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Fruit and Vegetable Access in Mobile Food Pantries Serving Households Impacted by Opioid Addiction

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Context and Acknowledgements:

This master's project explores the intersection between the growing opioid crisis in Vermont and food and nutrition insecurity, and how Vermont's existing addiction treatment and food access infrastructure can be leveraged to increase access. This project is informed by the work of a University of Vermont research team–Dr. Farryl Bertmann, Dr. Meredith Niles, Dr. Robert Athoff, Dr. Michael Mackey, and Dr. Jennifer Laurent– that has proposed a mobile fruit and vegetable distribution programs hosted at addiction treatment clinics. The research team, as well as others interested in this topic, will be able to use the products of this project to demonstrate the need of food access and nutrition programs supporting individuals impacted by opioid addiction. Additionally, though the feedback of two professionals engaged in this work cannot be representative of the entire field, I hope that their perspectives might help inform the development of potential future interventions.

This project would not have been possible without the work of the UVM research team behind the mobile fruit and vegetable intervention project and the work they have already done designing the logic model and speaking with community partners. I worked closely with Dr. Farryl Bertmann, a member of this team, to create and adjust a survey, draft an interview protocol, receive approval from the IRB, contact community partners, and complete the Community Needs Assessment and this write up. Dr. Emily Morgan also provided valuable feedback on the development of this project to include community partner feedback, and in the drafting of the Community Needs Assessment and this report. Alan Howard, a statistician at UVM, also helped with the development of the survey. Thank you also to Dr. David Conner for all of his support in finding and refining the topic for this project, and for his constant support throughout the process. I would also like to thank the two community partners I interviewed for taking the time to share their perspectives and expertise.

Introduction:

The opioid crisis continues to escalate in the United States, claiming 42,249 lives in 2016 ("Drug Overdose Death Data," 2018). In Vermont, deaths related to opioid overdoses have increased by 159% between 2010 and 2016 and over half of the children under the age of six placed in Vermont custody were removed from their homes due to opioid abuses (Gowdey, 2018). Studies have shown the extremely harmful effects addiction can have on nutrition (Nabipour et al., 2014), as well as a pattern of Body Mass Index (BMI) increase associated with addiction and methadone treatment (Fenn et al., 2015). Addicts and those seeking addiction treatment tend to consume more calorically dense foods (Alves et al., 2011; Neale, Nettleton, Pickering, & Fischer, 2012; Nolan & Scagnelli, 2007) and fewer fruits and vegetables than recommended (Alves, Filipa Costa, Custódi, Natário, Ferro-Lebres, Andrade, 2011; Mahadevan & Fisher, 2010), and lack sufficient levels of several key nutrients in their diets (el-Nakah, Frank, Louria, Quinones, Baker 2011).

Opioid addiction affects more than just individuals, and the rise in opioid addiction has also caused lasting effects on entire family units. Adverse childhood experiences (ACES) are associated with food insecurity, with issues like abuse, neglect, addiction, and household instability in childhood affecting adults' food access and provisioning (Chilton et al., 2014). Food insecurity in the US, in turn, has been associated with maternal and child mental illness (Althoff et al., 2016). Additionally, childhood malnutrition impedes development, the impacts of which often follow individuals into adulthood. Failure to thrive (FTT) is a term coined to describe inadequate or delayed growth in children measured against their genetic potential (Larson-Nath et al., 2019),

and has been connected to adverse health (Hecht et al., 2015), cognitive (Corbett & Drewett, 2004; Emond, Blair, Emmett, & Drewett, 2007), and behavioral (Black, Dubowitz, Krishnakumar, & Starr, 2007) outcomes. While multigenerational research is lacking, studies have shown that ACES can form a generational cycle of poverty (Metzler, Merrick, Klevens, Ports, & Ford, 2017), health issues (Felitti & Anda, 2010), and family dysfunction (Mehra, Boyd, & Ickovics, 2017) that require early intervention to adequately address (Metzler et al., 2017).

While the inclusion of nutritional interventions in addiction treatment settings was encouraged by the American Dietetic Association— now Academy of Nutrition and Dietetics—nearly 30 years ago (1990), and continues to be suggested in more recent literature (Fenn et al., 2015; Nabipour et al., 2014; Neale et al., 2012; Wiss & Waterhous, 2014; Wiss, Schellenberger, & Prelip, 2018), recovery program utilization of registered dietitian nutritionists and nutrition interventions remains low (Wiss, Schellenberger, & Prelip, 2019). Studies measuring existing nutritional interventions serving addiction treatment programs have found increased self-efficacy and confidence in food provisioning and preparation (Moore, Gray, Wiss, & Parker, 2016) and greater fruit and vegetable intake (Cowan & Devine, 2012; Cowan & Devine, 2013) among participants. The co-morbidity of eating disorders and addiction (Becker & Grilo, 2015) has also been emphasized when discussing the importance of nutrition intervention in addiction treatment settings (Wiss & Waterhous, 2014).

These place– and population–based interventions follow a recent trend in food access programs focused on the physical food environments and their impacts on individual and community health. Food deserts and obesogenic environments have been

of particular interest, serving as a way to explain obesity and malnutrition through a variety of physical environmental characteristics, including low access to minimally processed foods and an overabundance of ultra-processed foods in nearby food stores (Lovasi et al., 2009; Walker et al., 2010). Studies on unhealthy food environments emphasize the importance of physical environment and policy interventions in addressing obesity and food inequity (Story et al., 2008). This shift in perspective takes the emphasis off of individual–level behavior interventions, in favor of recognizing and attempting to correct issues of food access and security at the level of the food environment. There has been some criticism that this focus on food environment in the question of food access and health is too simplistic and limits the scope of solutions (Guthman, 2008; Lee, 2012; Pearson, 2005). Despite these criticisms, there has continued to be a focus on environmental interventions in food access work and research.

The focus on physical environment–based problems and solutions can be seen in the proliferation of food access programs. Some common environmental interventions include the creation of farmers' markets in low-income neighborhoods with reduced prices or SNAP programs, attempts to integrate more produce in corner stores, and mobile interventions such as mobile markets and mobile food banks (Larson et al. 2013; Sadler 2016). Mobile interventions are arguably the most direct, as they seek to bring the vegetables into underserved areas in order to increase health outcomes, often measured by fruit and vegetable intake (Breck et al., 2017; Farley et al., 2015; Gans et al., 2016; Risica et al., 2018). Mobile markets, which function essentially as farmers' markets that can be driven between market locations, have become increasingly popular in recent years, with the first documented instance of an explicitly food access-driven mobile

farmers' market in the United States occurring in 2003 in West Oakland, California (Robinson et al., 2016). Studies have shown that assistance and subsidized pricing at interventions such as Community Supported Agriculture (CSA) shares, farmers' markets, and mobile market interventions can help increase participation of lower income populations in Local Food Systems (Castellano, 2017). Gleaning, and donation based programs especially have become popular as a way to decrease food waste and provide fresh produce to food pantries and CSA-style access programs (Hoisington, 2001).

Justification:

Food insecurity is an issue that impacts a variety of Vermonters, and solutions that work for one population might not serve another well. Vermont has been recognized for its efforts to increase access to maintenance therapy for opioid addicted residents with the Hub & Spoke clinic model, which creates a system of short and long-term treatment facilities across the state facilitating constant communication between doctors, councilors, and patients (Simpatico, 2015). However, few programs currently exist to address issues of food insecurity and nutrition access in opioid-addicted populations specifically, and little data is known about this population's challenges and barriers in accessing and consuming nutritious food. However, Vermont does have programs working to address environmental–based food access barriers. Serving about 153,000 Vermonters a year ("FAQ," 2016.), the Vermont Food Bank runs a program called VeggieVanGo (VVG) that delivers and distributes free, locally gleaned and donated produce to six schools and eight hospitals throughout Vermont. This program aims to provide fresh and healthy foods to underserved populations in Vermont, create a

gathering place that fosters support and conversations around healthy food, and provide education and outreach to increase food access.

As part of a study investigating nutrition interventions in households impacted by opioid addiction, a new branch of the program has been proposed to further increase the reach of the free produce. As part of this program, the van would make weekly visits to the Chittenden Clinic in Burlington, Vermont to distribute free produce to households with at least one individual receiving addiction treatment. This program specifically aims to improve the function of family units in families where at least one parent is seeking addiction counseling, and to improve adverse effects associated with food and nutrition insecurity.

Objectives:

The present project seeks to assess the potential of a mobile fruit and vegetable intervention program to improve nutrition and food access in households impacted by opioid addiction. To do this, a Community Needs Assessment will be conducted to investigate the prevalence and nutrition needs of opioid-addicted households in Vermont and Chittenden County, develop a survey to measure the outcomes of the proposed fruit and vegetable intervention, and obtain feedback from community partners to inform the design of the proposed fruit and vegetable intervention study

Methods:

A Community Needs Assessment (CNA) was completed to investigate the need for nutrition interventions for households with at least one individual seeking addiction

treatment in Chittenden County, the service area of the Chittenden Clinic. The approach and format for this CNA was based on examples provided in the *Community needs assessment workbook* (Beffa-Negrini et al., 2013). Existing literature was surveyed to summarize contemporary research on opioid addiction and treatment, nutrition issues in addicted populations, and existing programs to address issues of food access, especially in this population. This research was also done at the local level to establish metrics for Vermont and Chittenden County populations. In addition to the background research into the needs of the specific community, three components of the larger study were also evaluated and developed: the logic model, a participant survey, and community partner feedback.

A survey was developed with the initial intent to be distributed at a pilot mobile pantry to assess interest and potential impact of the mobile intervention study. While the pilot study did not come to fruition due to funding and time limitations, the survey was further developed as a proposed measure of food procurement habits, food access, intervention utilization, and demographics of the participants of the eventual mobile food pantry intervention. The majority of the questions were taken and modified from existing validated surveys measuring eating habits and food access (Anderson, Winett, & Wojcik, 2000; Green, & Glanz, 2015; Leone et al., 2018; MacMillan Uribe, Winham, & Wharton, 2012; National Health and Nutrition Examination Survey, 2014). A few additional questions about the specific intervention were developed as well. Alan Howard, a statistician at the University of Vermont, was consulted to ensure the survey design allowed for statistical analysis to inform the guiding questions of the study. The survey was further edited based on feedback from potential community partners.

Two professionals from potential partner organizations identified in the larger study were interviewed to contribute vital information to background and community data, survey development, and community partner recommendations. Interviewees were sent the proposed survey and logic model for the study a week prior to the interview, and were asked about their opinions on the design. Interviewees also were asked about opportunities, needs, and challenges in existing and proposed fruit and vegetable access and opioid addiction treatment programming. Interviews lasted 20-30 minutes, were conducted in-person (n = 1) and over the phone (n = 1) by the author, and were recorded with participant consent. The audio recordings were transcribed, and the resulting transcripts were reviewed for key themes and quotes.

Outcomes:

The Community Needs Assessment generated by this project evaluates the potential impact of a mobile food pantry program on the nutrition of households impacted by opioid addiction. Research into opiate addiction and food insecurity in Chittenden County and Vermont revealed the severity of both the opioid crisis and food insecurity in the state. In 2015, 8,600 people in Vermont received treatment for opioid addiction and Emergency Medical Services received 1,375 overdose calls (VanDonse, Ligingston, & Searless, 2016). In Vermont, ten percent of residents and 15% of children live in food insecure households ("Hunger in Vermont," 2018). It also revealed the current dearth of data and programming addressing food insecurity and nutrition in households affected by opioid addiction, despite the clear and longstanding need for food access and nutrition programming to support those impacted by opioid addiction (American Dietetic

Association,1990). While projects like the Chittenden Clinics' farmstand have been well received and yielded promising outcomes (Sigmon, 2016), longer-term and more widespread solutions are needed.

Conversations with potential community partners from the Vermont Food Bank and the Chittenden Clinic yielded a wealth of knowledge and expertise on the feasibility and potential impact of a mobile food pantry intervention. Overall, there was great enthusiasm over the potential mobile food access interventions have to address issues of nutrition and food insecurity in households affected by opioid addictions. Interviewee feedback fell generally into six categories: (1) the issues of nutrition and food insecurity in households impacted by opioid addictions, (2) the appropriateness of mobile food pantry interventions, (3) the importance of considering the population in question, (4) logistical suggestions for the intervention, (5) partner relations, and (6) how to measure outcomes.

The two community partners interviewed both emphasized the prevalence of food insecurity and malnutrition in Vermont, and especially in households impacted by opioid addictions. To address this issue, the Chittenden Clinic has run a farm stand program from their lobby for several years, offering free produce from the Intervale Food Hub to their patients. Research on the impact of this program revealed, "remarkably high rates of self-reported past year food insecurity in our opiate maintained patients… and a remarkably high percentage even endorsed the extreme food insecurity level." In addition, they noted the "potential pharmacological effect of opiates promoting unhealthy weight increases," as an issue for the population. The community partner from the food bank also noted the potential for other issues to impact food behavior, such as appetite,

family structure, and time. Overall they both emphasized that it is, “a very important area,” but one without, “a lot of other services provided in terms of food … or nutrition.”

Both interviewees also considered mobile interventions specifically to be uniquely poised to serve the population in question. One interviewee asserted that, “a mobile service is a good idea,” because, “our addiction treatment clinics are so widely dispersive over broad geographic areas.” In a rural state like Vermont, this flexibility to bring food to central gathering points is extremely helpful in reaching otherwise underserved populations. The interviewee from the food bank also shared her experience with how bringing pantries into community settings can become, “like a gathering of community,” that demonstrates to community members that, “[their] community cares for [them] and [their] family,” and what “a positive experience for people,” that can be. The interviewee from the Food Bank noted that while food shelves can be stigmatized and difficult to access places for some, mobile pantries open up new opportunities for more positive interactions in additional locations.

The interviewees also both mentioned the importance of considering both the logistics of the intervention and the needs of the population it intends to serve. For households impacted by opioid addiction, this can include, but is not limited to, issues of dental hygiene and the ability to chew certain kinds of foods, homelessness and lack of access to a kitchen, and mental illness and chaotic family systems. One interviewee stressed the importance of these concerns being understood and used to, “help inform program content,” such as a focus on vegetables that can be prepared with just a microwave or offering more fruits or sweet vegetables. Both interviewees also mentioned the need to review all program material, “to make sure that it's a reasonable reading

level." Important logistics for interviewees considered the needs of both the participants and partners in the implementation of the program. This included considering how often patients visited the clinic, how many would be there at a given time, and how this would impact the scale of the produce distribution. One interviewee also suggested the participant play a more central role in development of the logic model and program.

Interviewees also shared their perspective on steps to support the community partners. Both emphasized the time, infrastructure, and funding constraints that are common to addiction treatment clinics and food access programs. Issues of confidentiality and safety, as well as the, "overstretched… and chaotic," nature of the clinics, led one interviewee to suggest that, "not relying on the physical space of the clinic or the clinic staff would be crucial." On the side of the food access partner, issues of scale and fiscal responsibility being clearly defined and communicated were key. Additionally, this food bank employee expressed that their organization has experienced difficulty in the past participating in research that seeks to answer a number of different research questions that don't always align with their focus on program evaluation and serving their clients.

Finally, interviewees shared their thoughts on what data should be collected and how it should be done. Both interviewees expressed that, "brevity is important," and suggested narrowing in on the most important goals for data collection, i.e. evaluating the program's ability to, "to really change [participants'] eating behavior and their food security." Each suggested alternatives to more traditional paper surveys, including using technology to make it more interactive, and using the University of California Davis' Food Behavior Checklist (Townsend Lab, 2019), which measures food behavior

visually rather than with text. The partner from the food bank also suggested using focus groups, “would be really important,” to get a better idea of how to address the challenges of, “serving this population in particular.” Overall, the interviewees emphasized the importance of narrowing the size and focus of evaluations to minimize the impact on the participants.

As a part of the Community Needs Assessment and the broader study goals, this project also developed a survey for assessment of participant eating habits and food access (Appendix A), modified the logic model of the larger study (Appendix B), and gathered community partner feedback. As a result of this feedback, the survey was further shortened and simplified in order to focus on the main questions of food insecurity, fruit and vegetable consumption, program impact, and participant feedback. Based on community feedback, further modifications to make the survey shorter and more accessible may be desirable, depending on the needs of the research team. The logic model was minimally modified to include the participants more integrally in the process, based on partner feedback. This included adding language around implementing focus groups with the target population in the assessment stage, incorporating target population feedback in the planning stage, and adding participant satisfaction to the list of topics to be tracked in the implementation stage.

Recommendations

The following recommendations are made based on community partner feedback and research on opioid addiction and food insecurity:

1. A mobile intervention has the potential to be particularly well suited to addressing the issue of food insecurity in households impacted by opioid addictions in a rural state like Vermont. Thanks to Vermont's Hub and Spoke model for opioid addiction treatment, clinics are well positioned throughout the state to serve as mobile food pantry locations.
2. The particular characteristics of the population should be taken into account when designing the intervention. Things like cooking knowledge, access to cooking tools, taste preferences, ability to chew fibrous or tough foods, and reading level should all be considered in the design. For example:
    a. Including as much fruit as possible, and a selection of sweeter vegetables to appeal to the heightened sweet cravings individuals receiving addiction treatment might experience.
    b. Including produce that can be prepared with minimal kitchen tools, in the microwave, or even without access to a kitchen.
    c. Incorporating basic cooking lessons, recipes, or tastings to help familiarize participants with new or unfamiliar ingredients.
3. Focus groups should be utilized before intervention design is complete to gain initial insight into how a mobile food pantry distributing fruits and vegetables might be received by the population.
4. Program evaluation and data collection should be, as much as possible, brief, visual, no higher than a 6th grade reading level, and focused on the main goals of the intervention. According to the potential community partners, these goals include food security status, fruit and vegetable consumption, and impact on eating behavior.
5. The needs and capacities of community partners should also be a central component to the design. Suggestions from community partners interviewed include:
    a. Holding the mobile food pantries outside of the clinic to minimize burden on the clinic staff
    b. Establishing the scale of food distribution, and staffing/funding contributions of the partner(s) running the mobile food pantry
    c. Discussing the goals of the research project thoroughly with community partners, especially as it impacts implementation and evaluation
    d. Maintaining open and frequent communication through differences in academic and community partner schedules, especially where semester and grant cycles might delay progress
6. Participants should be included as a more central part of the logic model to help inform the design of the intervention taking into account their particularly needs and challenges (see Appendix B for modified logic model).

Conclusion:

The opioid crisis is a well-known threat to the health of Vermonters and much work has been done to develop a statewide network of addiction treatment facilities. Nutrition and food insecurity are a prevalent but often overlooked and underserved portion of health concerns for individuals and family members facing opioid addiction. This assessment explored the need for a mobile pantry program providing free fruit and vegetables to households impacted by opioid addiction in Chittenden County. While programs and partnerships currently exist to help increase access to addiction treatment and food separately, there has been limited but successful overlap between these efforts. Hunger and nutrition interventions designed to serve Vermont households impacted by opioid addiction specifically have the potential to bridge this gap and increase nutritious food access in this population. Interventions designed specifically with this population in mind are especially important in understanding and addressing any food access barriers they might face, such as access to cooking supplies and appliances. Mobile interventions in particular have the potential to reach otherwise underserved populations, and would fit in well with the Hub and Spoke addiction treatment model that exists to maximize the geographic reach of addiction services in the rural state of Vermont.

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Appendix A: Proposed Survey

Proposed survey and logic model to be sent to interviewees for feedback.

This survey will be administered to users of the proposed mobile food bank to collect information on eating and food shopping habits, fruit and vegetable consumption, and mobile food bank preferences.

Farmers Market Survey

Section 1[a]: Please indicate the degree to which you agree or disagree with the following statements.
Circle the number that matches how much you agree or disagree with the statements below (circle one answer per row).

Disagree	***Mildly Disagree***	***Neutral/uncertain***	***Mildly Agree***	***Agree***	***N/A***
1. It is easy for me to eat fruits and vegetables.					
1	**2**	**3**	**4**	**5**	**N/A**
2. I do not have time to prepare fruits and vegetables					
1	**2**	**3**	**4**	**5**	
3. I do not know how to prepare fruits and vegetables					
1	**2**	**3**	**4**	**5**	**N/A**
4. I do not have transportation to place where I can get fruits and vegetables					
1	**2**	**3**	**4**	**5**	
5. It costs too much money to buy fruits and vegetables					
1	**2**	**3**	**4**	**5**	**N/A**
6. I do not like fruits					
1	**2**	**3**	**4**	**5**	
7. I do not like vegetables					
1	**2**	**3**	**4**	**5**	**N/A**
8. My family does not like fruits					
1	**2**	**3**	**4**	**5**	
9. My family does not like vegetables					
1	**2**	**3**	**4**	**5**	**N/A**

Section 2[b]: Please indicate how easy or hard it would be for you to adopt or maintain the following practices.
Circle the number that matches how much you agree or disagree with the statements below (circle one answer per row)..

Very difficult	***Mildly difficult***	***Neutral/uncertain***	***Mildly easy***	***Very Easy***
1. Buy more fruits and vegetables than you normally do the next time you shop.				
1	**2**	**3**	**4**	**5**
2. Work more fruits and vegetables than you normally do into meals for yourself and you family.				
1	**2**	**3**	**4**	**5**
3. Cook vegetables in a way that is appealing to your family.				
1	**2**	**3**	**4**	**5**
4. Try vegetables that you have not eaten before.				
1	**2**	**3**	**4**	**5**
5. Prepare and cook new recipes.				
1	**2**	**3**	**4**	**5**

Section 3:

1. Where do you do the majority of your shopping (circle one answer). [c]

a. Supermarket b. Supercenter c. Small grocery store

d. Farmers market e. Other: _____

2. How often do you shop for groceries (circle one answer)? [c]

a. Less than once a week b. Once a week c. More than once a week

3. How do you get to the store to shop for groceries? [c]

a. Your own car b. Active travel (i.e. walking or biking)

c. Public transportation d. Traveling with a friend or borrowing a car

e. Other: _____

4. Approximately how many cups of fruits and vegetables to you eat a day? _____
5. Which of the following food stores exist within a mile of your home? (Please circle all that apply)

a. Convenience stores b. Grocery stores c. Supermarkets

d. Supercenters e. Farmers' Market

6. If a service where a truck brought a selection of free fresh produce to a convenient central location every week was offered to you, what would be a good location? (Please select all the apply) [e]

a. Local school b. Local library c. Local post-office d. Town hall
e. Other: _____

7. What fruits and/or vegetables would you be interested in getting at a mobile market?

_____
_____
_____

8. Would you be interested in getting minimally processed produce (e.g. chopped veggies, ready to eat salad greens) from the mobile grocery program as well (circle one answer)?
   a. Yes b. No

9. Please take this space to share any other thoughts you have about the development of a new mobile market program.

_____
_____
_____
_____
_____
_____

Section 5:

1. Sex (circle one answer)
    a. Female
    b. Male
    c. Other
2. Age (circle one answer)
    a. 18 – 29
    b. 30 – 39
    c. 40 – 49
    d. 50 – 59
    e. 60 or over
3. What race and/or ethnicity do you identify with (circle as many as apply)
    a. American Indian or Alaskan Native
    b. Asian
    c. Black/African America
    d. Hispanic/Latino
    e. Native Hawaiian or Other Pacific Islander
    f. White/Caucasian
    g. Multiple race or ethnicity
    h. Other: _____
4. Including yourself, how many people are in your household (circle one answer)?
    - 1 member
    - 2 members
    - 3 – 4 members
    - 5 – 6 members
    - More than 6 members
5. In your household, do you have… (circle one answer)
    - At least one child (under 18)
    - At least one senior (60 or over), no children
    - At least one child and at least one senior
    - No children or seniors

6. What was your household's annual income in the past year (circle one answer)?
    a. $0
    b. $10,000 or less
    c. $10,001 -$20,000
    d. $20,001 - $30,000
    e. $30,001 -$40,000
    f. $40,001 - $50,000
    g. More than $50,000

Thank you so much for taking the time to fill out this survey!

[a]: Adapted from Leone, L. A., Tripicchio, G. L., Haynes-Maslow, L., McGuirt, J., Grady Smith, J. S., Armstrong-Brown, J., … Ammerman, A. S. (2018). A Cluster-Randomized Trial of a Mobile Produce Market Program in 12 Communities in North Carolina: Program Development, Methods, and Baseline Characteristics. *Journal of the Academy of Nutrition and Dietetics*. https://doi.org/10.1016/j.jand.2018.04.010

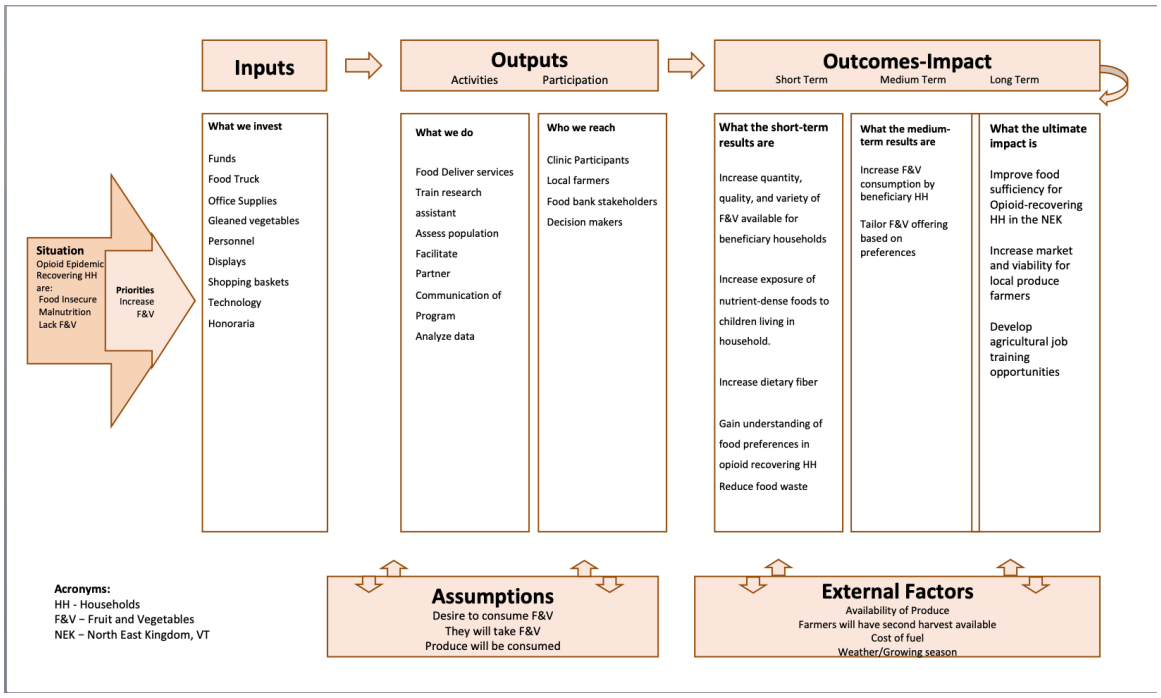
[b]: Adapted from: Anderson, E. S., Winett, R. A., & Wojcik, J. R. (2000). Social-cognitive determinants of nutrition behavior among supermarket food shoppers: a structural equation analysis. *Health Psychology: Official Journal of the Division of Health Psychology, American Psychological Association*, *19*(5), 479–486.

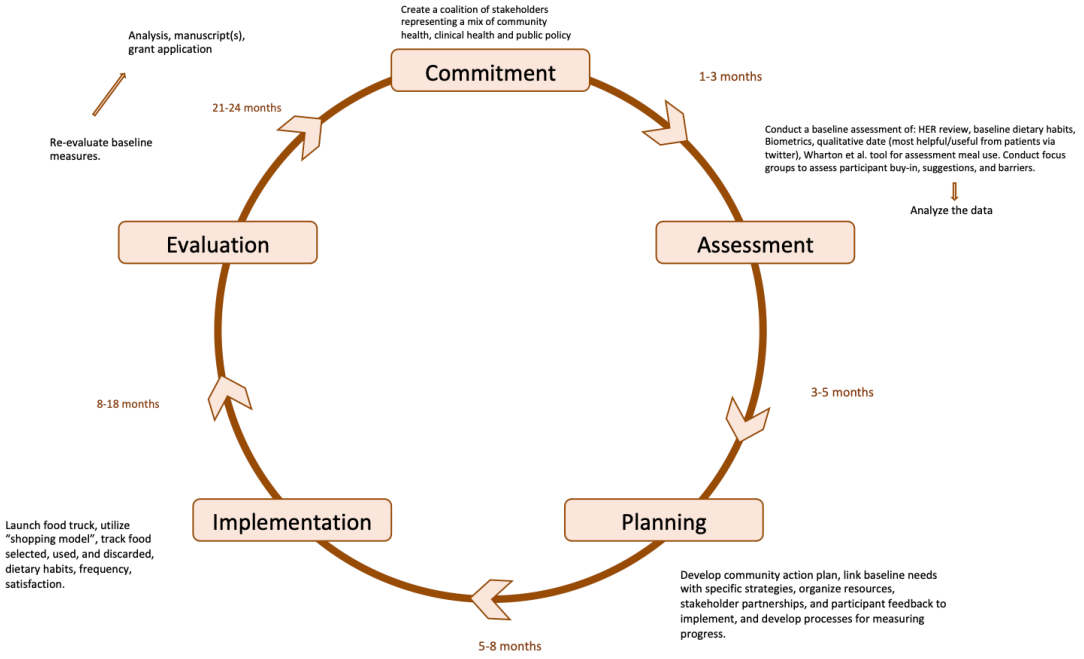
[c]: Adapted from Green, S. H., & Glanz, K. (2015). Development of the Perceived Nutrition Environment Measures Survey. *American Journal of Preventive Medicine*, *49*(1), 50–61. https://doi.org/10.1016/j.amepre.2015.02.004

[d]: Adapted from National Health and Nutrition Examination Survey NHANES 2015-2016, Flexible Consumer Behaviour Survey (FCBS) Module, CDC, December 2014

[e]: MacMillan Uribe, A. L., Winham, D. M., & Wharton, C. M. (2012). Community supported agriculture membership in Arizona. An exploratory study of food and sustainability behaviours. *Appetite*, *59*(2), 431–436. https://doi.org/10.1016/j.appet.2012.06.002

Appendix B: Modified Logic Model





Based on the ACHIEVE Model - CDC