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## **1. Introduction**

The population of interest is Toronto low-income families. It includes households in Toronto with at least one child who is aged 18 or below and the households' total income from all family members should not exceed the "Low-income cut-offs before and after tax by community size and family size" (Government of Canada, Statistics Canada, 2022). Since Toronto is putting its focus on "smart city" development (Haggart & Spicer, 2022), policymakers' interests lie in developing profit-making technologies instead of supporting the poor who can hardly contribute to the city's economy directly. Therefore, the low-income population's interests are hindered although they form a significant population in Toronto.

Emergent health issues in this population include food insecurity (City of Toronto, 2023), financial burden of healthcare (Stewart, 2021) and mental health problems (Santiago et al., 2012). Some structural factors identified are serious income disparity in Toronto (Ilic & Sawada, 2021), lack of community support (Loopstra & Tarasuk, 2012), lack of education (City of Toronto, 2021) and social stigma towards low-income population (Hamilton, 2012).

Fortunately, economic support programs are available in Toronto to provide financial assistance to low-income households to meet their short-term needs. Besides, strong social cohesion appears among low-income families and builds up the resilience of households in facing economic stress (Orthner et al., 2004). The strong interpersonal bond in the low-income neighborhood makes community activities likely to be attractive.

Economic vulnerability is this population's main weakness which impacts family functioning (Wadsworth & Berger, 2006). Parents of low family's socioeconomic statuses tend to be more pessimistic about their children's prospects of attending higher education (Crosnoe

et al., 2002). This attitude can lead to negative consequences for educational attainment and upward social mobility. Social stigma towards low-income populations remains a threat which the poor may get judged negatively about taking social resources “for free” (Hamilton, 2012).

Among all health issues identified, food insecurity stands out to be the priority due to its prevalence in Toronto (City of Toronto, 2023) and close association with poor health outcomes and high healthcare costs (Deaton & Scholz, 2022).

The proposed intervention to tackle the food insecurity issue adopts a similar approach as the Supplemental Nutrition Assistance Program (Caswell et al., 2013) with an adaptation of contactless payment. It is a US nutrition assistance program, providing monthly benefits through Electronic Benefit Transfer card or stamps to eligible low-income families (Caswell et al., 2013). It aims to increase low-income households' purchasing power and access to a healthy diet by encouraging them to prepare nutritious meals at home (Savoie et al., 2015; Leung et al., 2017; Keith-Jennings et al., 2019).

## **2. Structural Intervention: Toronto Healthy Diet Purchase Program**

### **2.1 Description**

Eligible low-income households are assessed on their level of food insecurity and income level in the past 12 months. According to the households' financial situation and severity of food insecurity, different amounts of financial aid are distributed to them in the form of monthly e-coupon electronically through a digital app which performs similarly to other contactless payment apps such as Apple Pay and Google Pay. All household members can have access to the e-coupons because they are registered under the same household account in the

app. They can purchase listed nutritional food\* in registered grocery stores by opening the app on their phone and tap-to-pay in physical stores or use their account number to pay in online stores. Online receipts, weekly summary of food nutrition and recommendations based on the food products brought are also available in the app for family budgeting and nutrition consumption review purposes. After each full year, participants are reassessed on their level of food insecurity and income level to confirm their eligibility and adjust the amount of aid to be given in the next year.

*\* Including: meat, poultry, or fish; bread or cereal; vegetables or fruit; dairy products and seeds or plants which can be used to produce food. Excluding: alcohol and tobacco products and foods eaten in a store. (Caswell et al., 2013)*

## 2.2 Overall Objectives

To ensure participants who receive the benefits use the aid directly with their food consumption and improve their health status by encouraging healthy eating habits. By December 31, 2024, a decrease in prevalence of food insecurity as measured in Household Food Security Survey Module (Deaton & Scholz, 2022) among low-income households in Toronto by 70% is expected.

## 2.3 Process objectives

During the implementation of the intervention, we aim to offer participants sufficient and in-time financial aid to fulfill their food consumption needs. The total amount of the monthly e-coupons should appear on the households' app account at 00:00 on the first day of each month. So, participants can start purchasing food as soon as possible with the given

budget. Besides, the establishment of a well-functioning digital app is expected to facilitate a smooth shopping experience. Fast contactless payment, synchronized receipts and nutrition summary should be provided with minimal errors.

#### 2.4 Expected outcomes

Since this program only subsidizes participants in purchasing nutritional foods, it is expected that the major portion of the households' diet is fresh and self-cooked (Leung et al., 2017). This financial aid should relieve their financial burden on purchasing food (Keith-Jennings et al., 2019) and encourage healthy eating habits (Savoie et al., 2015) because they are no longer restricted to buying cheap but non-fresh or unhealthy food as their main food intake.

#### 2.5 Theory of change (Sidani & Sechrest, 1999):

Surrounding the situation of food insecurity in the low-income population, we observe a few issues including low purchasing power (Dachner et al., 2010), social stigma to using financial aid (Purdam et al., 2016), lack of awareness about available resources (Loopstra & Tarasuk, 2012), increasing food price (City of Toronto, 2023)., and inefficient operation mode in food banks (Loopstra & Tarasuk, 2012).

Since this intervention relies on the digital app to distribute the coupons to eligible households, we require financial resources, time and staff to form a technology team to design the app. Continuous effort is essential to monitor the app to ensure its functionality and fix the errors as soon as possible. Additionally, a promotion team is needed to go into the

neighborhood and community centers to inform eligible households and grocery stores about this new program and encourage them to apply.

By providing e-coupons to the participants, their out-of-pocket food expenses can be reduced, and they can fulfill their basic food needs with less financial burden. By strengthening participants' purchasing power, they gain access to fresher products that they could not afford. Furthermore, participants can purchase sufficient amount of food and they do not need to over-control their food intake serving size due to unaffordable food prices. Since the e-coupons can only be used on listed nutritional food, expenses spent on purchasing fast food such as pizza and preprocessed food will not be covered. Hence, participants are motivated to make healthier food choices and develop healthy eating habits. Moreover, by reviewing the nutrition summary in the digital app, participants can reflect on their average nutrition intake in the past week and plan to improve the nutritional values for the coming week meals using the Food Pyramid recommendation app function.

In the long term, this program can create bigger impacts on participants' health status. Restriction on food categories of which the e-coupons can be used encourages participants to develop healthy eating style by considering the serving size and nutritional values in the food they purchase (Nguyen et al., 2015). Hence, malnutrition and starvation are prevented and risk factors for chronic diseases including arthritis, diabetes, coronary heart disease, heart attack, hypertension, and stroke are lowered (Venci & Lee, 2018). By offering financial aid to participants, participants will feel less stressed as their basic food needs can be securely met (Bowen et al., 2021) through using the e-coupons wisely and hence improve their mental health status.

Lastly, a decrease in social stigma about receiving support related to food insecurity is expected. Since participants do not need to identify themselves as receiving financial aid when they pay and their purchasing experiences through contactless payment is designed not to differ from other normal customers, they will less likely to label and blame themselves as “useless people that get free food” and the chance of facing discrimination from store staffs or other customers for using financial aid will be reduced (Hamilton, 2012). Also, research shows that food bank users are negatively described as ‘poor people who can’t cook’ (Purdam et al., 2016). Through this intervention, participants are encouraged to prepare their own meals and develop cooking skills. Hence, this can alter the negative image that they take advantage of food bank resources.

### **3. Evaluation Proposal**

#### **3.1 Key evaluation questions**

1. To what extent does the intervention alleviate Toronto low-income households' financial and mental stress to fulfill basic food needs?
2. How effective is this intervention in promoting healthy eating?
3. How do eligible households use the e-coupons?

#### **3.2 Research Design Plan (quasi-experiment)**

Since a significant population of low-income households in Toronto reside downtown, the recruited samples will be from downtown Toronto as well. We will contact grocery marts,

and inform them about the program and the use of e-coupons. Then, we will recruit 200 eligible households to serve as the intervention group and another 50 eligible households to serve as the comparison group.

All participants will be required to fill in a questionnaire to collect their family demographic information such as race, number of people and children in the household. Both groups will be assessed on the severity of food insecurity they experience measured by the eight item Food Insecurity Experience Scale FIES (Cafiero et al., 2018), household annual income in the past 12 months and total number of household members, to generate the amount of financial aid they can receive. Additionally, we will take baseline health indicators including weight, height, BMI, Healthy Eating Index (HEI-2010) and average daily intake of added sugar, solid fat, empty calories, and total calories. All participants have to rate on the scale of 10 their subjective stress level about food security prior to the start of the intervention.

The intervention group will obtain the aid as e-coupons through the digital app and have access to the nutrition-related health information in it. A monitoring function will be enabled in their app accounts so we can trace their use of e-coupons synchronously. Meanwhile, the comparison group will not have access to any function in the digital app. Instead, they will be given the equivalent amount of aid as assessed in cash. To trace the use of the financial aid in the group, we require participants to record weekly use of the aid, including receipts and the corresponding food category the products they purchase belong to, on an online system.



Monthly check-ins will be conducted to assess participants' severity of food insecurity in the following 180 days to all participants during the research period. By the end of the research period, participants' health indicators will be measured again as a record of post-health status.

Lastly, we will conduct interviews with adults in the households from the intervention group about their experiences in using the program and ask them to rate again on their subjective stress level about food insecurity. We seek to understand the level of user-friendliness of the e-coupons, whether participants face discrimination while purchasing food using the app and if they will encourage other eligible households to use the program in the future. We are open to any other suggestions and opinions regarding the logistic of the program.

### 3.3 Data analysis

Within the intervention group, we will examine the differences in food insecurity indicators, stress level score and health indicators before and after implementing the intervention. The post-intervention data from the intervention group and comparison group will be compared to analyze if app-form financial aid can alleviate food insecurity issue better than in cash-form.

The tracking data collected in the digital app during the intervention will be analyzed to calculate the average percentage of e-coupons used and the most popular food category purchased in the intervention group. An overall trend about weekly average nutritional value

obtained based on the weekly nutrition summary will be visualized. Similar data analysis will also be conducted within the comparison group using the online system.

All qualitative responses extracted from post-intervention interviews will be independently reviewed to fully understand users' experiences.

The intervention is deemed as successful if:

1. There is a decrease in stress level score and FIES score among intervention group participants by the end of the study. This indicates that participants carry less burden both mentally and financially on food insecurity issue after the intervention.
2. There is a improvement in BMI score and HEI-2010 score in intervention group, which shows participants' better health condition. An upward trend of weekly average nutritional value also indicates increased awareness about healthy eating and the intervention is effective in promoting healthy eating habits.
3. Participants report facing insignificant amount of discrimination while using the e-coupons in store and the payment process is quick. This reflects the purchasing experience using the coupons is efficient and users' do not get judged while using the financial aid, reducing their worries about using social resources.
4. The average percentage of e-coupons used is over 80%, meaning that participants are willing to use this form of financial aid and there is a high participation rate.

### **3. 4 Future use of findings**

We can adjust the implementation of the intervention accordingly according to opinions reflected by users. If the intervention is found effective in alleviating food insecurity, a similar e-coupon scheme can be used to aid purchasing other non-food necessities and the scale of this intervention can be expanded to provincial level.

## **4. Intervention assessment**

### **4.1 Strength**

One of the root concerns that stops low-income households from using financial aid is discrimination against the vulnerable group for taking social resources for free (Bowen et al., 2021; Purdam et al., 2016). In this intervention, participants use the e-coupons through contactless payment method which is less obvious than using physical form coupons. The payment process is identical to other contactless payment methods and everyone, including the cashiers, cannot distinguish if they are using financial aid to pay. Hence, this lowers the chance of discrimination they would have faced and removes lower class worries when using social resources (Hamilton, 2012).

Moreover, this program promotes food justice by increasing participants' opportunities to access high-cost healthy food. Since this program restricts participants to using financial aid only to purchase listed nutritional food, this encourages them to spend the money on healthy foods and enjoy the health benefits from consuming healthy foods.

## 4.2 Weakness

One of the root causes of food insecurity in Toronto is inflation in food prices. During the pandemic, many people experienced a significant reduction in income. Unfortunately, food prices still increase amid this situation, pushing the food to become uncontrollably expensive. Yet, this intervention only increases participants' purchasing power and lacks an element in controlling food prices so that prices are consistent with the income level of the public.

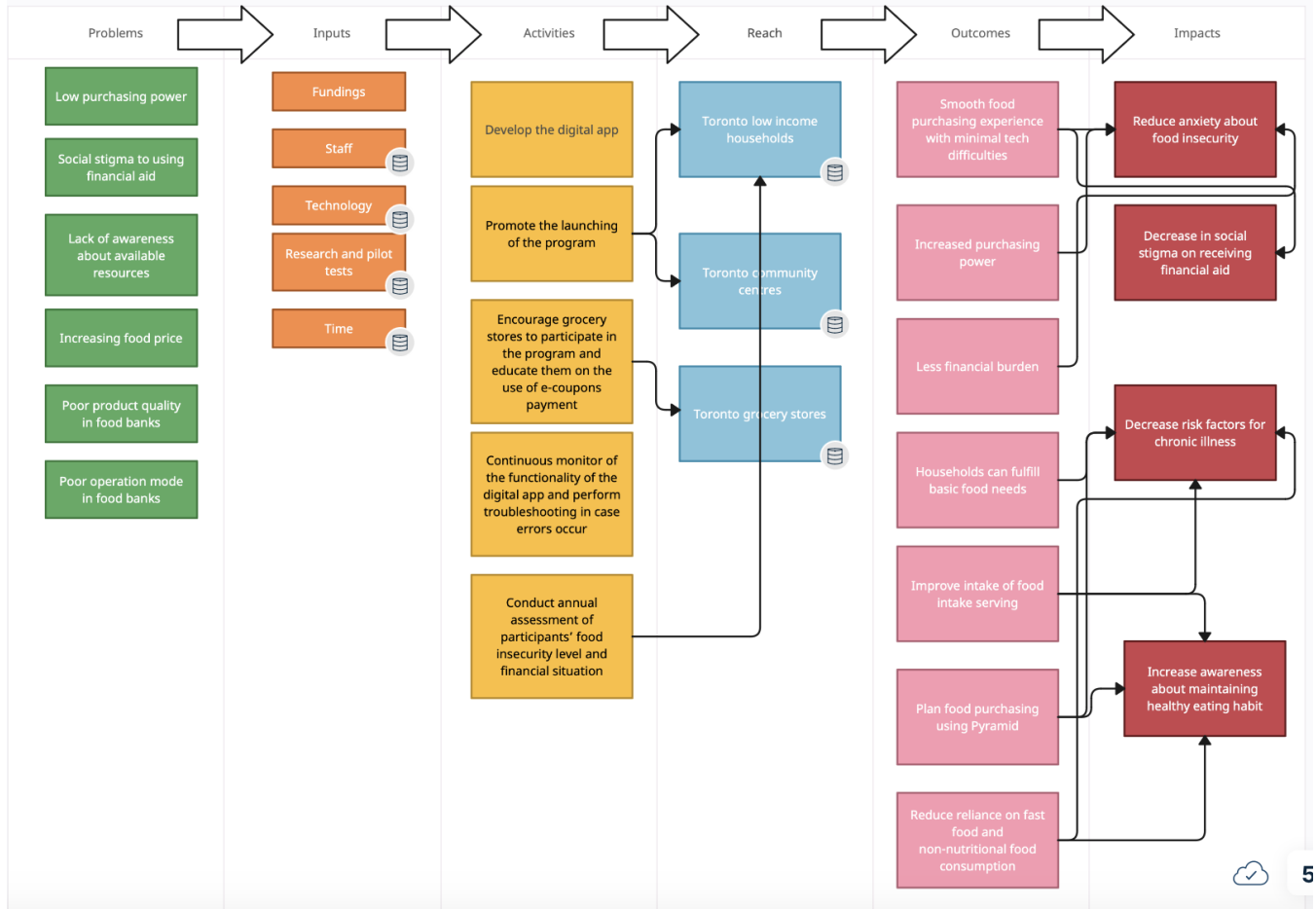
Under neoliberalism, people are framed as deserving of food based on notions of individualism, hard work and responsibility which contribute to stigmatization of food assistance (Purdam et al., 2016; Springer, 2016). However, this intervention does not take an active role in eliminating negative perceptions about using social resources among non-lower class society members. Instead, it only takes a passive role in this situation by preventing participants from facing direct discrimination at stores and avoids tackling the root social stigma on the whole (Hamilton, 2012).

## 4.3 Health implications

By providing financial aid to Toronto low-income households, they can afford food and lower their chance of starvation, which may lead to serious health outcomes in the future (Venci & Lee, 2018). Since the aid is restricted to being used on listed nutrient food and the support is provided for at least a year long, participants have sufficient time to build up the practice of consuming enough nutritional food and develop healthy eating habits (Savoie et al., 2015). Besides, this intervention can relieve these households, especially parents, stress about

food insecurity (Bowen et al., 2021). It ensures that household members can have access to food and their basic food needs can be fulfilled. Thereby, the intervention improves their mental health condition by relieving their anxiety.

## Appendix: Program Logic model



*\*Please refer to last paragraph in 'Theory of Change' and 'Intervention assessment' section for further clarification on 'Decrease in social stigma on receiving financial aid'.*

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