribution center. Although transportation services would still be needed and uncertainty with regard to the type and amount

of produce persists with this option, the frequency component is eliminated. There could be a scheduled drop-off of surplus products at a certain time and day of the week, eliminating also the need for trucks to travel to each individual daycare to drop off the produce. This reduction in cost and time associated with transporting the food items could make delivery to a distribution center a negotiable item for grocery stores. However, this creates an additional risk for daycares which was not present before. This risk involves the daycare staff having to go to the distribution center and transport the produce to the center. However, not every daycare center could have a vehicle in order to transport the goods. Moreover, as per a comment made by one of the nonprofit representatives interviewed, this is an additional burden of time and effort on the part of the daycare staff which they may not be willing to take on.

A third consideration takes transportation completely out of the picture in the proposed program by employing an app designed specifically to increase the sale of surplus, distributable food items at a reduced price, modeled after the configuration and operation of the app Cherripick. The premise of Cherripick is that a customer purchases an item that has a nearing expiration date, takes a photo of their receipt and the expiration date on the item through the mobile app, and receives cashback through the app. Cherripick is likely able to provide cashback through their partnerships with grocery retailers, which provides a financial incentive for Cherripick to process these transactions.

Within the context of the proposed program, a few modifications to the Cherripick model would be necessary. In the proposed program, the daycare staff member would be the consumer and user of the app, and the grocery store would retain its role as the produce seller. Firstly, instead of receiving a cashback and requiring the daycare staff member to pay the regular price upfront, the app should automatically provide a coupon code or barcode to the staff member to be used at checkout. For each surplus food item that the staff member puts in their cart, their “coupon” would grow in value to be scanned and used at checkout. The other roadblock that would need to be avoided is the lack of expiration dates on produce. A simple fix would be to take a picture of the fruit or vegetable itself-- with the blemish, discoloration, etc. clearly visible in the photo. This app option could also be considered without imperfection detection abilities, but rather act as an incentive for daycare staff to purchase more produce items, which could decrease the overall quantity of produce that is able to become unmarketable in the first place.

The app could be owned and operated by a third party, like Cherripick, or it could be internally created and operated since it simply acts as a private, instant coupon producer.

Some risks associated with this consideration is ensuring that the daycare staff member is the one that uses the app. This could be partially mitigated by the staff member needing to provide proof of daycare employment during registration in the app, but it does not eliminate the risk of a family member purchasing produce with the daycare employee's phone, or daycare staff members not delivering all of the produce bought at reduced price to the children they serve. This procedure does require some effort on the part of the daycare staff member, but less so than that of traveling to a distribution center since the staff member may complete their purchase during a regular grocery run. Nevertheless, if the daycare is located in a food desert, it would be much more difficult for the staff member to complete this transaction and reap the benefits. Similarly, it may be more difficult for the staff member to transport the produce purchased to the center, especially if they do not own a vehicle.

Program Persistence Risks

A risk for the persistence of the program is due to the difference in how stakeholders are influenced by the opinions of varying groups. As identified through influence mapping, grocery stores are highly influenced by city government's opinions. The city government representative indicated that they do not view the program favorably, but also indicated that they are positively influenced by nonprofit representatives who do view the proposed program very favorably. The nonprofit representatives also are not very influenced by city government. Therefore, if the representatives interviewed are assumed to be truly representative of their stakeholder group, then the persistence of the program could rely on the local nonprofit representatives advocating for the program and shifting city government's opinion of the program to a more neutral stance. The city government's more neutral stance would then avoid negatively influencing grocery stores' perspective on the proposed program, which is neutral already.

The other risk associated with influencing parties is daycares being more highly influenced by broader Philadelphian society, or public opinion, than grocery stores. On one hand, if broader Philadelphian society either positively views the proposed program or has a neutral stance toward the program, then there isn't a risk. However, if public opinion of the proposed program turns negative, that could influence daycares to quit engaging in the initiative. Due to

grocery stores not being influenced by broader society, they would continue to attempt supplying the daycares with produce, which would result in the proposed program becoming financially infeasible for the grocery retailers. Thus, the persistence of the program may rely somewhat on how broader Philadelphian society reacts to the proposed program.

As parents of the children enrolled in daycares are most highly influential on average, their opinions are most integral to the persistence of the program. If the parents do not approve of the program, that would make the proposed initiative a no-go. This is a major risk for the program's viability. Since there is no additional information on how parents would react to the proposed program or which groups they would be influenced by, further research would be necessary to ascertain whether the program would be viewed positively by parents and, as a result, whether it would persist.

A consideration for these risks is the framing of excess edible and redistributable produce. "Produce with personality is what they call it," one nonprofit representative stated, "It's not going to sell in the store, there's nothing wrong with it." The essence of the program is that these fruits and vegetables are safe to eat and are simply being wasted, when they could be put to use. If this sentiment is expressed appropriately, that could lessen the risk that the program would be perceived negatively by parents, broader Philadelphian society, and others.

Another risk to the persistence of the program is associated with Good Samaritan laws such as the Bill Emerson Good Samaritan Food Donation Act and Pennsylvania's Donated Food Limited Liability Act. Prior to the interviews being conducted, a discrepancy between the state and federal acts was identified which was believed to cause grocery stores to hesitate becoming involved in food donation. However, one of the nonprofit representatives interviewed stated that, although there is some subtlety in the law, they didn't know of any grocery stores hesitating due to that discrepancy specifically. Moreover, the grocery store representative actually sought the protection of the laws, instead of shying away from them.

Therefore, there are two risks that arise from legality. Firstly, a risk is associated with whether the proposed program would be covered by the Good Samaritan laws. Secondly, a risk to the persistence of the program stems from whether the discrepancy between the two laws poses the chance of legal liability for the grocery stores. If the proposed program is covered by the laws and the discrepancy does not create legal liability for the grocery retailers, then the risk dissipates. If the program is not covered by the laws but avoids the liability created by the

discrepancy, then that would be a low risk scenario from a legal perspective but should be further investigated to account for what risk it does present. If the program is covered by the laws and the discrepancy does create a liability for the grocery store, then that risk must be accounted for in the feasibility calculations and could disrupt the proposed program.

II. Limitations of the Study

A limitation of the research conducted is that the advance of the COVID-19 crisis significantly limited access to relevant stakeholders' time and availability for interviews. Nonprofits, government representatives, and grocery retailers were on the front lines of delivering products, services, and aid to those affected by both the coronavirus itself and the preventative measures taken by authorities. Daycares, classified as non-essential businesses, and religious institutions were temporarily shut down for health and safety reasons. These factors partially curbed the success of the qualitative analysis, as it depends on the number and availability of the stakeholders contacted. Although a quantitative analysis on the interview responses was not conducted and, as such, the results are not governed by the rules of statistically representative sampling, assessing the trends in the interview responses would have been more fruitful with a larger number of interviews completed. There is also a possibility that the qualitative analysis underrepresented the views of identified stakeholder groups due to there being an unequal number of representatives in each group, with daycares, city government, and grocery stores only having a single representative.

Another limitation of the research conducted is that it did not assess the attitudes and opinions of the parents of children attending the daycares or the children themselves although these groups would be the main beneficiaries of the proposed intervention. Further research can be conducted inclusive of parents and children. This was noted by two stakeholders interviewed in the nonprofit sector. One of the participants, when asked if there are any other groups whose opinion would influence their reaction to a program like this, noted: "I think a lot of times we don't actually ask the kids and I think that's important."

Similarly, there is a possibility that the qualitative analysis failed to account for other relevant stakeholder groups aside from affected children and parents. For example, the daycare representative indicated that they would be influenced by hospitals that have food programs, which often partner with daycares. Hospital systems' opinions of the proposed program were not

assessed in the study. Likewise, community advocacy groups were not considered in the qualitative analysis, as specific groups were not identified in the conductive landscape analysis of the North Philadelphia community. These groups may lack an online presence but be active in the space, so not representing their attitudes toward the proposed intervention may skew the findings of the research. Federal and state authorities were also not considered within the government entities stakeholder group, and may play more of a relevant role than acknowledged in the initial analysis of the North Philadelphia landscape. Additionally, one of the religious institution representatives indicated that they would be influenced by the opinions of national nonprofit organizations.

Another limitation of the study was the inability of the researcher to reach Relative/Neighbor (R/N) providers that are perhaps most critically in need of access to nutritious and fresh food for the children in their care and least likely to receive adequate governmental support. This research assesses the opportunity of surplus food to be delivered only to daycare centers which fall into the three categories of childcare centers, group child care homes, and family child care homes. There is an opportunity in future studies to assess whether such a program could be feasibly extended to R/N providers, whether that service would be desired by the R/N providers, and what modifications would need to be made to the proposed program in order to serve them.

A limitation of the cost-benefit analysis arises from the data utilized, which was at times sparse such as in the case of pricing information on green waste disposal, or very broad such as in the case of the excess produce volume by grocery stores. Further information from grocery stores, such as more accurate data on the volume of surplus produce and percentage of the surplus that is edible, would influence the high and low cases calculated in the analysis. This could influence the results of how feasible the proposed program is. The quantitative analysis could also be limited by the assumptions employed. For example, one assumption that was utilized in assessing the feasibility of the proposed program is weighing the high and low cases as equally likely. Gathering more grocery store representatives' perspectives on the proposed program and numbers found would enable a better assessment of whether one scenario is more likely than the other.

Another limitation of the cost-benefit analysis is that it only assessed tangible costs and benefits. The analysis did not account for potential intangible costs of the program, such as the

possible cost of litigation or the cost of a public relations dilemma if the program were perceived negatively by broader society. Similarly, the analysis did not calculate potential intangible benefits of the proposed program such as positive impact on the grocery stores' brand image. Furthermore, it did not assess how the proposed program could improve employee performance and retention, by connecting employees' daily work with their core values, as well as increased customer retention and acquisition.

Furthermore, the cost-benefit analysis did not account for or try to monetize positive and negative externalities to Philadelphian society. Unlike the cost-benefit analysis described in *Cost Benefit Analysis: Concepts and Practice*, this study did not quantify "the value of all consequences of a policy to all members of society" (Boardman et al., 2018). Future studies could undertake this initiative. Potential positive externalities of the proposed program include the impact of undernourished children consuming more nutritious and fresh food, the creation of jobs in the community, and the reduction in food waste-related GHG emissions. Potential negative externalities include the rise in carbon emissions as a result of the transportation and delivery of produce on trucks, unless alternative methods of delivery are utilized.

Conclusion

As a whole, the results of the study indicate that the proposed program is desirable. The analysis of the interviews conducted with stakeholder representatives resulted in representatives viewing the proposed program positively and finding it attractive on average, despite one stakeholder group finding it less appealing than others. Thus, the results do not support the first hypothesis, which was that stakeholder groups would find the program undesirable overall.

Furthermore, the results of the cost-benefit analysis indicate that the proposed program is feasible, but only in certain scenarios. If the proposed program included an intermediary, then the program would be feasible for both small- to medium-sized grocery retailers and large retailers on balance. However, without an intermediary and with the grocery stores incurring all costs associated with the delivery of the produce, the program would only be feasible for large grocers. Therefore, the results of the quantitative analysis do support the second hypothesis, which was that the proposed program is feasible, with a few considerations.

If the proposed program is developed further, the findings presented in this study may act as a foundation for greater research on its potential effectiveness, aside from its desirability and

feasibility. The proposed program could also be extended to include other sources of excess produce, such as regional farms, urban growers, and others. If a new circular program or market-based solution is advanced, the research conducted has the potential to act as a case study for those aspiring to mitigate the effects of hunger in urban environments.

Although the circular program proposed zeroes in on two main beneficiaries—children and grocery stores—the reverberations of the program are far-reaching. The communities most affected by the growing child hunger rate are predominantly minority communities. Increasing access to resources for disadvantaged groups, and thus positively impacting the city overall, is a potential byproduct of implementing such a program. As the global population continues to grow, demand for food products will increase. This research is a small-scale case study for matching scarcity with overproduction, which is the crux of reallocating food resources and bettering food distribution. Minimizing the amount of food waste from grocery stores also has positive consequences for the reduction of greenhouse gas emissions impacting the global environment, as food waste generates about 8% of total anthropogenic GHG emissions.

The existence of a business case for grocery stores to participate in a food redistribution program provides a case study for players in the supermarket industry to integrate social impact into their strategy as a way to drive higher returns. This should be of interest to both grocery store managers and proponents of CSR generally. The program's effect on daycares also has legs. Improving or implementing a food program could not only impact the well-being of current clients, but increase customer acquisition and retention for the daycares.

Altogether, while these conclusions show that the program is desirable and feasible, there are many challenges that would need to be addressed before the program could be considered for implementation. Some of these challenges, such as daycares lacking equipment for food preparation, are tangible and actionable. Others, such as shifting the outlook of city government officials or broader society for example, are more nuanced and abstract. Nevertheless, the primary objective of the proposed program, which is getting produce into the hands of children who need it, is a challenge that requires a change in the status quo. While a market-based solution like the one proposed is a short-term remedy, it is one way to get children the nutrition they need relatively quickly. It is an opportunity to mitigate the effects of child hunger while a long-term, stable policy solution is created and implemented.

References

- "About Us." *Coalition Against Hunger*, www.hungercoalition.org/about-us.
- Amott, David. "North Philadelphia." *Encyclopedia of Greater Philadelphia*, 2014, philadelphiaencyclopedia.org/archive/north-philadelphia-essay/.
- "Australian Communities are Fighting Food Waste with Circular Economies." 2016. *Food & Beverage Industry News*, n/a. <https://proxy.library.upenn.edu/login?url=https://search-proquest-com.proxy.library.upenn.edu/docview/1816150162?accountid=14707>.
- Balik, Justin, and Andrew Flynn. "Pennsylvania Landfill Disposal Tipping Fees." *The Trust For Public Land*, 2016.
- Bellemare, Marc F. 2017. "Is 'Food Waste' really such a Waste? the Optimal Amount of Waste is Not Zero." *Wall Street Journal (Online)*, n/a. <https://proxy.library.upenn.edu/login?url=https://search-proquest-com.proxy.library.upenn.edu/docview/1931870025?accountid=14707>.
- Bellemare, Marc F., Metin Cakir, Hikaru Hanawa Peterson, Lindsey Novak, and Jeta Rudi. 2017. "On the Measurement of Food Waste." *American Journal of Agricultural Economics* 99 (5): 1148-1158. <https://proxy.library.upenn.edu/login?url=https://search-proquest-com.proxy.library.upenn.edu/docview/2001395789?accountid=14707>.
- Bloom, Jonathan. 2010. *American Wasteland: How America Throws Away nearly Half of its Food (and what we can do about it)*. Cambridge, MA: Da Capo Press.
- Bluhm, D.J.; Harman, W.; Lee, T.W.; Mitchell, T.R. Qualitative research in management: A decade of progress. *J. Manag. Stud.* 2011, 48, 1866–1891
- Boardman, A., Greenberg, D., Vining, A., & Weimer, D. (2018). Introduction to Cost–Benefit Analysis. In *Cost-Benefit Analysis: Concepts and Practice* (pp. 1-27). Cambridge: Cambridge University Press. doi:10.1017/9781108235594.003
- CalRecycle. *Landfill Tipping Fees in California*. California Department of Resources Recycling and Recovery, Feb. 2015.
- Center for Food Safety and Applied Nutrition. "Final Rule for Preventive Controls for Human Food." U.S. Food and Drug Administration. FDA, 2018. <https://www.fda.gov/food/food-safety-modernization-act-fsma/fsma-final-rule-preventive-controls-human-food>.

Chigbu, Uchendu. "Visually Hypothesising in Scientific Paper Writing: Confirming and Refuting Qualitative Research Hypotheses Using Diagrams." *Publications*, vol. 7, no. 1, 2019, p. 22., doi:10.3390/publications7010022.

"Child and Adult Care Food Program." Department of Education, 2019. [https://www.education.pa.gov/Teachers - Administrators/Food-Nutrition/programs/Pages/Child-and-Adult-Care-Food-Program.aspx](https://www.education.pa.gov/Teachers-Administrators/Food-Nutrition/programs/Pages/Child-and-Adult-Care-Food-Program.aspx).

"Childhood hunger in North Philadelphia more than triples." Children's HealthWatch. September, 2017. September, 2019.

<https://childrenshealthwatch.org/childhood-hunger-in-north-philadelphia-more-than-triples/>

Child Nutrition Programs of Nutritional Development Services. "Child Care Meals Program." Healthy Meals for Children, n.d. <http://www.healthymealsforchildren.org/child-care-meal-programs/>.

Chriqui, Jamie F., Rebecca M. Schermbeck, and Julien Leider. 2018. "Food Purchasing and Preparation at Child Day Care Centers Participating in the Child and Adult Care Food Program in the United States, 2017." *Childhood Obesity* 14 (6): 375-385. doi:10.1089/chi.2018.0099. <https://www.liebertpub-com.proxy.library.upenn.edu/doi/abs/10.1089/chi.2018.0099>.

Commendatore, Cristina. "Experts Offer Solutions to Food Waste Prevention, Reduction, Recovery." Informa, <https://proxy.library.upenn.edu/login?url=https://search-proquest-com.proxy.library.upenn.edu/docview/2210999491?accountid=14707>.

Commercial Waste Report Guide. City of Philadelphia, 2018,

philadelphiastreet.com/images/uploads/documents/commercialwastereportguide_11.5.18.pdf.

"Commit to Zero Waste by 2035 – Join the Zero Waste Partnership Program!" Philadelphia Streets, 2017.

<https://www.philadelphiastreet.com/recycling/zero-waste-partnership-program>.

COMPASS HHS Childcare FAQ,

www.compass.state.pa.us/compass.web/menuitems/childcareFAQ.aspx?Language=EN.

Cottom, Theresa. "EREF Releases Analysis on National Landfill Tipping Fees." *Waste Today*, Waste Today, 29 Oct. 2019, www.wastetodaymagazine.com/article/eref-releases-analysis-national-msw-landfill-tipping-fees/.

Drexel Center for Hunger-free Communities and PCCY. "Key Facts about the Child and Adult Care Food Program (CACFP) for Subsidized, Approved, License-Exempt Child Care Providers." *Key Facts about the Child and Adult Care Food Program (CACFP) for Subsidized, Approved, License-Exempt Child Care Providers*, 2011.

"Early Learning." *Department of Education*, www.education.pa.gov/Early%20Learning/Pages/default.aspx.

Eriksson, Mattias, Christine Persson Osowski, Christopher Malefors, Emelie Eriksson, and Jesper Björkman. 2017. "Quantification of Food Waste in Public Catering Services – A Case Study from a Swedish Municipality." *Waste Management* 61: 415-422. doi://dx.doi.org.proxy.library.upenn.edu/10.1016/j.wasman.2017.01.035. <https://proxy.library.upenn.edu/login?url=https://search-proquest-com.proxy.library.upenn.edu/docview/2000265130?accountid=14707>.

Evans, David, Hugh Campbell, and Anne Murcott. 2013. *Waste Matters: New Perspectives of Food and Society*.

FDA Food Code, FDA Food Code § (2017).

Feltenberger, Denise. "York County Solid Waste Authority Approves 2020 Budget with \$3 Increase in the Cost for Waste Disposal." *York County Solid Waste Authority*, 21 Oct. 2019, www.ycswa.com/york-county-solid-waste-authority-approves-2020-budget-with-3-increase-in-the-cost-for-waste-disposal/.

"Food Donation Connection." PA DHS - Child Care Regulations. PA Department of Human Services, 2018. <http://www.dhs.pa.gov/provider/earlylearning/childcareregulations/index.htm>.

"Food Material-Specific Data." EPA, Environmental Protection Agency, 22 Apr. 2020, www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/food-material-specific-data.

Freeman-Wright, Carrie I. 2015. "Attrition in New Jersey Family Day Care Food Program." Ph.D., University of Phoenix. <https://proxy.library.upenn.edu/login?url=https://search-proquest-com.proxy.library.upenn.edu/docview/1733672109?accountid=14707>.

"Frequently Asked Questions." Food and Nutrition Service. USDA, 2013. <https://www.fns.usda.gov/snap/retailer/faq>.

Gail M. Sullivan, Joan Sargeant, (2011) Qualities of Qualitative Research: Part I. *Journal of Graduate Medical Education*: December 2011, Vol. 3, No. 4, pp. 449-452.

Griffin, Mary, Jeffery Sobal, and Thomas A. Lyson. 2009. "An Analysis of a Community Food Waste Stream." *Agriculture and Human Values* 26 (1-2): 67-81. doi://dx.doi.org.proxy.library.upenn.edu/10.1007/s10460-008-

9178-1. <https://proxy.library.upenn.edu/login?url=https://search-proquest-com.proxy.library.upenn.edu/docview/56883200?accountid=14707>.

Harvard Law School Food Law and Policy Clinic. "Moving Food Waste Forward: Policy Recommendations for Next Steps in Pennsylvania." *Moving Food Waste Forward: Policy* [s://www.pccy.org/resource/key-facts-about-the-child-and-adult-care-food-program/](http://www.pccy.org/resource/key-facts-about-the-child-and-adult-care-food-program/).

Heath, David. 2003. "Supermarket Chain Composts Food Waste." *Environment* 45 (3): 7.

<https://proxy.library.upenn.edu/login?url=https://search-proquest-com.proxy.library.upenn.edu/docview/224022695?accountid=14707>.

Hillengas, Amory, et al. *Neighborhood Food Retail in Philadelphia*. City of Philadelphia, Sept. 2019.

Holweg, Christina, Christoph Teller, and Herbert Kotzab. 2016. "Unsaleable Grocery Products, their Residual Value and Instore Logistics." *International Journal of Physical Distribution & Logistics Management* 46 (6/7): 634-658. doi:10.1108/IJPDLM-11-2014-0285.

<http://www.emeraldinsight.com.proxy.library.upenn.edu/doi/abs/10.1108/IJPDLM-11-2014-0285>.

"Inflation Rate for Food between 2008-2020." *Food Price History from 2008 through 2020*,

www.in2013dollars.com/Food/price-inflation/2008-to-2020?amount=1.

Is the Focus on Food Deserts Fruitless? Retail Access and Food Purchases Across the Socioeconomic Spectrum 2015.

https://www.openaire.eu/search/publication?articleId=od_____645::b76d2b129661e4514ed318e09c521dae.

KATARINA HAMBERG, EVA JOHANSSON, GERD LINDGREN, GÖRAN WESTMAN, Scientific Rigour in Qualitative Research—Examples From a Study of Women's Health in Family Practice, *Family Practice*, Volume 11, Issue 2, June 1994, Pages 176–181, <https://doi.org/10.1093/fampra/11.2.176>

"Key Facts About The Child and Adult Care Food Program." Public Citizens For Children and Youth, 2019.

Kohlbacher, Florian (2005). The Use of Qualitative Content Analysis in Case Study Research [89 paragraphs].

Forum Qualitative Sozialforschung / Forum: Qualitative Social Research, 7(1), Art. 21, <http://nbn-resolving.de/urn:nbn:de:0114-fqs0601211>.

Lebersorger, S. and F. Schneider. 2014. *Food Loss Rates at the Food Retail, Influencing Factors and Reasons as a Basis for Waste Prevention Measures*. Vol. 34. doi://doi-

- org.proxy.library.upenn.edu/10.1016/j.wasman.2014.06.013.
- <http://www.sciencedirect.com.proxy.library.upenn.edu/science/article/pii/S0956053X14002694>.
- Lee, Gyoungju and Hyunwoo Lim. 2009. "A Spatial Statistical Approach to Identifying Areas with Poor Access to Grocery Foods in the City of Buffalo, New York." *Urban Studies* 46 (7): 1299-1315.
- <http://www.jstor.org.proxy.library.upenn.edu/stable/43198027>.
- Lewis, Dave. 2017. *Curbing Food Waste is Good for Business, the Environment, and Society*.
- http://upenn.summon.serialssolutions.com.proxy.library.upenn.edu/2.0.0/link/0/eLvHCXMwrV1NT4QwEJ2oe9DERI0a16_05GmRUligB2MiAcXLmuzKHkmh4Ekgy_L_7SCsZE978Ni.
- Malterud, Kirsti. 2001. *Qualitative Research: Standards, Challenges, and Guidelines*. Vol. 358.
- doi:[https://doi.org/10.1016/S0140-6736\(01\)05627-6](https://doi.org/10.1016/S0140-6736(01)05627-6).
- <http://www.sciencedirect.com/science/article/pii/S0140673601056276>.
- Manson, Cynthia. *Benefit-Cost Analysis of Potential Food Waste Diversion Legislation*. Industrial Economics, Incorporated, Mar. 2017.
- McDonald, Sharon. "Food Code Changes Coming to Pennsylvania." Penn State , March 8, 2018.
- <https://extension.psu.edu/food-code-changes-coming-to-pennsylvania>.
- Moore, Latetia V., Ana V. Diez Roux, Jennifer A. Nettleton, and David R. Jacobs Jr. 2008. "Associations of the Local Food Environment with Diet Quality—A Comparison of Assessments Based on Surveys and Geographic Information Systems: The Multi-Ethnic Study of Atherosclerosis." *American Journal of Epidemiology* 167 (8): 917-924. doi:10.1093/aje/kwm394. <https://doi-org.proxy.library.upenn.edu/10.1093/aje/kwm394>.
- Nierenberg, Danielle, et al. "Seven Awesome Food Organizations in Pennsylvania." *Food Tank*, 16 Nov. 2016, foodtank.com/news/2015/01/seven-awesome-food-organizations-in-pennsylvania/.
- "A Note to the Mayor's Office: Discrimination and Racism in Philadelphia." *The Center for Hunger-Free Communities*, 8 Nov. 2019, www.centerforhungerfreecommunities.org/media/news/note-mayors-office-discrimination-and-racism-philadelphia.
- O'Donnell, Thomas. *Food Runner*. Uplift Solutions, Inc., Oct. 2017.

PA Department of Human Services. "PA.Gov." PA DHS - Child Care Works Subsidized Child Care Program, 2019. <http://www.dhs.pa.gov/citizens/childcareearlylearning/childcareworkssubsidizedchildcareprogram/index.htm>. *Recommendations for Next Steps in Pennsylvania*. Philadelphia, PA: Philabundance, 2017.

Parker, Cherelle, and PHL Council. "COUNCILWOMAN BLONDELL REYNOLDS BROWN HOSTS HEARING EXAMINING CHILD HUNGER IN PHILADELPHIA." *Philadelphia City Council*, 8 Mar. 2019, phlcouncil.com/councilwoman-blondell-reynolds-brown-hosts-hearing-examining-child-hunger-in-philadelphia/.

"ReFED 2018 US Food Waste Investment Report". ReFED. September, 2019.

"Relative/Neighbor Provider." *Community Service for Children*, dev.cscinc.org/providers-practitioners/ccis/relativeneighbor-provider/.

Stewart, Hayden, et al. *How Much Do Fruits and Vegetables Cost?* United States Department of Agriculture, Feb. 2011.

"Supermarket Job Salary Information - How Much Do Grocery Store Jobs Pay?" *Job-Applications*, 21 Sept. 2011, www.job-applications.com/grocery-store-jobs/grocery-store-salaries/.

Szczepanski, Mallory. "EREF Study Shows Continued Increase in Average MSW Landfill Tip Fees." *Waste360*, 1 Aug. 2018, www.waste360.com/landfill-operations/eref-study-shows-continued-increase-average-msw-landfill-tip-fees.

Tatu, Christina. "Trash Talk? Two Lehigh Valley Landfills Say They Are Fast Running out of Space." *Mcall.com*, 27 Nov. 2015, www.mcall.com/news/breaking/mc-lehigh-valley-landfill-space-20151126-story.html.

"The Food Trust: Where We Work." *The Food Trust | Where We Work*, 2017, thefoodtrust.org/where-we-work.

Walcott, R. L., Corso, P. S., Rodenbusch, S. E., & Dolan, E. L. (2018). Benefit-cost analysis of undergraduate education programs: An example analysis of the freshman research initiative. *CBE Life Sciences Education*, 17(1), rm1. doi:10.1187/cbe.17-06-0114

Warshawsky, Daniel N. 2016. "Food Waste, Sustainability, and the Corporate Sector: Case Study of a US Food Company." *The Geographical Journal* 182 (4): 384-394. doi://dx.doi.org.proxy.library.upenn.edu/10.1111/geoj.12156. <https://proxy.library.upenn.edu/login?url=https://search-proquest-com.proxy.library.upenn.edu/docview/1838250326?accountid=14707>.

“Waste Business Journal - Monthly Pricing and Volume Index.” *Waste Business Journal : Industry Research & Analysis*, Aug. 2019, www.wasteinfo.com/wbjpriceindex.htm.

Wright, Sigrid, and Sarah Antonelli. *Rebalancing the Food Waste Equation: A Case Study for Santa Barbara*. Community Environmental Council, Oct. 2015.

“Zero Waste and Litter Initiative.” *Philadelphia Streets*: www.philadelphiastreet.com/zero-starts-with-one/.

Appendix

Exhibit 1: Interview Guide Intended for Daycare Owners / Employees

General Information

1. On average, how many children does your daycare serve?
2. What is the average age range of children that you serve?
3. How many consecutive hours do you provide child care per day?

Child Hunger Questions

1. Have you had any experience caring for a child that you've suspected isn't getting enough nutrition?
 - a. How frequently would you say that you come across this situation?
2. Are you aware that child hunger in North Philadelphia has more than tripled between 2006 and 2016?
3. What do you think are the drivers of child hunger?

Food Program Questions

1. Do you have a food program in place at your daycare?
 - a. If yes :
 - i. Do you participate in a government sponsored food program such as the The Child and Adult Care Food Program (CACFP)?
 1. On a scale of 1 to 5, how satisfied are you with the program?
 2. Does your daycare have to pay for the program or do you get reimbursed?
 - ii. Have you ever served donated food to the children in your care?
 1. Was the donor a non-profit organization, a for-profit organization, or an individual?
 - iii. Where is the food provided for the children in your care sourced from? (e.g. grocery store, catering company, etc.)
 - iv. Do you prepare the food on-site or do you receive cooked food?
 - v. How many meals and snacks do your children receive per day?
 - vi. Could you give me an example of a typical meal that a child receives at your daycare?
 - b. If no :
 - i. What are some of the factors that deter you from incorporating a food program into your daycare?
 - ii. Have you ever considered a government sponsored food program?
 1. What hinders your daycare from enrolling in one?
 - iii. Hypothetically, if you decided to incorporate a food program into your daycare, would you rather prepare the food on-site or receive cooked food from a third party?
4. Grocery stores often destroy fruits and vegetables that are fresh and safe to eat because of how they look. How would you feel about receiving surplus fruits and vegetables like this from a grocery store at a discounted price?
5. On a scale of 1 to 5, (with 1 being "very negatively", 3 being "no effect" and 5 being "very positively") how would you react to a program like this?
 - i. Would it matter if it was free as opposed to discounted?
 - ii. What do you believe are the potential benefits of a program like this, if any?
 - iii. What do you believe are the potential risks a program like this, if any?
6. On a scale of 1 to 5, (with 1 being "very negatively", 3 being "no effect" and 5 being "very positively") how much would the following factors influence your decision to partner with grocery stores?
 - i. The partnership is not reimbursed through a government sponsored food program

- ii. The partnership costs less than buying fruits and vegetables through a government sponsored food program
 - iii. The fruits and vegetables are delivered as ingredients (i.e. they are not cut or prepared in any other way)
 - iv. The appearance of the fruits and vegetables
 - v. The fruits and vegetables are from a local grocery store
 - vi. The fruits and vegetables are from a chain grocery store
 - 2. Are there any other factors that would influence your reaction to a program like this?
7. I'm going to list some groups that could react to a food program like this. Could you indicate on a scale of 1 to 5, (with 1 being "very negatively", 3 being "no effect" and 5 being "very positively") how their opinion affects you?
- i. Parents of children enrolled in the daycare
 - ii. City government / city government officials
 - iii. Churches and other religious institutions
 - iv. Local non-profits like Philabundance
 - v. Broader Philadelphian society
 - 1. Are there any other groups whose opinion would influence your reaction to a program like this?

Closing Questions

1. Is there anyone you know that I could potentially interview, whether they are civil servants, non-profit representatives, daycare owners / managers, or grocery store managers / representatives?
2. Would you feel comfortable with me contacting you again if I have more questions?

Exhibit 2: Interview Guide Intended for Grocery Store Managers / Representatives

General Information

1. Do you consider yourself a local or chain grocery store?
2. Do you sell fresh fruits and vegetables in your store?

Unmarketable Fruits and Vegetables Questions

- 1) How do you define “unmarketable” produce?
- 2) Do you consider unmarketable produce, surplus produce, and “damaged” produce to be treated the same way?
 - a) If not:
 - i) What is the difference between unmarketable, surplus, and “damaged” produce?
 - ii) Are there different procedures for identifying and disposing of unmarketable, surplus, and “damaged” produce?
 - b) If yes:
 - i) What is the procedure for identifying and disposing of unmarketable / surplus / “damaged” produce?
- 3) Is there store policy regarding a specific date for when uncut fruits and vegetables should be disposed of?
 - a) Are there different dates for the type of fruit and vegetable (e.g. an apple versus a cucumber)?
 - b) Are there different dates for the classification of fruit and vegetable (e.g. washed or unwashed, with shell or without shell)?
- 4) Do you store unmarketable, surplus, or “damaged” food separately from spoiled and contaminated food?

Financial Questions

- 1) Do you track the cost that goes into food waste disposal?
- 2) Could you walk me through the expenditures associated with food waste disposal?
- 3) What do you estimate is the cost of disposing of unmarketable, surplus, and “damaged” produce for your grocery store?
 - a) If you are unable to provide an estimate of this, could you give an estimate of the overall cost of food disposal for your grocery store?
 - i) Could you estimate what percentage of this cost is associated with produce disposal?

Food Program Questions

1. How would you feel about selling unmarketable fruits and vegetables like this to a daycare at a discounted price?
 - a) On a scale of 1 to 5, (with 1 being “very negatively”, 3 being “no effect” and 5 being “very positively”) how would you react to a program like this?
 - i) What do you believe are the potential benefits of a program like this, if any?
 - ii) What do you believe are the potential risks a program like this, if any?
 - b) On a scale of 1 to 5, (with 1 being “very negatively”, 3 being “no effect” and 5 being “very positively”) how much would the following factors influence your decision to partner with daycares?
 - i) The partnership would need to be approved by a government sponsored food program
 - ii) The partnership would reduce the cost associated with disposing of unmarketable fruits and vegetables
 - iii) The fruits and vegetables would be delivered as ingredients (i.e. the grocery store would not cut or prepare them in any other way)
 - iv) The partnership would potentially lower child hunger in North Philadelphia
 - (1) Are there any other factors that would influence your reaction to a program like this?
 - c) I’m going to list some groups that could react to a food program like this. Could you indicate on a scale of 1 to 5, (with 1 being “very negatively”, 3 being “no effect” and 5 being “very positively”) how their opinion affects you?

- i) Parents of children enrolled in the daycare
 - ii) City government / city government officials
 - iii) Churches and other religious institutions
 - iv) Local non-profits like Philabundance
 - v) Broader Philadelphian society
- (1) Are there any other groups whose opinion would influence your reaction to a program like this?

Food Donation Questions

- 1) Have you ever donated unmarketable, surplus, or damaged fruits and vegetables?
 - a) If yes:
 - i) Do you plan to donate fruits and vegetables again in the next year?
 - (1) If yes: why?
 - (2) If not: why not?
 - b) If no:
 - i) Have you ever considered food donation?
 - ii) Why do you hesitate to donate food?
 - 2) Does donating unmarketable, surplus, or damaged fruits and vegetables appeal more, less, or about the same to you as reselling these kinds of fruits and vegetables?

Child Hunger Questions

- 1) Are you aware that child hunger in North Philadelphia has more than tripled between 2006 and 2016?
- 2) Has your store engaged with the North Philadelphia community to proactively mitigate child hunger, whether that is through a Corporate Social Responsibility (CSR) program or otherwise?
 - a) If so, could you please describe the program?
- 3) What do you think are the drivers of child hunger?

Closing Questions

- 1) Is there anyone you know that I could potentially interview, whether they are civil servants, non-profit representatives, daycare owners / managers, or grocery store managers / representatives?
- 2) Would you feel comfortable with me contacting you again if I have more questions?
- 3) Is there any financial data that I could obtain regarding your grocery stores' expenditures on food disposal?

Exhibit 3: Interview Guide Intended for Civil Servants, Nonprofit Representatives, and Representatives of Religious Institutions

Child Hunger Questions

- 1) Are you aware that child hunger in North Philadelphia has more than tripled between 2006 and 2016?
- 2) Has your institution engaged with the North Philadelphia community to proactively mitigate child hunger?
 - a) If so, could you please describe the program(s) your institution has pursued?
- 3) What do you think are the drivers of child hunger?

Food Program Questions

- 1) Grocery stores often destroy fruits and vegetables that are fresh and safe to eat because of how they look. How would you feel about daycares receiving fruits and vegetables like this from a grocery store at a discounted price?
 - a) On a scale of 1 to 5, (with 1 being “very negatively”, 3 being “no effect” and 5 being “very positively”) how would you react to a program like this?
 - i) Would it matter if it was free as opposed to discounted?
 - ii) What do you believe are the potential benefits of a program like this, if any?
 - iii) What do you believe are the potential risks of a program like this, if any?
- 2) On a scale of 1 to 5, (with 1 being “very negatively”, 3 being “no effect” and 5 being “very positively”) how much would the following factors influence your reaction to a program like this?
 - a) The partnership is not reimbursed through a government sponsored food program
 - b) The partnership costs less than buying fruits and vegetables through a government sponsored food program
 - c) The fruits and vegetables are delivered as ingredients (i.e. they are not cut or prepared in any other way)
 - d) The appearance of the fruits and vegetables
 - e) The fruits and vegetables are from a local grocery store
 - f) The fruits and vegetables are from a chain grocery store
 - i) Are there any other factors that would influence your reaction to a program like this?
- 3) I’m going to list some groups that could react to a food program like this. Could you indicate on a scale of 1 to 5, (with 1 being “very negatively”, 3 being “no effect” and 5 being “very positively”) how their opinion affects you?
 - a) Parents of children enrolled in the daycare
 - b) City government / city government officials
 - c) Churches and other religious institutions
 - d) Local non-profits like Philabundance
 - e) Broader Philadelphian society
 - i) Are there any other groups whose opinion would influence your reaction to a program like this?

Closing Questions

1. Is there anyone you know that I could potentially interview, whether they are civil servants, non-profit representatives, daycare owners / managers, or grocery store managers / representatives?
2. Would you feel comfortable with me contacting you again if I have more questions?