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Decreasing Rates of Obesity in Onondaga County Among Older Adults

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RUNNING HEAD: DECREASING RATES OF OBESITY IN ONONDAGA COUNTY
AMONG OLDER ADULTS

Decreasing Rates of Obesity in Onondaga County Among Older Adults

State University of New York College at Cortland

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Introduction

An investigation into the health and wellness status of Onondaga County was conducted in the Fall of 2019. Located in the Central New York region, the county is home to 19 towns and 15 villages with the largest city being Syracuse which holds the focus for many recreational and business activities (New York State, 2018; Onondaga County, 2019). Onondaga County is approximately 35 miles long and 30 miles wide providing 6,500 acres of land (Onondaga County, 2019). The county's largest employer is a medical school called Upstate Medical University and is a world-class research center. The second largest employer is Syracuse University which is known for enrolling nationally ranked athletes and is the only college campus in the United States to have an on-campus domed stadium (Onondaga County, 2019).

The data in the investigation showed a need for additional strategies for improving the overall health of county residents (HealthCNY, 2019a). Compared to New York State, Onondaga County showed higher mortality rates due to illnesses and a substantial increase in obesity rates (New York State Department of Health, 2016b, 2018). This resulting paper will focus on the rates of obesity among older adults aged 50 years old and older living in Onondaga County and propose a program to address that health issue.

The Precede-Proceed model served as the foundation for the *Live Right* needs assessment, intervention, and evaluation. The Precede-Proceed model helps program planners understand that health and behaviors are the direct result from the interactions of multiple factors such as the environment and genetic makeup and provides guidance for a potentially effective intervention (Hodges & Videto, 2011).

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Phases one through four of the Precede-Proceed model are used to conduct the needs assessment followed by phases five through eight which addresses program implementation and evaluation (Hodges & Videto, 2011). Phase one examines the social assessment of the county investigating demographics and social indicators (Hodges & Videto, 2011). Phase two is the epidemiological, behavioral, and environmental assessment which describes the health status of the county. Phase three is the educational and ecological assessment which identifies the predisposing, reinforcing, and enabling factors that contribute to obesity, as well as choosing which theory will best guide the intervention. Phase four is the administrative and policy assessment which will describe the entire intervention. There are four additional phases within the model that consist of the implementation and evaluation processes. Implementation involves designing an intervention utilizing the best resources to appropriately fit the needs of the priority population. To then assess the intervention, three evaluation designs are included. There are process, impact, and outcome evaluations. Process evaluations are conducted throughout the intervention to determine if the intervention is reaching the desired goal or goals. Impact evaluations are conducted at the end of the intervention to indicate the change. Outcome evaluations are conducted either months or years after the intervention ends to identify if there will be an increase or decrease in the prevalence or incidence rates among the priority population (Hodges & Videto, 2011).

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Phase 1: Social Assessment of Onondaga County

Demographics

There are 464,140 people living in Onondaga County and of those people 78.42% are White, 11.59% are Black or African American, 5.18% are Hispanic or Latino, and 4.18% are Asian (HealtheCNY, 2019a). The majority of people living in Onondaga County, 13.92%, are between the ages of 55 and 64 followed by 13.06% of people between the ages of 25 and 34. There are also more females than males in the county, with females making up 51.71% of the population and males making up 48.29% of the population. Onondaga County's findings were compared to New York State data. In New York State there are 19,903,676 residents and 62.72% are White, 15.94% are Black or African American, 19.58% are Hispanic or Latino, and 8.97% are Asian (HealtheCNY, 2019a). Chart 1 and Chart 2 show the differences in percentages across all races and ethnicities between Onondaga County and New York State.

Chart 1

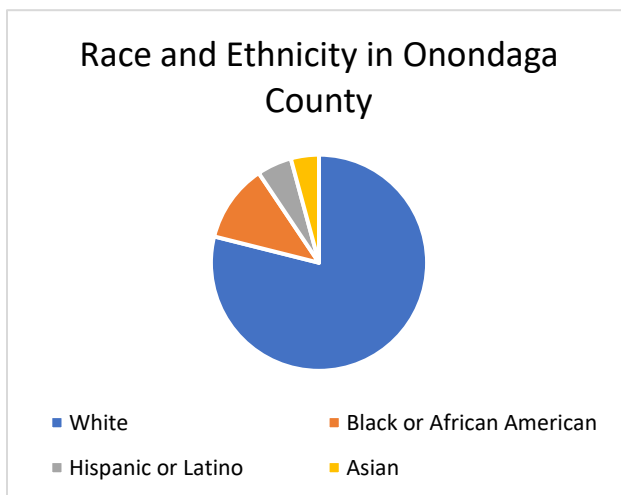
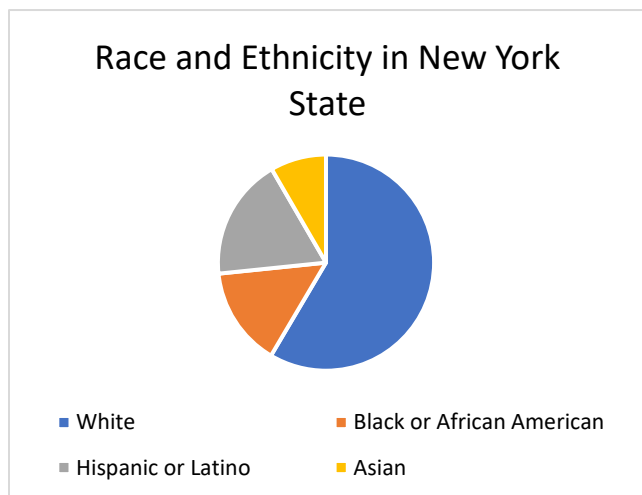


Chart 2



Source: HealtheCNY. (2019).

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The age difference in New York State is the opposite of the age difference in Onondaga County (HealthCNY, 2019a). The majority of people in New York State, 14.45%, are between the ages of 25 and 34 followed by 13.23% being between the ages of 55 and 64. Like in Onondaga County, there are more females than males in New York State with females making up 51.41% of the population and males making up 48.59% of the population (HealthCNY, 2019a).

The rate of homeownership in Onondaga County in 2017 was 68.5% compared to 51.1% in New York State (Federal Reserve Bank of St. Louis, 2019a, 2019b). The high school graduation rate between Onondaga County and New York State showed a minor difference. In Onondaga County the high school graduation rate was 84% of the 2016-2017 school year and 72% of people from the years 2013-2017 attended some college afterwards (County Health Rankings and Roadmaps, 2019). In New York State the 2016-2017 high school graduation rate was 82% and 68% of people from the years 2013-2017 attended some college afterwards (County Health Rankings and Roadmaps, 2019). The data from Onondaga County showed a higher education level when compared to the level in New York State.

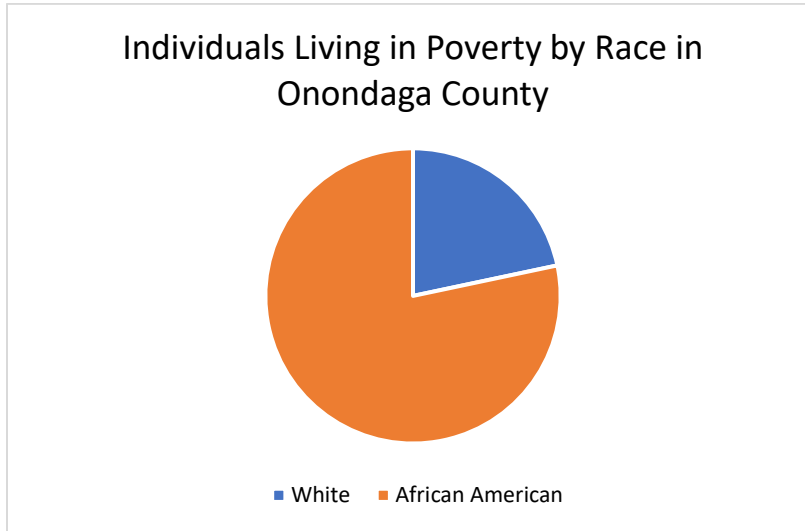
The rate of unemployment as of July 2019 in Onondaga County was 3.8% and for New York State it was 4.0 percent (Bureau of Labor Statistics, 2019a, 2019b). The county data showed a slight decrease compared to the state's data on unemployment rates. The socioeconomic status or poverty rates for individuals living in Onondaga County was 14.9% in 2019 (New York State Community Action Association, 2019). Data showed a difference among race and poverty with 37.2% of African Americans living in poverty compared to 10.3% of whites. The poverty rate for individuals living in New York State in 2019 was 15.1%, just

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slightly higher than the county data (New York State Community Action Association, 2019).

Chart 3 shows the differences in poverty rates related to race in Onondaga County.

Chart 3



Source: New York State Community Action Association. (2019).

Social Indicators

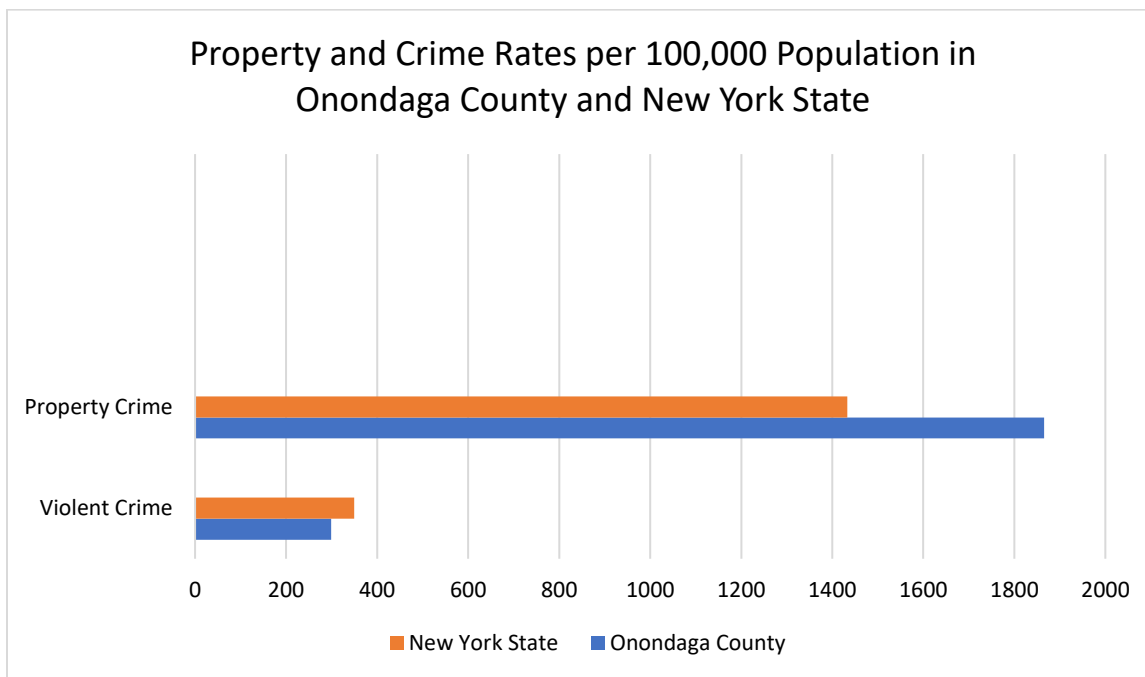
The measurements used to determine the well-being of individuals living in a community are called social indicators (National Oceanic and Atmospheric Administration, n.d.). There are multiple social indicators investigated in order to entirely describe a whole community (National Oceanic and Atmospheric Administration, n.d.). The following five social indicators in Onondaga County and New York State are strongly correlated with determinants of health outcomes (HealtheCNY, 2019c). Higher rates or values are known to show a higher socioeconomic need (HealtheCNY, 2019c).

Crime rates. The rate of violent crime per 100,000 people in 2018 in Onondaga County was 298.7 compared to New York State's rate of 349.5 (New York State Division of Criminal

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Justice Services, 2018). The rate of property crime per 100,000 people in 2018 in Onondaga County was 1,865.8 compared to New York State's rate of 1,433. Chart 4 compares violent crime rates and property crime rates between Onondaga County and New York State, showing that property crime rates were higher in Onondaga County and violent crime rates were higher in New York State (New York State Division of Criminal Justice Services, 2018).

Chart 4



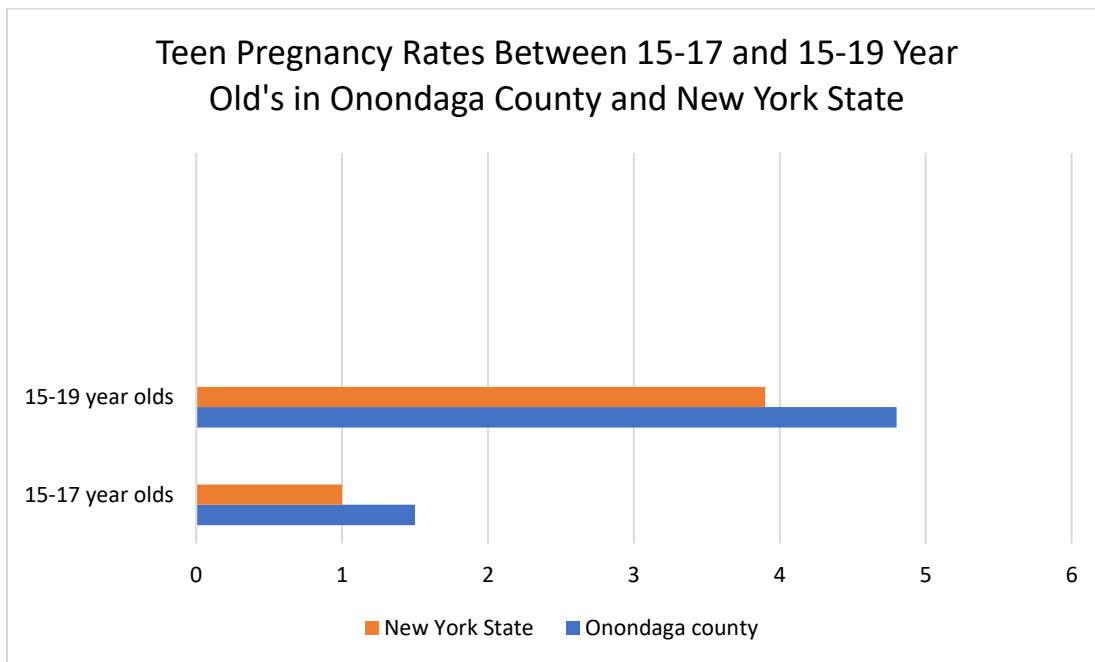
Source: New York State Division of Criminal Justice Services. (2018).

Child Abuse/Maltreatment. For children aged 0-17 years the rate of reported child abuse or maltreatment in Onondaga County was 19.0% in 2017 (New York State Kid's Well-being Indicators Clearinghouse, 2019). In New York State the rate of child abuse or maltreatment was 17.1% in 2017. The rate of child abuse was higher in Onondaga County than New York State in 2017 (New York State Kid's Well-being Indicators Clearinghouse, 2019).

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Teen Pregnancy. In 2016, the rate of teen pregnancy for teenagers aged 15 to 17 was 1.5% in Onondaga County compared to 1.0% in New York State (New York State Department of Health, 2019d). The rate of teen pregnancy in teenagers aged 15 to 19 was 4.8% in Onondaga County compared to 3.9% in New York State. Between both age groups the rate of teen pregnancy in Onondaga County was higher than the state rate. Chart 5 compares teen pregnancy rates between 15-17-year old's and 15-19-year old's in Onondaga County and New York State, proving that both rates are higher in Onondaga County (New York State Department of Health, 2019d).

Chart 5



Source: New York State Department of Health. (2019d).

Poor Mental Health Days. In 2016, 9.1% of residents living in Onondaga County had reported poor mental health for at least 14 days per month (HealtheCNY, 2019b). In New York State, the percentage of adults who reported poor mental health for at least 14 days per month

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was 10.7% for the same year. In 2016, the rate of poor mental health days for at least 14 days per month was higher in New York State than in Onondaga County (HealtheCNY, 2019b).

Severe Housing Problems. Housing reports were issued if one of four of the following problems existed: overcrowding, high housing costs, lack of kitchen facilities, or lack of plumbing facilities (County Health Ranking and Roadmaps, 2019). The percentage of households in Onondaga County with reported severe housing problems was 15% compared to 24% of households in New York State (County Health Rankings and Roadmaps, 2019). The percentage of households in Onondaga County suffering from severe housing problems is almost 10% less than the number of households suffering from housing problems in New York State.

Discussion and Conclusion

Data suggests that the health status of Onondaga County has negative rates in three out of the five social indicators investigated. Onondaga County did show higher rates for property crime, child abuse, and teen pregnancy among young adults compared to the New York State data (see Charts 4 and 5; New York State Kid's Well-being Indicators Clearinghouse, 2019). Based on the social indicator data that was included in this report, it is possible that the individuals in Onondaga County have a poorer quality of life. Quality of life refers to an understanding that people who have their needs met, and are free from barriers keeping them from being happy, will get more enjoyment out of life (Hodges & Videto, 2011).

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Phase 2: Epidemiological Assessment

Health Status of Onondaga County, New York

After an investigation of the health priorities in Onondaga County, research concludes that the mortality rates are generally higher when compared to New York State (New York State Department of Health, 2018). When compared to the United States, Onondaga County shows slightly lower mortality rates (Heron, 2019; New York State Department of Health, 2018). The top nine communicable disease reported prevalence cases in Onondaga County in 2017 are the same compared to New York State's top nine communicable disease reported prevalence cases in 2017 except three (New York State Department of Health, 2017a). Chronic disease rates are also compared between Onondaga County, New York State, and the United States. Obesity is one chronic disease that shows higher rates in Onondaga County than New York State and the United States (Centers for Disease Control and Prevention, 2019; New York State Department of Health, 2016b). Finally, in this section, injury incidence data is compared between Onondaga County, New York State, and the United States as well.

Mortality. Heart disease is the leading cause of death in Onondaga County, New York State, and the United States (Centers for Disease Control and Prevention, 2017a; Heron, 2019; New York State Health Department, 2018). The mortality rates for Onondaga County per 100,000 population are as follows, heart disease 166.2, cancer 155.4, unintentional injury (UI) 55.1, chronic lower respiratory disease (CLRD) 35.8, stroke 29.1, influenza and pneumonia 18.9, and Alzheimer's disease 17.1 (New York State Health Department, 2018).

The mortality rates for New York State per 100,000 population are as follows, heart disease 171.2, cancer 141.2, UI 35.5, CLRD 28.9, stroke 24.6, influenza and pneumonia 17.7,

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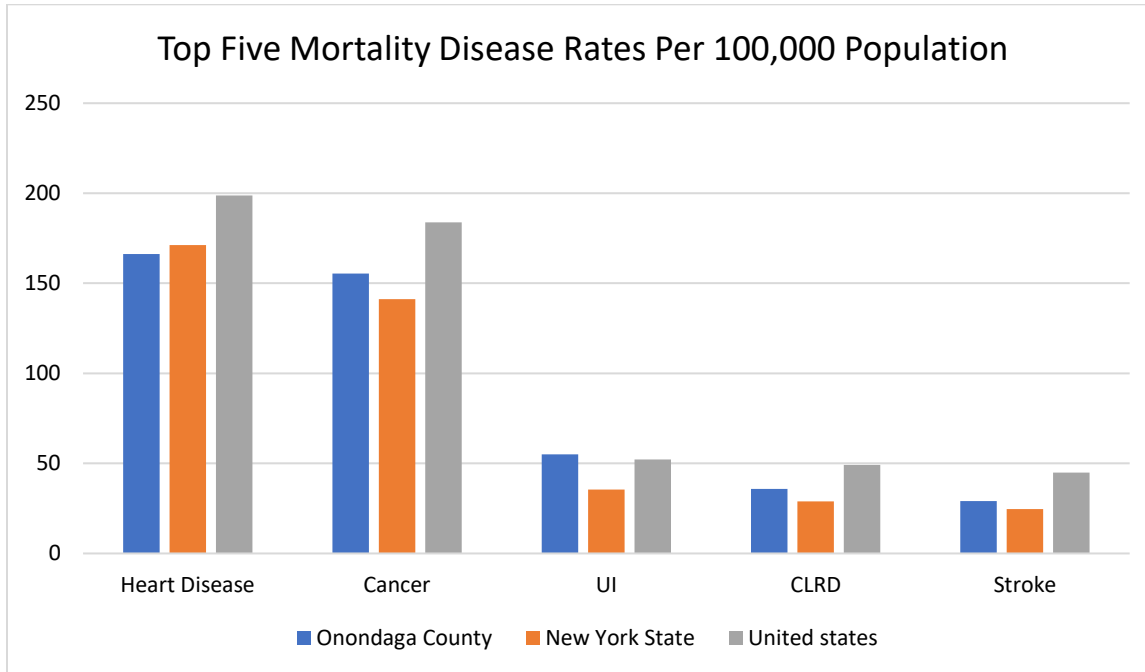
diabetes 16.8, and Alzheimer's disease 13.2 (Centers for Disease Control and Prevention, 2017a).

The mortality rates for the United States per 100,000 population are as follows, heart disease 198.8, cancer 183.9, UI 52.5, CLRD 49.2, stroke 44.9, Alzheimer's disease 37.3, diabetes 25.7, and influenza and pneumonia 17.1 (Heron, 2019).

The top five leading causes of mortality are the same across all three locations, Onondaga County, New York State, and the United States (Centers for Disease Control and Prevention, 2017a; Heron, 2019; New York State Health Department, 2018). Heart disease mortality rates in Onondaga County is the only disease out of the five that showed a lower rate when compared to New York State (Centers for Disease Control and Prevention, 2017a; New York State Health Department, 2018). Onondaga County showed higher rates for all other diseases when compared to New York State. Chart 6 shows the rates between the top five leading causes of mortality in Onondaga County, New York State, and the United States.

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Chart 6



Source: Centers for Disease Control and Prevention. (2017a). Heron. (2019). New York State Health Department. (2018).

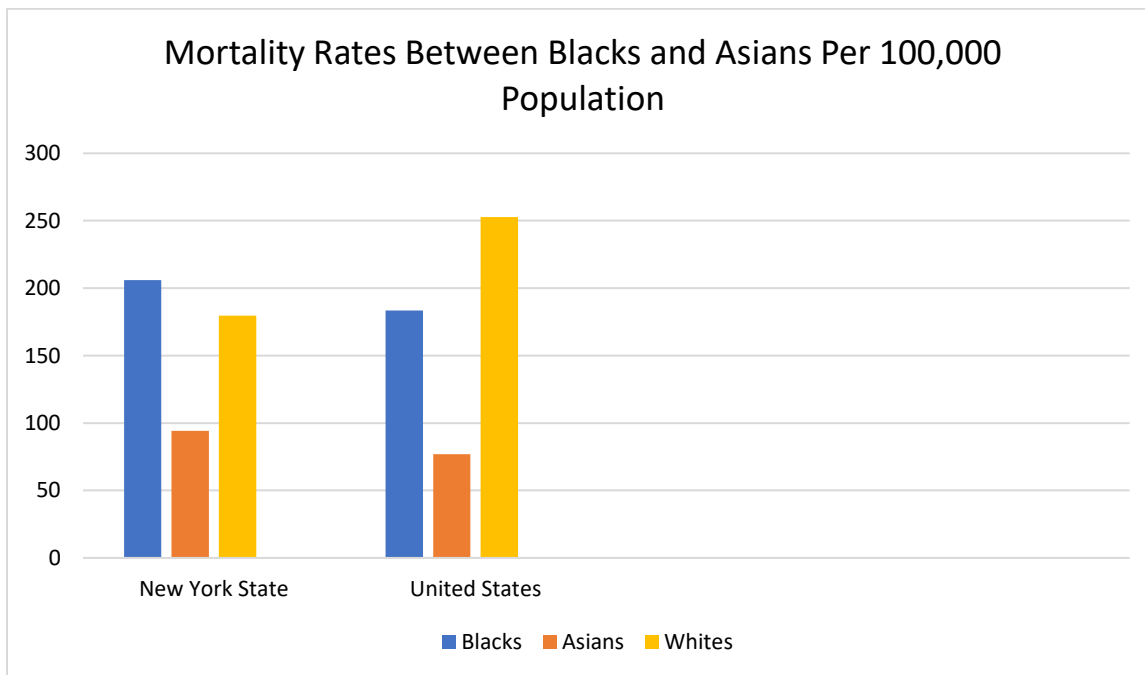
The rate of heart disease in Onondaga County in males is 218.4 per 100,000 population and in females it is 126.7/100,000 population (New York State Department of Health, 2018). In New York State the rate of heart disease in males is 220.4/100,000 population and in females it is 143.2/100,000 population (Centers for Disease Control and Prevention, 2017a). Heart disease in males is almost double the rate as it is in females.

Race in New York State and the United States is another notable health disparity. The mortality rate for heart disease in Blacks living in New York State is 206/100,000 population compared to Whites of 179.7/100,000 population and Asians of 94.2/100,000 population (New York State Department of Health, 2018). The mortality rate in Blacks is more than double the

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mortality rate compared to Asians. The mortality rate in Blacks is also higher than the mortality rate for Whites. Blacks living in the United States have a mortality rate from heart disease of 183.4/100,000 population compared to Whites of 252.7/100,000 population and Asians of 76.8/100,000 population (Heron, 2019). Again, the mortality rate in Blacks is more than doubled the mortality rate of Asians. Nationally, Blacks show a lower mortality rate from heart disease than Whites. Chart 7 shows the differences in heart disease mortality rates between Blacks, Whites, and Asians in New York State and the United States.

Chart 7



Source: Heron. (2019). & New York State Department of Health. (2018).

Communicable diseases. The top nine reported cases of communicable diseases in 2017 in Onondaga County with the number of cases reported were influenza (2,698 cases), chlamydia (2,684 cases), gonorrhea (773 cases), hepatitis C (464 cases), mumps (158 cases), Lyme disease

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(128 cases), campylo-bacteriosis (84 cases), hepatitis B (74 cases), and salmonellosis (66 cases) (New York State Department of Health, 2017a).

The top nine reported cases of communicable diseases in 2017 in New York State with the number of cases reported were chlamydia (116,843 cases), influenza (67,427 cases), gonorrhea (34,111 cases), hepatitis C (12,227 cases), Lyme disease (9,803), hepatitis B (8,813 cases), syphilis early (6,273 cases), campylo-bacteriosis (4,183 cases), and syphilis late (3,596 cases) (New York State Department of Health, 2017a).

Almost all nine top communicable diseases were the same in both locations except syphilis late, salmonellosis, and mumps. Chlamydia showed high rates in the United States as well with a rate of 528.8 per 100,000 population or 1,708,569 cases reported in 2017 (Centers for Disease Control and Prevention, 2018). The health disparities of chlamydia were most common between genders. In females in New York State the rate of reported chlamydia is 726.1 per 100,000 population compared to the male rate of 470.9/100,000 population (New York State Department of Health, 2017b). In Onondaga County the rate of reported chlamydia cases in females is 746.8/100,000 population compared to the male rate of 392.8/100,000 population (New York State Department of Health, 2017b).

Chronic Diseases

New York State. Some common chronic diseases in adults in New York State are diabetes, arthritis, obesity, and cardiovascular diseases such as high blood pressure/hypertension, angina, coronary heart disease, and heart attack (New York State Department of Health, 2019a). About 10.5% of adults in New York State were diagnosed with diabetes and with the prevalence highest among Blacks compared to Whites. The prevalence in Blacks was 13.8% compared to

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Whites at 8.8 percent. The percentage of those with diabetes was highest among adults making an annual household income of less than \$15,000 and lowest among adults with an annual household income of \$75,000 or more. A total of 18.3% of adults making an annual household income of less than \$15,000 reported having diabetes whereas 6.4% of adults making an annual household income of \$75,000 or more reported having diabetes. Health disparities are more common in adults living in a low income household as opposed to living in a high income household (New York State Department of Health, 2019a).

Arthritis in older white females showed greater prevalence than any other demographic group (New York State Department of Health, 2019a). The percentage of adult females with arthritis was 27.7% and 19.3% in males. Arthritis in females is almost 9% greater than arthritis diagnosed in males. Whites made up 28.5% of total diagnoses compared to Blacks making up 19.8% and Hispanics making up 16.8 percent. The population of 75 years or older showed the highest percentage out of all other age groups. A total of 54.9% of diagnoses were in the 75+ age group and a total of 7% were in the 18-44 age group. Household income level showed no relation to an increase or a decrease in diagnoses. Educational levels showed differences in data between arthritis diagnoses. A total of 27.1% of arthritis diagnoses were people who did not graduate high school, and 19.1% of diagnoses were people who graduated from college or technical school. Arthritis is more prominent in older white females and in people who show a lower educational level (New York State Department of Health, 2019a).

The prevalence of obesity is 25.5% in New York State and it is 32% in Onondaga County (New York State Department of Health, 2016b). Obesity in Onondaga County is 6.5% higher than the State rate. Obesity in New York State between males and females showed no distinct relationship (New York State Department of Health, 2019a). Percentages of obesity in adults by

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age group showed differences between the younger population and the older population. The lowest percentage of obesity was 12.3% in 18-24-year old's, and the highest percentage was 31.7% in 55-64-year olds. Differences in educational levels showed obesity was more common in people who did not graduate from high school, 33.3% of population, and less common in people who graduated college, 18.7% of population (New York State Department of Health, 2019a).

The total percentage of adults with diagnosed high blood pressure/hypertension is 29.4% and is highest among populations with diabetes (New York State Department of Health, 2019a). About 67.2% of adults with diagnosed high blood pressure also have diabetes. High blood pressure also shows disparities within racial and ethnic groups and age. High blood pressure in Blacks showed a percentage of 40.1% compared to 27.4% in Hispanics. High blood pressure diagnoses are highest among adults aged 65+ making up 55.6% of diagnoses and 7.8% of diagnoses in adults aged 18-24 years. The range of diagnosed high blood pressure between age groups shows a greater increase the older a person gets (New York State Department of Health, 2019a).

Total self-reported percentages of heart attack, coronary heart disease, and angina combined was 5.9 percent (New York State Department of Health, 2019a). Differences were shown between male and females with 7.3% of males who reported having a heart attack, CHD, or angina compared to 4.5% of females who reported having the same conditions. Annual household income in relationship to these conditions also showed differences ranging from 3.4% to 8.6 percent. A total of 8.6% adults making an annual household income of less than \$15,000 reported having these conditions. A total of 3.4% of adults making an annual household income

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of \$75,000 or more reported having these conditions (New York State Department of Health, 2019a).

United States. The percentage of adult diabetes in the United States is exactly 1% less than in New York State (Centers for Disease Control and Prevention, 2019b). Total national diabetes diagnoses among adults is 9.5 percent. Compared at a national level, diabetes diagnoses are still highest in lower income families and lowest in higher income families. With a family income of less than \$35,000, the diabetes prevalence is 13.4% and with a family income of \$75,000-99,999, the percentage is 7.8 percent (Centers for Disease Control and Prevention, 2019b).

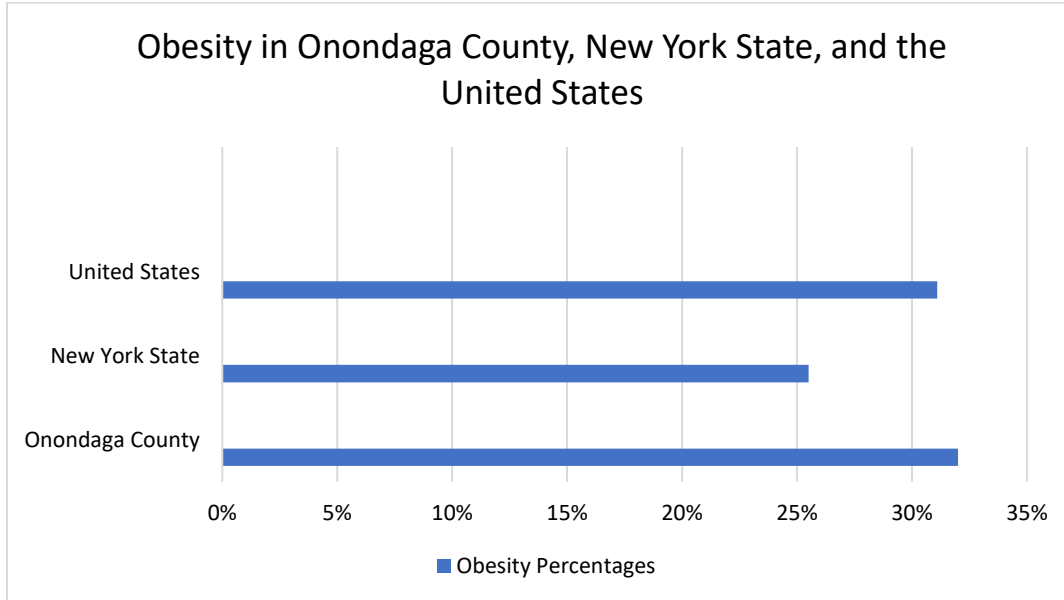
Arthritis at the national level is still more common in females than males. Total female diagnoses make up 23.7% compared to 18.9% of total male diagnoses (Centers for Disease Control and Prevention, 2019b). Racial group differences at the national level are not as distinct compared to the State level. The total national percentage of arthritis in Whites made up 22%, Blacks made up 21% and Hispanics made up 16.8 percent. Age again showed a difference in arthritis diagnoses. A total of 7% of diagnoses were reported in the age group 18-44 years and a total of 53.7% of diagnoses were reported in the age group 75 years or older. No correlation between arthritis and education level was found at the national level (Centers for Disease Control and Prevention, 2019b).

Total national obesity diagnoses made up 31.1% of the adult population (Centers for Disease Control and Prevention, 2019b). Onondaga County showed the highest percentage of obesity between the State and national data. Obesity between gender nationally showed no distinct relationship. Compared to the State data, obesity level does not show as great of a

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distinction in age group like the State level did. Nationally, a total of 29.2% diagnoses were in 18-44-year old's and 33.5% of diagnoses were of the 65-74-year old age group. When comparing obesity within racial groups between New York State and the United States, data show the percentages are higher among Blacks than Whites (Centers for Disease Control and Prevention, 2019b; New York State Department of Health, 2016b). Data also showed differences in educational levels. People who did not graduate from high school made up 37.3% of the population with obesity and people containing a bachelor's degree or higher made up 24.5% of the population with obesity (Centers for Disease Control and Prevention, 2019b). Chart 8 shows the relationship between obesity levels in Onondaga County, New York State, and the United States.

Chart 8



Sources: Centers for Disease Control and Prevention. (2019b). & New York State Department of Health. (2016b).

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Compared to New York State data, adults in the United States showed lower percentages of diagnosed high blood pressure (Centers for Disease Control and Prevention, 2019b). The total percentage of adults with diagnosed high blood pressure in the nation was 24.8% and is more prominent among Blacks than Hispanics and Whites. Blacks make up 32.2% of diagnosed high blood pressure, Hispanics make up 23.7%, and Whites make up 23.9% of diagnosed high blood pressure. The older a person gets, the more likely they are to be diagnosed with high blood pressure. In 18-24-year old's the percentage of diagnosed high blood pressure was 8.8% and ranges to 61.1% in adults aged 75 and older. High blood pressure among educational levels showed greater differences. In adults who did not graduate high school, the percentage of diagnosed high blood pressure was 32.1% and it was 22.7% in adults who had a bachelor's degree or higher (Centers for Disease Control and Prevention, 2019b).

Injuries. The top nine emergency department visits due to injuries in New York State are unintentional falls 29%, being struck by or against 12%, overexertion 8%, cut/pierce 8%, motor vehicle traffic (MVT) occupant 7%, assault 6%, natural/environmental 5%, poisoning 1%, and non-traffic pedal cyclist 1% (New York State Department of Health, 2016a). The highest hospitalization unintentional fall rate in New York State by age and gender is of the female 85+ group showing a rate of 4,175.4 per 100,000 population (New York State Department of Health, 2014). The second highest hospitalization unintentional fall rate in New York State by age and gender is of the male 85+ group showing a rate of 2,785/100,000 population (New York State Department of Health, 2014).

The top seven emergency department visits due to injuries in the United States are unintentional falls 23%, being struck by or against 13%, MVT 8.1%, cut/pierce 5.2%,

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natural/environmental 4%, overexertion 0.7%, pedal cyclist 0.6%, and hot objects 0.5%

(National Hospital Ambulatory Medical Care Survey, 2016).

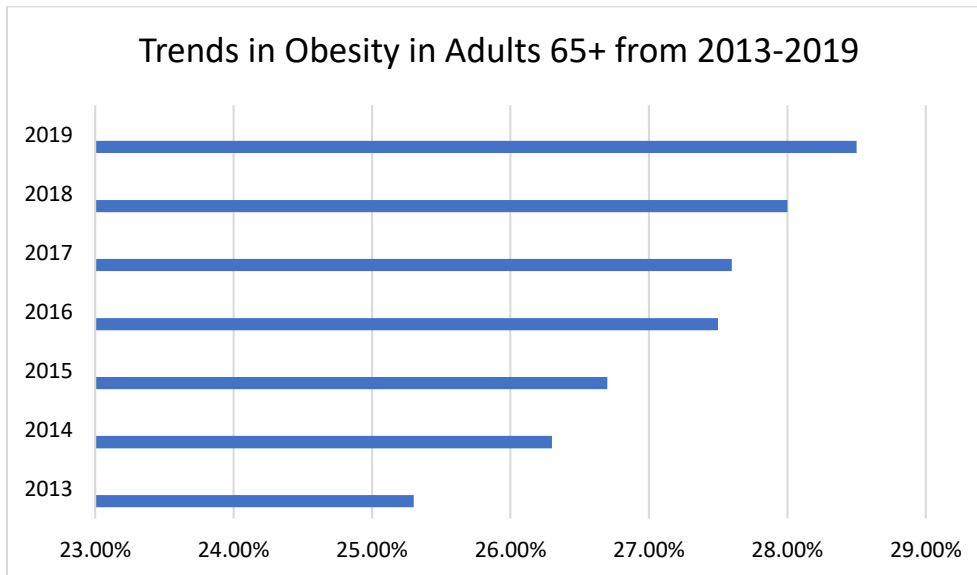
Falls and being struck by or against are the main causes of emergency department visits due to injuries for New York State and the United States. In New York State, the rate of hospitalizations due to falls increased 119 times in females from age 25-34 to 85+ (Bureau of Occupational Health and Injury Prevention, 2014). The rate of falls in females aged 25-34 was 35.2 per 100,000 population and the rate of falls in females aged 85+ was 4,175.4/100,000 population (New York State Department of Health, 2014).

Behavior, Environmental, and Genetic Factors for Obesity Among Older Adults

Obesity is the result of chronic imbalance in someone who consumes more calories than needed to power their body's metabolic and physical functions (Centers for Disease Control and Prevention, 2013). Currently, obesity and being overweight are the second leading causes of preventable deaths in the United States (New York State Department of Health, 2019e). The prevalence of obesity in United States adults aged 40-59 was 42.8%, outnumbering all other adult age groups (Hales, 2017). Obesity trends are continuing to increase in the 65+ age group (America's Health Rankings, 2019). Chart 9 shows the trends in obesity in adults aged 65 years and older from 2013 to 2019 (America's Health Rankings, 2019).

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Chart 9



Source: America's Health Rankings. (2019).

The behaviors that directly contribute to obesity are physical inactivity and poor nutrition (New York State Department of Health, 2019b). The New York State Prevention Agenda provides statistics among New York State adults who participate in leisure time physical activity, adults who do not consume daily fruits and vegetables, and adults who consume sugar-sweetened beverages. The percentage of adults who participate in leisure time physical activity is 73.7 percent. The percentage of adults who do not consume fruits and vegetables daily is 31.2 percent. The percentage of adults who consume at least one sugar-sweetened beverage daily is 23.2 percent (New York State Department of Health, 2019b).

Environmental factors that contribute to obesity are lack of quality of sidewalks, unsafe bike trails, and poor lack of health care (Centers for Disease Control and Prevention, 2017a). Living in poverty and having lower educational levels are factors linked to obesity (Newman, 2009). A survey distributed by AARP New York was conducted to analyze the safety and quality

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of streets and sidewalks throughout the state (AARP, n.d.). The findings were 47% of intersections and sidewalks were rated fair, 27% were rated good, and 24% were rated poor. Volunteer survey takers also found that sidewalks were frequently cracked or broken and often blocked off by objects or obstacles making walking difficult (AARP, n.d.).

After analyzing and counting the amount of bike suitability paths/roads in Onondaga County from a map, there are an estimated 21 bike trails that were rated poor (SMTC, 2019). Compared to the amount of bike trails that were rated poor, there were only 10 bike trails rated excellent (SMTC, 2019). There are more than double the amount of bike trails in Onondaga County that are not suitable for bikes than there are trails suitable for bikes.

Access to services and health care can be analyzed as one social determinant of health and as a contributor to obesity. The percentage of adults who did not received health care in 2016 due to medical costs was 11.5 percent (New York State Department of Health, 2019c). In Onondaga County the percentage who did not receive health care due to medical costs was 7.7 percent. The food insecurity percentage in New York State was 12.6% of the population. This means that 12.6% of New York State adults did not have access to a reliable source of food. (New York State Department of Health, 2019c).

Genes play a role in energy balance (Centers for Disease Control and Prevention, 2013). Genes are directly responsible for regulating food intake by providing the signals and responses received from adipose tissue, the digestive tract, and the pancreas. Causes in obesity among the older population age group, specifically in adults aged 50-65 years, are corelated to aging and the body not being able to use as much energy (Newman, 2009). Body fat tends to accumulate as people age due to hormonal changes (Newman, 2009). Some of the genes associated with obesity

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are ADIPOQ, FTO, LEPR, MC4R, and PPARG. All these genes are responsible for the regulation and response of either food or energy which leads to obesity (Centers for Disease Control and Prevention, 2013).

Intervention Priorities

In 2016, economic costs of chronic diseases due to obesity in the United States accounted for 1.72 trillion dollars (Waters & Graf, 2018). One example of the cost of the chronic disease that obesity directly contributed to in 2016 was type 2 diabetes, costing the United States more than 120 million dollars (Waters & Graf, 2018).

The research for obesity among adults aged 50 years and older will focus on the behavior factors of poor nutrition. According to the New York State Prevention Agenda of 2019-2024, their first focus area is healthy eating and food security (New York State Department of Health, 2019f). Their goals for achieving healthy eating are increasing access to healthy foods and beverages, increasing skills and knowledge that support healthy food choices, and increasing food security. One objective the Health Department strives to accomplish by December 31, 2024 is to decrease the percentage of all adults who consume less than one fruit and less than one vegetable a day (New York State Department of Health, 2019f).

One environmental factor that the research on obesity will focus on is community accessibility for physical activity. The New York State's Prevention Agenda of 2019-2024 second focus area is physical activity (New York State Department of Health, 2019f). One goal of this focus area is to improve community environments that support physical activity for all ages. Two objectives the Health Department strives to accomplish by December 31, 2024 is to increase the percentage of all adults who participate in leisure time physical activity and to

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increase the percentage of all adults who walk or bike to get from one place to another (New York State Department of Health, 2019f).

Healthy People (HP) 2020 also states a goal to promote health by consuming healthy foods (2019b). HP 2020 strives to get American's to consume more whole grains, vegetables, low-fat or fat-free milk, eat lean meats, and find other protein sources while working on decreasing sodium, added sugar, and saturated fat intake. One objective for reaching this goal is to increase the total consumption of vegetables consumed by people aged two years and older (Healthy People 2020, 2019b).

HP 2020 also states objectives towards increasing physical activity through environmental controls (Healthy People 2020, 2019c). One objective is to increase legislative policies for environments that enhance access to physical activity (Healthy People 2020, 2019c).

Research in this paper will focus primarily on improving nutrition in older adults aged 50 years old and older as well as improving environmental factors that lead to obesity.

Phase 3: Educational and Ecological Assessment

Obesity among older adults is a harmful health issue that the nation has been facing for the previous six years (America's Health Rankings, 2019). Causes of obesity have been linked to a poor diet and a lack of physical activity (New York State Department of Health, 2019b). In order to implement a successful health program to combat the obesity epidemic, one must follow theories and models for developing effective programs. The Precede-Proceed Model is one of the most comprehensive models that help in the design of an effective approach to improve health and quality of life (Hodes & Videto, 2011). Three categories of behavioral and environmental factors within the model consist of predisposing, reinforcing, and enabling. This phase will focus on the poor nutritional behaviors of individuals aged 50 years old and older and the environmental factor of community accessibility for outdoor physical activity.

Predisposing Factors for Behavior-Poor Nutrition

Predisposing factors include knowledge, attitudes, beliefs, values, and confidence/self-efficacy that exist prior to the start of the individual's health behavior (Community Toolbox, 2019; Hodges & Videto, 2011). A study conducted by Jeruszka-Bielak, et al., (2018) concluded that nutrition related knowledge decreases as age increases. It was also stated that a higher educational attainment is linked to better nutritional awareness in the older population. As stated in Phase 2, obesity is more prevalent in people who did not graduate from high school (New York State Department of Health, 2019a). According to data from the New York State Department of Health (2019a) 33.3% of the New York State population are obese and do not hold a high school diploma. Participants who reported having high knowledge on nutrition were associated with a lower BMI and participants who reported having low knowledge on nutrition

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were associated with a higher BMI (Jeruszka-Bielak et al, 2018). Understanding the terminology associated with quality nutrition is an important indicator when someone is choosing what foods to consume (Jeruszka-Bielak et al, 2018).

Jeruszka-Bielak, et al., (2018) provided information on not only the elderly's knowledge, but on attitudes and perceptions as well. Research shows that having a more positive attitude towards health and eating was associated with a lower BMI among adults aged 56-70 years. An increased appetite was also associated with a more positive attitude towards healthy eating and nutrition. The basic food selection factors include smell, taste, color, and food consistency. With focus on the older population, these factors tend to decrease with age, further contributing to a loss of appetite and negative attitudes toward nutrition. Jeruszka-Bielak, et al., (2018) suggested that nutrition related attitudes were strongly correlated with an individual's eating habits more than nutrition related knowledge was.

Beliefs was another topic discussed when identifying the causes of poor nutrition (Reddy & Anitha, 2015). Food habits may exist because of cultural reasons and cannot be easily changed. Culture is a combination of shared values, attitudes, habits, and customs experienced at a young age during early childhood. One example includes the Mexican Indian strong cultural beliefs in consuming corn over more nutritious plants. Another example indicates that parts of the Middle Eastern and European regions where vegetables are not refrigerated nor preserved result in vegetable consumption being only seasonal (Reddy & Anitha, 2015). Both practices would not be considered a healthy diet according to the U.S. Department of Agriculture (USDA) 2015-2020 Dietary Guidelines. The USDA Dietary Guidelines suggest a daily diet composed of a variety of vegetables, fruits, whole grains, low-fat dairy, and a variety of animal and plant-based proteins (2015).

Reinforcing Factors for Behavior- Poor Nutrition

Reinforcing factors can include influences by others who may negatively or positively contribute to the individual's health behavior (Community Toolbox, 2019). Reinforcing factors include social, physical, emotional, and economic rewards contributing to the current behavior (Hodges & Videto, 2011). Growing old is viewed as a negative part of life in American society. A study conducted by Villiers-Tuthill, Copley, and McGee (2016) describes the social norm to engage in drinking alcohol among older adults coping with negative feelings.

Alcohol consumption in older adults is a behavior that relates to poor nutrition. This behavior contributes to the negative reinforcement factor through social norms influenced by others. Villiers-Tuthill's, et al., (2016) study revealed that social drinking is the most common coping technique among adults aged 50 years and older. Social norms can form an individual's experience within the ageing process but does allow for change over time.

According to the USDA (2015), the key recommendations for consuming alcohol is suggested that women consume up to one drink per day and men consume up to two drinks per day. Based on the study by Villiers-Tuthill, et al., (2016) 13.8% of participants do not abide by the USDA recommendation. Although American society views ageing negatively and people tend to cope on their own terms, changing this behavior is possible. Villiers-Tuthill, et al., (2016) suggests forming an intervention that will change the social norm of drinking alcohol to cope with ageing. It has been proven that older adults with more positive views on ageing practice better preventive health behaviors such as eating a balanced diet, engaging in exercise, and following directions for taking prescribed medications (Villiers-Tuthill et al, 2016).

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Villiers-Tuthill's, et al., (2016) study revealed that older adults believe alcohol plays a positive role in affecting emotions and mood. These results suggest that older adults with perceptions of positive drinking norms among friends and family are more likely to report harmful drinking patterns. Older adults are also concerned about the quality of their social lives which influences their decisions to engage in social drinking as many social outings take place where alcohol is served (Villiers-Tuthill et al, 2016).

Other than social norms, family influence is another reinforcing factor for poor nutrition (Scagnoli, Cosmi, and Ciappolino, 2018). Scaglioni, Cosmi, and Ciappolino conducted a study to examine the relationship between parental and family influence on children's eating habits. Evidence has concluded that poor eating habits are established during early childhood and carried on into adulthood. Younger children are more susceptible to model their parents eating behaviors, so if a parent mostly eats unhealthy fast food, convenience foods, and soft drinks then their child will develop similar eating habits. Family meals also show evidence in the development of poor eating patterns and food choices (Scagnoli et al, 2018).

The overall setting of family meals has effects on food choices (Scagnoli et al, 2018). Adolescents and children who do not join in family meals consume more unhealthy food as most parents who have the time to prepare their own meals show greater consumption of fruits, vegetables, and calcium rich foods. During family meals, the influences of the nutrient quality, the amount of food intake, and any observed eating disorders exist among all age groups. Parental and family influence are strong factors that are shown to affect the quality of nutrition in children that continue the same behaviors later in life (Scagnoli et al, 2018).

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Enabling Factors for Behavior-Poor Nutrition

Enabling factors consist of internal and external conditions that relate to the health issue (Community Toolbox, 2019). Factors include availability of resources, accessibility of resources, laws or policies, and an individual's level of skill (Community Toolbox, 2019). Producing healthy meals requires individual skills, money, and resources such as transportation, time, and access to food (Institute of Medicine & National Research Council, 2013).

A study conducted by McGowan, Pot, and Stephen (2016) showed that greater cooking skills have been indirectly associated with a more nutritious diet. Greater cooking skills were found most notable in relation to a reduction of consumed saturated fats and a higher intake of fiber. Other studies have also indicated that greater cooking skills are associated with a diet low in processed foods (Tailie, 2018). Home prepared meals have been linked to an overall healthier diet (Tailie, 2018). Interventions to increase cooking skills have been implemented numerous times in the past. McGowan, et al., (2016) suggests forming an intervention prioritizing sub-groups within a population which would make the intervention even more effective. Tailie (2018) also concluded that interventions on improving cooking skills have been proven effective to increase cooking confidence, frequency, and consumption of fruits and vegetables.

The increased cost of healthy foods is another variable indirectly contributing to poor nutrition (Rao, Afshin, Singh, & Mozaffarian, 2013). It costs an average \$1.50 more per day, or over \$550 annually, to consume a healthier, balanced diet. A healthy diet is key to preventing chronic diseases such as obesity, but there comes an unfair disadvantage to the people who do not have the means to do so. The price difference between protein sources and meats, specifically chicken, showed the largest difference between unhealthy and healthy options. The

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healthier chicken options were on average, \$0.30 more per serving than the less healthy chicken options. Diets rich in fruits, vegetables, fish, and nuts were concluded more expensive than diets rich in processed foods, meats, and refined grains. It was stated that a goal of public health should be to lower the cost on healthy food options (Rao et al, 2013).

Lack of access for transportation is another factor that can affect food choices (Institute of Medicine & National Research Council, 2013). When personal transportation is unavailable, people must rely on others. Lacking transportation disproportionately affects low income families more versus middle and high income families. A study revealed that 28 low income families in rural, village, and inner-city settings relied on social networks for transportation for food shopping. Not having personal transportation limits access to healthy food with regards to how far someone would have to drive to obtain the healthy and affordable foods (Institute of Medicine & National Research Council, 2013). Disparities among low income black neighborhoods exist when finding the transportation to shop for healthy foods (Healthy People 2020, 2019a). On average, those neighborhoods travel an additional 1.1 miles farther to supermarkets than white low income neighborhoods. Disparities for transportation exist even higher among older adults living in rural settings (Healthy People 2020, 2019a).

Lack of time can largely contribute to poor nutrition (Institute of Medicine & National Research Council, 2013). To produce a healthy meal, it takes time to go shopping, time for preparation, time for eating, and time for cleanup. Low income households with adults who work full time reported having the most difficulty in finding the time to cook healthy meals. Availability of time has also been shown to affect the choice between eating commercially prepared foods or home prepared foods. A person's choice between the two can affect the

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nutritional quality of the desired food consumed (Institute of Medicine & National Research Council, 2013).

Access to healthy food is an important factor in determining one's nutrition status (Healthy People 2020, 2019a). Living in a food desert limits access to fresh fruit, vegetables, and other healthy whole foods due to a lack in close grocery stores or farmers markets (Gallagher, 2019). Food deserts are mainly found in low income neighborhoods that are more likely to consist of a food supply of processed, sugary, and high fat foods from convenient stores (Gallagher, 2019; Healthy People 2020, 2019a). According to a USDA study, 23 million Americans live in a food desert where the nearest grocery store is more than one mile away (Let's Move, 2010). Multiple studies have found that people living in low income and rural settings are far more impacted to choose less healthy options due to their supply of quick conveniences stores that supply the processed, sugary, and high fat foods (Gallagher, 2019; Healthy People 2020, 2019a).

A strong relationship between disparities in access to foods and obesity was found based on multiple studies (Institute of Medicine & National Research Council, 2013). People who live farther from large grocery stores have an increased risk for developing obesity based on a review from 54 studies. People who have access to large grocery stores were found to have the lowest rates of obesity. Benefits of living in a neighborhood with access to healthy foods has been shown to positively affect health (Institute of Medicine & National Research Council, 2013).

Enabling Factors for Environment-Accessibility for Outdoor Physical Activity

Enabling factors for a lack of opportunities for outdoor physical activity consist primarily of barriers involving accessibility (National Recreation and Park Association, 2019).

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Governments and organizations play an important role in the encouragement of outdoor physical activity, yet many Americans still do not engage in the activity. Lacking accessibility to engage in outdoor physical activity is a main factor for why people do not exercise (National Recreation and Park Association, 2019).

In 2015, 43% of New York residents and 37% of Onondaga County residents did not live within a half mile to a park (National Environmental Public Health Tracking Network, 2015). Research shows that the closer someone lives to a park the more likely they are to get there by foot or bike, which in turn reduces chronic disease rates such as obesity. Not having access to close parks creates a barrier for outdoor physical activity (National Environmental Public Health Tracking Network, 2015).

Studies have been conducted concluding that the reason for a lack in outdoor physical activity was because of environmental influences (University of Washington, 2018). The research found that people view trees and nature as an important element to being physical active outside. A five-year study among older adults found that having access to parks with trees was a strong motivator in engaging in outdoor physical activity. Green space elements are important to public health as they create an appealing aesthetic to people influencing their behavior to improve health (University of Washington, 2018).

Other enabling factors for choosing not to engage in physical activity are not enough time, not knowing how to be active, and the weather (BetterHealth, 2018). Lacking the energy after work to engage in physical activity is another common barrier as to why people do not exercise (Mayo Clinic, 2019). Out of all these described factors, lacking close accessibility to a

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public park is an important factor in understanding why individuals do not engage in outdoor physical activity.

Priority Predisposing, Reinforcing, and Enabling Factors

This intervention will focus on one predisposing factor and one reinforcing factor contributing towards poor nutrition. The intervention will also focus on one enabling factor contributing towards a lack in outdoor physical activity among older adults. The predisposing factor addressed will be on nutritional knowledge, the reinforcing factor addressed will be on changing social norms regarding drinking excess alcohol, and the enabling factor will be on accessibility to public parks.

Theories and Models

Theories and/or models help planners guide their intervention to meet their program goals (Hodges & Videto, 2011). Theories give planners an understanding of an individual's behavior so they then can create strategies that best reach the population (Rimer, Glanz, & National Cancer Institute (U.S.), 2005). Nutritional knowledge, social norms regarding drinking excess alcohol, and accessibility to public parks fall into constructs from the Social Cognitive Theory. Social Cognitive Theory describes personal factors, environmental factors, and influences of human behavior (Rimer et al, 2005).

Nutritional knowledge falls into the behavioral capability construct (Rimer et al, 2005). Behavioral capability is the knowledge and skill it takes to perform a certain behavior. To perform a behavior, a person must know how to do it. By increasing nutritional knowledge, someone can then learn how to change their diet to a more nutrient dense one. Social norms regarding drinking excess alcohol falls into the reinforcements construct. In this situation,

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reinforcements are the responses to a person's behavior that increase the likelihood of reoccurrence. Accessibility to public parks falls into the reciprocal determinism construct. Reciprocal determinism are the influences between a person, behavior, and the environment (Rimer et al, 2005).

Program Mission Statement, Goal, and Objectives

To form an intervention or health program, a mission statement, its goals, and objectives must be developed (Hodges & Videto, 2011). Like theory, developing these key attributes will help guide and direct the health program. This intervention will reflect its mission statement, goals, and objectives, off the Social Cognitive Theory.

Mission Statement: Our focus is to improve the health and quality of life among older adults aged 50 years old and older living in Onondaga County. By improving healthy diet patterns and increasing accessibility to outdoor physical activity, the rates of obesity will likely decrease.

Program Goal: To decrease the rate of obesity among older adults aged 50 years old and older living in Onondaga County.

Program Objective for Behavior: By 2025, 40% of program participants will eat a daily balanced diet containing a variety of fruits, vegetables, whole grains, low-fat dairy, and a variety of animal and plant-based proteins.

Program Objective for Environment: By 2025, the percentage of older adults aged 50 years old and older living in Onondaga County who have access to public parks will increase by 10 percent.

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Process Objective for Predisposing Factor: By 2023, 80% of program participants will understand nutritional terminology (Social Cognitive Theory, behavioral capability).

Process Objective for Reinforcing Factor: By 2021, 95% of older adults aged 50 years old and older living in Onondaga County will have received an infographic through mail explaining the harmful effects of drinking excess alcohol in social settings (Social Cognitive Theory, reinforcements).

Process Objective for Enabling Factor: By 2024, contracts for the development of three additional public parks in three different low income neighborhoods in Onondaga County will be signed (Social Cognitive Theory, reciprocal determinism).

Phases 4 Through 8: Administration, Implementation, and Evaluation

Intervention Description

The *Live Right* program will be five years long and reflect ideas from the National Institute of Food and Agriculture's Expanded Food and Nutrition Education Program (2017) and recommendations from the Community Preventive Services Task Force (2016) for the built environment. *Live Right* will consist of 12 face-to-face workshops with program participants once a month for the first year focusing on nutrition education (National Institute of Food and Agriculture, 2017). *Live Right* will also focus on building environmental elements that encourage physical activity among the elderly (Community Preventive Services Task Force, 2016). Program participants will be recruited through newspaper advertisements, printed posters, pamphlets, and social media (Fujihira, Kubacki & Ronto, 2015).

Live Right will assess the participants knowledge on nutrition by administering questionnaires during the first workshop and follow-up with the same questionnaire one year after (National Institute of Food and Agriculture, 2017). Program educators will teach program participants in a group setting what a balanced diet consists of, how to substitute alcohol with healthier beverages, how to read nutrition labels, and nutrition-related terminology. Program educators will also provide interactive lessons where participants are encouraged to engage in outdoor physical activity. This actively engaging aspect of *Live Right* will increase the participants' capabilities and skills to choose healthier meal options and to increase exercise levels (National Institute of Food and Agriculture, 2017). Collaboration with community partners helps to increase program participation and strengthens support systems. *Live Right* will also

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partner with ACR Health’s Nutrition Health Education and Food and Meal services program (2019).

The Community Preventive Services Task Force (2016) suggests combining environmental approaches with an intervention to increase physical activity. *Live Right* program educators will work with county legislatures to agree on the development of new public parks. The plan will include the development of three additional public parks in three different low income neighborhoods in Onondaga County to encourage outdoor physical activity. These parks will have paved trails built on a flat terrain in order to accommodate older adults. With combined efforts of nutrition education and environmental encouragement, *Live Right* is expected to change behaviors and reduce obesity rates among older adults aged 50 years old and older living in Onondaga County (Community Preventive Services Task Force, 2016).

Evaluation Plan

Evaluation plans include the implementation process, effectiveness, efficiency, and costs to ensure that the program was appropriate for the priority population (Hodges & Videto, 2011). This evaluation plan will assist in determining if the program will be effective in decreasing obesity rates among older adults aged 50 years old and older living in Onondaga County.

Evaluation Question	Information Needed	From Whom	How Collected	When Collected	Type of Data	Analysis
Process Evaluation Question for Predisposing Factor: Did 80% of program participants understand the	Scores from the knowledge questionnaires	Program participants	Paper questionnaires	2021	Quantitative	Frequencies

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nutritional terminology?						
Process Evaluation Question for Reinforcing Factor: Did 95% of older adults in Onondaga County receive an infographic through mail explaining the harmful effects of drinking excess alcohol?	Percentage who received the infographic	Program educators	Phone survey	2021	Quantitative	Frequencies
Process Evaluation Question for Enabling Factor: Were three contracts for the development of three additional public parks in three different low income neighborhoods in Onondaga County signed?	Number of contracts signed	County facilitators	Collecting the contracts	2024	Quantitative	Frequencies
Impact Evaluation Question for Behavior: Did 40% of program participants eat a daily balanced diet containing a variety of fruits, vegetables, whole grains, low-fat dairy, and a variety of animal and	The percent of program participants who ate a daily balanced diet	Program participants	2017 Behavioral Risk Factor Surveillance System on nutrition	2025	Quantitative	Frequencies

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plant-based proteins?						
<p>Impact Evaluation Question for Environment:</p> <p>Did the percentage of older adults in Onondaga County who have access to public parks increase by 10 percent?</p>	Percentage of older adults in Onondaga County with access to public parks	Program educators	County tracking system	2025	Quantitative	Frequencies
<p>Outcome Evaluation Question for Program Goal:</p> <p>Did the rates of obesity among older adults aged 50 years old and older living in Onondaga County decrease?</p>	County obesity rates	County or national health departments	Secondary data	2029	Quantitative	Pre and post comparison

Social Marketing

Social marketing is used to influence the behavior of the desired population for the benefit of society (Hodges & Videto, 2011). Three effective social marketing techniques to promote a health intervention among adults aged 60 years old and older are newspaper advertisements, printed posters, and distribution of pamphlets (Fujihira et al, 2015). Creating websites was another strategy described as a promotional effort. By partnering with ACR Health, promotion can occur on the ACR Health website describing *Live Right's* educational workshops. *Live Right's* educational workshops will also be held monthly at the ACR Health office in Syracuse, NY (ACR Health, 2019). Providing snacks at workshops was described as an incentive

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and social advertising technique to encourage behavior change and increase participation (Fujihira et al, 2015).

The price a participant would pay by volunteering in *Live Right* would be time, any physical discomfort associated with the behavior change, energy used to perform certain behaviors, and psychological risks (Fujihira et al, 2015). Barriers that participants may face when changing their diet patterns is the higher cost of healthier foods (Rao et al, 2013). *Live Right* will strategically utilize social marketing techniques that would influence program participants to think about the benefits of changing their behaviors instead of only seeing the price and barriers associated with the behavior change.

Core Product

- Lower risk of developing chronic diseases
- Improving knowledge
- Improving health

Actual Product

- Better nutritional diet and increased access for physical activity

Augmented Products

- Educational workshops
- New public parks

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Price

- Time
- Physical discomfort
- Energy
- Psychological risks

Place

- ACR Health office in Syracuse, NY

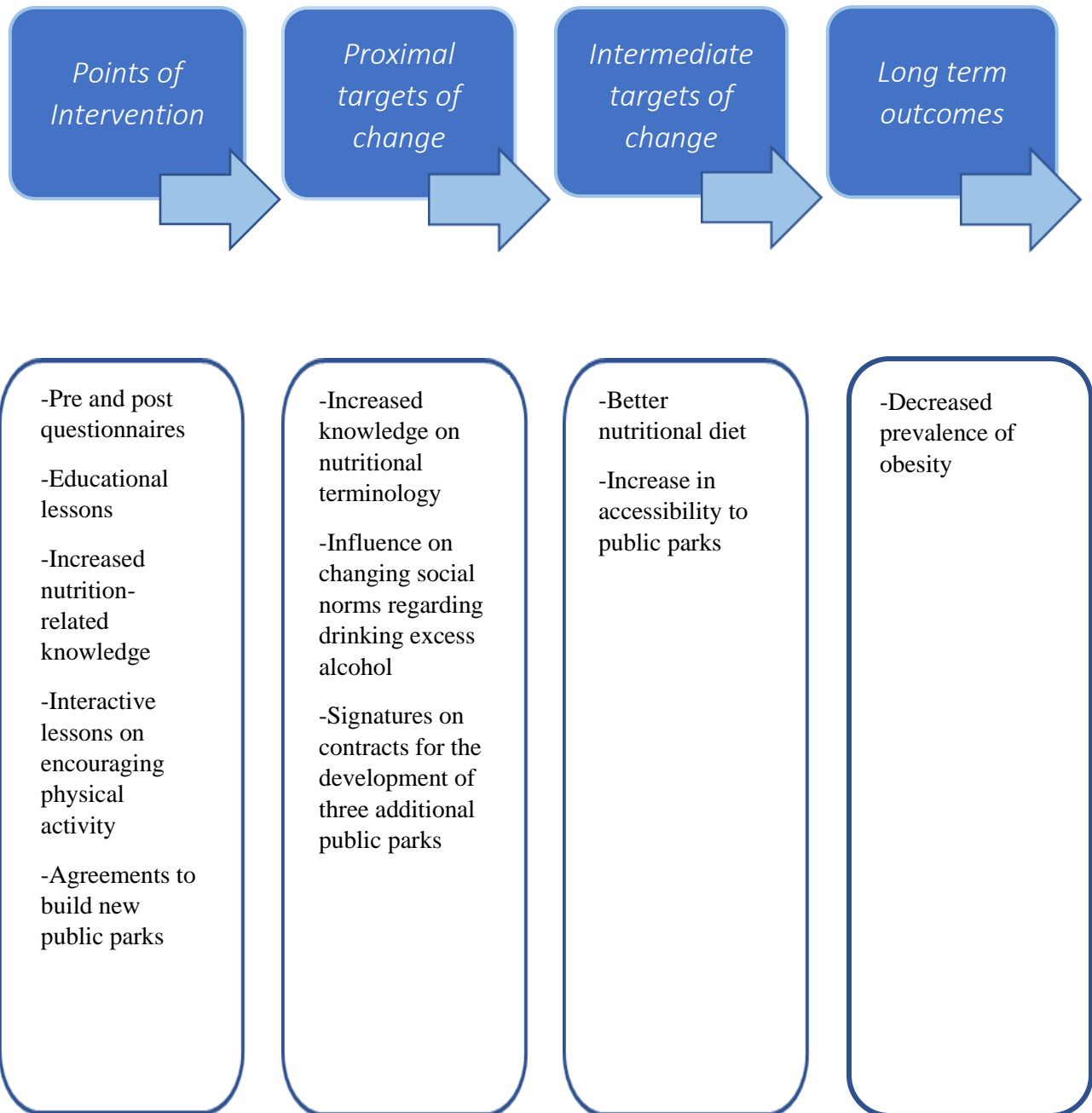
Promotion

- Newspaper advertisements
- Printed posters
- Pamphlets
- Social media
- Snacks

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Logic Model



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Conclusion

Obesity accounted for \$1.72 trillion dollars nationally in 2016 proving that public health efforts must be addressed (Waters & Graf, 2018). Obesity has been proven to be the underlying cause for other chronic diseases such as diabetes, heart disease, stroke, and some types of cancer and is currently the second leading cause of preventable deaths (Centers for Disease Control and Prevention, 2017a; New York State Department of Health, 2019e;). According to the Centers for Disease Control and Prevention (2017a) obesity is one indicator for poor mental health and reduced quality of life. In Onondaga County in 2016 there were 29.1% of residents who had reported poor mental health for at least 14 days (HealtheCNY, 2019b). Since 2013, steady trends in obesity have increased among the older population demanding a need for an intervention (America's Health Rankings, 2019). Obesity rates among the elderly are expected to be reduced with continued efforts of nutrition education and support for increased physical activity through the *Live Right* intervention.

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